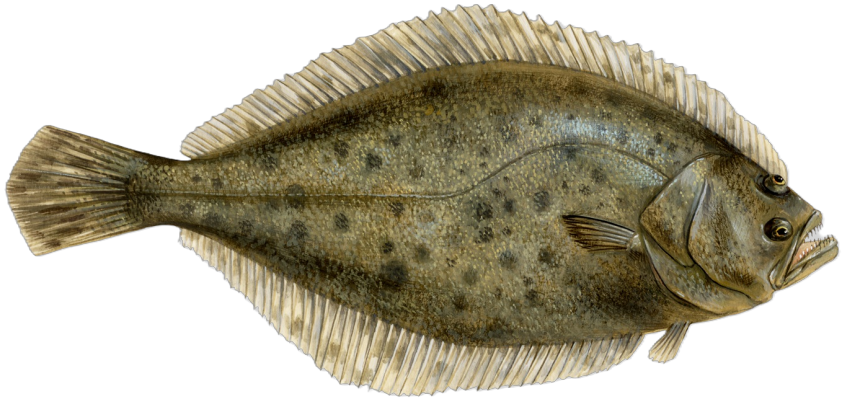
Monterey Bay Aquarium Seafood Watch

Environmental sustainability assessment of wild-caught Summer flounder (*Paralichthys dentatus*) from the United States caught using barriers, fences, weirs, corrals, handlines and hand-operated pole-and-lines, and set gillnets



Species:	Summer flounder (*Paralichthys dentatus*)
Location:	United States: Northwest Atlantic
Gear:	Barriers, fences, weirs, corrals, etc., Handlines and hand-operated pole-and-lines, Set gillnets
Type:	Wild Caught
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Assessed using Seafood Watch Fisheries Standard v2

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About Seafood Watch

Monterey Bay Aquarium's Seafood Watch program evaluates the environmental sustainability of wild-caught and farmed seafood commonly found in the United States marketplace. Seafood Watch defines sustainable seafood as originating from sources, whether wild-caught or farmed, which can maintain or increase production in the long-term without jeopardizing the structure or function of affected ecosystems. The program's goals are to raise awareness of important ocean conservation issues and empower seafood consumers and businesses to make choices for healthy oceans.

Seafood Watch's science-based ratings are available at www.SeafoodWatch.org. Each rating is supported by a Seafood Watch assessment, in which the fishery or aquaculture operation is evaluated using the Seafood Watch standard.

Seafood Watch standards are built on our guiding principles, which outline the necessary environmental sustainability elements for fisheries and aquaculture operations. The guiding principles differ across standards, reflecting the different impacts of fisheries and aquaculture.

- Seafood rated Best Choice comes from sources that operate in a manner that's consistent with our guiding principles. The seafood is caught or farmed in ways that cause little or no harm to other wildlife or the environment.

- Seafood rated Good Alternative comes from sources that align with most of our guiding principles. However, one issue needs substantial improvement, or there's significant uncertainty about the impacts on wildlife or the environment.

- Seafood rated Avoid comes from sources that don't align with our guiding principles. The seafood is caught or farmed in ways that have a high risk of causing harm to wildlife or the environment. There's a critical conservation concern or many issues need substantial improvement.

Each assessment follows an eight-step process, which prioritizes rigor, impartiality, transparency and accessibility. They are conducted by Seafood Watch scientists, in collaboration with scientific, government, industry and conservation experts and are open for public comment prior to publication. Conditions in wild capture fisheries and aquaculture operations can change over time; as such assessments and ratings are updated regularly to reflect current practice.

More information on Seafood Watch guiding principles, standards, assessments and ratings are available at www.SeafoodWatch.org.

Guiding Principles

Seafood Watch defines sustainable seafood as originating from sources, whether fished[1] or farmed, that can maintain or increase production in the long term without jeopardizing the structure or function of affected ecosystems.

The following guiding principles illustrate the qualities that fisheries must possess to be considered sustainable by the Seafood Watch program (these are explained further in the Seafood Watch Standard for Fisheries):

- Follow the principles of ecosystem-based fisheries management.
- Ensure all affected stocks are healthy and abundant.
- Fish all affected stocks at sustainable levels.
- Minimize bycatch.
- Have no more than a negligible impact on any threatened, endangered, or protected species.
- Managed to sustain the long-term productivity of all affected species.
- Avoid negative impacts on the structure, function, or associated biota of aquatic habitats where fishing occurs.
- Maintain the trophic role of all aquatic life.
- Do not result in harmful ecological changes such as reduction of dependent predator populations, trophic cascades, or phase shifts.
- Ensure that any enhancement activities and fishing activities on enhanced stocks do not negatively affect the diversity, abundance, productivity, or genetic integrity of wild stocks.

These guiding principles are operationalized in the four criteria in this standard.Each criterion includes:

- Factors to evaluate and score
- Guidelines for integrating these factors to produce a numerical score and rating

Once a rating has been assigned to each criterion, Seafood Watch develops an overall recommendation. Criteria ratings and the overall recommendation are color coded to correspond to the categories on the Seafood Watch pocket guides and online guide:

Best Choice/Green: Buy first; they're well managed and caught or farmed responsibly.

Good Alternative/Yellow: Buy, but be aware there are concerns with how they're caught, farmed or managed.

Avoid/Red: Take a pass on these for now; they're caught or farmed in ways that harm other marine life or the environment.

[1] "Fish" is used throughout this document to refer to finfish, shellfish and other invertebrates

Summary

Summer flounder (*Paralichthys dentatus*), commonly known as fluke, is a bottom-dwelling, left-eyed flatfish found in the Northwest Atlantic Ocean from Maine to Florida. It is most abundant in the Mid-Atlantic Bight from Cape Cod, Massachusetts to Cape Hatteras, North Carolina. This report assesses the sustainability of U.S. summer flounder caught with handlines, trap nets (e.g., pound nets and weirs), and gillnets in the Middle Atlantic Region (New York to Virginia). These fishing methods contribute to a low proportion of the total catch. Most summer flounder are caught in bottom trawl fisheries, which have been assessed in a separate report.

The abundance of summer flounder was low in the 1980s and 1990s, but the population has since increased. The most recent assessment update indicated that summer flounder is not overfished and overfishing is not occurring.

The gillnet, trap net, and handline fisheries that catch summer flounder are typically mixed-species fisheries. By-catch in these fisheries varies by gear type. The handline fisheries catch few nontarget species. In the trap net fisheries, there is some concern about incidental catches of coastal bottlenose dolphin. The gillnet fisheries incidentally have the potential to catch several endangered, threatened, or protected (ETP) species, including North Atlantic right whale, Atlantic sturgeon, and sea turtles. Management measures are in place to reduce the by-catch of these vulnerable species; however, the Atlantic Large Whale Take Reduction Plan (ALWTRP) has failed to reduce the impact of U.S. fisheries to below the potential biological removal (PBR) for North Atlantic right whale.

The handline fisheries have a minimal impact on bottom habitats, while trap nets and bottom gillnets have a low to moderate impact on the sandy/muddy habitats where summer flounder is found.

Overall, because of concerns about the by-catch of vulnerable ocean wildlife, the trap net and gillnet fisheries are rated Yellow, or Good Alternative. The handline fishery is rated Green, or Best Choice.

Final Seafood Recommendations

SPECIES | FISHERY	CRITERION 1 TARGET SPECIES	CRITERION 2 OTHER SPECIES	CRITERION 3 MANAGEMENT	CRITERION 4 HABITAT	OVERALL RECOMMENDATION
Summer flounder | Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	4.472	2.159	3.464	3.122	**Good Alternative (3.197)**
Summer flounder | Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	4.472	2.709	3.464	3.464	**Best Choice (3.472)**
Summer flounder | Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	4.472	0.950	1.732	3.122	**Avoid (2.189)**

Summary

Handline fisheries for summer flounder from New York to Virginia in the U.S. are rated a Best Choice; summer flounder populations are healthy and well-managed. Barriers, fences, and weirs are rated a Good Alternative, because there are some concerns over interactions with bottlenose dolphin. Summer flounder caught with set gillnets are considered an Avoid, because of the potential impact on North Atlantic right whale and the failure of the Atlantic Large Whale Take Reduction Plan to effectively reduce the impact of fisheries on this critically endangered species.

Scoring Guide

Scores range from zero to five where zero indicates very poor performance and five indicates the fishing operations have no significant impact.

Final Score = geometric mean of the four Scores (Criterion 1, Criterion 2, Criterion 3, Criterion 4).

Best Choice/Green = Final Score >3.2, and no Red Criteria, and no Critical scores

Good Alternative/Yellow = Final score >2.2-3.2, and neither Harvest Strategy (Factor 3.1) nor Bycatch Management Strategy (Factor 3.2) are Very High Concern2, and no more than one Red Criterion, and no Critical scores

Avoid/Red = Final Score ≤2.2, or either Harvest Strategy (Factor 3.1) or Bycatch Management Strategy (Factor 3.2) is Very High Concern or two or more Red Criteria, or one or more Critical scores.

[2] Because effective management is an essential component of sustainable fisheries, Seafood Watch issues an Avoid recommendation for any fishery scored as a Very High Concern for either factor under Management (Criterion 3).

Introduction

Scope of the analysis and ensuing recommendation

This report assesses the sustainability of summer flounder caught with gillnets, trap nets (e.g., pound nets and weirs), and handlines along the East Coast of the United States from New York to Virginia. Summer flounder caught with bottom trawls has been assessed in a separate report.

Species Overview

Summer flounder (*Paralichthys dentatus*), or fluke, is a left-eyed, bottom-dwelling flatfish (URI 1998). It is found from Maine to Florida in the United States (Packer et al. 1999). It is sometimes found as far north as Nova Scotia, Canada, although rarely (Froese and Pauly 2014). It is most abundant in the Mid-Atlantic Bight from Cape Cod, Massachusetts to Cape Hatteras, North Carolina. Summer flounder undergoes seasonal migrations, and can be found inshore during the spring and summer and offshore during the fall and winter (Packer et al. 1999). In offshore waters, it is found at depths to 150 meters (Packer et al. 1999). Summer flounder is typically found on soft-bottom habitats, such as sand, silt, or mud (Packer et al. 1999). Male summer flounder reach a maximum size of 61 cm in length and can live to 7 years. Females can reach 82 to 94 cm in length and can live to 12 years (Collette and Klein-MacPhee 2002).

Summer flounder in the United States has been jointly managed by the Atlantic States Marine Fisheries Commission (ASMFC) and the Mid-Atlantic Fishery Management Council (MAFMC) since 1988. The species is managed as a single population from the United States/Canada border to the southern border of North Carolina (MAFMC 2014d). Since 1993, managers have set annual catch limits for summer flounder. The catch limit is divided 60/40 between the commercial and recreational fisheries, respectively (ASMFC 2015e).

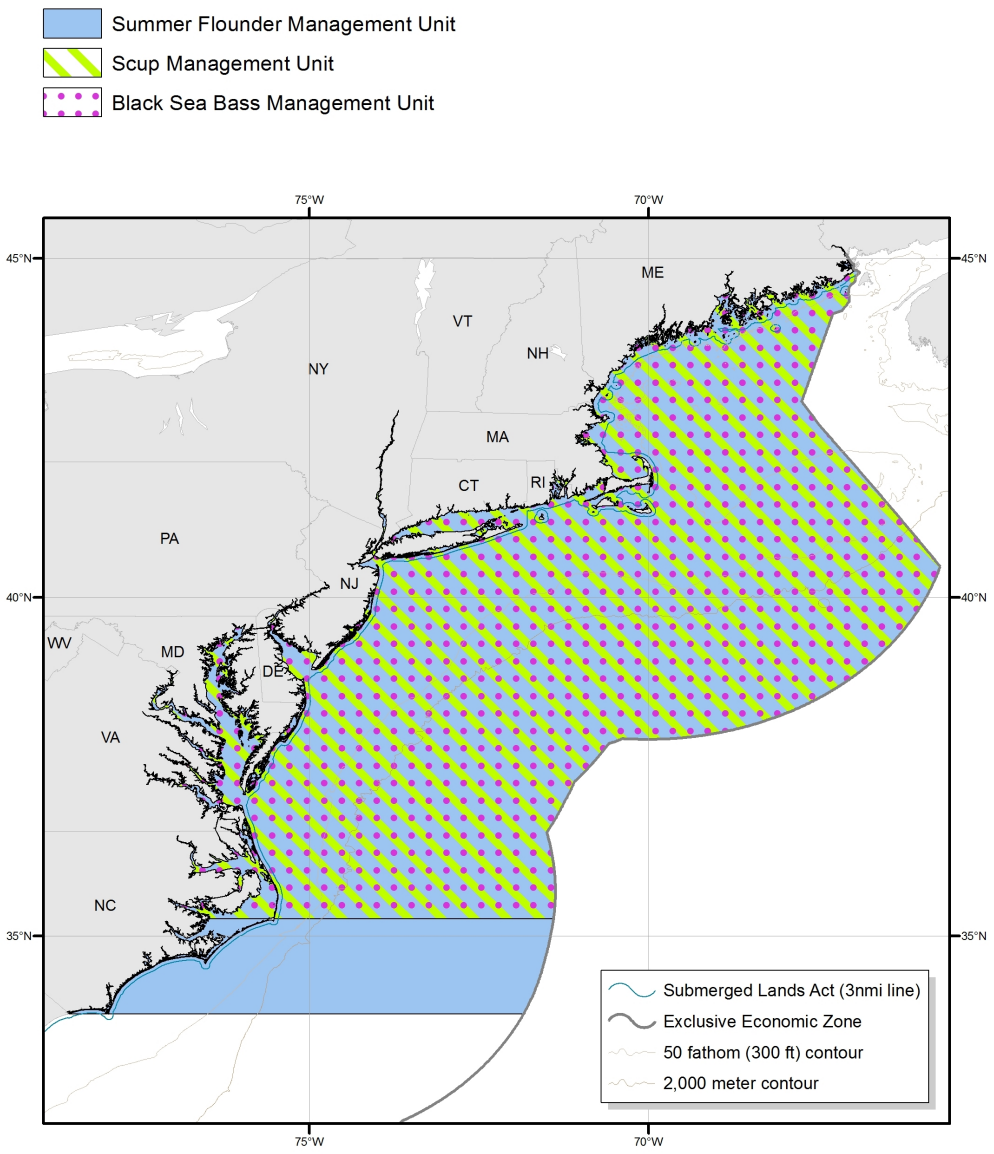

Figure 1: Management unit of summer flounder (*Paralichthys dentatus*) from Maine to North Carolina. Image from NOAA Fisheries Greater Atlantic Region.

