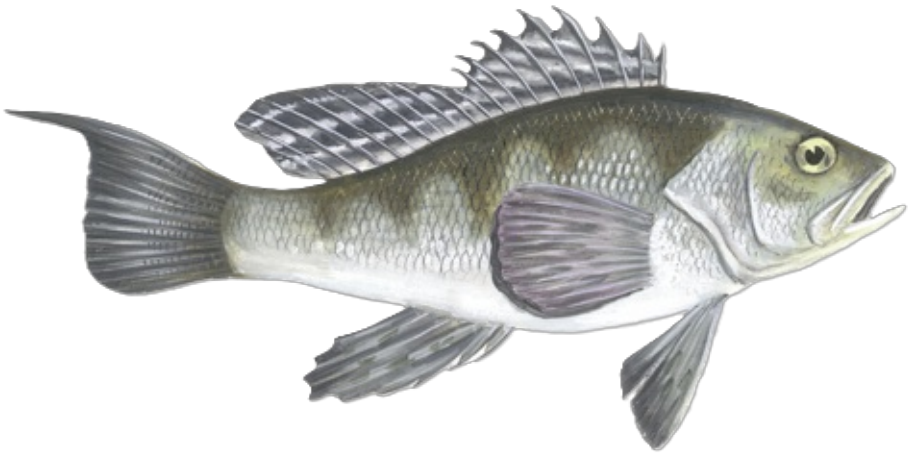
Monterey Bay Aquarium
Seafood Watch

Environmental sustainability assessment of wild-caught black sea bass *(Centropristis striata)* from the United States caught using pots, bottom trawls, and handlines.



Species:	Black sea bass *(Centropristis striata)*
Location:	United States: Northwest and Western Central Atlantic
Gear:	Pots, Bottom trawls, Handlines
Type:	Wild Caught
Author:	Seafood Watch
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Assessed using Seafood Watch Fisheries Standard v3

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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

This report provides recommendations for the commercial black sea bass (*Centropristis striata*) fishery using pots in the U.S. Northwest Atlantic and in the west coast of Florida (in the Gulf of Mexico), and using trawls and handlines in the U.S. Northwest Atlantic. There are three separate stocks of black sea bass in the U.S.; however, only two stocks were included in this report: the North Atlantic stock, which is found from the Gulf of Maine through Cape Hatteras, North Carolina and is managed by the Mid-Atlantic Fishery Management Council, the Atlantic States Marine Fisheries Commission and member states, and NOAA Fisheries; and the Gulf of Mexico stock, which is not federally managed and, in the state of Florida, only a Saltwater Products License (SPL), a Restricted Species (RS) license, and a minimum size limit of 10 inches total length are required.

Stock assessment models indicate that black sea bass in the Northwest Atlantic is healthy, showing sustainable levels for biomass and fishing mortality. The Gulf of Mexico stock does not have a recent stock assessment, so a productivity-susceptibility assessment (PSA) was performed, and fishing mortality is unknown.

The main concerns for by-catch in the pots/traps are the impacts on marine mammals (for both the Northwest Atlantic and Gulf of Mexico). By-catch in handlines has one common species, red hake, that is considered to be overfished and undergoing overfishing. By-catch in the trawl fishery is usually higher than for other fishing gears. There are some issues with catch of marine mammals in this fishery, but no by-catch species are currently assessed as overfished or undergoing overfishing.

The black sea bass fishery in Florida (Gulf of Mexico) is not federally managed, but the Florida Fish and Wildlife Conservation Commission requires a Saltwater Products License (SPL) and Restricted Species (RS) license. A minimum size limit of 10 in. total length is also mandatory. Quotas and harvest limits are not in place. Traps have specific regulations to avoid catch of undersized animals as well as to prevent ghost fishing. In the Northwest Atlantic, black sea bass is managed jointly by the Mid-Atlantic Fishery Management Council and the Atlantic States Marine Fisheries Commission, in a multi-species fishery management plan with scup and summer flounder. The fishery management plan includes annual catch limits, annual catch targets, accountability measures, gear restrictions, minimum fish sizes, and special management zones. Also, minimum size, minimum mesh size, closed seasons, and moratoriums on entry into the fishery may be established by each state. Strong enforcement and stakeholder engagement are part of the management process in these fisheries. There are serious concerns regarding the effectiveness of the Atlantic Large Whale Take Reduction Plan and the impact of pot/trap fisheries on North Atlantic right whale in this region.

Because black sea bass has a strong association with structured habitats, including reefs, any gear targeting such species may cause impacts on more vulnerable habitats. Spatial management in the Northwest Atlantic stock management only includes an exclusion of commercial fisheries on certain artificial reefs, which was implemented to address conflicts between commercial and recreational fishers (with ecological concerns as a secondary benefit); whereas in Florida, existing management measures do not include spatial management and does not consider ecological roles of targeted species.

Final Seafood Recommendations

SPECIES | FISHERY	CRITERION 1 TARGET SPECIES	CRITERION 2 OTHER SPECIES	CRITERION 3 MANAGEMENT	CRITERION 4 HABITAT	OVERALL RECOMMENDATION
Black sea bass | Northwest Atlantic | Bottom trawls | United States	5.000	2.236	4.000	2.121	**Good Alternative (3.121)**
Black sea bass | Northwest Atlantic | Handlines | United States	5.000	1.000	4.000	3.464	**Good Alternative (2.885)**
Black sea bass | Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida	2.644	1.732	1.000	2.449	**Avoid (1.830)**
Black sea bass | Northwest Atlantic | Pots | United States	5.000	1.000	1.000	2.739	**Avoid (1.924)**

Summary

Black sea bass caught with handlines or bottom trawls is rated a Good Alternative. Black sea bass caught with pots or traps is rated an Avoid: in Florida, the fishery is ineffectively managed, and in the New England region, there is potential to interact with the critically endangered North Atlantic right whale, and the Atlantic Large Whale Take Reduction Plan has failed 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 provides recommendations for the black sea bass (*Centropristis striata*) fishery using pots with vertical lines in the U.S. Northwest Atlantic and Gulf of Mexico, and using trawls and handlines in the U.S. Northwest Atlantic. Black sea bass occurs along the entire U.S. Atlantic coast, from Maine through Florida and in the Gulf of Mexico, as three distinct stocks; however, this report focuses on the Northwest Atlantic and Florida's west coast (Gulf of Mexico) fisheries. These sections contain two distinct stocks: the North Atlantic stock and the Gulf of Mexico stock. There is an emerging fishery using 'on-demand' or 'ropeless' trap systems which are not assessed in this report.

Species Overview

Black sea bass (*Centropristis striata*) is a serranid fish found in waters from the Gulf of Mexico to the Gulf of Maine (Drohan et al. 2007)(NEFSC 2017). Adult specimens are usually found associated with habitats that are structurally complex, such as rocky reefs, cobble and rock fields, coral patches, and mussel beds (Drohan et al. 2007). Genetic studies indicate three different stocks for black sea bass: Gulf of Mexico, South Atlantic (both in FAO area 31), and the North Atlantic stock (FAO area 21) (Drohan et al. 2007) (NEFSC 2017). The South Atlantic and the North Atlantic stocks are geographically separated by Cape Hatteras, North Carolina (MAFMC 2018). Because these are separate stocks, they are managed separately with distinct management plans and agendas. Black sea bass is a protogynous hermaphrodite and is sexually mature by 2–3 years, or about 20 cm in length (MAFMC 2018). The species feeds particularly on crabs, shrimp, worms, clams, and small fish, whereas it is prey for little skate, spiny dogfish, monkfish, summer flounder, and spotted hake (NOAA 2019).

The black sea bass fishery is managed by multiple councils, varying according to the geographic region. North of Cape Hatteras (NC), it is managed by the Mid-Atlantic Fishery Management Council, NOAA's National Marine Fisheries Service (NMFS), and the Atlantic States Marine Fisheries Commission. The fishery in this region is managed under the Summer Flounder, Scup and Black Sea Bass management plan, and otter trawl is the most-used gear for this fishery, along with pots and hook and line. South of Cape Hatteras, it is managed by the South Atlantic Fishery Management Council and NOAA's National Marine Fisheries Service (NMFS), under the South Atlantic Snapper Grouper Fishery Management Plan. Pots and handlines/rod-reel are the most-used gears in this region (NOAA 2019). The stock in the Gulf of Mexico is not managed federally, and in the state of Florida, only a Saltwater Products License (SPL), a Restricted Species (RS) license, and a minimum size limit of 10 in. total length are required. The use of fish traps in federal waters is illegal in the Gulf of Mexico, so the rating refers to fish caught in Florida's state waters.

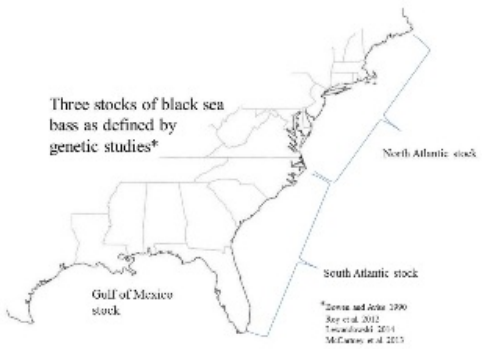

Figure 1: Map of geographic boundaries for three black sea bass stocks in the United States. Source: (NEFSC 2017).

Production Statistics

Reported values of commercial landings in 2018 were 1,550 mt (3.416 million lbs.), whereas estimated values were 722 mt (1.591 million lbs.) (NEFSC 2019d). The highest reported value of commercial landings is from 2017 (1,808 mt) and the lowest is from 2009 (523 mt). Landings of black sea bass have been recorded since 1989 (NEFSC 2019d).

	Commercial Landings	Commercial Discards	Recreational Landings	Recreational Discards	Total
1989	1,105	109	1,881	99	3,194
1990	1,402	53	1,354	231	3,040
1991	1,190	10	1,766	175	3,142
1992	1,264	141	1,344	165	2,914
1993	1,353	78	2,022	120	3,573
1994	848	37	1,347	210	2,443
1995	889	24	1,860	397	3,171
1996	1,448	285	2,755	236	4,724
1997	1,197	55	2,470	251	3,973
1998	1,152	121	681	310	2,263
1999	1,290	45	856	545	2,736
2000	1,186	44	1,836	873	3,939
2001	1,279	240	2,621	886	5,025
2002	1,564	46	2,528	1,381	5,518
2003	1,347	114	2,492	641	4,595
2004	1,405	380	1,362	374	3,521
2005	1,297	89	1,437	350	3,173
2006	1,285	33	1,243	371	2,933
2007	1,037	104	1,425	354	2,920
2008	875	66	1,606	585	3,132
2009	523	167	2,525	623	3,838
2010	751	134	3,502	733	5,121
2011	765	227	1,421	358	2,771
2012	782	116	3,162	1,048	5,108
2013	1,027	278	2,685	749	4,739
2014	1,088	459	3,510	839	5,896
2015	1,113	423	4,448	985	6,969
2016	1,133	757	6,131	1,391	9,412
2017	1,808	1,027	5,692	1,634	10,162
2018	1,550	722	4,008	1,044	7,324

Figure 2: Total catch of black sea bass (mt) from Maine through North Carolina. Values of recreational catch are also estimated (recreational discards assume 15% mortality). Source: (NEFSC 2019d).

In 2018, the production from otter trawl reached 2,000,819 lbs., from pots reached 521,314 lbs., and from handline/rod-reel reached 569,212 lbs. (NOAA 2019p).

Importance to the US/North American market.

Black sea bass is only found within U.S. water limits, so it is not included in import statistics. Data on the U.S. Import and Export Merchandise trade statistics do not specify sea bass species; therefore, a specific export trend for black sea bass is not available.
https://usatrade.census.gov/data/Perspective60/Dim/dimension.aspx

Common and market names.

Blackfish, rock bass, black bass, bluefish, tallywag (Seafood Handbook 2019).

Primary product forms

Black sea bass is available for purchase live, fresh (whole, head-on, headed/gutted, fillets) and frozen (whole, head-on, headed/gutted, fillets) (Seafood Handbook 2019).

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. When abundance is unknown, abundance is scored based on the species' inherent vulnerability, which is calculated using a Productivity-Susceptibility Analysis. 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.

Guiding principles

- *Ensure all affected stocks are healthy and abundant.*
- *Fish all affected stocks at sustainable level*

Criterion 1 Summary

BLACK SEA BASS			
REGION / METHOD	**ABUNDANCE**	**FISHING MORTALITY**	**SCORE**
Northwest Atlantic | Bottom trawls | United States	5.000: Very Low Concern	5.000: Low Concern	Green (5.000)
Northwest Atlantic | Handlines | United States	5.000: Very Low Concern	5.000: Low Concern	Green (5.000)
Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida	2.330: Moderate Concern	3.000: Moderate Concern	Yellow (2.644)
Northwest Atlantic | Pots | United States	5.000: Very Low Concern	5.000: Low Concern	Green (5.000)

Criterion 1 Assessments

SCORING GUIDELINES

Factor 1.1 - Abundance

Goal: Stock abundance and size structure of native species is maintained at a level that does not impair recruitment or productivity.

- *5 (Very Low Concern) — Strong evidence exists that the population is above an appropriate target abundance level (given the species' ecological role), or near virgin biomass.*
- *3.67 (Low Concern) — Population may be below target abundance level, but is at least 75% of the target level, OR data-limited assessments suggest population is healthy and species is not highly vulnerable.*
- *2.33 (Moderate Concern) — Population is not overfished but may be below 75% of the target abundance level, OR abundance is unknown and the species is not highly vulnerable.*
- *1 (High Concern) — Population is considered overfished/depleted, a species of concern, threatened or endangered, OR abundance is unknown and species is highly vulnerable.*

Factor 1.2 - Fishing Mortality

Goal: Fishing mortality is appropriate for current state of the stock.

- *5 (Low Concern) — Probable (>50%) that fishing mortality from all sources is at or below a sustainable level, given the species ecological role, OR fishery does not target species and fishing mortality is low enough to not adversely affect its population.*
- *3 (Moderate Concern) — Fishing mortality is fluctuating around sustainable levels, OR fishing mortality relative to a sustainable level is uncertain.*
- *1 (High Concern) — Probable that fishing mortality from all source is above a sustainable level.*

Black sea bass

Factor 1.1 - Abundance

Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida

Moderate Concern

The black sea bass stock in the Gulf of Mexico is not a well-studied stock. A stock assessment is not available. A productivity-susceptibility analysis (PSA) was then performed for the Gulf of Mexico stock. The relevant information for the PSA are displayed in the tables below. The PSA score for black sea bass in the Gulf of Mexico is 2.80, suggesting medium vulnerability; therefore, this factor is scored a moderate concern.

Productivity attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity	1–3 years (NOAA 2019)	1
Average maximum age	8 years (female); 12 years (male) (NOAA 2019)	2
Fecundity	30,000 to 500,000 eggs (NOAA 2019)	1
Average maximum size (fish only)	60.96 cm (NOAA 2019)	1
Average size at maturity (fish only)	n/a	n/a
Reproductive strategy	Broadcast spawner (Lavenda 1949)	1
Trophic level	3, 9 (Froese and Pauly 2019)	3
Habitat quality	Moderately altered, particularly because the species spawns in coastal areas (NOAA 2019) that are subject to cumulative human impacts.	2
Productivity score	-	1.57

Susceptibility attribute	Relevant information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Areal overlap (considers all fisheries)	Black sea bass is found in waters from the Gulf of Mexico to Cape Cod (MAFMC 2018). The species is highly targeted throughout its distribution.	3
Vertical overlap (considers all fisheries)	Species is targeted, default value is used.	3
Selectivity of fishery (specific to fishery under assessment)	Species is targeted and "high risk" conditions do not apply.	2
Post-capture mortality (specific to fishery under assessment)	Species is retained.	3
Susceptibility score		2.33

Northwest Atlantic | Bottom trawls | United States
Northwest Atlantic | Handlines | United States
Northwest Atlantic | Pots | United States

Very Low Concern

The most recent operational assessment for black sea bass is from 2019, with data up to 2018, and suggests that the stock is not overfished (NEFSC 2019d). Updated SSB_{2018} was estimated at 33,668 mt, which is over two times the target reference point SSB_{MSY} proxy = $SSB_{40\%}$ = 14,085 mt (NEFSC 2019d). Recruitment from 1989 to 2018 has an average of 36 million fish at age 1; however, recruitment of the 2017 year class in 2018 (as age 1) was estimated at 16 million fish, which is much lower than average (NEFSC 2019d). Abundance for black sea bass is scored a very low concern, because there is a recent stock assessment and values are about two times the target reference points.

Justification:

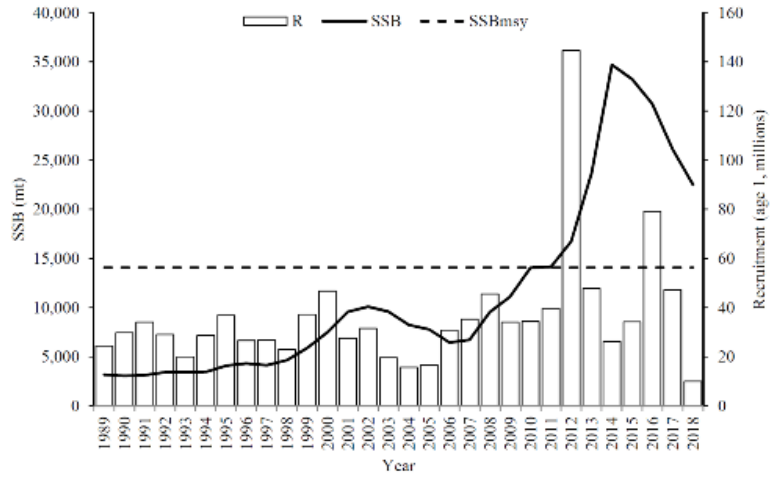

Figure 3: Spawning stock biomass (SSB, solid line) and recruitment (R, vertical bars) for black sea bass, by calendar year. Dashed horizontal line means the updated proxy for SSB at MSY (SSB_{MSY} proxy = $SSB_{40\%}$ = 14,085 mt). Source: (NEFSC 2019d).

Factor 1.2 - Fishing Mortality

Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida

Moderate Concern

Because a stock assessment is not available for the Gulf of Mexico stock, fishing mortality for this stock is unknown. This score is rated a moderate concern, because fishing mortality is unknown.

Northwest Atlantic | Bottom trawls | United States
Northwest Atlantic | Handlines | United States
Northwest Atlantic | Pots | United States

Low Concern

The most updated stock assessment indicates that overfishing is not occurring on the Northern Atlantic black sea bass stock (NEFSC 2019d). Fishing mortality for this stock (ages 6–7) was estimated at 0.27 for 2018. This value is 57% of the updated F reference point F_{MSY} proxy = $F_{40\%}$ = 0.46 (NEFSC 2019d). Because fishing mortality is occurring at a sustainable level, this factor is scored a low concern.

Justification:

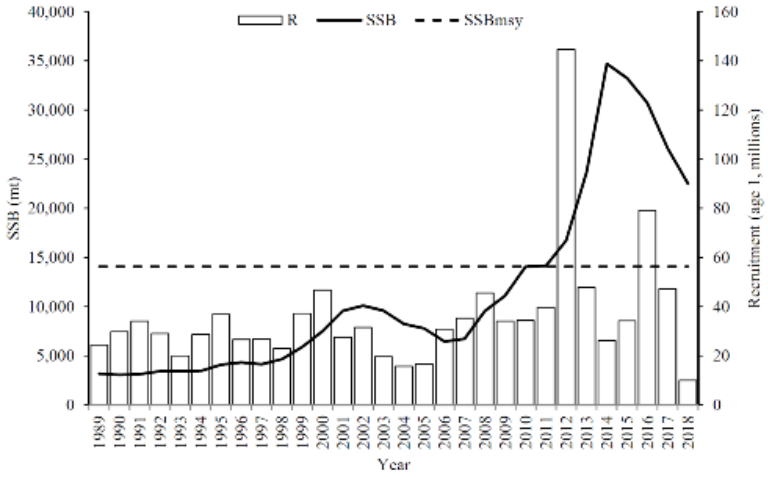

Figure 4: Spawning stock biomass (SSB, solid line) and recruitment (R, vertical bars) for black sea bass, by calendar year. Dashed horizontal line means the updated proxy for SSB at MSY (SSB_{MSY} proxy = $SSB_{40\%}$ = 14,085 mt). Source: (NEFSC 2019d).

Criterion 2: Impacts on Other Species

All main retained and bycatch species in the fishery are evaluated under Criterion 2. 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. Species are evaluated using the same guidelines as in Criterion 1. When information on other species caught in the fishery is unavailable, the fishery's potential impacts on other species is scored according to the Unknown Bycatch Matrices, which are based on a synthesis of peer-reviewed literature and expert opinion on the bycatch impacts of each gear type. The fishery is also scored for the amount of non-retained catch (discards) and bait use relative to the retained catch. To determine the final Criterion 2 score, the score for the lowest scoring retained/bycatch species is multiplied by the discard/bait 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 is Critical if Factor 2.3 (Fishing Mortality) is Crtitical

Guiding principles

- *Ensure all affected stocks are healthy and abundant.*
- *Fish all affected stocks at sustainable level.*
- *Minimize bycatch.*

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.

BLACK SEA BASS			
REGION / METHOD	**SUB SCORE**	**DISCARD RATE/LANDINGS**	**SCORE**
Northwest Atlantic | Bottom trawls | United States	2.236	1.000: < 100%	Yellow (2.236)
Northwest Atlantic | Handlines | United States	1.000	1.000: < 100%	Red (1.000)
Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida	1.732	1.000: < 100%	Red (1.732)
Northwest Atlantic | Pots | United States	1.000	1.000: < 100%	Red (1.000)

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.

GULF OF MEXICO | ATLANTIC, WESTERN CENTRAL | POTS | UNITED STATES | FLORIDA			
SUB SCORE: 1.732	DISCARD RATE: 1.000	**SCORE: 1.732**	
SPECIES	**ABUNDANCE**	**FISHING MORTALITY**	**SCORE**
Bottlenose dolphin	1.000: High Concern	3.000: Moderate Concern	Red (1.732)
Black sea bass	2.330: Moderate Concern	3.000: Moderate Concern	Yellow (2.644)
Calico box crab	2.330: Moderate Concern	3.000: Moderate Concern	Yellow (2.644)

NORTHWEST ATLANTIC | BOTTOM TRAWLS | UNITED STATES			
SUB SCORE: 2.236	DISCARD RATE: 1.000	**SCORE: 2.236**	
SPECIES	**ABUNDANCE**	**FISHING MORTALITY**	**SCORE**
Skates (unspecified)	1.000: High Concern	5.000: Low Concern	Yellow (2.236)
Atlantic white-sided dolphin	2.330: Moderate Concern	5.000: Low Concern	Green (3.413)
Bottlenose dolphin	2.330: Moderate Concern	5.000: Low Concern	Green (3.413)
Gray seal	2.330: Moderate Concern	5.000: Low Concern	Green (3.413)
Harbor porpoise	2.330: Moderate Concern	5.000: Low Concern	Green (3.413)
Harbor seal	2.330: Moderate Concern	5.000: Low Concern	Green (3.413)
Long-finned pilot whale	2.330: Moderate Concern	5.000: Low Concern	Green (3.413)
Risso's dolphin	2.330: Moderate Concern	5.000: Low Concern	Green (3.413)
Short-beaked common dolphin	2.330: Moderate Concern	5.000: Low Concern	Green (3.413)
Silver hake	2.330: Moderate Concern	5.000: Low Concern	Green (3.413)
Squid (unspecified)	5.000: Very Low Concern	3.000: Moderate Concern	Green (3.873)
Little skate	3.670: Low Concern	5.000: Low Concern	Green (4.284)
Summer flounder	3.670: Low Concern	5.000: Low Concern	Green (4.284)
Winter skate	3.670: Low Concern	5.000: Low Concern	Green (4.284)
Black sea bass	5.000: Very Low Concern	5.000: Low Concern	Green (5.000)
Scup	5.000: Very Low Concern	5.000: Low Concern	Green (5.000)

NORTHWEST ATLANTIC | HANDLINES | UNITED STATES			
SUB SCORE: 1.000	DISCARD RATE: 1.000	**SCORE: 1.000**	
SPECIES	**ABUNDANCE**	**FISHING MORTALITY**	**SCORE**
Red hake	1.000: High Concern	1.000: High Concern	Red (1.000)
Black sea bass	5.000: Very Low Concern	5.000: Low Concern	Green (5.000)
Scup	5.000: Very Low Concern	5.000: Low Concern	Green (5.000)

NORTHWEST ATLANTIC | POTS | UNITED STATES			
SUB SCORE: 1.000	DISCARD RATE: 1.000	**SCORE: 1.000**	
SPECIES	**ABUNDANCE**	**FISHING MORTALITY**	**SCORE**
North Atlantic right whale	1.000: High Concern	1.000: High Concern	Red (1.000)
American lobster	1.000: High Concern	3.000: Moderate Concern	Red (1.732)
Fin whale	1.000: High Concern	5.000: Low Concern	Yellow (2.236)
Humpback whale	2.330: Moderate Concern	3.000: Moderate Concern	Yellow (2.644)
Black sea bass	5.000: Very Low Concern	5.000: Low Concern	Green (5.000)
Scup	5.000: Very Low Concern	5.000: Low Concern	Green (5.000)

For all gears in the Northwest Atlantic, catch composition data provided by the National Marine Fisheries Service from 2018 were evaluated, and species making up at least 5% of total catch were included in this assessment. In addition, the list of commercial fisheries in the Atlantic Ocean, Gulf of Mexico, and Caribbean was considered, to include any species of concern, following the Marine Mammal Protection Act.

For the pot fishery in the Northwest Atlantic, North Atlantic right whale limits the score for Criterion 2 due to its "Endangered" listing under the Endangered Species Act.

For the trawl fishery in the Northwest Atlantic, no species assessed present concerns on their stock status. Multiple species of skate are caught in this fishery, and two of the seven species that occur along the Northeast Atlantic coast collectively made up over 5% of the total catch: little skate (*Leucoraja erinacea*) and winter skate (*Leucoraja ocellata*). As a result, these two skate species were assessed in the report individually, while all other skate species were grouped, unspecified.