Production Statistics

Summer flounder along the East Coast of the United States supports both a commercial and recreational fishery. In 1983, total landings (commercial and recreational) hit a peak of 26,000 metric tons (mt) (57 million lbs) (NEFSC 2013b). From the late 1980s to the early 1990s, total landings dropped dramatically, and have since remained relatively stable (Figure 2) (ASMFC 2015e). In 2014, total commercial landings of summer flounder were 4,900 mt (10.9 million lbs). North Carolina landed the most summer flounder, followed by Rhode Island, Virginia, New Jersey, New York, and Massachusetts. In 2014, recreational landings of summer flounder were 3,350 mt (7.4 million lbs), with New Jersey and New York accounting

for most of the recreational catch (MAFMC 2015b).

In the commercial fishery, bottom trawls are the most commonly used gear to catch summer flounder (Rootes-Murdy 2014). Small amounts of summer flounder are caught in coastal waters with gillnets, pound nets, weirs, and handlines. In 2014, bottom trawls accounted for 96% of summer flounder landings, while handlines, gillnets, pound nets, and weirs each contributed to 1% or less of the landings (MAFMC 2015b). Some summer flounder are also caught as by-catch in dredge, trap, and pot fisheries (NOAA 2015a). In 2014, states that used gillnets and handlines to catch summer flounder included Connecticut, Delaware, Massachusetts, New Jersey, New York, North Carolina, Rhode Island, and Virginia. States that caught summer flounder using pounds nets or weirs included Maryland, New Jersey, New York, Rhode Island, and Virginia (NOAA 2015a).

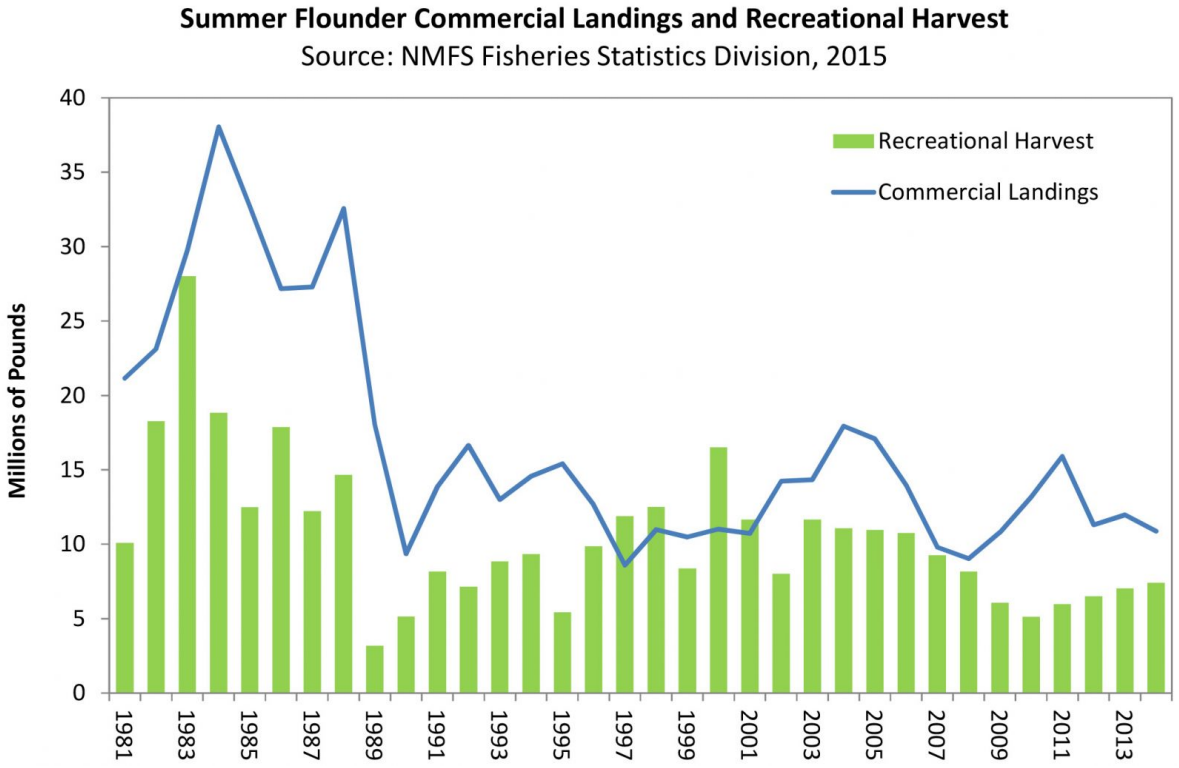

Figure 2: Commercial landings and recreational harvest of summer flounder in millions of pounds. Image from ASMFC: summer flounder profile.

Importance to the US/North American market.

Summer flounder is solely caught in the United States. In 2014, summer flounder commercial landings totaled 4,900 mt (10.9 million lbs). The summer flounder fishery is the largest flatfish fishery on the U.S. Atlantic coast. U.S. landings of Atlantic flounders (summer, winter, witch, and yellowtail) totaled 9,300 mt in 2014. In addition, 50,800 mt of arrowtooth flounder were landed by the U.S. on the Pacific coast (NOAA 2015c).

The National Marine Fisheries Service reports imports and exports of all flounder species together. In 2014, the U.S. imported 12,500 mt of flounder, the majority of which was from China (NOAA 2015b). There are no reported exports of flounders.

Common and market names.

Summer flounder is commonly marketed as fluke, flounder, northern fluke, and hirame (sushi or sashimi) (NOAA FishWatch 2014).

Primary product forms

Summer flounder is usually found fresh or frozen, either whole or as fillets, and is commonly used raw for sushi or sashimi (Froese and Pauly 2014)(NOAA FishWatch 2014).

Assessment

This section assesses the sustainability of the fishery(s) relative to the Seafood Watch Standard for Fisheries, available at www.seafoodwatch.org. The specific standard used is referenced on the title page of all Seafood Watch assessments.

Criterion 1: Impacts on the species under assessment

This criterion evaluates the impact of fishing mortality on the species, given its current abundance. The inherent vulnerability to fishing rating influences how abundance is scored, when abundance is unknown.

The final Criterion 1 score is determined by taking the geometric mean of the abundance and fishing mortality scores. The Criterion 1 rating is determined as follows:

- ***Score >3.2=Green or Low Concern***
- ***Score >2.2 and ≤3.2=Yellow or Moderate Concern***
- ***Score ≤2.2 = Red or High Concern***

Rating is Critical if Factor 1.3 (Fishing Mortality) is Critical.

Criterion 1 Summary

SUMMER FLOUNDER				
REGION / METHOD	**INHERENT VULNERABILITY**	**ABUNDANCE**	**FISHING MORTALITY**	**SCORE**
Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	2.000: Medium	4.000: Low Concern	5.000: Very Low Concern	Green (4.472)
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	2.000: Medium	4.000: Low Concern	5.000: Very Low Concern	Green (4.472)
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	2.000: Medium	4.000: Low Concern	5.000: Very Low Concern	Green (4.472)

Criterion 1 Assessments

SCORING GUIDELINES

Factor 1.1 - - Inherent Vulnerability

- *Low—The FishBase vulnerability score for species is 0-35, OR species exhibits life history characteristics that make it resilient to fishing, (e.g., early maturing).*
- *Medium—The FishBase vulnerability score for species is 36-55, OR species exhibits life history characteristics that make it neither particularly vulnerable nor resilient to fishing, (e.g., moderate age at sexual maturity (5-15 years), moderate maximum age (10-25 years), moderate maximum size, and middle of food chain).*

- *High—The FishBase vulnerability score for species is 56-100, OR species exhibits life history characteristics that make is particularly vulnerable to fishing, (e.g., long-lived (>25 years), late maturing (>15 years), low reproduction rate, large body size, and top-predator). Note: The FishBase vulnerability scores is an index of the inherent vulnerability of marine fishes to fishing based on life history parameters: maximum length, age at first maturity, longevity, growth rate, natural mortality rate, fecundity, spatial behaviors (e.g., schooling, aggregating for breeding, or consistently returning to the same sites for feeding or reproduction) and geographic range.*

Factor 1.2 - Abundance

- *5 (Very Low Concern)—Strong evidence exists that the population is above target abundance level (e.g., biomass at maximum sustainable yield, BMSY) or near virgin biomass.*
- *4 (Low Concern)—Population may be below target abundance level, but it is considered not overfished*
- *3 (Moderate Concern) —Abundance level is unknown and the species has a low or medium inherent vulnerability to fishing.*
- *2 (High Concern)—Population is overfished, depleted, or a species of concern, OR abundance is unknown and the species has a high inherent vulnerability to fishing.*
- *1 (Very High Concern)—Population is listed as threatened or endangered.*

Factor 1.3 - Fishing Mortality

- *5 (Very Low Concern)—Highly likely that fishing mortality is below a sustainable level (e.g., below fishing mortality at maximum sustainable yield, FMSY), OR fishery does not target species and its contribution to the mortality of species is negligible (≤ 5% of a sustainable level of fishing mortality).*
- *3.67 (Low Concern)—Probable (>50%) chance that fishing mortality is at or below a sustainable level, but some uncertainty exists, OR fishery does not target species and does not adversely affect species, but its contribution to mortality is not negligible, OR fishing mortality is unknown, but the population is healthy and the species has a low susceptibility to the fishery (low chance of being caught).*
- *2.33 (Moderate Concern)—Fishing mortality is fluctuating around sustainable levels, OR fishing mortality is unknown and species has a moderate-high susceptibility to the fishery and, if species is depleted, reasonable management is in place.*
- *1 (High Concern)—Overfishing is occurring, but management is in place to curtail overfishing, OR fishing mortality is unknown, species is depleted, and no management is in place.*
- *0 (Critical)—Overfishing is known to be occurring and no reasonable management is in place to curtail overfishing.*

Summer flounder

Factor 1.1 - Inherent Vulnerability

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Medium
FishBase assigns summer flounder (*Paralichthys dentatus*) a medium inherent vulnerability to fishing score of 47 out of 100 (Froese and Pauly 2014). Males reach a maximum size of 61 cm (2 ft) in length and can live to 7 years. Females can reach 94 cm (3 ft) in length and can live to 12 years. The size of this fish typically ranges from 40 to 56 cm (Collette and Klein-MacPhee 2002). Summer flounder reaches maturity at around 2 years, and at a length of 25–30 cm for males and 30–37 cm for females (Packer et al. 1999). It begins to spawn as it moves offshore during the fall and winter months, and continues to spawn throughout the winter (Collette and Klein-MacPhee 2002). It has been estimated that females can produce from 460,000 to more than 4,000,000 eggs, with egg production increasing with size (Collette and Klein-MacPhee 2002). Summer flounder is considered an opportunistic feeder and is a high-level predator in the food chain (Froese and Pauly 2014). Fish make up the largest percentage of its diet but other components include a variety of marine worms, shrimp, clams, and crabs (Packer et al. 1999).

Factor 1.2 - Abundance

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Low Concern
Summer flounder has been rated as "Least Concern" by the International Union for the Conservation of Nature (IUCN), and the third quarter 2018 update from the National Marine Fisheries Service (NMFS) notes that this stock is not overfished or nearing an overfished state (Munroe 2010)(NMFS 2018). Spawning stock biomass (SSB) was estimated at 44,552 mt in 2017, 78% of the 2018 SAW-66 SSB_{MSY} target proxy = $SSB_{35\%}$ = 57,159 mt, and 56% above the 2018 SAW-66 ½ SSB_{MSY} threshold proxy = ½ $SSB_{35\%}$ = 28,580 mt (NOAA 2019). The stock was rebuilt in 2010

(GARFO 2017), and is not considered overfished (NOAA 2019). Because the stock is not considered overfished, abundance is scored a low concern.