For the handline fishery in the Northwest Atlantic, red hake limits the score for Criterion 2 due to its overfished and overfishing status, according to a recent stock assessment.

For the pot fishery in the Western Central Atlantic (Gulf of Mexico), bottlenose dolphin limits the score for Criterion 2 because the majority of stocks show unknown abundance and the group is considered to have high vulnerability.

Criterion 2 Assessment

SCORING GUIDELINES

Factor 2.1 - Abundance
(same as Factor 1.1 above)

Factor 2.2 - Fishing Mortality
(same as Factor 1.2 above)

Factor 2.3 - Modifying Factor: Discards and Bait Use
Goal: Fishery optimizes the utilization of marine and freshwater resources by minimizing post-harvest loss. For fisheries that use bait, bait is used efficiently.

Scoring Guidelines: The discard rate is the sum of all dead discards (i.e. non-retained catch) plus bait use divided by the total retained catch.

Ratio of bait + discards/landings	Factor 2.3 score
<100%	1
>=100	0.75

American lobster

Factor 2.1 - Abundance

Northwest Atlantic | Pots | United States

High Concern

The Southern New England (SNE) lobster stock is depleted, with the 3-year average abundance for 2016–2018 (7 million lobsters) below the abundance threshold (20 million lobsters) (ASMFC 2020a). Beginning in 1997, the SNE stock suffered severe population declines, due partly to shell disease and changing environmental conditions (Phillips 2013). The stock is at an all-time low, and recruitment indices indicate that recruitment failure is preventing the stock from rebuilding (ASMFC 2020a). There is a contraction of the stock, which is now being seen in the offshore component in conjunction with the contraction of the inshore component (ASMFC 2020a). Environmental conditions remain unfavorable and disease indices are high (ASMFC 2020a). Because the SNE stock is in a depleted state, it is scored a high concern.

Justification:

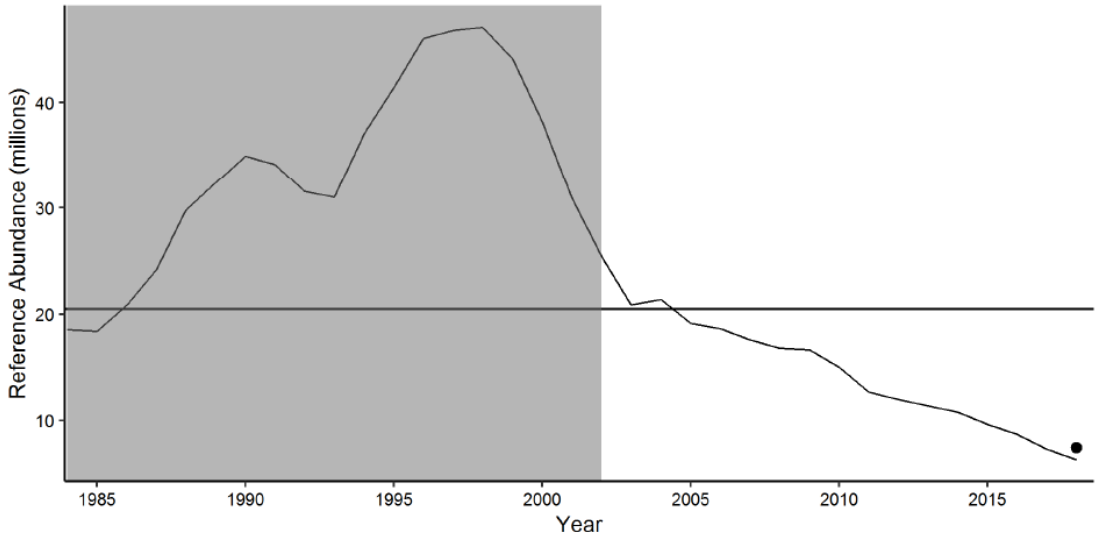

Figure 5: Southern New England lobster stock reference abundance relative to the abundance threshold (solid black line) reference point based on detected high (grey period) and low (white period) abundance regimes. The circle denotes the terminal 3-year (2016–2018) average reference abundance (ASMFC 2020a).

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Pots | United States

Moderate Concern

Managers do not consider the Southern New England lobster stock to be experiencing overfishing. The 3-year average exploitation for 2016–2018 (0.2742) is below the exploitation threshold

(0.2895). But, it exceeds the target exploitation reference point (0.2569) and is not considered favorable (ASMFC 2020a). Exploitation has fluctuated between the threshold and target reference points during the last decade (ASMFC 2020a). Because overfishing is not occurring but exceeds the target exploitation reference, a score of moderate concern is given.

Justification:

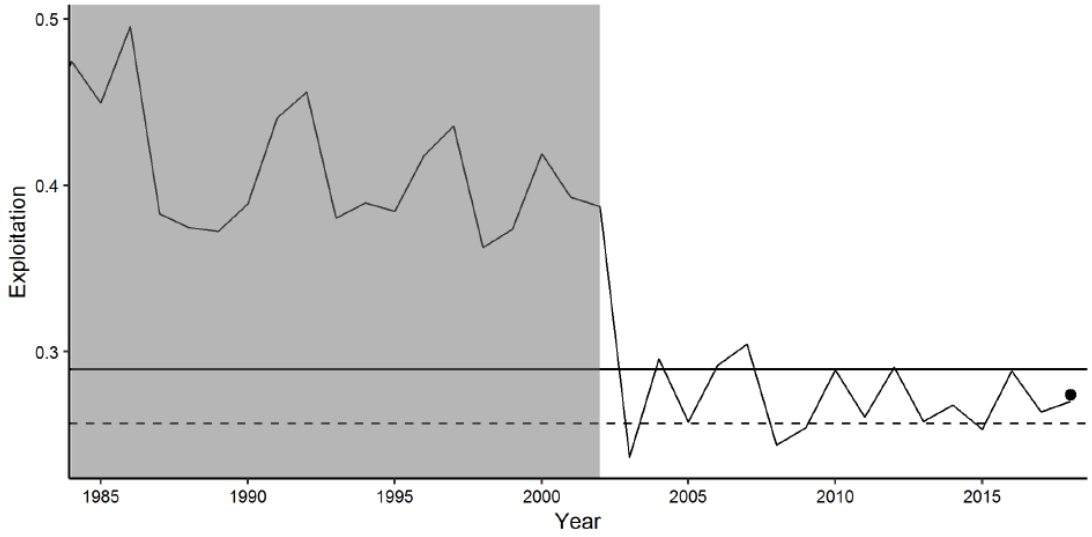

Figure 6: Southern New England lobster stock exploitation relative to the current target (dashed black line) and threshold (solid black line) reference points. Shaded periods are detected high (grey period) and low (white period) abundance regimes. The circle is the terminal 3-year (2016–2018) average exploitation (ASMFC 2020a).

Atlantic white-sided dolphin

Factor 2.1 - Abundance

Northwest Atlantic | Bottom trawls | United States

Moderate Concern

According to the most current marine mammal stock assessment report, the best estimate of abundance for the North Atlantic white-sided dolphin stock was 93,233 (CV = 0.71), with a minimum population size of 54,443 (Hayes et al. 2020). The status of this population relative to the optimum sustainable population (OSP) in the U.S. Atlantic EEZ is unknown, and a trend analysis has not been conducted for this species (Hayes et al. 2020). The International Union for the Conservation of Nature (IUCN) considers this species as "Least Concern" (Hammond et al. 2008a), and because status and trend analysis are unknown, abundance is considered a moderate concern.

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Bottom trawls | United States

Low Concern

The total annual estimated average fishery-related mortality or serious injury to the western North Atlantic white-sided dolphin stock during 2013 to 2017 was 26 individuals (CV = 0.20), with a potential biological removal (PBR) of 544 (Hayes et al. 2020). The Northeast bottom trawl is by far the primary contributor, accounting for 81% (21/26 individuals) of the total by-catch across all fisheries, with the Northeast sink gillnet fishery accounting for 11% (2.8/26 individuals) (Hayes et al. 2020). Because PBR is not exceeded, and the bottom trawl fishery takes less than 50% of the PBR, fishing mortality is considered a low concern.

Bottlenose dolphin

Factor 2.1 - Abundance

Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida

High Concern

Multiple stocks were included for this criterion, with some being considered strategic under the Marine Mammal Protection Act (MMPA), such as the Northern Gulf of Mexico Bay, Sound, and Estuary Stocks (NOAA 2019m). Because multiple stocks are included in this criterion, the stock with the most vulnerable condition will make up the final score. Also, bottlenose dolphin has an IUCN "Least Concern" status (Wells et al. 2019). The Gulf of Mexico eastern coastal stock has a stock assessment from 2011–2012 surveys (abundance estimated at 12,388; CV = 0.13) (NOAA 2016). This stock is not listed as threatened or endangered under the Endangered Species Act, nor is it considered strategic under the MMPA (NOAA 2016). But, the Northern Gulf of Mexico Bay, Sound, and Estuary Stocks have unknown population sizes (except 2 stocks, out of 36) and there are insufficient data to estimate population trends (NOAA 2019m). This factor is deemed a high concern, because the majority of stocks show unknown abundance and the group is considered to have high vulnerability.

Northwest Atlantic | Bottom trawls | United States

Moderate Concern

The best available estimate for the offshore stock of common bottlenose dolphin in the western North Atlantic is 62,851 (CV = 0.23), with a minimum population size of 51,914 (Hayes et al. 2020). This estimate is from surveys covering waters from central Florida to the lower Bay of Fundy in 2011 and 2016. The status of this stock relative to the optimum sustainable population (OSP) in the U.S. Atlantic EEZ is unknown, as are population trends (Hayes et al. 2020). The International Union for the Conservation of Nature (IUCN) considers this species as "Least Concern" (Hammond et al. 2012), and because status and trend analyses are unknown, abundance is considered a moderate concern.

Factor 2.2 - Fishing Mortality

Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida

Moderate Concern

Multiple stocks were also included for this criterion, including strategic stocks under the Marine

Mammal Protection Act (MMPA), such as the Northern Gulf of Mexico Bay, Sound, and Estuary Stocks (NOAA 2019m). Total annual observed average fishery-related mortality or serious injuries are unknown for these stocks, because some fisheries that are known to interact with bottlenose dolphin in the region do not have observer coverage (the species interacts with shrimp trawl, blue crab, stone crab and spiny lobster trap/pot, shark bottom longline, purse seine, and hook and line fisheries) (NOAA 2016). The current potential biological removal (PBR) may not be available for some stocks (e.g., (NOAA 2019m)). This factor is deemed a moderate concern because, even though the species is not considered strategic under the MMPA or threatened under the ESA, the total mortality is unknown.

Northwest Atlantic | Bottom trawls | United States

Low Concern

The total annual estimated average fishery-related mortality or serious injury to the western North Atlantic bottlenose dolphin stock during 2013 to 2017 was 28 (CV = 0.34), with a potential biological removal (PBR) of 519 (Hayes et al. 2020). The Northeast bottom trawl is a main contributor, accounting for 37% (10.4/28 individuals) of the total by-catch across all fisheries, with the Northeast sink gillnet fishery accounting for 25% (7/28 individuals) (Hayes et al. 2020). Because PBR is not exceeded, and the bottom trawl fishery takes less than 50% of the PBR, fishing mortality is considered a low concern.

Calico box crab

Factor 2.1 - Abundance

Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida

Moderate Concern

Calico box crab is not targeted in this fishery, and information for this species is scarce (including the absence of stock assessments). To perform a productivity-susceptibility analysis (PSA) for this species, a better-studied congener (flecked box crab, *Hepatus pundibundus*) was considered to fill key biological parameters. The PSA indicates a moderate concern for the species (PSA = 2.68). Because the species does not have information on stock status, and the PSA result indicates medium vulnerability, this factor receives a score of moderate concern.

Productivity attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity	<1 year {Keunecke 2007}	1
Average maximum age	1.7 years {Keunecke 2007}	1
Fecundity	>20,000 eggs per year (Reigada and Negreiros-Fransozo 1995)	1
Reproductive strategy	Spawner (de Lima et al. 2014)	1
Trophic level	3, 9 (Mantelatto and Petracco 1997)	3
Density dependence	No evidence for compensatory or depensatory dynamics	2

Productivity score	-	1.33

Susceptibility attribute	Relevant information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Areal overlap (considers all fisheries)	Unknown, and the species appears to be a common by-catch species across its range (Gandy et al. 2018). Default score of 3 is used.	3
Vertical overlap (considers all fisheries)	Species is not targeted, default value is used.	3
Selectivity of fishery (specific to fishery under assessment)	Species is not targeted and "high risk" conditions do not apply.	2
Post-capture mortality (specific to fishery under assessment)	Post-capture mortality is unknown, so the default score of 3 is used.	3
Susceptibility score		2.33

Factor 2.2 - Fishing Mortality

Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida

Moderate Concern

Fishing mortality for calico box crab is unknown. For this reason, this factor is scored a moderate concern.

Fin whale

Factor 2.1 - Abundance

Northwest Atlantic | Pots | United States

High Concern

The best abundance estimate available for the western North Atlantic fin whale stock is 6,802, with a minimum population size of 5,573 (Hayes et al. 2021). This is the estimate derived from the sum of the 2016 NOAA shipboard and aerial surveys and the 2016 Canadian Northwest Atlantic International Sightings Survey (NAISS) (Hayes et al. 2021). The surveys do not overlap, so the estimates from the two surveys were combined (Hayes et al. 2021), extending the range of the survey from Newfoundland to Florida and resulting in a significant increase in the population estimate relative to the 2011 NOAA survey (Hayes et al. 2021). The status of this stock relative to the optimum sustainable population (OSP) in the U.S. Atlantic EEZ is unknown, as are population trends (Hayes et al. 2021). The International Union for the Conservation of Nature (IUCN) Red List classifies fin whale as "Vulnerable" to extinction, the Endangered Species Act (ESA) lists it as "Endangered" (Cooke 2018b)(USFWS 2017), and it is listed on CITES Appendix I (NOAA 2017a) and as MMPA "Depleted" throughout its range (NOAA 2017b). Because of the IUCN, ESA, and MMPA listings, abundance is considered a high concern.

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Pots | United States

Low Concern

The total annual estimated average fishery-related mortality or serious injury (SIM) to the western North Atlantic fin whale stock from 2014 to 2018 was 1.55, with a potential biological removal (PBR) of 11 (Hayes et al. 2021). This value includes incidental fishery interaction records, 0.95 (0 U.S. waters, 0.95 unknown but first reported in U.S. waters, and 0.6 Canadian waters); and records of vessel collisions, 0.8 (all U.S.) (Hayes et al. 2021). But, the total level of human-caused mortality and serious injury is unknown, because NMFS records represent coverage of only a portion of the area surveyed for the population estimate for the stock (Hayes et al. 2021). The total U.S. fishery-related mortality and serious injury for this stock derived from the available records is likely biased low (Hayes et al. 2021). Because the PBR is not exceeded, and the pot/trap fishery contributes SIMs that are less than 50% of PBR, a score of low concern is given.

Gray seal

Factor 2.1 - Abundance

Northwest Atlantic | Bottom trawls | United States

Moderate Concern

There is a single population of gray seal in the Northwest Atlantic, found in both the United States and Canada. The size of the population is estimated separately for each country, and mainly reflects the size of the breeding population in each country (Hayes et al. 2021). Based on the 2016 estimate of 27,131 individuals in the U.S. portion of the population, the minimum population estimate is 23,153 (Hayes et al. 2021). Gray seal has recovered from persecution in previous years and is listed as "Least Concern" by the International Union for the Conservation of Nature (IUCN) (Bowen 2016). Based on the IUCN listing, a score of moderate concern is given.

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Bottom trawls | United States

Low Concern

The average annual estimated human-caused mortality and serious injury to gray seal from 2014 to 2018 was 4,729 (Hayes et al. 2021). The U.S. observed fishery accounted for 20% (946/4,729) of the average annual estimated human-caused mortality and serious injury; the bottom trawl fishery accounted for 2% (18/946) of those deaths (Hayes et al. 2021). The potential biological removal (PBR) for this stock is 1,389 animals and, although this is exceeded by cumulative fishing impacts, the impact of the Northeast bottom trawl fishery is responsible for less than 10% of PBR and is considered a low concern.

Justification:

The human-caused mortality and serious injury average was derived from six components: 1) 946

(CV = 0.11) from the 2014 to 2018 U.S. observed fishery; 2) 6.2 from average 2014 to 2018 non-fishery-related, human interaction stranding mortalities; 3) 636 from the average 2014 to 2018 Canadian commercial harvest; 4) 62 from the average 2014 to 2018 DFO scientific collections; 5) 3,078 removals of nuisance animals in Canada; and 6) 1.2 from U.S. research mortalities (Hayes et al. 2021).

Harbor porpoise

Factor 2.1 - Abundance

Northwest Atlantic | Bottom trawls | United States

Moderate Concern

The best current abundance estimate of the Gulf of Maine/Bay of Fundy harbor porpoise stock is 95,543 individuals (CV = 0.31), with a minimum population size of 74,034, which is from a 2016 U.S. shipboard and aerial survey combined with a DFO aerial survey of the Bay of Fundy and Scotian Shelf {Hayes et al. 2021}. But, the surveyed area may not have covered the entire area of the stock's habitat at the appropriate time of the year, and the current abundance estimate did not account for availability bias due to the submergence of animals. Without a correction for availability bias, the abundance estimate is expected to be biased low {Hayes et al. 2021}. The status of this population relative to the optimum sustainable population (OSP) in the U.S. Atlantic EEZ is unknown, and a trend analysis has not been conducted for this species {Hayes et al. 2021}. The International Union for the Conservation of Nature (IUCN) considers this species as "Least Concern" (Hammond et al. 2008b), and because status and trend analysis are unknown, abundance is considered a moderate concern.

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Bottom trawls | United States

Low Concern

The total annual estimated average fishery-related mortality or serious injury to the harbor porpoise stock during 2014 to 2018 was 150 harbor porpoises (CV = 0.14) from U.S. fisheries, with a potential biological removal (PBR) of 851 (Hayes et al. 2021). The Northeast bottom trawl fishery accounted for less than 1% (1.1/150 individuals) of the total by-catch across all fisheries {Hayes et al. 2021}. Because PBR is not exceeded, and the bottom trawl fishery accounts for less than 50% of the PBR, fishing mortality is considered a low concern.

Harbor seal

Factor 2.1 - Abundance

Northwest Atlantic | Bottom trawls | United States

Moderate Concern

The best current abundance estimate of the harbor seal stock is 75,834 (CV = 0.15), with a minimum population size of 66,884, which is from a 2012 survey {Waring et. al. 2015}(Hayes et al. 2021). The status of this population relative to the optimum sustainable population (OSP) in the U.S. Atlantic EEZ is unknown, and a trend analysis has not been conducted for this species (Waring et al. 2015)(Hayes et al. 2021). The International Union for the Conservation of Nature (IUCN) considers this species as "Least Concern" (Lowry 2016), and because status and trend analysis are unknown, abundance is considered a moderate concern.

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Bottom trawls | United States

Low Concern

The total human-caused mortality or serious injury to the harbor seal stock during 2014 to 2018 was 365.2 (351 harbor seals per year from U.S. fisheries), with a potential biological removal (PBR) of 2,006 (Hayes et al. 2021). The Northeast bottom trawl fishery accounts for 1% (3.8/351 individuals) of the total by-catch across all fisheries (Hayes et al. 2021). Because PBR is not exceeded, and the bottom trawl fishery is not a major contributor, fishing mortality is considered a low concern.

Humpback whale

Factor 2.1 - Abundance

Northwest Atlantic | Pots | United States

Moderate Concern

The humpback whale population in the Gulf of Maine stock is estimated to be 1,396 individuals (Hayes et al. 2020). Population trends and the status of the stock relative to the optimum sustainable population (OSP) are unknown. NMFS conducted a global status review of humpback whale (Bettridge et al. 2015) and recently revised the Endangered Species Act (ESA) listing of the species (Federal Register 2016). The final rule indicated that, until the stock delineations are reviewed in light of the Distinct Population Segment (DPS) designations, NMFS would consider stocks that do not fully or partly coincide with a listed DPS as not depleted, for management purposes. Hence, the Gulf of Maine stock (part of the West Indies DPS) is considered not depleted because it does not coincide with any ESA-listed DPS (NOAA 2018b). Globally, humpback whale is considered "Least Concern" by the International Union for the Conservation of Nature (IUCN) (Cooke 2018). Because humpback whale is not considered endangered or threatened in the Gulf of Maine and is classified as "Least Concern" by the IUCN, abundance is ranked a moderate concern.

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Pots | United States

Moderate Concern

From 2013 to 2017, the average annual rate of human-caused mortality and serious injury (SIM) for the Gulf of Maine humpback whale stock was 12.15 whales (7.75 for fishery interactions), which is considered negatively biased due to detection limitations (Hayes et al. 2020). Based on the inference of undetected mortality from annual population estimates, managers determined that it is likely that annual average mortality and serious injury exceeds the potential biological removal (PBR) (22 whales); however, this has yet to be formally determined and the proportion by nationality or cause is unknown. There is an Unusual Mortality Event in effect (since January 2016) for Atlantic humpback whale due to coast-wide elevated mortality levels in the United States observed from strandings, but it is likely that these are due to vessel strikes (NOAA 2021). It is estimated that 48–65% of the Gulf of Maine humpback whale stock have experienced a previous entanglement, based on scarring {Robbins & Mattila 2001}.

The majority of entanglements are not identifiable to a specific fishery, so the proportion of entanglement due to the black sea bass pot fishery is unclear. The annual rate of mortality and serious injury during 2013–2017 from unidentified U.S. pot and trap interactions was 2.5 (11.4% of PBR) and from unidentified pot and trap interactions first seen in U.S. waters but unassigned to country was 0.75 (3.4% of PBR); while the rate of SIM not attributable to gear type was 0.75 (3.4% of PBR) in the United States, 3.2 (14.5% of PBR) for those first seen in the United States but unassigned to country, and 0.15 (0.7% of PBR) for those first seen in Canada but unassigned to country (Hayes et al. 2020).

Of the mortalities documented from 1970 to 2009, 24.5% were attributed to entanglement, 0.8% was attributed to a combination of ship strikes and entanglement, and 57% were due to unknown causes (van der Hoop et al. 2013). The majority of entanglements are not identifiable to fishery, so the proportion of entanglement due to pot and trap fisheries is unclear. Data are lacking regarding fisheries' interactions with the other feeding groups in the Western Atlantic humpback whale population. Because known fisheries mortality does not exceed PBR, but with concern that total fishing mortality likely exceeds PBR and uncertainty in the proportion of contribution from the pot and trap fisheries, fishing mortality is considered a moderate concern.

Little skate

Factor 2.1 - Abundance

Northwest Atlantic | Bottom trawls | United States

Low Concern

For little skate, the 2017 to 2019 NEFSC spring average biomass index of 5.32 kg/tow is above the biomass threshold reference point (3.07 kg/tow), but below the B_{MSY} proxy (6.15 kg/tow; see Figure 7) (Sosebee 2020). Because the stock is not overfished, and biomass is greater than 75% of the biomass target, abundance is considered a low concern.

Justification:

For little skate, the B_{MSY} proxy is defined as the 75th percentile of the appropriate survey biomass

index time series for that species.

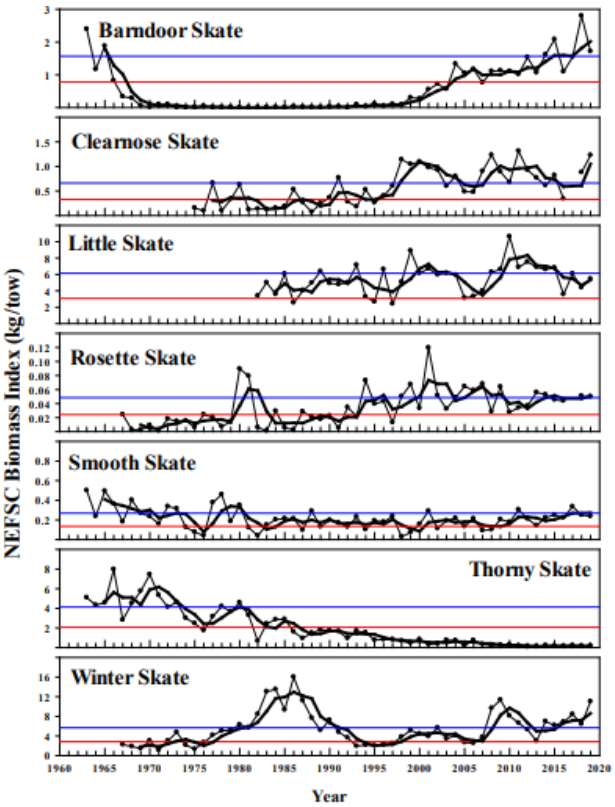

Figure 7: Northeast Fisheries Science Center survey biomass indices (kg/tow). Thin lines with symbols are annual indices, thick lines are 3-year moving averages, and the thin horizontal lines are the management biomass thresholds and targets. From (Sosebee 2020).

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Bottom trawls | United States

Low Concern

For little skate, the 2017 to 2019 average index is above the 2016 to 2018 average by 13.4% (Sosebee 2020). Because the stock is not undergoing overfishing, fishing mortality is considered a low concern.

Justification:

The fishing mortality reference points are based on changes in the 3-year survey biomass indices. If there is a decline in the 3-year moving average of the survey biomass index that is greater than the average CV of the survey time series, then fishing mortality is assumed to be greater than F_{MSY}, and overfishing is occurring for that skate species (Sosebee 2020).

Long-finned pilot whale

Factor 2.1 - Abundance

Northwest Atlantic | Bottom trawls | United States

Moderate Concern

The best available estimate for long-finned pilot whale in the western North Atlantic is 39,215 (CV = 0.30), with a minimum population size of 30,627 (Hayes et al. 2020). This estimate is from the U.S. summer 2016 surveys combined with the DFO Canada summer 2016 survey, providing coverage from Virginia to Labrador (Hayes et al. 2020). The status of this stock relative to the optimum sustainable population (OSP) in the U.S. Atlantic EEZ is unknown, and there are insufficient data to determine population trends. The International Union for the Conservation of Nature (IUCN) considers this species as "Least Concern" (Minton et al. 2018), so abundance is considered a moderate concern.