Factor 1.3 - Fishing Mortality

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Very Low Concern

The most recently updated assessment of summer flounder in the mid-Atlantic since 2007 states that the fishing mortality rate has increased and was 0.334 in 2017, 75% of the 2018 SAW-66 F_{MSY} proxy = $F_{35\%}$ = 0.448 (NOAA 2019). Because overfishing of summer flounder is not occurring, we have awarded a very low concern score.

Criterion 2: Impacts on Other Species

All main retained and bycatch species in the fishery are evaluated in the same way as the species under assessment were evaluated in Criterion 1. Seafood Watch defines bycatch as all fisheries-related mortality or injury to species other than the retained catch. Examples include discards, endangered or threatened species catch, and ghost fishing.

To determine the final Criterion 2 score, the score for the lowest scoring retained/bycatch species is multiplied by the discard rate score (ranges from 0-1), which evaluates the amount of non-retained catch (discards) and bait use relative to the retained catch. The Criterion 2 rating is determined as follows:

- ***Score >3.2=Green or Low Concern***
- ***Score >2.2 and ≤3.2=Yellow or Moderate Concern***
- ***Score ≤2.2 = Red or High Concern***

Rating is Critical if Factor 2.3 (Fishing Mortality) is Crtitical

Criterion 2 Summary

Criterion 2 score(s) overview

This table(s) provides an overview of the Criterion 2 subscore, discards+bait modifier, and final Criterion 2 score for each fishery. A separate table is provided for each species/stock that we want an overall rating for.

SUMMER FLOUNDER			
REGION / METHOD	**SUB SCORE**	**DISCARDS+BAIT / LANDINGS**	**SCORE**
Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	2.159	1.000: < 20%	Red (2.159)
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	2.709	1.000: < 20%	Yellow (2.709)
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	1.000	0.950: 20-40%	Red (0.950)

Criterion 2 main assessed species/stocks table(s)

This table(s) provides a list of all species/stocks included in this assessment for each 'fishery' (as defined by a region/method combination). The text following this table(s) provides an explanation of the reasons the listed species were selected for inclusion in the assessment.

ATLANTIC AND ADJACENT AREAS | ATLANTIC, NORTHWEST | BARRIERS, FENCES, WEIRS, CORRALS, ETC. | UNITED STATES | MIDDLE ATLANTIC (NEW YORK, NEW JERSEY, DELAWARE, MARYLAND, VIRGINIA)

SUB SCORE: 2.159 DISCARD RATE: 1.000 **SCORE: 2.159**

SPECIES	INHERENT VULNERABILITY	ABUNDANCE	FISHING MORTALITY	SCORE
Bottlenose dolphin	1.000: High	2.000: High Concern	2.330: Moderate Concern	Red (2.159)
Finfish	2.000: Medium	2.000: High Concern	3.670: Low Concern	Yellow (2.709)
Summer flounder	2.000: Medium	4.000: Low Concern	5.000: Very Low Concern	Green (4.472)

ATLANTIC AND ADJACENT AREAS | ATLANTIC, NORTHWEST | HANDLINES AND HAND-OPERATED POLE-AND-LINES | UNITED STATES | MIDDLE ATLANTIC (NEW YORK, NEW JERSEY, DELAWARE, MARYLAND, VIRGINIA)

SUB SCORE: 2.709 DISCARD RATE: 1.000 **SCORE: 2.709**

SPECIES	INHERENT VULNERABILITY	ABUNDANCE	FISHING MORTALITY	SCORE
Finfish	2.000: Medium	2.000: High Concern	3.670: Low Concern	Yellow (2.709)
Summer flounder	2.000: Medium	4.000: Low Concern	5.000: Very Low Concern	Green (4.472)

ATLANTIC AND ADJACENT AREAS | ATLANTIC, NORTHWEST | SET GILLNETS | UNITED STATES | MIDDLE ATLANTIC (NEW YORK, NEW JERSEY, DELAWARE, MARYLAND, VIRGINIA)

SUB SCORE: 1.000 DISCARD RATE: 0.950 **SCORE: 0.950**

SPECIES	INHERENT VULNERABILITY	ABUNDANCE	FISHING MORTALITY	SCORE
Atlantic sturgeon	1.000: High	1.000: Very High Concern	1.000: High Concern	Red (1.000)
Mammals	1.000: High	1.000: Very High Concern	1.000: High Concern	Red (1.000)
North Atlantic right whale	1.000: High	1.000: Very High Concern	1.000: High Concern	Red (1.000)
Finfish	2.000: Medium	2.000: High Concern	2.330: Moderate Concern	Red (2.159)
Sea turtles	1.000: High	1.000: Very High Concern	5.000: Very Low Concern	Yellow (2.236)
Summer flounder	2.000: Medium	4.000: Low Concern	5.000: Very Low Concern	Green (4.472)

Limited information is available on other species caught in the handline, trap net, and gillnet fisheries

that catch summer flounder, but some information was obtained from fisheries experts. When rating some species or species groups, we utilized the Seafood Watch Unknown By-catch Matrix, which is based on a synthesis of peer-reviewed literature and expert opinion on the by-catch impacts of each gear type.

All fisheries are likely to catch several other coastal fish species, such as striped bass, bluefish, scup, menhaden, croaker, dogfish, weakfish, and shad (RI DFW 2015)(DNREC 2015a) (pers. comm., Mike Bednarski, MA DMF 2015) (pers. comm., Harry Rickabaugh, MD DNR 2015). These species are considered together under the group "finfish." Some of the fish species that are known to be caught are considered depleted, but fishing mortality on these fish species is likely to be only a low to moderate concern.

In addition, some trap net fisheries are known to incidentally catch bottlenose dolphin (Federal Register 2014a), so we have rated this species for the trap net fisheries. Trap net fisheries may also occasionally entangle sea turtles, but risks to sea turtles are considered low and, in most cases, they are able to be released uninjured (Federal Register 2014c); therefore, sea turtles were not included in the assessment. The gillnet fisheries have the potential to catch several endangered, threatened, or protected (ETP) species, including North Atlantic right whale, Atlantic sturgeon, and sea turtles, so these species were assessed for the gillnet fishery (NMFS 2013a)(Federal Register 2014a).

Overall, the handline fishery has a moderate impact on other species, with the limiting species being other finfish. Impacts on other species are of higher concern in the trap net and gillnet fisheries. Bottlenose dolphin limits the score for the trap net fishery, and North Atlantic right whale limits the score for the gillnet fishery.

Criterion 2 Assessment

SCORING GUIDELINES

Factor 2.1 - Inherent Vulnerability
(same as Factor 1.1 above)

Factor 2.2 - Abundance
(same as Factor 1.2 above)

Factor 2.3 - Fishing Mortality
(same as Factor 1.3 above)

Atlantic sturgeon

Factor 2.1 - Inherent Vulnerability

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

High

Atlantic sturgeon has a high inherent vulnerability (85 out of 100) (FishBase 2013).

Factor 2.2 - Abundance

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Very High Concern

All U.S. populations of Atlantic sturgeon are listed as "Endangered" or "Threatened" under the Endangered Species Act (ESA) (NMFS 2012a). U.S. populations of Atlantic sturgeon are divided into five distinct population segments (DPS) for management purposes (NOAA Fisheries 2012b). The Gulf of Maine DPS is currently listed as "Threatened" by the ESA, while the four DPS south of Cape Cod are currently listed as "Endangered" (NOAA Fisheries 2012b). Little is known about stock status: reliable data are difficult to collect because many river systems have few fish and are difficult to sample {ASFMC 2017}. Although accurate stock assessments are difficult to conduct, some states conduct long-term monitoring of Atlantic sturgeon via fishery-independent surveys (see Figure 3) {ASFMC 2017}. The figure contains data from New Jersey and North Carolina surveys and provides an example of local conditions, with both surveys indicating an increase in the number of sturgeon in these areas {ASFMC 2017}. Because all populations of Atlantic sturgeon are threatened or endangered, Seafood Watch deems this factor a very high concern.

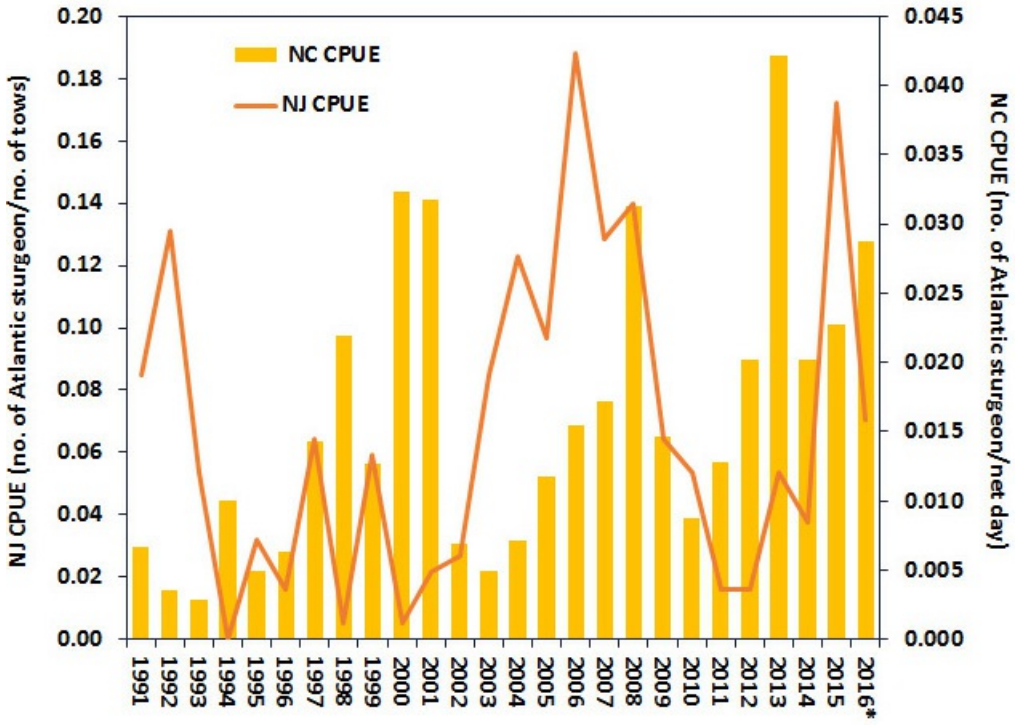

Figure 3: Atlantic sturgeon fishery-independent catch per unit effort (CPUE) in New Jersey's coastal waters and North Carolina's Albemarle Sound. Data from (ASMFC 2017).

Factor 2.3 - Fishing Mortality

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

High Concern

A variety of threats including directed harvest, commercial fisheries by-catch, and habitat destruction have contributed to the dramatic declines in Atlantic sturgeon populations since the mid-1800s {ASSRT 2007}. In late 1997 and early 1998, the Atlantic States Marine Fisheries Commission (ASMFC) and the federal government issued a moratorium on Atlantic sturgeon fishing to allow stocks to rebuild, which is projected to take at least 40 years {ASFMC 2012}. The 2007 status review of Atlantic sturgeon, which recommended the listing of five distinct population segments (DPS) of Atlantic sturgeon under the Endangered Species Act (ESA), found commercial fisheries by-catch to be a significant threat in each DPS {ASSRT 2007}. Bottom gillnet fisheries were found to have the greatest impact, while trawl gear used to fish the northern stock was not a high concern for Atlantic sturgeon {ASSRT 2007}. Several fisheries in the region contribute to Atlantic sturgeon by-catch, but sturgeon caught in the bottom gillnet fishery suffers some of the highest mortality rates, and the fishery has one of the highest levels of overall Atlantic sturgeon by-catch {ASSRT 2007}. Annual by-catch in the bottom gillnet fishery has averaged 350 individuals from 2006 to 2010 (NEFMC 2011c).

Current levels of by-catch are believed to be too high to allow Atlantic sturgeon from the New York Bight, Chesapeake, Carolina, and South Atlantic DPSs to recover (accounting for other threats as well) {ASSRT 2007}. Because gillnet fisheries have one of the highest levels of Atlantic sturgeon by-catch, it is likely that the fishery is a substantial contributor to this mortality. Methods for reducing sturgeon by-catch include seasonal and/or area closures, reduced soak times for sink gillnet gear, and modifications to sink gillnet gear, such as adjustments to tie-down hanging ratios. The effectiveness of management measures to reduce Atlantic sturgeon by-catch are unknown. This factor is deemed a high concern, because fishing mortality from all sources is likely above a sustainable level that is appropriate, given the species' ecological role, and the fishery is a substantial contributor.

Bottlenose dolphin

Factor 2.1 - Inherent Vulnerability

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

High

All marine mammals are considered to have a high inherent vulnerability to fishing because they are long-lived, reach sexual maturity late in life, and have low reproductive rates.