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Bottom trawls | United States

Low Concern

The total annual observed average fishery-related mortality or serious injury during 2013 to 2017 was 21 for long-finned pilot whale (CV = 0.15), with a potential biological removal (PBR) of 306 (Hayes et al. 2020). The Northeast bottom trawl fishery is the primary contributor, accounting for 71% (15/21 individuals) of the total by-catch across all fisheries (Hayes et al. 2020). Because the PBR is not exceeded, and the bottom trawl fishery accounts for less than 50% of the PBR, fishing mortality is considered a low concern.

North Atlantic right whale

Factor 2.1 - Abundance

Northwest Atlantic | Pots | United States

High Concern

The western Atlantic stock of North Atlantic right whale is listed as "Endangered" under the Endangered Species Act (ESA), and it is considered "Critically Endangered" by the International Union for the Conservation of Nature (IUCN) (Cooke 2020) because it is "considered to be facing an extremely high risk of extinction in the wild" (IUCN 2012). 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}. There are fewer reproductive females producing fewer calves each year, with experts estimating that there are 88 or fewer reproductively active females remaining {Pettis et al. 2022}(NOAA 2022c). The population has been declining since 2011 and calving rates have been low (2017–2019 calving rates averaged four per season, which is

<33% of the previous annual average). But in 2020, calving increased (10 calves sighted; 1 involved in a vessel strike) (Pace et al. 2017)(NOAA 2020b). The cause of reduced productivity is unknown but several factors are likely contributing to the declining health of North Atlantic right whale, including climate-related shifts in prey distribution, anthropogenic noise, pollution, vessel strikes, and entanglement in fishing gear (Pace et al. 2017)(NOAA 2019c). Because the North Atlantic right whale is considered "Critically Endangered" by the IUCN, abundance is rated a high concern.

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Pots | United States

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 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 black sea bass 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).

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. Due to 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 NARW 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 NARW 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 of 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 U.S., 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 8).

The black sea bass trap fishery is classified as a Category II fishery by NOAA {NMFS 2018c}. The Massachusetts mixed species trap/pot fishery (of which the black sea bass fishery is a part) is classified as a Category II fishery due to reduced risk to marine mammals; fishery-specific information is not available, so it is included in the analysis of the broader black sea bass fishery (with which it was previously classified) because there is continued overlap between the fishery and the presence of NARW and the scoring rationale is the same for both fisheries using the Seafood Watch standards. Cumulative SIMs far exceed PBR and entanglements due to unknown fisheries are considered a significant contributor. Until there is more specific information available regarding which fisheries are responsible for the unattributed entanglements, Seafood Watch considers that all relevant fisheries that may overlap with NARW pose risks. Based on the available information and the significant risks to NARW, the black sea bass pot fishery cannot be considered sustainable, and fishing mortality is scored a high concern.

Justification:
Distributional shifts in the 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 continuous 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 in Canada, 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}.

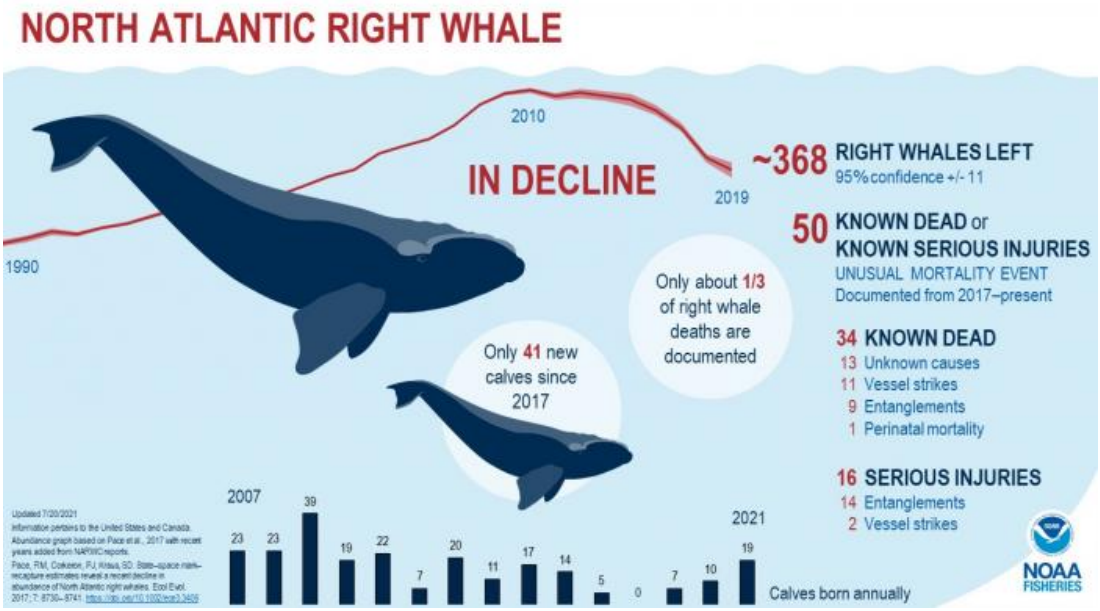

Figure 8: An infographic showing best estimates of current North Atlantic right whale population numbers and causes of death during the current Unusual Mortality Event, 2017 to present. (NOAA 2021)

Red hake

Factor 2.1 - Abundance

Northwest Atlantic | Handlines | United States

High Concern

The red hake's range is divided between two stocks in FAO's Northwest Atlantic region: a northern and a southern stock (Alade and Traver 2018). The most recent stock assessment update for red hake reports that, for the northern stock, the 2015–2017 spring survey biomass index is estimated at 5.13 kg/tow, which is above the management threshold (1.27 kg/tow). But for the southern stock, the same index has been in decline, being estimated at 0.38 kg/tow, which is below the management threshold for this stock (0.51 kg/tow) (Alade and Traver 2018). Because the southern stock is overfished, this factor is scored a high concern.

Justification:

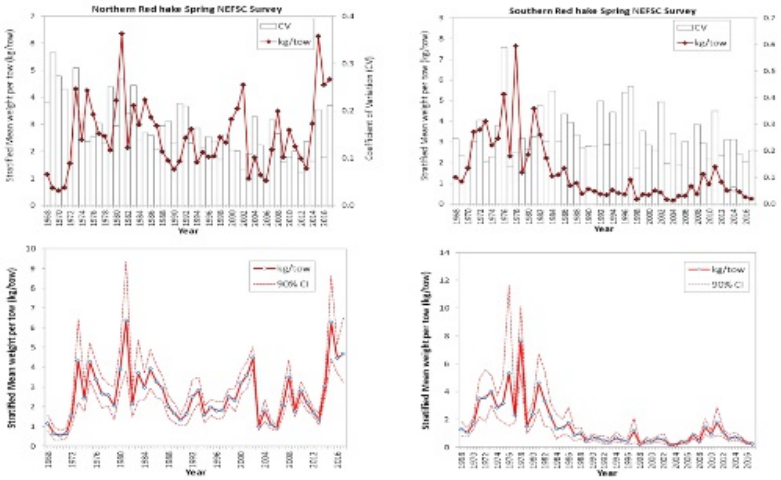

Figure 9: Northern and southern red hake index of biomass (kg/tow) and estimated coefficient of variation (CV). Bottom panels present estimated index and the 95% confidence intervals. Source: (Alade and Traver 2018).

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Handlines | United States

High Concern

A relative exploitation index is used for red hake as a proxy for fishing mortality. For the northern stock, the 2016 3-year relative exploitation index (0.09 kt/tow) was estimated to be below the management threshold (0.163 kt/tow) (Alade and Traver 2018). But for the southern stock, the red hake exploitation index was estimated at 4.13 kt/tow, which is above the management threshold (3.04 kt/tow) (Alade and Traver 2018). This assessment also recommends that the red hake southern stock is undergoing overfishing. Because estimates indicate that the southern stock is undergoing overfishing, this factor is scored a high concern.

Justification:

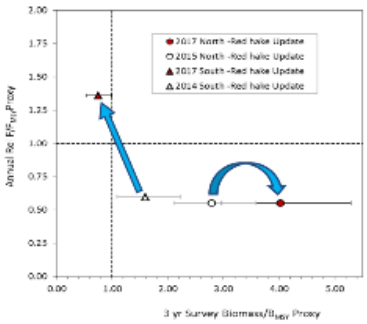

Figure 10: Red hake biomass and fishing stock plots based on assessment updates (2014, 2015, and 2017), and associated 95% confidence intervals. Source: (Alade and Traver 2018).

Risso's dolphin

Factor 2.1 - Abundance

Northwest Atlantic | Bottom trawls | United States

Moderate Concern

The best abundance estimate for Risso's dolphin is the sum of the estimates from the 2016 surveys: 35,493 (CV = 0.19), with a minimum population estimate of 30,289 (Hayes et al. 2020). The status of this stock relative to the optimum sustainable population (OSP) in the U.S. Atlantic EEZ is unknown, and there are insufficient data to determine population trends (Hayes et al. 2020). The International Union for the Conservation of Nature (IUCN) considers this species as "Least Concern" (Taylor et al. 2012), and because status and trend analysis are unknown, abundance is considered a moderate concern.

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Bottom trawls | United States

Low Concern

The total annual estimated average fishery-related mortality or serious injury to the Risso's dolphin stock from 2013 to 2017 was 54.3 individuals (53.9 from fisheries), with a potential biological removal (PBR) of 303 (Hayes et al. 2020). The Northeast bottom trawl fishery accounts for only 8% of the total U.S. fishery-related serious injury and mortality (4.2/53.9 individuals) (Hayes et al. 2020). Because PBR is not exceeded, and the bottom trawl fishery accounts for less than 50% of the PBR, fishing mortality is considered a low concern.

Scup

Factor 2.1 - Abundance

Northwest Atlantic | Bottom trawls | United States
Northwest Atlantic | Handlines | United States
Northwest Atlantic | Pots | United States

Very Low Concern
The most recent stock assessment update has been conducted in 2019, with data from 2018 {NEFSC 2020}. Abundance data have been consistently collected over the years {NMFS & NEFSC 2017}. Because there is a recent stock assessment and update for scup that has been published by the Northeast Fisheries Science Center, and spawning stock biomass (SSB) has been well above the target reference threshold set for the scup fishery, abundance has been scored a very low concern.

Justification:
In 2018, the SSB was 186,578 mt, which was higher than the updated SSB_{MSY} or $SSB_{40\%}$, indicating that the stock is not overfished {NEFSC 2020}. The fishing mortality on the fully selected age 3 fish was 0.158 in 2018, which is lower than the updated biological reference point of F_{MSY} or $F_{40\%}$, indicating that the stock is not being overfished {NEFSC 2020}. The fishery is being well managed by NOAA Fisheries, the Mid-Atlantic Fishery Management Council, and the Atlantic States Marine Fisheries Commission. Nevertheless, the fishery needs to be closely watched in the future because SSB is projected to further decrease unless recruitment to the stock increases {NEFSC 2020}.

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Bottom trawls | United States
Northwest Atlantic | Handlines | United States
Northwest Atlantic | Pots | United States

Low Concern
The fishing mortality on the fully selected age 3 fish was 0.158 in 2018, which is lower than the updated biological reference point of F_{MSY} or $F_{40\%}$, indicating that the stock is currently not being overfished {NEFSC 2020}. The fishery is being well managed by NOAA Fisheries, the Mid-Atlantic Fishery Management Council, and the Atlantic States Marine Fisheries Commission. Nevertheless, fishing mortality needs to be closely monitored in the future because SSB is projected to further decrease unless recruitment to the stock increases {NEFSC 2020}. Because there is currently a probable chance that the fishing mortality from all sources is below the biological target reference point of F_{MSY} or $F_{40\%}$ that has been set specifically for the scup fishery, fishing mortality has been set a low concern.

Justification:
In the early 1990s, fishing pressure was high and the scup spawning stock biomass was low (Figure 4, {NMFS & NEFSC 2017}). Consequently, the stock was overfished and overfishing was occurring. Gradually, the fishing pressure on the stock was reduced from the mid-1990s to 2000 and beyond. The stock likely responded to the reduced fishing pressure due to management strategies put in

place between 2005 and 2009.

Per the 2018 assessment, fishing mortality on the fully selected age 3 fish was 0.158, which is lower than the updated biological reference point of $F_{40\%}$, which was set to 0.215, indicating that the stock is not being overfished (Figure 5, {NEFSC 2020}). But, managers must be cautious in the future to ensure that fishing pressure does not increase.

Short-beaked common dolphin

Factor 2.1 - Abundance

Northwest Atlantic | Bottom trawls | United States

Moderate Concern

The current best abundance estimate for short-beaked common dolphin in the Northwest Atlantic is 172,947 (CV = 0.21), with a minimum population size of 145,216 (Hayes et al. 2021). This estimate is derived from 2016 shipboard and aerial surveys in the United States and Canada and covers most of the population's range. The status of common dolphin relative to the optimum sustainable population (OSP) in the U.S. Atlantic EEZ is unknown, and population trends have not been investigated (Hayes et al. 2021). The International Union for the Conservation of Nature (IUCN) considers this species as "Least Concern" {Braulik et al. 2021}, and because status and trend analysis are unknown, abundance is considered a moderate concern.

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Bottom trawls | United States

Low Concern

The total annual estimated average fishery-related mortality or serious injury to the short-beaked common dolphin stock during 2014 to 2018 was 399 (CV = 0.10), with a potential biological removal (PBR) of 1,452 (Hayes et al. 2021). The Northeast bottom trawl fishery accounted for only 4.3% of the total U.S. fishery-related serious injury and mortality (17/399 individuals), whereas the Northeast sink gillnet fishery accounted for 24.6% (98/399 individuals) (Hayes et al. 2021). Because PBR is not exceeded, and neither the bottom trawl fishery nor the set gillnet fishery accounts for more than 50% of the PBR, fishing mortality is considered a low concern.

Silver hake

Factor 2.1 - Abundance

Northwest Atlantic | Bottom trawls | United States

Moderate Concern

The most recent stock assessment update for silver hake reports that both stocks (called northern and southern stocks; both are within FAO's Northwest Atlantic Area 21) are not overfished (Alade

and Traver 2018). Although the northern stock demonstrates strong increases in biomass (B/B_{MSY} = 3.1), the southern stock's recruitment rates seem to remain poor (B/B_{MSY} = 0.64) (Alade and Traver 2018). Because there is a recent stock assessment and one of the stocks is less than 75% of B_{MSY}, this factor is scored a moderate concern.

Justification:

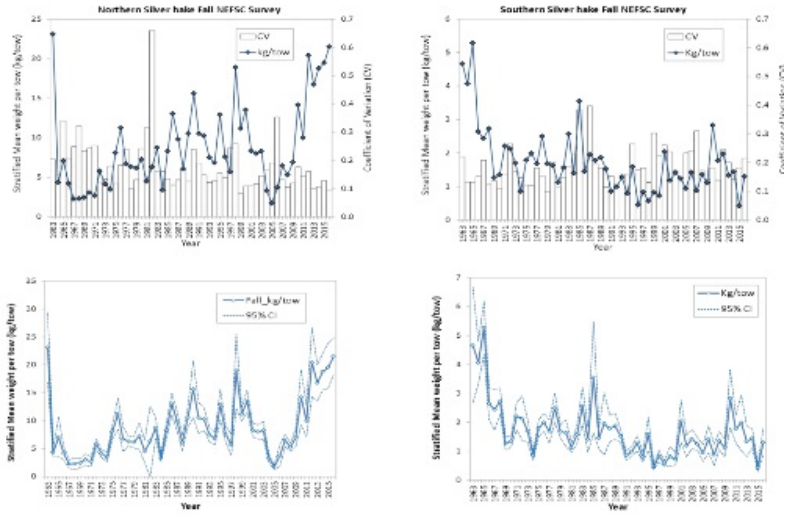

Figure 11: Northern (left) and southern (right) index of biomass (kg/tow) for silver hake from bottom-trawl survey, and estimated coefficient of variation (CV), 1963–2017. Bottom panels show estimated index and the 95% confidence intervals. Source: (Alade and Traver 2018).

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Bottom trawls | United States

Low Concern

A relative exploitation index is used for silver hake as a proxy for fishing mortality. Such values have remained consistent and low for over 15 years (Alade and Traver 2018). For both northern and southern stocks, the 2016 3-year relative exploitation index was below the management overfishing thresholds (Alade and Traver 2018). Because estimates are below the thresholds, thus indicating overfishing, this factor is scored a low concern.

Justification:

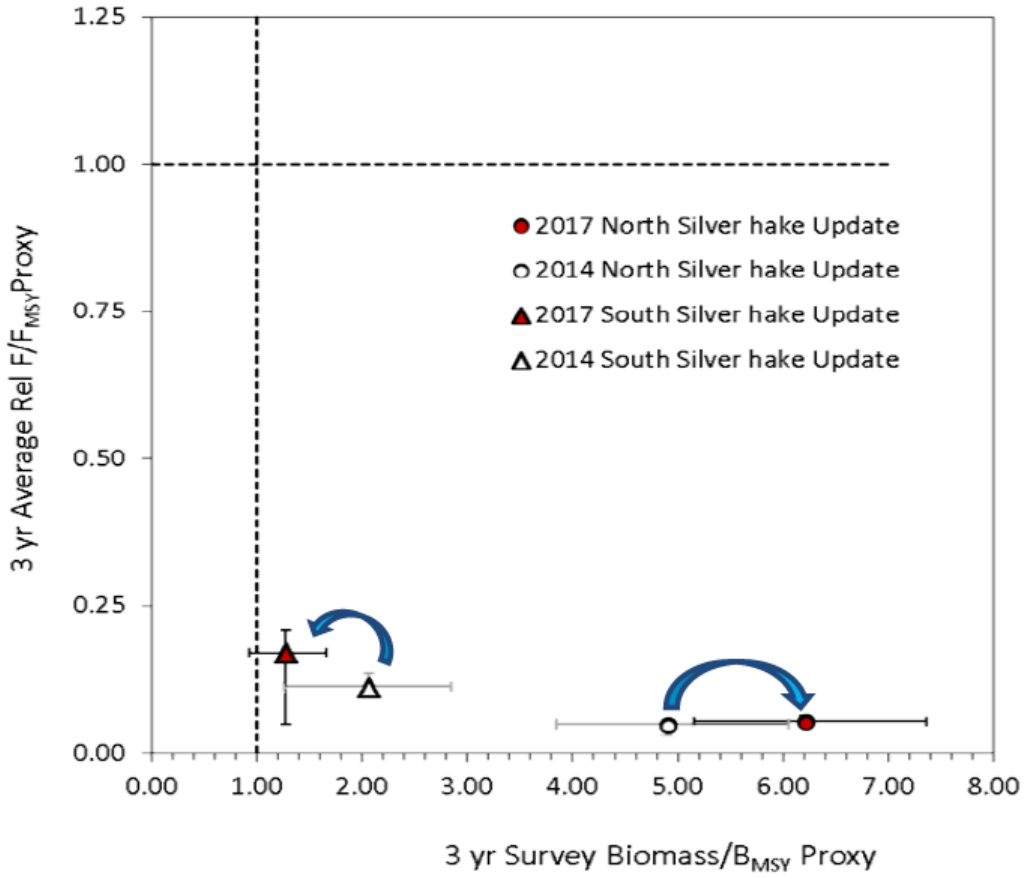

Figure 12: Silver hake biomass and fishing stock status plots, based on assessment updates for 2014, 2015, and 2017, and associated 95% confidence intervals. Source: (Alade and Traver 2018).

Skates (unspecified)

Factor 2.1 - Abundance

Northwest Atlantic | Bottom trawls | United States

High Concern

The Northeast skate complex fishery encompasses seven species: *Leucoraja ocellata* (winter skate), *Dipturis laevis* (barndoor skate), *Amblyraja radiata* (thorny skate), *Malacoraja senta* (smooth skate), *Leucoraja erinacea* (little skate), *Raja eglanteria* (clearnose skate), and *Leucoraja garmani* (rosette skate) (NOAA 2019b). The 2019 NE Skate Stock Status Update presents estimates from fall surveys (except for little skate, which used a spring survey), with recommendations that, except thorny skate, all species are respecting reference points and/or B_{MSY} proxies and are not overfished (Sosebee 2020). Because one species from the skate complex, thorny skate, is overfished, this factor is deemed a high concern.

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Bottom trawls | United States

Low Concern

For the skate complex, fishing mortality reference points are estimated by changes in survey biomass indices: overfishing is likely occurring if the 3-year moving average of the survey biomass index for each species declined by more than the average CV (coefficient of variation) of the survey time series (NEFSC 2017b). Using this rationale, the 2019 NE Skate Stock Status Update reports that none of the species are experiencing overfishing (Sosebee 2020). Because overfishing is not occurring for any species from the Atlantic Northeast skate complex, this factor is deemed a low concern.

Squid (unspecified)

Factor 2.1 - Abundance

Northwest Atlantic | Bottom trawls | United States

Very Low Concern

The 2017 stock assessment update for *Loligo* squid, which included new data from 2010 to 2016, shows that annual biomass has ranged between 25,806 mt and 175,894 mt from 1976 to 2016 (Hendrickson 2017). The average of annual biomass during 2015–2016 was 73,762 mt (80% CL = 67,198; 80,327) and was much greater than the threshold B_{MSY} proxy of 21,203 mt and the target B_{MSY} proxy of 42,205 mt (Hendrickson 2017). The report recommends that the stock was not overfished because biomass estimates are much greater than the threshold values. Because there is a recent stock assessment update indicating that the stock is not overfished, this factor is scored a very low concern.

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Bottom trawls | United States

Moderate Concern

There are no fishing mortality reference points for *Loligo* squid, according to the most recent stock assessment update. There is a lack of evidence that annual catches affected annual biomass estimates during 1976–2009 and of a theoretical basis for linking F_{MSY} to natural mortality or $F_{\%SPR}$ from per-recruit models for short-lived species such as *Loligo* squid (Hendrickson 2017). The stock is believed to be lightly exploited, because annual catches during 1987–2016 were less than annual biomass, and estimates of natural mortality for this semelparous species were quite high in relation to exploitation indices (Hendrickson 2017). Fishing mortality for *Loligo* squid is rated with moderate concern because, although fishing mortality is not available, the exploitation indices indicate that the stock is lightly exploited.

Summer flounder

Factor 2.1 - Abundance

Northwest Atlantic | Bottom trawls | United States

Low Concern

Summer flounder has been rated as "Least Concern" by the International Union for the Conservation of Nature (IUCN), and the second quarter 2021 update from the National Marine Fisheries Service notes that this stock is not overfished or nearing an overfished state (NMFS 2021). SSB was estimated to be 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 and is at a level greater than 75% of SSB_{MSY}, abundance is scored a low concern.

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Bottom trawls | United States

Low Concern

The most recently updated assessment of summer flounder in the mid-Atlantic Ocean 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 score of low concern.

Winter skate

Factor 2.1 - Abundance

Northwest Atlantic | Bottom trawls | United States

Low Concern

For winter skate, the 2017 to 2019 NEFSC autumn average biomass index of 8.61 kg/tow is above the biomass threshold reference point (2.83 kg/tow) and above the B_{MSY} proxy (5.66 kg/tow; see Figure 13) (Sosebee 2020). Because the stock is not overfished, but there is uncertainty associated with using the survey index as a proxy for abundance, a score of low concern is given (rather than a score of very low concern).

Justification:

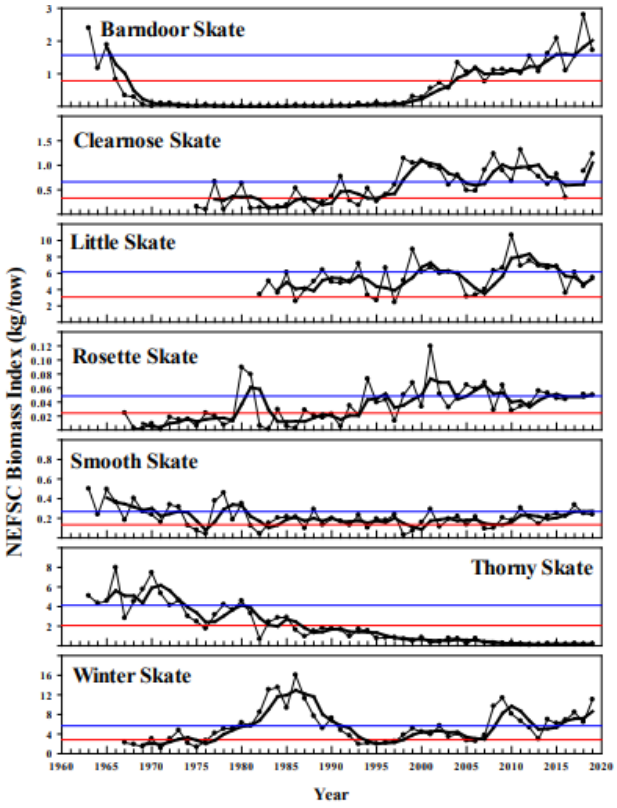

Figure 13: Northeast Fisheries Science Center survey biomass indices (kg/tow). Thin lines with symbols are annual indices, thick lines are 3-year moving averages, and the thin horizontal lines are the management biomass thresholds and targets. From (Sosebee 2020).

Factor 2.2 - Fishing Mortality

Northwest Atlantic | Bottom trawls | United States

Low Concern

For winter skate, the 2017 to 2019 average index is above the 2016 to 2018 index by 19.2% (Sosebee 2020). Because the stock is not undergoing overfishing, fishing mortality is considered a low concern.

Justification:

The fishing mortality reference points are based on changes in survey biomass indices. If the 3-year moving average of the survey biomass index for a skate species declines by more than the average CV of the survey time series, then fishing mortality is assumed to be greater than F_{MSY}, and overfishing is occurring for that skate species (Sosebee 2020).

Factor 2.3 - Discard Rate/Landings

Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida

< 100%

Incidental catch may include undersized individuals and nontarget species, but adaptations on gear to prevent by-catch effectively reduce such catches. The discard rate/landings ratio is expected to be lower than 100%.

Northwest Atlantic | Bottom trawls | United States

< 100%

Discards from trawls are assumed to suffer 100% mortality because of the depths fished and the length of tow (NEFSC 2017). According to the Standardized By-catch Reporting Methodology, the correlation of the ratio estimate (discard to kept estimator) for small mesh otter trawls in the Mid-Atlantic is 0.099 (MAFMC 2015).