Factor 2.2 - Abundance

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

High Concern

There are three coastal populations of bottlenose dolphin that may interact with Mid-Atlantic trap net fisheries: Northern Migratory Coastal, Southern Migratory Coastal, and Northern North Carolina Estuarine System (Federal Register 2014a). The Northern and Southern Migratory Coastal populations are listed as "Depleted" under the Marine Mammal Protection Act and the status of the Northern North Carolina Estuarine System population is unknown {Hayes et al. 2021}. We have therefore awarded a high concern score.

Factor 2.3 - Fishing Mortality

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Moderate Concern

The Virginia pound net fishery is listed as a Category II fishery under the Marine Mammal Protection Act (MMPA), due to occasional injuries or mortalities to coastal bottlenose dolphin (Federal Register 2014a)(NOAA 2014e). The Virginia pound net fishery interacts with three different coastal bottlenose dolphin populations. Because these populations overlap in North Carolina and Virginia waters, it is difficult to determine the mortality on each population. But, there is concern that the total cumulative fishery mortality (from pound nets and gillnets) on the Northern North Carolina Estuarine System bottlenose dolphin population is exceeding the potential biological removal (PBR = 7.8 animals/year), meaning that more dolphins are being killed than the population can sustain {Hayes et al. 2021}. Although the Virginia pound net fishery's contribution to the total mortality of the Northern North Carolina Estuarine System bottlenose dolphin population is unknown, it could be substantial {Hayes et al. 2021}. Gear modifications, which require fishers to use modified pound net leaders, were originally implemented to reduce sea turtle catches, but they have been shown to reduce dolphin catches, too. Managers recently expanded the use of these gear modifications to

further reduce dolphin mortalities (Federal Register 2014b)(Federal Register 2015).

Other trap net fisheries in the Mid-Atlantic are considered Category III fisheries under the MMPA, which means that interactions with marine mammals are likely rare (Federal Register 2014a).

Because the Virginia pound net fishery may be having an adverse impact on some bottlenose dolphin populations, but management actions have been taken to reduce dolphin catches in the fishery, we have awarded a moderate concern score.

Finfish

Factor 2.1 - Inherent Vulnerability

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Medium
A variety of finfish species may be caught in the gillnet, handline, and trap net fisheries that catch summer flounder. To account for the diversity of species, we have ranked inherent vulnerability as medium.

Factor 2.2 - Abundance

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

High Concern
Trap net fisheries generally catch a mix of finfish species. Limited information was available on what other species are caught in the trap net fisheries that catch summer flounder. Species that may be caught in the trap net fisheries include menhaden, striped bass, weakfish, Atlantic croaker, scup, herring, shad, drum, bluefish, spot, mackerel, catfish, perch, and other coastal fish (pers. comm., Harry Rickabaugh, MD DNR 2015) (RI DFW 2015). Although most of these fish are at healthy abundance levels, weakfish is at a very low abundance level and is considered depleted (NOAA 2009). In addition, although the last assessment for striped bass (2013) indicated that the species was not depleted/overfished, the population was nearing the overfished threshold level and was expected to continue to decline through 2015 (ASMFC 2013). Other depleted species that could be caught in the trap net fisheries are river herring and American shad; however, these species are unlikely to be frequently encountered during the time of year when summer flounder are caught (pers. comm., Harry Rickabaugh, MD DNR 2015). Because the trap net fisheries catch some depleted fish species, we have rated this factor a high concern.

Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

High Concern
Limited information was available on the catch of other target and nontarget species in the summer flounder handline fisheries. Potential finfish species that may be caught along with summer

flounder include black sea bass, scup, sea robins, dogfish, bluefish, striped bass, weakfish, and Atlantic croaker (pers. comm., Mike Bednarski, MA DMF, 2015) (DNREC 2015a)(RI DFW 2015). Although most of these fish are at healthy abundance levels, weakfish is at a very low abundance level and is considered depleted (NOAA 2009). In addition, although the last assessment for striped bass (2013) indicated that the species was not depleted/overfished, the population was nearing the overfished threshold level and was expected to continue to decline through 2015 (ASMFC 2013). Because some depleted species are likely caught, we have awarded a high concern score.

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

High Concern

Summer flounder is typically caught in gillnet fisheries aimed at other species. There is limited information on exactly what species are caught along with summer flounder. Gillnet catch data from Rhode Island for 2011–2014 indicate that unspecified skates dominate the catch (>50%). Other species that accounted for >5% of the catch included monkfish, dogfish, scup, and bluefish (RI DFW 2015). Catch data from Delaware for 2011–2013 indicate that striped bass is the main component of the gillnet catch; however, in some years, Atlantic menhaden, American shad, and white perch also accounted for a significant proportion of the catch (DNREC 2015a).

Many of these fish species are considered to be at healthy abundances, but American shad is depleted and striped bass was near the overfished threshold level and still declining when it was last assessed in 2013 (ASMFC 2015b)(ASMFC 2013). Other depleted species that may potentially be caught include weakfish and river herring (Monterey Bay Aquarium Seafood Watch 2012), although they were not found to be a common component of the catch in the Rhode Island and Delaware fisheries. Because the gillnet fisheries potentially catch some depleted fish species, we have awarded a high concern score.

Factor 2.3 - Fishing Mortality

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Low Concern

Fish species that are likely to be targeted/retained along with summer flounder in the trap net fisheries, including striped bass, Atlantic croaker, Atlantic menhaden, and weakfish, are not considered to be experiencing overfishing (ASMFC 2013)(ASMFC 2010)(SEDAR 2015)(NOAA 2009). In addition, the fishing method allows for the live release of non-target fish species in most instances. We have rated fishing mortality of finfish species caught in trap fisheries a low concern, consistent with the unknown by-catch matrix (see Appendix 3 in the Seafood Watch Wild Fisheries Assessment Criteria).

Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Low Concern

None of the fish species that are likely targeted in the handline fisheries along with summer flounder are considered to be experiencing overfishing (ASMFC 2013)(ASMFC 2010)(NOAA 2009). In addition, handline fisheries are generally considered to have a low impact on other fish species, and unwanted species can often be released alive. We have rated fishing mortality of finfish species as low concern, consistent with the unknown by-catch matrix (see Appendix 3 in the Seafood Watch Wild Fisheries Assessment Criteria).

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Moderate Concern

None of the fish species that are likely targeted/retained in the gillnet fisheries along with summer flounder are considered to be experiencing overfishing (ASMFC 2013)(ASMFC 2010)(SEDAR 2015) (NOAA 2009)(ASMFC 2015b). But, some species are depleted and showing limited recovery (e.g., American shad). Information on the catch of non-target species or by-catch is limited. Because we have only limited information on what is caught in the summer flounder gillnet fisheries, we have rated fishing mortality of finfish species a moderate concern, consistent with the unknown by-catch matrix (see Appendix 3 in the Seafood Watch Wild Fisheries Assessment Criteria).

Mammals

Factor 2.1 - Inherent Vulnerability

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

High

All marine mammals are considered to have a high inherent vulnerability to fishing because they are long-lived, reach sexual maturity late in life, and have low reproductive rates.

Factor 2.2 - Abundance

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Very High Concern

A variety of marine mammal species may be caught in the Atlantic gillnet fisheries, including bottlenose dolphin, common dolphin, harbor porpoise, Risso's dolphin, white-sided dolphin, gray seal, harbor seal, harp seal, hooded seal, humpback whale, pilot whale, minke whale, and fin whale (Federal Register 2014a). The humpback whale and fin whale are listed as "Endangered" under the U.S. Endangered Species Act (NOAA 2015e). The coastal bottlenose dolphin populations are listed as "Depleted" under the Marine Mammal Protection Act (NOAA 2015g). None of the other species are listed as depleted, threatened, or endangered, but all marine mammals are highly vulnerable to fishing. We have awarded a very high concern score, because the gillnet fisheries may interact with endangered marine mammal species.

Factor 2.3 - Fishing Mortality

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

High Concern

The Mid-Atlantic gillnet and Northeast gillnet fisheries are listed as Category I fisheries under the Marine Mammal Protection Act. This means that these fisheries cause frequent incidental mortality or serious injury to marine mammals. The Mid-Atlantic gillnet fisheries (South Carolina to Long Island, NY) may incidentally catch several marine mammal species, but it is the high catches of coastal bottlenose dolphin that is driving the Category I listing. The Category I listing for the Northeast gillnet fisheries (Long Island to the United States/Canada border) is due to high catches of harbor porpoise, humpback whale, North Atlantic right whale, and minke whale (Federal Register 2014a).

The Category I listing excludes gillnet fisheries that occur in inshore waters, such as bays and estuaries. The Chesapeake Bay inshore gillnet fishery and North Carolina inshore gillnet fishery are

listed as Category II fisheries, meaning that there are occasional interactions with marine mammals. Interactions with bottlenose dolphin are the largest concern in these fisheries. The inshore gillnet fisheries in Delaware, New York, Rhode Island, and Massachusetts are considered Category III fisheries, which means that interactions with marine mammals are rare (Federal Register 2014a).

Because many gillnet fisheries in the U.S. Atlantic are known to have a high impact on marine mammals, we have awarded a high concern score.

North Atlantic right whale

Factor 2.1 - Inherent Vulnerability

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

High

Seafood Watch considers marine mammals to have a high vulnerability to fishing activities (Seafood Watch criteria document, p. 9). The life history characteristics of marine mammals, including high age at maturity, low fecundity (single births), and low reproductive rates (every 1–5 years), make their populations vulnerable to high mortality rates. Higher than average mortality of marine mammals is frequently human-caused and can include mortality from ship or boat strikes and from fisheries by-catch. Marine mammal populations (and those of other long-lived taxa) are especially vulnerable to mortality of adults (the reproductively active portion of the population) because it takes years, if not decades, for a calf to reach maturity and become reproductively active.

Factor 2.2 - Abundance

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Very High Concern

The western Atlantic stock of North Atlantic right whale is listed as "Endangered" under the Endangered Species Act (ESA) and is considered "Critically Endangered" by the International Union for the Conservation of Nature (IUCN) (Cooke 2020). Minimum abundance from the most recent stock assessment was estimated at 364 individuals (best estimate 368) (Hayes et al. 2022), while the best estimate of the population from the North Atlantic Whale Consortium was 336 individuals at the end of 2020 {Pettis et al. 2022}. The population has been declining since 2011 and calving rates have been low. From 2017 to 2019, calving rates averaged four per season, <33% of the previous annual average. But, calving increased in 2020 with 10 calves sighted, and 1 involved in a vessel strike (Pace et al. 2017)(NOAA 2020b). The cause of reduced productivity is unknown, but it is likely attributed to several factors that contribute to declining North Atlantic right whale health, including climate-related shifts in prey distribution, anthropogenic noise, pollution, vessel strikes, and entanglement in fishing gear (Pace et al. 2017)(NOAA 2019c). Because North Atlantic right whale is considered "Critically Endangered" by the IUCN, abundance is rated a very high concern.

Factor 2.3 - Fishing Mortality

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

High Concern

The western Atlantic stock of the North Atlantic right whale (NARW) is considered a strategic stock because annual serious injury and mortality (SIM) (7.7 from all sources; 5.7 attributed to fisheries entanglement from 2015 to 2019) exceeds the potential biological removal (PBR) (0.7 whales) (Hayes et al. 2022). Due to a lack of information, it is often not possible to assign entanglements to a specific fishery. Documented entanglements from 2015 to 2019 involving pot/trap gear or unidentified gear are all attributed to unknown fisheries, of which the summer flounder fishery may be a part. Annual SIMs attributed to entanglements in pot/trap gear in Canadian fisheries were 1.95 (279% of PBR), while none were attributed to pot/trap gear in United States fisheries. Serious injuries and mortalities first seen in the United States but not attributable to country were 2.65 (379% of PBR), and those first seen in Canada but not attributable to country were 1.05 (150% of PBR) (Hayes et al. 2022). In 2014, there was one SIM (0.2 average annual serious injuries and mortality, 29% of PBR) that was first seen in the U.S. but not attributable to country, and it was most likely caused by entanglement in netting gear {Sharp et al. Supplemental 2019}{Sharp et al. 2019}.

Vessel strikes and entanglement (from pot/trap and anchored gillnet fisheries) are the two leading causes of mortality and serious injury to North Atlantic right whale, with entanglements increasing over the past decade (Moore 2019). Rope strengths have increased in recent decades (based on data from 1994 to 2010), leading to reduced escape success from entangling gear {Knowlton et al. 2016}. Sinking groundline (2009) and vertical line (2015) regulations have been implemented, resulting in gear configuration changes for which the effects on mitigation of whale entanglement have yet to be determined. Because of limited observation coverage, it is likely that the number of entanglements is severely underestimated {Kraus et al. 2019}. Based on mark-recapture studies through photo identification, <50% of entanglement-related mortality is estimated to be detected, with these same studies demonstrating that 59% of North Atlantic right whales have been entangled more than once (83% at least once), and new scars from entanglement are observed annually for at least 26% of the observed population {Knowlton et al. 2012}.