Northwest Atlantic | Handlines | United States

< 100%

According to the Standardized By-catch Reporting Methodology, the correlation of the ratio estimate (discard to kept estimator) for handlines in New England is 0.521, whereas there is no observer coverage in the Mid-Atlantic (MAFMC 2015).

Northwest Atlantic | Pots | United States

< 100%

According to the Standardized By-catch Reporting Methodology (MAFMC 2015), there is no observer coverage for the trap fishery in this region. The values from the Mid-Atlantic were used for this score.

Criterion 3: Management Effectiveness

Five factors are evaluated in Criterion 3: Management Strategy and Implementation, Bycatch Strategy, Scientific Research/Monitoring, Enforcement of Regulations, and Inclusion of Stakeholders. Each is scored as either 'highly effective', 'moderately effective', 'ineffective,' or 'critical'. The final Criterion 3 score is determined as follows:

- *5 (Very Low Concern) — Meets the standards of 'highly effective' for all five factors considered.*
- *4 (Low Concern) — Meets the standards of 'highly effective' for 'management strategy and implementation' and at least 'moderately effective' for all other factors.*
- *3 (Moderate Concern) — Meets the standards for at least 'moderately effective' for all five factors.*
- *2 (High Concern) — At a minimum, meets standards for 'moderately effective' for Management Strategy and Implementation and Bycatch Strategy, but at least one other factor is rated 'ineffective.'*
- *1 (Very High Concern) — Management Strategy and Implementation and/or Bycatch Management are 'ineffective.'*
- *0 (Critical) — Management Strategy and Implementation is 'critical'.*

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 Management Strategy and Implementation is Critical.

Guiding principle

- The fishery is managed to sustain the long-term productivity of all impacted species.

Five factors are evaluated in Criterion 3: Management Strategy and Implementation, Bycatch Strategy, Scientific Research/Monitoring, Enforcement of Regulations, and Inclusion of Stakeholders. Each is scored as either 'highly effective', 'moderately effective', 'ineffective,' or 'critical'. The final Criterion 3 score is determined as follows:

Criterion 3 Summary

FISHERY	MANAGEMENT STRATEGY	BYCATCH STRATEGY	RESEARCH AND MONITORING	ENFORCEMENT	INCLUSION	SCORE
Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida	Ineffective	Moderately Effective	N/A	N/A	N/A	**Red (1.000)**
Northwest Atlantic | Bottom trawls | United States	Highly effective	Moderately Effective	Moderately Effective	Highly effective	Highly effective	**Green (4.000)**
Northwest Atlantic | Handlines | United States	Highly effective	Moderately Effective	Moderately Effective	Highly effective	Highly effective	**Green (4.000)**

Northwest Atlantic | Pots | United States	Highly effective	Ineffective	N/A	N/A	N/A	**Red (1.000)**

Criterion 3 Assessment

SCORING GUIDELINES

Factor 3.1 - 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? Do manages follow scientific advice? To achieve a highly effective rating, there must be appropriately defined management goals, precautionary policies that are based on scientific advice, and evidence that the measures in place have been successful at maintaining/rebuilding species.

Factor 3.2 - Bycatch Strategy
Considerations: What type of management strategy/measures are in place to reduce the impacts of the fishery on bycatch species and when applicable, to minimize ghost fishing? How successful are these management measures? To achieve a Highly Effective rating, the fishery must have no or low bycatch, or if there are bycatch or ghost fishing concerns, there must be effective measures in place to minimize impacts.

Factor 3.3 - Scientific Research and Monitoring
Considerations: How much and what types of data are collected to evaluate the fishery's impact on the species? Is there adequate monitoring of bycatch? To achieve a Highly Effective rating, regular, robust population assessments must be conducted for target or retained species, and an adequate bycatch data collection program must be in place to ensure bycatch management goals are met.

Factor 3.4 - 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.

Factor 3.5 - 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, if high participation by all stakeholders is encouraged, and if there a mechanism to effectively address user conflicts.

Factor 3.1 - Management Strategy And Implementation

Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida

Ineffective

In the state of Florida, it is required to have a Saltwater Products License (SPL) and a Restricted Species (RS) license for fishing in the Gulf of Mexico (GOM). A minimum size limit of 10 inches total length for black sea bass is also mandatory. There are no harvest limits for the species in the GOM (FFWCC 2019). During a closed season from September 20 through October 4 each year, no black sea bass trap shall be placed in state waters of the Gulf of Mexico seaward of 3 nautical miles from shore (Florida Administrative Code 2019). Black sea bass must be landed in whole condition (with head and tail intact) (FFWCC 2019). Other management regulations for the species are not in place and, because there is no stock assessment for the black sea bass GOM stock, catch limits are not available. Management strategy and implementation is scored ineffective, because existing regulations may not be enough to control the stock's sustainability.

Northwest Atlantic | Bottom trawls | United States

Highly effective

Black sea bass is managed jointly by the Mid-Atlantic Fishery Management Council and the Atlantic States Marine Fisheries Commission in a multi-species fishery management plan with scup and summer flounder (ASMFC 2019c). This management unit ranges from the United States–Canada border to Cape Hatteras in North Carolina (MAFMC 2018). Within the management plan, there is a division of the total annual quota between the recreational fishery (51%) and the commercial fishery (49%, divided into state-by-state quotas) (ASMFC 2019c). Once the quota is fully harvested, the commercial black sea bass fishery is closed (NOAA 2019). The 2020–2021 specifications are presented below. Because silver hake is caught in the black sea bass fishery but is managed under a different fishery management plan, both plans had to be taken into account to score appropriately. Silver hake is managed under the Small-Mesh Multi-species FMP (SMMP), which is a series of exemptions to the Northeast Multi-species FMP (NEFMC 2019), and the species makes up a significant component in this fishery (NOAA 2019p). There are no major concerns to consider from the management of this FMP. The Federal Management Measures for the black sea bass fishery include an annual catch limit, an annual catch target, accountability measures, gear restrictions, minimum fish sizes, and special management zones (GPO 2019). Furthermore, minimum size, minimum mesh size, closed seasons, and moratoriums on entry into the fishery may be established by each state (ASMFC 2019c). Because appropriate management measures have been implemented, this factor is deemed highly effective.

2020–2021 commercial quotas and recreational harvest limits for black sea bass (2019 values are provided for comparison purposes). Note: landings limits shown in the table are initial limits before any deductions for past overages. Source: (ASMFC 2019d).

Year	2019	2020	2021
Commercial quota (millions of pounds)	3.52	5.58	5.58

Recreational harvest limit (millions of pounds)	3.66	5.81	5.81

Northwest Atlantic | Handlines | United States
Northwest Atlantic | Pots | United States

Highly effective

Black sea bass is managed by the Mid-Atlantic Fishery Management Council in a single fishery management plan with scup and summer flounder (ASMFC 2019c). This management unit ranges from the United States–Canada border to Cape Hatteras, North Carolina (MAFMC 2018). Within the management plan, there is a division of the total annual quota between the recreational fishery (51%) and the commercial fishery (49%, divided into state-by-state quotas) (ASMFC 2019c). Once the quota is fully harvested, the commercial black sea bass fishery is closed (NOAA 2019). The 2019 specifications are presented below. The Federal Management Measures for the black sea bass fishery include an annual catch limit, an annual catch target, accountability measures, gear restrictions, minimum fish sizes, and special management zones (GPO 2019). In addition, minimum size, minimum mesh size, closed seasons, and moratoriums on entry into the fishery may be established by each state (ASMFC 2019c). Because appropriate management measures have been implemented, this factor is deemed highly effective.

Current black sea bass specifications (January 1–December 31, 2019). Source: (NOAA 2019).

Overfishing Limit (OFL)	10.29 million lb
Acceptable Biological Catch (ABC)	8.94 million lb
Commercial Annual Catch Limit (ACL)	4.35 million lb
Commercial Annual Catch Target (ACT)	4.35 million lb
Recreational ACL and ACT	4.59 million lb
Commercial Quota	3.52 million lb
Recreational Harvest Limit (RHL)	3.66 million lb

Factor 3.2 - Bycatch Strategy

Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida

Moderately Effective

The trap/pot fishery in Florida/Gulf of Mexico is listed as Category II (stone crab) and as Category III (blue crab, spiny lobster, golden crab, mixed species) for marine mammal by-catch (NOAA 2019n). A recent study of the stone crab trap fishery (which may also catch black sea bass) showed that cull rings retained bigger specimens and less by-catch (Gandy et al. 2018), and this gear adaptation is in the process of being implemented as standard on all traps. In Florida, mandatory trap designs targeting black sea bass include: maximum trap size of 2 ft by 2 ft by 2 ft or a volume of 8 ft^3; mesh size 1-1/2 inches or larger; the throat or entrance not to exceed 5 in. by 2 in. at its narrowest point; and at least two unobstructed escape rings (rectangular: 1-1/8 in. by 5-3/4 in.;

circular: 2 in. diameter; square: 1-3/4 in. measured inside the square) located on a vertical side of the trap (FFWCC 2019b). Also, vertical lines in the pot and trap fishery are fitted through regulation with breakaway links at the buoy end to address entanglement with mammals (pers. comm., Clarke P. 2020). By-catch limits are not established. By-catch strategy is scored moderately effective, because by-catch reduction techniques are used but are of uncertain effectiveness.

Justification:

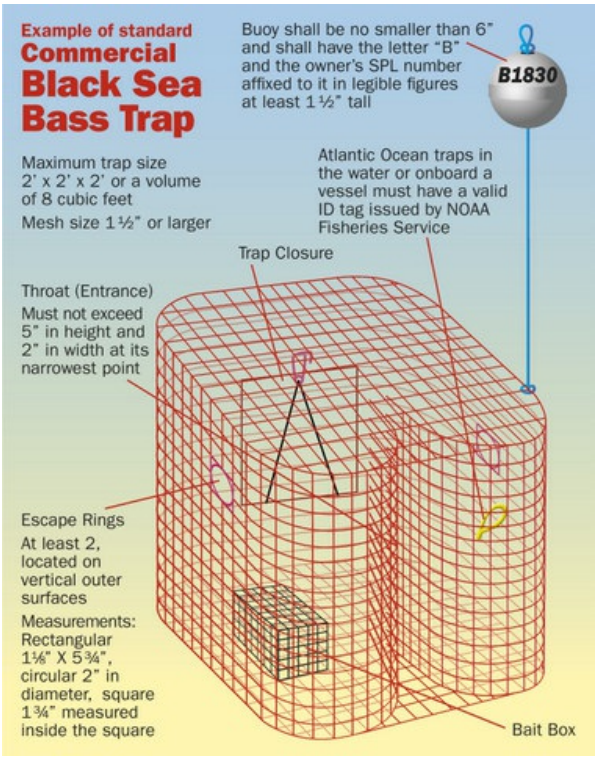

Figure 14: Example of standard commercial black sea bass trap. Source: (FFWCC 2019b).

Northwest Atlantic | Bottom trawls | United States

Moderately Effective

To address the incidental mortality and serious injury of long-finned pilot whale, short-finned pilot whale, common dolphin, and white-sided dolphin incidental to the Mid-Atlantic midwater trawl fishery, as well as other trawl fisheries, the Atlantic trawl take reduction team was formed in 2006 (NOAA 2019k). Voluntary measures were established, and in 2012 a monitoring strategy was published to accompany the voluntary measures. The monitoring strategy's main goal is to review biological metrics: annual population abundance estimates, annual human-caused serious injury and mortality estimates, and the calculated potential biological removal (PBR) levels (NOAA 2019k). This factor is scored moderately effective, because the take reduction plan and monitoring strategy's effectiveness are unclear.

Northwest Atlantic | Handlines | United States

Moderately Effective

No strategy for by-catch reduction is established for handlines targeting black sea bass. Because this fishery does not carry any information on species of concern (MAFMC 2015), but catch of such species is unlikely, this factor is scored moderately effective, as a precautionary approach.

Northwest Atlantic | Pots | United States

Ineffective

According to the Management Measures for the Black Sea Bass Fishery (GPO 2019), some gear restrictions are compulsory. These include gear marking ("the owner of a vessel issued a black sea bass moratorium permit must mark all black sea bass pots or traps with the vessel's USCG documentation number or state registration number"), the use of two escape vents and lath spaces following minimum size requirements, and the use of a ghost panel affixed to the pot with degradable fasteners and hinges (GPO 2019). This mixed trap/pot fishery is listed as a Category II fishery, and is part of the Atlantic Large Whale Take Reduction Plan (NOAA 2019l), which established in 1997 regulations to reduce both mortality and injury of three strategic stocks of large whales (including humpback and fin whale) in trap/pot fisheries. The Northeast trap/pot fisheries requirements and management areas present specific management instructions from Maine to Connecticut as well as federal waters, and such trap/pot gear requirements vary by geographic area (NMFS 2015)(NMFS 2018).

The Atlantic Large Whale Take Reduction Plan (ALWTRP) was developed under the Marine Mammal Protection Act (MMPA) in 1997 to reduce mortality and serious injury 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 annual mortality and serious injury due to entanglement continues 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 black sea bass pot 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) {NMFS 2021a}. 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 {NMFS 2021a}.