More than 90% of entanglements (based on 2010–2016 data and partial data for 2016/2017) are not linked to gear (7.8% of entangled North Atlantic right whale carry gear) and only 12% of those are linked to a location {Knowlton et al. 2012}{Knowlton et al. 2019}{Kraus et al. 2019}. Fisheries interactions with North Atlantic right whale have been documented with gillnet fisheries (15% of entanglements attributed to gillnets from 1984 to 2016) {Kraus et al. 2019}. An entanglement that results in gear remaining attached to the whale places an energetic strain that can compromise overall fitness and reproduction {van der Hoop et al. 2016}. Also, a new paper shows that whale lengths have been decreasing due to fishing gear entanglements and vessel strikes since 1981, possibly leading to reduced reproductive success and increased probability in the lethality of entanglements {Stewart et al. 2021}. Challenges in identifying the fishery involved in an entanglement occur due to ineffective gear marking (gear recovered from an entanglement does not carry a mark identifying the gear type, target species, and/or location) or the inability to recover gear from the entangled whale. A recent study estimated that, from 2010 to 2017, the carcass detection rate (how many whale deaths were identified) was 29% {Pace et al. 2021}. Pace et al. (2021) also concluded that, of the cryptic mortalities, the majority were likely caused by entanglement rather than blunt force trauma from vessel strikes.

An Unusual Mortality Event is in effect (since June 2017) for North Atlantic right whale, which includes 34 mortalities (21 in Canada and 13 in the United States, based on the location of stranding, not the location of mortality) through December 2021 (NOAA 2021). Mortalities are attributed to a combination of human interactions including vessel strikes and rope entanglement (final results are pending; however, preliminary investigations list 11 suspected as vessel strikes, 9 suspected as entanglement, 13 as pending or unknown causes, and 1 as perinatal mortality) (NOAA 2021) (see Figure 4 in Justification).

The Mid-Atlantic and Northeast sink gillnet fisheries are classified as Category I fisheries by NOAA (NMFS 2018c). Because cumulative fisheries mortality and serious injury far exceeds PBR, and entanglement due to unknown fisheries (of which the summer flounder fishery may be a part) is considered a significant contributor, the impact of the summer flounder fishery cannot be considered sustainable due to significant uncertainty in entanglement sources, and fisheries mortality is rated a high concern.

Justification:
Distributional shifts in abundance of North Atlantic right whale (NARW) across its range may lead to shifts in regional fisheries interactions and entanglement risks. Based on data from passive acoustic monitoring (2004–2014), North Atlantic right whale is highly mobile and has a year-round presence across its geographic range {Davis et al. 2017}. In recent years (2010–2014), there has been a distributional shift, with presence increased in the Southern New England and Mid-Atlantic regions and decreased in the Scotian Shelf and greater Gulf of Maine. Visual surveys in Canadian waters reported increased presence farther north in the Gulf of St. Lawrence, which may be related to increased fisheries interactions with North Atlantic right whale in Canada {Meyer-Gutbrod et al. 2018}. A recent study of individual whales identified in the Gulf of St. Lawrence found that there was a high return rate from year to year, indicating that this is an important feeding area for a specific group of NARW (Crowe et al. 2021). The study also found that, in 2019, a total of 137 individual NARW were estimated to have visited the Gulf of St. Lawrence (Crowe et al. 2021), which was 38% of the estimated 356 NARW alive at the end of 2019 {Pettis et al 2021}. Although this identifies the Gulf of St. Lawrence as an important foraging area for a significant proportion of the population, it does raise uncertainty regarding the location of the remaining individuals and the concern that they may be in areas that are offered less protection (Crowe et al. 2021).

In 2017, an Unusual Mortality Event for North Atlantic right whale was observed in the region (NOAA 2020). It is unclear if distributional shifts are due to environmental or anthropogenic effects; however, warming temperatures and shifting prey distributions are thought to play a part in the change {Meyer-Gutbrod et al. 2018}. The primary prey (*Calanus finmarchicus*) of the North Atlantic right whale currently remains in highest abundance in the western Gulf of Maine {Record et al. 2019}.

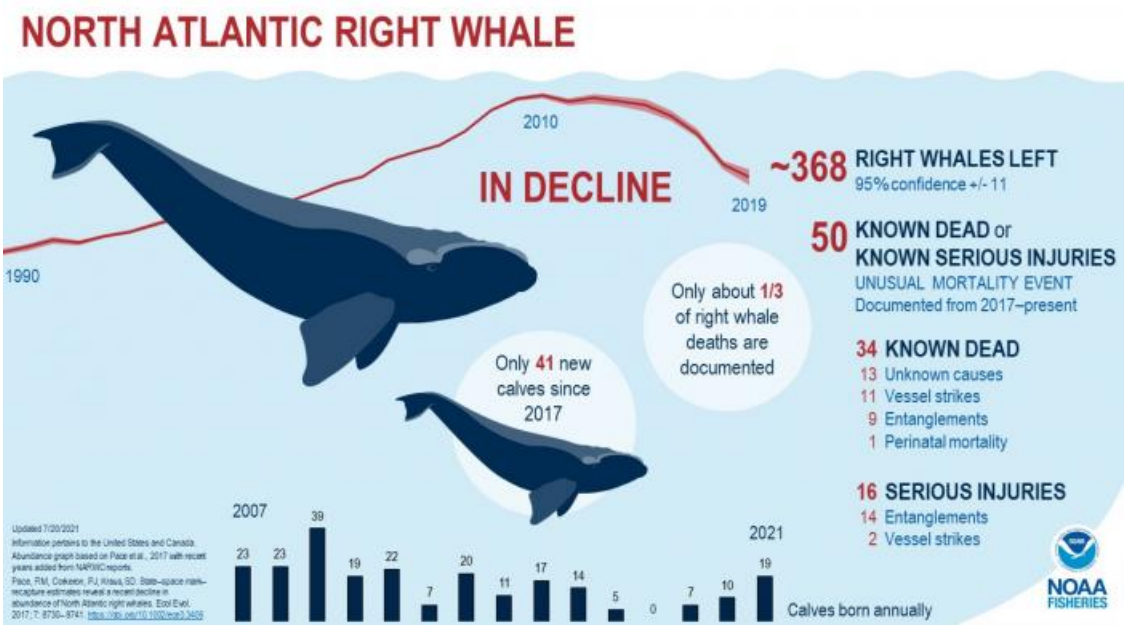

Figure 4: An infographic showing best estimates of current North Atlantic right whale population numbers and causes of death during the current Unusual Mortality Event, 2017 to present. (NOAA 2021)

Sea turtles

Factor 2.1 - Inherent Vulnerability

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

High

All sea turtles are considered to have a high inherent vulnerability to fishing because they are long-lived and do not reach sexual maturity until late in life.

Factor 2.2 - Abundance

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Very High Concern

All sea turtles found in United States waters are listed under the U.S. Endangered Species Act (ESA). The hawksbill, Kemp's ridley, and leatherback turtles are listed as "Endangered" (NOAA 2015f). The green sea turtle and the Northwest Atlantic loggerhead population are listed as "Threatened" (NOAA 2015e)(NOAA 2015f). This factor is rated a very high concern.

Factor 2.3 - Fishing Mortality

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Very Low Concern

Of the five sea turtle species found in U.S. Atlantic waters, the Mid-Atlantic gillnet fisheries interact with loggerhead turtle most frequently. The most recent (2021) biological opinion for several federally managed Atlantic fisheries (e.g., skates, dogfish, bluefish, and monkfish) used information from (Murray 2018) and data from the Sea Turtle Disentanglement Network (STDN) to estimate that 1,036 loggerhead turtles will interact with gillnet fisheries in the U.S. Atlantic region over a 5-year period, resulting in 808 mortalities (NMFS 2021a). It is uncertain what the impact of fishing activities in the region is on the loggerhead turtle population; however, it is not anticipated that summer flounder fisheries will appreciably affect the population, because the estimated number of mortalities is ≈0.7% of the population, based on an estimate of the adult population (38,334 from {Richards et al. 2011}) (NMFS 2021a). The gillnet fisheries may also incidentally catch leatherback, green, and Kemp's ridley turtles, but catches of these species are expected to be low. Interactions with hawksbill turtle are considered unlikely (NMFS 2013a). Because summer flounder fisheries are not expected to negatively affect sea turtle populations, a score of very low concern is given.

Factor 2.4 - Modifying Factor: Discards and Bait Use

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

< 20%

Trap net fisheries typically catch a mix of fish species. Because the fish remain alive in the nets until they are sorted, the majority of fish that cannot be retained and sold are released alive. We therefore consider the dead discard to landings ratio to be <20%.

Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

< 20%

The handline fisheries that catch summer flounder likely retain the majority of fish that are captured. Unmarketable and undersized fish can often be released back to sea alive. Discard rates (discards/landings) in handline fisheries typically range from 0% to 7%, with an average discard rate of 2% (Kelleher 2005).

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

20-40%

Discard rates (discards/landings) in gillnet fisheries can vary greatly, ranging from 0% to 66% (Kelleher 2005). Discard rates in the U.S. Mid-Atlantic and Northeast gillnet fisheries range from 2% to 28% (NMFS 2013b).

Criterion 3: Management Effectiveness

Management is separated into management of retained species (harvest strategy) and management of nonretained species (bycatch strategy). The final score for this criterion is the geometric mean of the two scores.

The Criterion 3 rating is determined as follows:

- ***Score >3.2=Green or Low Concern***
- ***Score >2.2 and ≤3.2=Yellow or Moderate Concern***
- ***Score ≤2.2 = Red or High Concern***

Rating is Critical if either or both of Harvest Strategy (Factor 3.1) and Bycatch Management Strategy (Factor 3.2) ratings are Critical

Criterion 3 Summary

FISHERY	HARVEST STRATEGY	BYCATCH MANAGEMENT STRATEGY	SCORE
Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	3.000	4.000	**Green (3.464)**
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	3.000	4.000	**Green (3.464)**
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	3.000	1.000	**Red (1.732)**

Factor 3.1 Summary

FISHERY	STRATEGY	RECOVERY	RESEARCH	ADVICE	ENFORCE	TRACK	INCLUSION
Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	Highly effective	Moderately Effective	Highly effective	Highly effective	Highly effective	Moderately Effective	Highly effective
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	Highly effective	Moderately Effective	Highly effective	Highly effective	Highly effective	Moderately Effective	Highly effective
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	Highly effective	Moderately Effective	Highly effective	Highly effective	Highly effective	Moderately Effective	Highly effective

Factor 3.2 Summary

FISHERY	ALL SPECIES RETAINED?	CRITICAL?	STRATEGY	RESEARCH	ADVICE	ENFORCE
Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	No	No	Highly effective	Moderately Effective	Highly effective	Moderately Effective
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	No	No	Highly effective	Moderately Effective	Highly effective	Moderately Effective
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	No	No	Ineffective	Moderately Effective	Moderately Effective	Moderately Effective

Criterion 3 Assessment

SCORING GUIDELINES

Factor 3.1 - Harvest Strategy

Seven subfactors are evaluated: Management Strategy, Recovery of Species of Concern, Scientific Research/Monitoring, Following of Scientific Advice, Enforcement of Regulations, Management Track Record, and Inclusion of Stakeholders. Each is rated as 'ineffective,' 'moderately effective,' or 'highly effective.'

- *5 (Very Low Concern)—Rated as 'highly effective' for all seven subfactors considered*
- *4 (Low Concern)—Management Strategy and Recovery of Species of Concern rated 'highly effective' and all other subfactors rated at least 'moderately effective.'*
- *3 (Moderate Concern)—All subfactors rated at least 'moderately effective.'*
- *2 (High Concern)—At minimum, meets standards for 'moderately effective' for Management Strategy and Recovery of Species of Concern, but at least one other subfactor rated 'ineffective.'*
- *1 (Very High Concern)—Management exists, but Management Strategy and/or Recovery of Species of Concern rated 'ineffective.'*
- *0 (Critical)—No management exists when there is a clear need for management (i.e., fishery catches threatened, endangered, or high concern species), OR there is a high level of Illegal, unregulated, and unreported fishing occurring.*

Subfactor 3.1.1 – Management Strategy and Implementation
Considerations: What type of management measures are in place? Are there appropriate management goals, and is there evidence that management goals are being met? To achieve a highly effective rating, there must be appropriate management goals, and evidence that the measures in place have been successful at maintaining/rebuilding species.

Subfactor 3.1.2 – Recovery of Species of Concern
Considerations: When needed, are recovery strategies/management measures in place to rebuild overfished/threatened/ endangered species or to limit fishery's impact on these species and what is their likelihood of success? To achieve a rating of Highly Effective, rebuilding strategies that have a high likelihood of success in an appropriate timeframe must be in place when needed, as well as measures to minimize mortality for any overfished/threatened/endangered species.

Subfactor 3.1.3 – Scientific Research and Monitoring
Considerations: How much and what types of data are collected to evaluate the health of the population and the fishery's impact on the species? To achieve a Highly Effective rating, population assessments must be conducted regularly and they must be robust enough to reliably determine the population status.

Subfactor 3.1.4 – Management Record of Following Scientific Advice
Considerations: How often (always, sometimes, rarely) do managers of the fishery follow scientific recommendations/advice (e.g. do they set catch limits at recommended levels)? A Highly Effective rating is given if managers nearly always follow scientific advice.

Subfactor 3.1.5 – Enforcement of Management Regulations
Considerations: Do fishermen comply with regulations, and how is this monitored? To achieve a Highly Effective rating, there must be regular enforcement of regulations and verification of compliance.

Subfactor 3.1.6 – Management Track Record
Considerations: Does management have a history of successfully maintaining populations at sustainable levels or a history of failing to maintain populations at sustainable levels? A Highly Effective rating is given if measures enacted by management have been shown to result in the long-term maintenance of species overtime.

Subfactor 3.1.7 – Stakeholder Inclusion
Considerations: Are stakeholders involved/included in the decision-making process? Stakeholders are individuals/groups/organizations that have an interest in the fishery or that may be affected by the management of the fishery (e.g., fishermen, conservation groups, etc.). A Highly Effective rating is given if the management process is transparent and includes stakeholder input.

Factor 3.2 - Bycatch Strategy

Four subfactors are evaluated: Management Strategy and Implementation, Scientific Research and Monitoring, Record of Following Scientific Advice, and Enforcement of Regulations. Each is rated as 'ineffective,' 'moderately effective,' or 'highly effective.' Unless reason exists to rate Scientific Research and Monitoring, Record of Following Scientific Advice, and Enforcement of Regulations differently, these rating are the same as in 3.1.

- *5 (Very Low Concern)—Rated as 'highly effective' for all four subfactors considered*
- *4 (Low Concern)—Management Strategy rated 'highly effective' and all other subfactors rated at least 'moderately effective.'*

- *3 (Moderate Concern)—All subfactors rated at least 'moderately effective.'*
- *2 (High Concern)—At minimum, meets standards for 'moderately effective' for Management Strategy but some other factors rated 'ineffective.'*
- *1 (Very High Concern)—Management exists, but Management Strategy rated 'ineffective.'*
- *0 (Critical)—No bycatch management even when overfished, depleted, endangered or threatened species are known to be regular components of bycatch and are substatntially impacted by the fishery*

Subfactor 3.2.1 – Management Strategy and Implementation
Considerations: What type of management strategy/measures are in place to reduce the impacts of the fishery on bycatch species and how successful are these management measures? To achieve a Highly Effective rating, the primary bycatch species must be known and there must be clear goals and measures in place to minimize the impacts on bycatch species (e.g., catch limits, use of proven mitigation measures, etc.)

Subfactor 3.2.2 – Scientific Research and Monitoring
Considerations: Is bycatch in the fishery recorded/documented and is there adequate monitoring of bycatch to measure fishery's impact on bycatch species? To achieve a Highly Effective rating, assessments must be conducted to determine the impact of the fishery on species of concern, and an adequate bycatch data collection program must be in place to ensure bycatch management goals are being met

Subfactor 3.2.3 – Management Record of Following Scientific Advice
Considerations: How often (always, sometimes, rarely) do managers of the fishery follow scientific recommendations/advice (e.g., do they set catch limits at recommended levels)? A Highly Effective rating is given if managers nearly always follow scientific advice.

Subfactor 3.2.4 – Enforcement of Management Regulations
Considerations: Is there a monitoring/enforcement system in place to ensure fishermen follow management regulations and what is the level of fishermen's compliance with regulations? To achieve a Highly Effective rating, there must be consistent enforcement of regulations and verification of compliance.

Factor 3.1.1 - Mgmt Strategy / Implement

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Highly effective

Because summer flounder is frequently caught in both inshore state waters and offshore federal waters, the Atlantic States Marine Fisheries Commission (ASMFC) and the federal Mid-Atlantic Fishery Management Council (MAFMC) jointly manage summer flounder under the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan. The joint management plan was first implemented in 1988 (MAFMC 2014d). Since its inception, the fishery management plan has undergone a number of changes through the adoption of various amendments, addenda, and framework adjustments (MAFMC 2014d)(Rootes-Murdy 2014). The current objectives of the management plan include reducing fishing mortality to avoid overfishing, increasing the abundance of fish capable of reproducing by decreasing mortality on immature fish, improving the yield from the fishery, promoting cooperative management between ASMFC and MAFMC, providing consistent enforcement, and minimizing the amount of regulations it takes to accomplish these objectives (Rootes-Murdy 2014).

Target abundance and fishing goals have been defined for summer flounder, and regulations for summer flounder include total allowable catch limits (ACL), minimum size limits (14 in. for the commercial fishery; varies by state for the recreational fishery), gear restrictions, a moratorium on entry to the commercial fishery, recreational bag limits and seasons, and mandatory data collection requirements (Rootes-Murdy 2014)(MAFMC 2014d). Roughly 60% of the total allowable catch (TAC) is given to the commercial fishery and 40% to the recreational fishery. The commercial catch limit or quota is further allocated among individual states. If a state exceeds its catch limit or quota, there is a deduction the following year (NOAA 2014b). When scientists and managers set the annual catch limit, they factor in how many summer flounder are likely to be discarded back to sea in the commercial and recreational sectors, and consider uncertainty levels in the abundance and fishing mortality estimates (MAFMC 2013). Managers are responsive to changes in summer flounder abundance and the latest scientific assessments. The most recent assessment update for summer flounder indicated that overfishing is occurring, so managers have reduced catches by 29% for the 2016 season (Terceiro 2015)(MAFMC 2015a).

Other species that are likely targeted and retained along with summer flounder in the handline, trap net, and gillnet fisheries are also managed by the Atlantic States Marine Fisheries Commission and/or the Mid Atlantic Fishery Management Council.

Because the management plan for summer flounder includes appropriate goals and fishing controls, we have awarded a highly effective score.

Factor 3.1.2 - Recovery of Stock Concerns

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle

Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Moderately Effective

In the late 1980s and early 1990s, summer flounder was at a very low abundance, and a rebuilding plan was established in 1993 (Rootes-Murdy 2014). Since then, the abundance of summer flounder has greatly increased and the population is no longer overfished/depleted, although abundance remains below the target level (NEFSC 2013a)(Terceiro 2015).

Summer flounder that are caught with handlines, gillnets, and trap nets are often caught in mixed-species fisheries, and some currently depleted/overfished species may be targeted or retained; for example, weakfish and American shad. These species have been at low abundances for over a decade, due to a number of factors. But, management measures are in place to prevent overfishing (ASMFC 2015b)(ASMFC 2015c). The status of striped bass is also a concern because the population was near the overfished threshold in 2013 and was expected to continue to decline through 2015. New regulations were implemented in 2015 to reduce fishing levels on striped bass and rebuild its population (ASMFC 2015d).

Overall, management efforts to recover species of concern are considered moderately effective.

Factor 3.1.3 - Scientific Research / Monitoring

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Highly effective

Research surveys are conducted by state agencies from Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, and North Carolina, the Virginia Institute of Marine Science (VIMS), and the Northeast Fisheries Science Center (NEFSC) to monitor the abundance of summer flounder (NEFSC 2013a). The surveys provide information on the abundance of young, immature fish and adult fish, as well as information on the biology of the species (Rootes-Murdy 2014).

Federally permitted fishers must submit records of all fishing activity on a monthly basis. Also, federally permitted vessels are required to allow onboard observers if their vessel is selected randomly by the National Oceanic and Atmospheric Administration's (NOAA) observer program (NOAA 2014b). States monitor summer flounder catches in relation to the catch limit or quota through the mandatory submission of monthly or weekly fisher logbook and dealer reports, and in some states, through dealer Interactive Voice Response (IVR), which is a program where dealers may call in and report their information to an automated system. In addition, in 2014, Massachusetts

had observers onboard several targeted summer flounder trips (Rootes-Murdy 2014).

Population assessments for summer flounder, along with updates to the assessments, are performed on a regular basis and use data collected from research surveys and the fisheries (NEFSC 2013a). Fishery Management Plan reviews are performed every few years (ASMFC 2015e). For these reasons, scientific research and monitoring is awarded a score of highly effective.

Factor 3.1.4 - Scientific Advice

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Highly effective
The Mid-Atlantic Fishery Management Council's (MAFMC) Scientific and Statistical Committee (SSC) provides ongoing advice to help manage the summer flounder fishery. Together, the Summer Flounder Monitoring Committee and the SSC provide recommendations on the acceptable catch levels and harvest limits for the commercial and recreational fisheries. These recommendations are then passed along to the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service, and limits are set. The commercial quota is further broken down state by state (MAFMC 2013). Total allowable landings can be specified for up to 3 years but must be based on the best available science (Rootes-Murdy 2014). Therefore, this factor is rated highly effective.

Factor 3.1.5 - Enforce

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Highly effective
Enforcement of fishery legislation at sea is a cooperative operation between coastal states, the NOAA Office of Law Enforcement (OLE), and the United States Coast Guard. OLE efforts include meetings with industry representatives, dock visits and outreach, and patrolling efforts (NOAA 2018k). NOAA deploys observers to report violations, collects and addresses issues via vessel monitoring systems

(VMS), and reports incidents, by law (NOAA 2018k). The U.S. Coast Guard conducts fisheries patrols in the Mid-Atlantic for illegal fishing activities, and does outreach and enforcement of the right whale speed zone rule (USCG 2018).

The Mid-Atlantic Fishery Management Council obtains information from observer data, a Days-at-Sea (DAS) database, and vessel trip reports (VTRs) (NOAA 2018j), in addition to dealer reports and Monitoring Committees (ECFR 2013). Vessel operators must fill monthly VTRs for every trip (GARFO 2018c). VTRs contain information for each trip taken, including catch, effort, gear characteristics, and spatial information (GARFO 2018c).

Accountability measures (AMs) permit management to take actions, such as decreasing catch limits for the following year if the allowable catch is exceeded in any given year (ECFR 2013).

The NOAA fisheries division has set enforcement priorities for 2018–2022, outlining needs for patrol outreach and investigation in an effort to deter and detect observer harassment, reporting and permitting compliance, by-catch management, incursions into closed or protected areas, monitoring and enforcement of illegal sales, and gear compliance, as well as maintaining control over illegal, unreported, and unregulated (IUU) fishing and over seafood fraud (NOAA 2018i). There are no known issues with enforcement in this region; therefore, this factor is scored highly effective.

Factor 3.1.6 - Track Record

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Moderately Effective

Catches of summer flounder along the East Coast of the United States hit a peak in 1983 of 26,000 metric tons (mt) (NEFSC 2013b). After a dramatic decline in the summer flounder population in the late 1980s and early 1990s, managers established a fishery management plan (FMP) in 1988 and a coast-wide catch limit (commercial and recreational) in 1993 (ASMFC 2015e)(NEFSC 2013a). Also in 1993, a rebuilding schedule was created, permit and reporting requirements were established, and fish size limits and gear restrictions were implemented. Throughout the years, various amendments, addenda, and framework adjustments have been made to the fishery management plan, to help continually manage this species as best as possible (NEFSC 2013a).

Since the mid-1990s, summer flounder abundance has greatly increased and the population has recovered from an overfished/depleted state. But, abundance remains below the target abundance level (NEFSC 2013a). In addition, a recent assessment update indicated that fishing levels have increased in recent years and that overfishing is currently occurring (Terceiro 2015). Managers

responded by reducing catches by 29% for the 2016 season (MAFMC 2015a).
Persistent management challenges in this fishery include determining the appropriate annual catch limit and sector allocation, and dealing with problems of illegal fishing (ASMFC 2015e). Overall, we consider the management track record for summer flounder moderately effective.

Factor 3.1.7 - Stakeholder Inclusion

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Highly effective
There are 3 commissioners from each of the 15 member states that form the Atlantic States Marine Fisheries Commission (ASMFC). The members from each state comprise the director of the state's fisheries management agency, a legislator, and a governor-appointed individual who represents various stakeholder interests (ASMFC 2014a). The Mid-Atlantic Fishery Management Council (MAFMC) comprises 21 voting members (20 state, 1 federal). Each of the seven states contributes one representative from its fish and wildlife agency to the council. In addition, there are 13 state governor-appointed private citizens on the council who have knowledge about the fishing industry (recreational and commercial) and/or marine conservation issues. There are also four nonvoting participants from ASMFC, the U.S. Coast Guard, the U.S. Department of State, and the U.S. Fish and Wildlife Service (MAFMC 2014c). Also, the advisory panels for ASMFC and MAFMC comprise commercial fishers, recreational fishers, scientists, and environmentalists; these advisory panels meet throughout the year so managers can get the panels' perspectives on any new management proposals (MAFMC 2015c).

All changes to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan (FMP) are open for public comment, and the procedures are transparent to the public. Interested parties can express their opinions by attending hearings or writing comments to the management bodies {ASMFC & MAFMC 2014}. Copies of board proceedings, management plans, amendments, addenda, and framework adjustments are easily accessible online. Currently, the fishery management plan is undergoing a new amendment, to update goals and management strategies for summer flounder {ASMFC & MAFMC 2014}.