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-making 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 that 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 whale 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 United States 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 U.S. 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% of the line, and two within the bottom 50%) (MDMF 2022).

Factor 3.3 - Scientific Research And Monitoring

Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida
Northwest Atlantic | Pots | United States

N/A
In cases where either Factor 3.1 or 3.2 scores ineffective, Factor 3.3 is not scored because the overall score for Criterion 3 is a very high concern (1), regardless of how a fishery performs against Factor 3.3.

Northwest Atlantic | Bottom trawls | United States
Northwest Atlantic | Handlines | United States

Moderately Effective
Stock assessments and operational assessments are peer-reviewed and updated on a regular basis. Overfishing limits are also set for the following years when a stock assessment is released (NEFSC 2017)(NOAA 2019). By-catch may be closely monitored by specific management bodies, particularly by-catch of species of concern (such as ESA- or MMPA-listed species). Fishery performance reports are also published yearly by a joint effort of the Mid-Atlantic Fishery Management Council's Summer Flounder, Scup, and Black Sea Bass Advisory Panel and the Atlantic States Marine Fisheries Commission's Summer Flounder, Scup, and Black Sea Bass Advisory Panel (MAFMC 2019). Current research priorities suggested by the latest fishery performance report include a directed study of the population's genetics, including studies on stock mixing and migration patterns, as well as a greater sampling area of black sea bass (MAFMC 2019). Scientific research and monitoring is scored moderately effective, because data related to stock abundance and health are regularly evaluated, but conditions are not sufficient to earn a higher score.

Factor 3.4 - Enforcement Of Management Regulations

Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida
Northwest Atlantic | Pots | United States

N/A
In cases where either Factor 3.1 or 3.2 scores ineffective, Factor 3.4 is not scored because the overall score for Criterion 3 is a very high concern (1), regardless of how a fishery performs against Factor 3.4.

Northwest Atlantic | Bottom trawls | United States
Northwest Atlantic | Handlines | United States

Highly effective
The Atlantic States Marine Fisheries Commission (Commission) and the Mid-Atlantic Fishery Management Council (Council) work cooperatively to develop fishery regulations for black sea bass in the Northwest Atlantic (ASMFC 2019c). Both the Council and the Commission work cooperatively with the National Marine Fisheries Service (NMFS), the federal implementation and enforcement entity. Because black sea bass is caught in state waters (0–3 mi. offshore) and federal waters (3–200 mi.), a joint effort uniting NMFS, Council, and Commission is a necessary approach (MAFMC 2018). Permits, gear requirements, catch limits, and accountability measures for quotas are enforced by this framework (ASMFC 2019c)(NOAA 2019). Also, NOAA's Office of Law Enforcement is responsible for enforcing domestic laws and supporting international requirements: through patrols; vessel

monitoring; criminal and civil investigations; partnerships with state, tribal, federal, and nongovernmental organizations; outreach and compliance assistance; and the use of innovative technological tools (NOAA 2019o). Because regulations are enforced by a joint effort of complementing entities, this factor is scored highly effective.

Factor 3.5 - Stakeholder Inclusion

Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida
Northwest Atlantic | Pots | United States

N/A
In cases where either Factor 3.1 or 3.2 scores ineffective, Factor 3.5 is not scored because the overall score for Criterion 3 is a very high concern (1), regardless of how a fishery performs against Factor 3.5.

Northwest Atlantic | Bottom trawls | United States
Northwest Atlantic | Handlines | United States

Highly effective
The Atlantic States Marine Fisheries Commission and the Mid-Atlantic Fishery Management Council organize and release schedules of public hearings for input on options for the Summer Flounder, Scup, and Black Sea Bass Management Plan draft updates/addenda (usually such hearings take place in each state from Massachusetts through Virginia) (ASMFC 2019c). Because the management process is transparent and user conflicts are not reported, this factor is scored highly effective.

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 (factor 4.1 + factor 4.2) and the Ecosystem Based Fishery Management score. The Criterion 4 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***

Guiding principles

- Avoid negative impacts on the structure, function or associated biota of marine 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.
- Follow the principles of ecosystem-based fisheries management.

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
Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida	Score: 2	Score: 0	Moderate Concern	**Yellow (2.449)**
Northwest Atlantic | Bottom trawls | United States	Score: 1	+.5	Moderate Concern	**Red (2.121)**
Northwest Atlantic | Handlines | United States	Score: 4	Score: 0	Moderate Concern	**Green (3.464)**
Northwest Atlantic | Pots | United States	Score: 2	+.5	Moderate Concern	**Yellow (2.739)**

Criterion 4 Assessment

SCORING GUIDELINES

Factor 4.1 - Physical Impact of Fishing Gear on the Habitat/Substrate
Goal: The fishery does not adversely impact the physical structure of the ocean habitat, seafloor or associated biological communities.

- *5 - Fishing gear does not contact the bottom*
- *4 - Vertical line gear*
- *3 - 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. Or bottom seine on resilient mud/sand habitats. Or midwater trawl that is known to contact bottom occasionally. Or purse seine known to commonly contact the bottom.*
- *2 - Bottom dragging gears (dredge, trawl) fished on resilient mud/sand habitats. Or gillnet, trap, or bottom longline fished on sensitive boulder or coral reef habitat. Or bottom seine except on mud/sand. Or there is known trampling of coral reef habitat.*
- *1 - Hydraulic clam dredge. Or dredge or trawl gear fished on moderately sensitive habitats (e.g., cobble or boulder)*
- *0 - 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 - Modifying Factor: Mitigation of Gear Impacts
Goal: Damage to the seafloor is mitigated through protection of sensitive or vulnerable seafloor habitats, and limits on the spatial footprint of fishing on fishing effort.

- *+1 —>50% of the habitat is protected from fishing with the gear type. Or fishing intensity is very low/limited and for trawled fisheries, expansion of fishery's footprint is prohibited. Or gear is specifically modified to reduce damage to seafloor and modifications have been shown to be effective at reducing damage. Or there is an effective combination of 'moderate' mitigation measures.*
- *+0.5 —At least 20% of all representative habitats are protected from fishing with the gear type and for trawl fisheries, expansion of the fishery's footprint is prohibited. Or gear modification measures or other measures are in place to limit fishing effort, fishing intensity, and spatial footprint of damage caused from fishing that are expected to be effective.*
- *0 —No effective measures are in place to limit gear impacts on habitats or not applicable because gear used is benign and received a score of 5 in factor 4.1*

Factor 4.3 - Ecosystem-Based Fisheries Management
Goal: All stocks are maintained at levels that allow them to fulfill their ecological role and to maintain a functioning ecosystem and food web. Fishing activities should not seriously reduce ecosystem services provided by any retained species or result in harmful changes such as trophic cascades, phase shifts or reduction of genetic diversity. Even non-native species should be considered with respect to ecosystem impacts. If a fishery is managed in order to eradicate a non-native, the potential impacts of that strategy on native species in the ecosystem should be considered and rated below.

- *5 — Policies that have been shown to be effective are in place to protect species' ecological roles and ecosystem functioning (e.g. catch limits that ensure species' abundance is maintained at sufficient levels to provide food to predators) and effective spatial management is used to protect spawning and foraging areas, and prevent localized depletion. Or it has been scientifically demonstrated that fishing practices do not have negative ecological effects.*
- *4 — Policies are in place to protect species' ecological roles and ecosystem functioning but have not proven to be effective and at least some spatial management is used.*

- *3 — Policies are not in place to protect species' ecological roles and ecosystem functioning but detrimental food web impacts are not likely or policies in place may not be sufficient to protect species' ecological roles and ecosystem functioning.*
- *2 — Policies are not in place to protect species' ecological roles and ecosystem functioning and the likelihood of detrimental food impacts are likely (e.g. trophic cascades, alternate stable states, etc.), but conclusive scientific evidence is not available for this fishery.*
- *1 — Scientifically demonstrated trophic cascades, alternate stable states or other detrimental food web impact are resulting from this fishery.*

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

Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida
Northwest Atlantic | Pots | United States

Score: 2
Because black sea bass has a strong association with structured habitats, including reefs (NOAA 2019), traps used to catch reef-dwelling species may impact such habitats.

Northwest Atlantic | Bottom trawls | United States

Score: 1
Black sea bass is known for having a strong association with structured habitats, including reefs (NOAA 2019), but such habitats are more commonly used by the species during summer months and inshore (NOAA 1999). In the winter, black sea bass migrates offshore in the Middle Atlantic Bight, where structured habitats are not that common and the species tends to burrow into sediments (NOAA 1999). Because this trawl fishery occurs where structured habitats are not common, this factor is scored accordingly.

Northwest Atlantic | Handlines | United States

Score: 4
Handline gears have low contact to bottom habitats, but the target species, black sea bass, is a structured habitats/reef-associated species (NOAA 2019).

Factor 4.2 - Modifying Factor: Mitigation of Gear Impacts

Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida

Score: 0
Mitigations measures are not in place to reduce gear impacts.

Northwest Atlantic | Bottom trawls | United States

+.5
There are minimum mesh requirements for trawls established by the Atlantic States Marine Fisheries Council and the Mid-Atlantic Fishery Management Council (ASMFC 2019c). Because the species is often associated with structured habitats (including aquatic vegetation, rocky reefs, mussel and oyster beds, rock fields, stone coral patches, and exposed clay and stone aggregate; nonnatural structures may include artificial reefs, shipwrecks, piers, pilings, jetties, groins, and fish and lobster traps (ASMFC 2018)), impacts on such habitats from trawls are expected. In the Northeast U.S. Continental Shelf, stony corals, black corals, soft corals/gorgonians, and sea pens are found between 50 and 1,000 m (NEFSC 2019c). A few habitat closed areas have been established in this region, including closed areas to bottom trawling (NEFSC 2019c), to approximately 20% of such habitats. Special management areas are established in the states of Delaware and New Jersey, where

only handline, rod and reel, and spearfishing are allowed; however, such areas are mainly to address gear conflicts between commercial and recreational fisheries, and these special management zones include artificial reefs (GPO 2019)(pers. comm., Beaty J. 2020). But, it is known that fishers using trawl nets attempt to avoid contact with physical structures such as reefs, to prevent damage to fishing gear (pers. comm., Beaty J. 2020). Because available information does not meet the standard for a higher score, and existing measures in use are reasonably expected to be effective, this factor is scored with moderate mitigation.

Northwest Atlantic | Handlines | United States

Score: 0

Mitigations of handline impacts, which could include closed areas, are not in place. Special management areas are established in the states of Delaware and New Jersey, where only handline, rod and reel, and spearfishing are allowed (GPO 2019). This factor is scored with no mitigation.

Northwest Atlantic | Pots | United States

+.5

Pots may cause low impact over bottom habitats; however, such impacts may be cumulative. Spatial management exists and seasonal closures may apply to some specific regions (NMFS 2015)(NMFS 2018)(GPO 2019), but such management strategies are more focused on by-catch mitigation than habitat impacts. This factor is scored with moderate mitigation.

Factor 4.3 - Ecosystem-based Fisheries Management

Gulf of Mexico | Atlantic, Western Central | Pots | United States | Florida

Moderate Concern

Existing management measures do not include spatial management, nor do they consider the ecological roles of targeted species. But, food web impacts at a broader scale are not clear. Black sea bass catches prey that includes fish, crabs, mussels, and razor clams (ASMFC 2019c), whereas little skate, spiny dogfish, monkfish, spotted hake, and summer flounder feed on black sea bass (NOAA 2019). Because detrimental food web impacts are not likely, this factor is scored a moderate concern.

Northwest Atlantic | Bottom trawls | United States
Northwest Atlantic | Handlines | United States
Northwest Atlantic | Pots | United States

Moderate Concern

In 2016, the Mid-Atlantic Fishery Management Council launched the Ecosystem Approach to Fisheries Management (EAFM) Guidance Document, which aims to foster the incorporation of ecosystem considerations into fishing management programs (MAFMC 2016). This document uses the ecosystem approach to fisheries management, defined as follows: "An ecosystem approach to fishery management recognizes the biological, economic, social, and physical interactions among the components of ecosystems and attempts to manage fisheries to achieve optimum yield taking those

interactions into account" (MAFMC 2016). As part of the summer flounder, scup, and black sea bass being managed under a single fishery management plan (FMP), forage species are also managed within this FMP as "ecosystem components" (MAFMC 2016). An inshore habitat, oyster reefs, has been assessed to determine its contribution to sea bass production as part of this EAFM Guidance Document (MAFMC 2016). As the council implements the Guidance Document, the key focus areas and recommendations are forage species, habitat (including essential fish habitats), ecosystem-level interactions, and climate change and variability (MAFMC 2016). This factor is scored with moderate concern, because an EAFM has been used but without much evidence of its effectiveness.

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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 recommendations for black sea bass caught in the U.S. Atlantic pot fisheries were downgraded to Avoid. The overall recommendations for black sea bass caught in the U.S. bottom trawl and handline and hand-operated pole and line fisheries remain Good Alternatives, while the overall recommendation for black sea bass caught in the Gulf of Mexico pot fishery remains an Avoid.

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 U.S. pot fisheries for black sea bass to minimize the impact on this endangered marine mammal. The cumulative impact of fishing mortality, the potential for U.S. pot fisheries for black sea bass 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 U.S. pot fisheries for black sea bass using vertical lines.