Because of the fair representation of interest groups on both the commission and the council, the transparency of the management processes, and the allowance for public participation, stakeholder inclusion is ranked highly effective.

Factor 3.2.1 - Mgmt Strategy / Implement

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Highly effective

Unwanted by-catch caught in trap nets (such as pounds and weirs) is generally released alive and in good condition (pers. comm., Harry Rickabaugh, MD DNR 2015). But, in the Virginia pound net fishery, there are some concerns about the by-catch of sea turtles and dolphins. This fishery is listed as a Category II fishery (occasional mortalities to marine mammals) under the Marine Mammal Protection Act (MMPA). Virginia has put in place some management measures to reduce sea turtle by-catch in pound nets, such as using a stiffer material for the leader and placing the leader 10 feet from the low water line in summer months (NOAA 2014f). These measures have also been found to reduce entanglement rates with dolphins (NOAA 2014f). The National Marine Fisheries Service has recently expanded the use of modified leaders in this fishery to further reduce dolphin interactions (Federal Register 2015). Because measures that have been shown to be effective at reducing by-catch of vulnerable species are in place in the Virginia pound net fishery, and there are few by-catch concerns in other trap net fisheries, we have rated this factor highly effective.

Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Highly effective

The handline fisheries that catch summer flounder are likely to retain most of the other fish species that are caught. Unmarketable or undersized species may be discarded, but most are likely released unharmed. Because there are few by-catch concerns in this fishery, we have rated this factor highly effective.

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Ineffective

There are some measures in place to reduce by-catch of marine mammals, sea turtles, and Atlantic sturgeon in Mid-Atlantic gillnet fisheries. These measures include adding weak links to gillnets to help large whales escape entanglements, adding "pingers" (acoustic devices) to nets to help reduce cetacean interactions, banning the use of large mesh gillnets (in federal and some inshore waters), and having certain seasonal and/or area closures (NOAA 2014g)(NMFS 2013a). The Mid-Atlantic gillnet fisheries are required to comply with measures in the Atlantic Large Whale Take Reduction Plan (ALWTRP), Bottlenose Dolphin Take Reduction Plan, and Harbor Porpoise Take Reduction Plan. Retention of Atlantic sturgeon is prohibited, and research into fishing gear that minimizes Atlantic sturgeon by-catch is ongoing (NMFS 2013a).

The Atlantic Large Whale Take Reduction Plan (ALWTRP) was developed under the MMPA in 1997 to reduce mortality and serious injury (SIM) to whales due to incidental take in U.S. commercial fisheries that interact with strategic stocks (NOAA 2012)(NOAA 2018c). To achieve this goal, several

measures have been implemented, including requirements of sinking groundline, weak links, a vertical line rule, gear marking requirements, and area closures {Gouveia & Swails 2017}(NOAA 2018c). But the Take Reduction Plans (TRPs) in the northeastern U.S. have been regarded as the least successful of the U.S. TRPs at reducing marine mammal by-catch {McDonald et al. 2016}. To date, the ALWTRP has failed to meet its statutory goal of reducing SIM to a level below the potential biological removal (PBR), and to a level approaching zero (the Zero Mortality Rate Goal). Many management measures have been ineffective in reducing entanglement rates (based on data from 1999 to 2009, inclusive of entanglements attributed to unidentified fisheries) {Pace et al. 2014}, because SIMs due to entanglement continue to exceed PBR (NOAA 2019c). The impacts of introducing regulations such as the "sinking groundline rule" in 2009 and the "vertical line rule" (50 Federal Register 2014) in 2015 are not fully understood due to limited data and analyses (the latest marine mammal stock assessments consider data from 2014 to 2018). But, for most entanglement interactions, gear is not recovered or is unidentifiable (77% of entanglements between 2000 and 2018) and, although the summer flounder gillnet fishery has not been identified specifically in recent interactions, most interactions cannot be attributed to a specific fishery (NOAA 2019c). In 2014, a whale carcass was found south of Nantucket entangled in what was most likely gillnet gear {Sharp et al. 2019}{Sharp et al. 2019 Supplemental}.

A batched biological opinion published in May 2021 considers the impact of fisheries in U.S. federal waters on species listed under the Endangered Species Act (ESA) (NOAA 2021). Although the biological opinion reached a determination that fisheries in U.S. federal waters will not jeopardize the continued existence of North Atlantic right whale, NOAA predicts that the Conservation Framework will take 9 years to reduce the impact of U.S. fisheries to below PBR (currently 0.8) (Table 1). NOAA's analysis indicates that the proposed management measures will fail to limit the impact of U.S. fisheries to below PBR within a reasonable time frame consistent with the Seafood Watch Fisheries Standard with respect to the Marine Mammal Protection Act. The impact of the Risk Reduction Rule is expected to reduce the impact of U.S. pot and trap fisheries from 4.57 SIMs per year to 2.56 SIMs, and 2.69 SIMs per year in federal waters inclusive of gillnet interactions.

Table 1: Actions to be taken under the ALWTRP Conservation Framework. From 2021 Batched Biological Opinion.

Phase	Year	Framework Action Description
	Annually	Provide updates, as appropriate, on the implementation of the Framework to the New England and Mid-Atlantic Fishery Management Councils, Atlantic States Marine Fisheries Commission, and ALWTRT.
1	2021	NMFS implements the MMPA ALWTRP rule-aking focused on 60% reduction in right whale M/SI incidental to American lobster and Jonah crab trap/pot fisheries. In federal waters, this action reduces M/SIs, on average annually, to 2.69. Implementation for certain measures will begin in 2021; others will be phased over time.
2	2023	NMFS implements rule-making to reduce M/SI in federal gillnet and other pot/trap (i.e., other than lobster and Jonah crab fisheries included in Phase 1) fisheries by 60%, reducing M/SI, on average annually, to 2.61. The ALWTRT will convene in 2021 to recommend modifications to the ALWTRP to address risk in the remaining fixed gear fisheries. This phase will consider how any changes to the ALWTRP contribute to achieving the target reduction under this Framework.
Evaluation	2023–2024	NMFS evaluates any updated or new data on right whale population and threats to assess progress toward achieving the conservation goals of this Framework. At this time, we will also assess measures taken by Canada to address M/SI in Canadian waters.

3	2025	NMFS implements rule-making to further reduce M/SI by 60% in all federal fixed gear fisheries, reducing M/SI, on average annually, to 1.04.
Evaluation	2025–2026	NMFS evaluates measures implemented in 2025 action as well as new data on right whale population and threats to assess progress toward achieving the conservation goals of this Framework. Based on the results of this evaluation, NMFS will determine the degree to which additional measures are needed to ensure the fisheries are not appreciably reducing the likelihood of survival and recovery. As described above, if actions outside the federal fisheries reduce risk to right whales by 0.5 M/SI on average annually (one whale every 2 years), the M/SI reduction requirement in Phase 4 will be reduced from 87% to 39%. If M/SI from other sources is reduced by greater than one M/SI on average annually, we will evaluate whether further action in the federal fisheries is needed.
4	2030	In accordance with the goals identified in the 2025–2026 evaluation, NMFS implements regulations to further reduce M/SI (up to 87%) in fixed gear fisheries.

In July 2022, a District Court ruled that the 2021 Final Rule and 2021 Biological Opinion were invalid, in part due to the concerns noted above. Specifically, the court ruled that the Risk Reduction Rule and 2021 Biological Opinion violated requirements of the Endangered Species Act and Marine Mammal Protection Act on two accounts: 1) "through its failure to satisfy the required antecedent in section 101 (a)(5)(E) of the MMPA before issuing an ITS"; and 2) "the Final Rule did not attempt to meet the take-reduction measures that it was obligated to under the MMPA within the required timeline" {US District Court 2022}.

Current management measures to prevent by-catch are insufficient, given the potential impacts of the fishery on endangered North Atlantic right whale, and the planned framework to implement risk reduction measures is not anticipated to reduce the impact of U.S. fisheries to below PBR until 2030. Therefore, the by-catch strategy is rated ineffective.

Justification:
There is a need for improved cooperation between U.S. and Canadian agencies in addressing the impact of fisheries on North Atlantic right whale. Since 2010, there has been a shift in North Atlantic right whale distribution, with whales migrating to the Gulf of St. Lawrence during the summer months {Davis et al. 2017}. The number of entanglements involving Canadian fisheries, including snow crab fisheries, increased starting in 2016 (NOAA 2021); during the ongoing Unusual Mortality Event, 21 of the 34 known mortalities have been attributed to Canadian waters (NOAA 2021). Although United States and Canadian agencies have introduced measures aimed at reducing the impact of, and the risk posed by, commercial fisheries (and other human activities) on North Atlantic right whale, the effectiveness of these measures remains unproved, and the impact of these activities continues to exceed a sustainable level {Hayes et al. 2021}. Cumulative impacts (average of 8.15 SIMs per year from 2014 to 2018), particularly on SIMs from unknown sources (5.1 SIMs), remain far above levels that would allow the population to recover (PBR = 0.8) {Hayes et al. 2021}, and the Conservation Framework will allow continued impacts above PBR for the next 9 years. Cumulative impacts must be addressed through a comprehensive and coordinated management strategy to account for the transboundary nature of North Atlantic right whales that migrate between U.S. and Canadian waters.

New scientific data indicate additional risks that have not been addressed in the Conservation Framework: specifically, risks related to entanglements that do not result in SIMs {Steward et al. 2021}, and range shifts due to climate change and the impact this has on food availability {Meyer-Gutbrod et al. 2021}. There is a growing body of evidence indicating that entanglements that do not result in SIMs can still have a negative impact on North Atlantic right whale populations as a result of

decreased growth {Steward et al. 2021}, increased energy consumption {van der Hoop et al. 2017}, declining body condition {Pettis et al. 2017}, and reduced reproductive output {Fauquier et al. 2020}; as scientific understanding of these issues improves, there will likely be a need for improved management to ensure that negative impacts of entanglements are avoided.

In addition to the federal management measures described above, the Massachusetts Division of Marine Fisheries has implemented a suite of measures to reduce the risk to North Atlantic right whale in Massachusetts state waters effective from May 1, 2021 (Massachusetts Register 2022). A seasonal closure has been implemented prohibiting the use of traps and gillnets within 53% of state waters from February 1 to May 15 (with the possibility of opening after April 30, or extending beyond May 15, dependent on the presence of North Atlantic right whale in the area). All buoy lines in the trap fisheries are required to have a 1,700-lb breaking strength contrivance, and buoy lines shall be no thicker than 3/8" in diameter. Further to the federally required gear marking, MDMF requires all trap fisheries in state waters to include a 3-ft red mark within the surface system, and four 2-ft red marks along the buoy line (two within the top 50%, and two within the bottom 50% of the line) (MDMF 2022).

Factor 3.2.2 - Scientific Research / Monitoring

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Moderately Effective

Little information on nontarget species or by-catch is collected for the trap net fisheries that catch summer flounder; however, in most fisheries, by-catch is not considered a large concern. Some data on sea turtle and dolphin by-catch have been collected in the Virginia pound net fishery (Federal Register 2014b). Studies on gear modifications to reduce sea turtle and dolphin by-catch in the Virginia pound net fishery have also been conducted (Magnusson et al. 2012)(Federal Register 2014b). This factor has been ranked moderately effective.

Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Moderately Effective

There are limited data collected on by-catch in the handline fisheries that capture summer flounder; however, by-catch is not considered a large concern, because most species are likely retained. We have therefore rated this factor moderately effective.

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Moderately Effective

There is limited information on by-catch in the gillnet fisheries that capture summer flounder. Some

data on interactions with protected or threatened species, such as marine mammals and sea turtles, have been collected by onboard scientific observers, but observer coverage is low (Federal Register 2014a)(NMFS 2013a). There are no mandatory observer requirements for the summer flounder fisheries (NOAA 2014b). The Sea Turtle Stranding and Salvage Network (STSSN) helps monitor sea turtle mortality along the coast, and participates in tagging live turtles to help study their movements. Atlantic sturgeon now has a similar stranding network, where deceased sturgeon can be studied (NMFS 2013a). In addition, several studies have been conducted on ways to reduce by-catch of vulnerable species in gillnet fisheries (NOAA 2014g)(NMFS and ASMFC 2013). Because some research is conducted on vulnerable by-catch species, but by-catch monitoring in these gillnet fisheries is low, we have awarded a moderately effective score.

Factor 3.2.3 - Scientific Advice

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Highly effective
There is no indication that managers do not follow scientific advice. See Harvest Strategy for further details.

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Moderately Effective
Managers typically incorporate scientific advice into policy and regulation development; however, scientific advice regarding the need to reduce the impact of fisheries on North Atlantic right whale has not always been integrated and implemented effectively. This factor is ranked moderately effective.

Factor 3.2.4 - Enforce

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Moderately Effective

Enforcement in this fishery is considered moderately effective. See Harvest Strategy for further details.

Criterion 4: Impacts on the Habitat and Ecosystem

This Criterion assesses the impact of the fishery on seafloor habitats, and increases that base score if there are measures in place to mitigate any impacts. The fishery's overall impact on the ecosystem and food web and the use of ecosystem-based fisheries management (EBFM) principles is also evaluated. Ecosystem Based Fisheries Management aims to consider the interconnections among species and all natural and human stressors on the environment. The final score is the geometric mean of the impact of fishing gear on habitat score (plus the mitigation of gear impacts score) and the Ecosystem Based Fishery Management score. The Criterion 2 rating is determined as follows:

- ***Score >3.2=Green or Low Concern***
- ***Score >2.2 and ≤3.2=Yellow or Moderate Concern***
- ***Score ≤2.2 = Red or High Concern***

Rating cannot be Critical for Criterion 4.

Criterion 4 Summary

FISHERY	FISHING GEAR ON THE SUBSTRATE	MITIGATION OF GEAR IMPACTS	ECOSYSTEM-BASED FISHERIES MGMT	SCORE
Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	Low Concern	Minimal Mitigation	Moderate Concern	**Yellow (3.122)**
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	Very Low Concern	No Effective Mitigation	Moderate Concern	**Green (3.464)**
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)	Low Concern	Minimal Mitigation	Moderate Concern	**Yellow (3.122)**

Criterion 4 Assessment

SCORING GUIDELINES

Factor 4.1 - Impact of Fishing Gear on the Habitat/Substrate

- *5 (None) - Fishing gear does not contact the bottom*
- *4 (Very Low) - Vertical line gear*
- *3 (Low)—Gears that contacts the bottom, but is not dragged along the bottom (e.g. gillnet, bottom longline, trap) and is not fished on sensitive habitats. Bottom seine on resilient mud/sand habitats. Midwater trawl that is known to contact bottom occasionally (*
- *2 (Moderate)—Bottom dragging gears (dredge, trawl) fished on resilient mud/sand habitats. Gillnet, trap, or bottom longline fished on sensitive boulder or coral reef habitat. Bottom seine except on mud/sand*
- *1 (High)—Hydraulic clam dredge. Dredge or trawl gear fished on moderately sensitive habitats (e.g., cobble or boulder)*
- *0 (Very High)—Dredge or trawl fished on biogenic habitat, (e.g., deep-sea corals, eelgrass and*

maerl) Note: When multiple habitat types are commonly encountered, and/or the habitat classification is uncertain, the score will be based on the most sensitive, plausible habitat type.

Factor 4.2 - Mitigation of Gear Impacts

- *+1 (Strong Mitigation)—Examples include large proportion of habitat protected from fishing (>50%) with gear, fishing intensity low/limited, gear specifically modified to reduce damage to seafloor and modifications shown to be effective at reducing damage, or an effective combination of 'moderate' mitigation measures.*
- *+0.5 (Moderate Mitigation)—20% of habitat protected from fishing with gear or other measures in place to limit fishing effort, fishing intensity, and spatial footprint of damage caused from fishing.*
- *+0.25 (Low Mitigation)—A few measures are in place (e.g., vulnerable habitats protected but other habitats not protected); there are some limits on fishing effort/intensity, but not actively being reduced*
- *0 (No Mitigation)—No effective measures are in place to limit gear impacts on habitats*

Factor 4.3 - Ecosystem-Based Fisheries Management

- *5 (Very Low Concern)—Substantial efforts have been made to protect species' ecological roles and ensure fishing practices do not have negative ecological effects (e.g., large proportion of fishery area is protected with marine reserves, and abundance is maintained at sufficient levels to provide food to predators)*
- *4 (Low Concern)—Studies are underway to assess the ecological role of species and measures are in place to protect the ecological role of any species that plays an exceptionally large role in the ecosystem. Measures are in place to minimize potentially negative ecological effect if hatchery supplementation or fish aggregating devices (FADs) are used.*
- *3 (Moderate Concern)—Fishery does not catch species that play an exceptionally large role in the ecosystem, or if it does, studies are underway to determine how to protect the ecological role of these species, OR negative ecological effects from hatchery supplementation or FADs are possible and management is not place to mitigate these impacts*
- *2 (High Concern)—Fishery catches species that play an exceptionally large role in the ecosystem and no efforts are being made to incorporate their ecological role into management.*
- *1 (Very High Concern)—Use of hatchery supplementation or fish aggregating devices (FADs) in the fishery is having serious negative ecological or genetic consequences, OR fishery has resulted in trophic cascades or other detrimental impacts to the food web.*

Factor 4.1 - Impact of Fishing Gear on the Habitat/Substrate

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Low Concern

Trap nets are stationary fishing gears. They are typically set in shallow coastal or estuarine waters and can be set in the same place for several months to years (CT DEEP 2007)(Stephan et al. 2000)

(FAO 2014a)(DFO 2010). There are various types of traps nets, including pound nets and weirs. Pound nets are generally set perpendicular to the shoreline. The gear consists of several nets that extend above the surface of the water. A leader fence interrupts the movement of the targeted catch and the fish are then funneled into deeper water as they move through several larger enclosures, and eventually into the pound (trap) part of the net. The top of the pound is typically open, and fish are then scooped out (NOAA 2014f). Weirs consist of a series of poles with nets attached. The netting runs from the bottom habitat to above the surface of the water (FAO 2014a). Similar to a pound net, a leader fence interrupts the movement of fish and funnels them into the end of the trap, where they remain until the fishers come to retrieve the catch (GMRI 2014).

Summer flounder is typically found on soft bottoms, such as sand, mud, or silt (Packer et al. 1999). Occasionally, it is found in eelgrass beds for feeding and possibly for protection; however, its frequency of occurrence in this type of habitat is considered low. Unless a trap net is placed directly on an eelgrass bed, impacts are generally considered minimal to the bottom habitat (Stephan et al. 2000). Because of its long placement time, if a trap net is set on top of an eelgrass bed, smothering or uprooting of the grass may occur (CT DEEP 2007). If any damage from trap net fishing does occur, it is localized to the area in which the gear is set, or where the poles are driven into the substrate (DFO 2010). Overall, the impact of trap net fishing on bottom habitats is considered a low concern.

Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Very Low Concern

Commercial handlines used in the U.S. summer flounder fishery are typically rod and reel (or "hook and line"). Rod and reel gear consists of a pole, a baited hook attached to fishing line, and a reeling mechanism for bringing in the line (FAO 2014b)(CT DEEP 2007). The damage caused by handline gear to the bottom habitat is low, but it can occasionally become entangled in hard structures such as corals, rocks, and sponges (Fuller et al. 2008).

Summer flounder is typically found on softer bottoms such as sand, mud, or silt (Packer et al. 1999). Occasionally, it is found in eelgrass beds for feeding and possible protection; however, its frequency of occurrence in this type of habitat is considered low. Handlines may become ensnared in eelgrass but it has been determined that, overall, this gear type causes no significant damage to eelgrass beds (CT DEEP 2007). For these reasons, the impact of handlines to bottom ocean habitats has been ranked a very low concern.

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Low Concern

Gillnets are a type of passive fishing gear (Baer et al. 2010). Gillnets are vertical walls of netting that have a weighted groundline and a floatline. Bottom-set gillnets are anchored to the seafloor at both ends so that they remain stationary (FAO 2014c). If ensnared, bottom-set gillnets can cause damage

to or break physical or biological structures such as rocks, sponges, or corals; however, they are less damaging than dredges or trawls, or if they are used on softer bottom types (Baer et al. 2010).

Summer flounder is typically found on softer, more resilient bottoms, such as sand, mud, or silt (Packer et al. 1999). Occasionally, it is found in or adjacent to eelgrass beds for feeding and possibly for protection; however, its frequency of occurrence in this type of habitat is considered low (Packer et al. 1999)(CT DEEP 2007). Overall, gillnets used to catch summer flounder are considered to have a low impact on bottom ocean habitats.

Factor 4.2 - Modifying Factor: Mitigation of Gear Impacts

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Minimal Mitigation

The Atlantic coastal states have varying regulations pertaining to trap nets (i.e., pounds and weirs). Most of these regulations are general and not specific to the summer flounder fishery. States that have regulations pertaining to trap nets include Connecticut, Maryland, Massachusetts, New Jersey, North Carolina, and Virginia. Generally, these regulations concern area closures, permit requirements, a limit on the number of traps, and the use of escape panels (CT DEEP 2015)(MD DNR 2015b)(MA DMF 2015)(NJDEP 2014)(NCDENR 2013)(VA MRC 2015). North Carolina has stricter regulations if pound nets are to be placed in submerged aquatic vegetation (SAV) areas or in tidal wetlands (NCDENR 2013). Mitigation is considered to be minimal.

Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

No Effective Mitigation

There are no known spatial closures in place for the handline fishery to protect summer flounder habitats, so a score of no effective mitigation is awarded.

Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Minimal Mitigation

Regulations on gillnet use vary by state. Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Virginia, and North Carolina have regulations in place to control the use of gillnets by fishers; however, these regulations are not necessarily specific to the summer flounder fishery, nor are they all in place to protect bottom habitat. Regulations include, but are not limited to, area and season closures, permit requirements, and net length restrictions (MA DMF 2015)(RI DEM 2014)(CT DEEP 2015)(NYS DEC 2015)(NJDEP 2014)(DNREC 2015b)(MD DNR 2015a)(VA MRC 2015)(NCDENR 2013). Mitigation is considered to be minimal.

Factor 4.3 - Ecosystem-based Fisheries Management

Atlantic and adjacent areas | Atlantic, Northwest | Barriers, fences, weirs, corrals, etc. | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Handlines and hand-operated pole-and-lines | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)
Atlantic and adjacent areas | Atlantic, Northwest | Set gillnets | United States | Middle Atlantic (New York, New Jersey, Delaware, Maryland, Virginia)

Moderate Concern

There is no indication that summer flounder should be considered a species of "exceptional importance" in the ocean ecosystem. Throughout its life, summer flounder feeds on a variety of prey items. Although this species is considered an opportunistic feeder, and usually feeds on what is available, patterns of preference in diet have been observed as the fish matures. As larvae, they feed primarily on zooplankton and small crustaceans. As small juveniles (<100 mm), they eat crustaceans and polychaete worms, but for larger juveniles (>100 mm), fish become a prevalent component of their diet. Adult summer flounder feed mostly on fish and crustaceans, but similar to juveniles, their diet depends on the size of the flounder, prey availability, and geographic location (Packer et al. 1999).

Summer flounder is also prey for a variety of species. A wide array of species feed on summer flounder during its larval and juvenile phases, until it has reached adult sizes (Packer et al. 1999). Adult flounder were found most frequently in the stomachs of spiny dogfish, followed by monkfish, winter skates, and bluefish (NEFSC 2013a). Larger sharks and rays also likely prey on adult summer flounder (Packer et al. 1999).

One ecosystem issue currently affecting the summer flounder fishery is that this species is undergoing a geographic shift, moving from warmer southern waters to cooler northern waters as ocean temperatures rise. This has led to increased fishing activity and landings of this species in northern waters (Pinsky et al. 2013), the impacts of which are still being studied.

Currently, the National Oceanic and Atmospheric Administration (NOAA) is running an Integrated Ecosystem Assessment (IEA) Program throughout various regions of the country. Ecosystem-based management approaches are relatively new, compared to single species assessments and management measures, and the IEA program is still developing methods for managing on an ecosystem level. But, NOAA plans on using these methods in the future. So far, the Northeast region has two publications regarding its ongoing work and model developments (NOAA 2014a). In addition to NOAA's program, both the Mid-Atlantic Fishery Management Council (MAFMC) and the Atlantic States Marine Fisheries Commission (ASMFC) have been working toward ecosystem-based management approaches and multispecies assessments over the last decade (ASMFC 2014c)(MAFMC 2014a). But, no specific ecosystem policies are in place for the summer flounder fishery.

Because there are no species of exceptional ecological importance affected by this fishery, and

ecosystem-based approaches remain in the planning stages, this factor has been awarded a score of moderate concern.

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Appendix A: Report Review and Update

This report was reviewed and updated in September 2022 for any significant stock status or management updates to the fishery. Additional data and scientific information were found that significantly affected some of the ratings.

The overall recommendation for summer flounder caught in the U.S. gillnet fishery was downgraded to Avoid. The overall recommendations for summer flounder caught using barriers, fences, weirs, corrals, etc. remains a Good Alternative, while summer flounder caught using handlines and hand-operated pole and lines remains a Best Choice.

The most recent stock status information was used to update answers for Factors 2.1 and 2.2 for North Atlantic right whale. This did not result in a change in the score for either factor.

Information on recent entanglements of North Atlantic right whale resulting in serious injury was considered with respect to the effectiveness of management measures implemented in the U.S. gillnet fishery for summer flounder to minimize the impact on this endangered marine mammal. The cumulative impact of fishing mortality, the potential for the U.S. gillnet fishery for summer flounder to contribute to this excessive fishing mortality, and the failure of management measures to prevent entanglement leading to serious injury or mortality of North Atlantic right whale resulted in a score of ineffective (a downgrade from the previous moderately effective score).

Red criterion scores for Criteria 2 and 3 result in an overall rating of Avoid for the U.S. gillnet fishery for summer flounder.