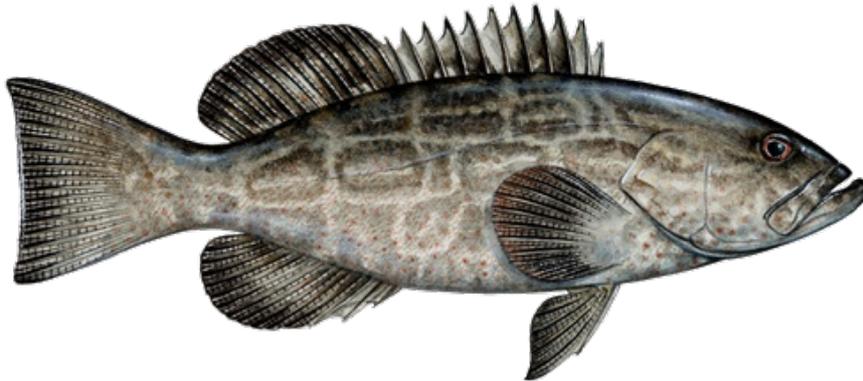


Monterey Bay Aquarium Seafood Watch®

Grouper (United States)

Black Grouper (*Mycteroperca bonaci*)
Gag Grouper (*Mycteroperca microlepis*)
Red Grouper (*Epinephelus morio*)
Scamp (*Mycteroperca phenax*)
Snowy Grouper (*Hyporthodus niveatus*)
Warsaw Grouper (*Hyporthodus nigritus*)
Yellowedge Grouper (*Hyporthodus flavolimbatus*)



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United States - Western Central Atlantic

Set longlines, Vertical lines

11/5/18

Seafood Watch Consulting Researcher

Disclaimer

Seafood Watch® strives to have all Seafood Reports reviewed for accuracy and completeness by external scientists with expertise in ecology, fisheries science and aquaculture. Scientific review, however, does not constitute an endorsement of the Seafood Watch program or its recommendations on the part of the reviewing scientists. Seafood Watch is solely responsible for the conclusions reached in this report.

Seafood Watch Standard used in this assessment: Standard for Fisheries vF3

Table of Contents

About Seafood Watch	3
Guiding Principles	4
Summary	5
Final Seafood Recommendations	7
Introduction	10
Assessment	16
<i>Criterion 1: Impacts on the Species Under Assessment</i>	16
<i>Criterion 2: Impacts on Other Species</i>	45
<i>Criterion 3: Management Effectiveness</i>	94
<i>Criterion 4: Impacts on the Habitat and Ecosystem</i>	114
Acknowledgements	124
References	125
Appendix A: Extra By Catch Species	137

About Seafood Watch

Monterey Bay Aquarium's Seafood Watch program evaluates the ecological 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. Seafood Watch makes its science-based recommendations available to the public in the form of regional pocket guides that can be downloaded from www.seafoodwatch.org. 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.

Each sustainability recommendation on the regional pocket guides is supported by a Seafood Watch Assessment. Each assessment synthesizes and analyzes the most current ecological, fisheries and ecosystem science on a species, then evaluates this information against the program's conservation ethic to arrive at a recommendation of "Best Choices," "Good Alternatives" or "Avoid." This ethic is operationalized in the Seafood Watch standards, available on our website here. In producing the assessments, Seafood Watch seeks out research published in academic, peer-reviewed journals whenever possible. Other sources of information include government technical publications, fishery management plans and supporting documents, and other scientific reviews of ecological sustainability. Seafood Watch Research Analysts also communicate regularly with ecologists, fisheries and aquaculture scientists, and members of industry and conservation organizations when evaluating fisheries and aquaculture practices. Capture fisheries and aquaculture practices are highly dynamic; as the scientific information on each species changes, Seafood Watch's sustainability recommendations and the underlying assessments will be updated to reflect these changes.

Parties interested in capture fisheries, aquaculture practices and the sustainability of ocean ecosystems are welcome to use Seafood Watch assessments in any way they find useful.

Guiding Principles

Seafood Watch defines sustainable seafood as originating from sources, whether fished¹ 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, we develop an overall recommendation. Criteria ratings and the overall recommendation are color coded to correspond to the categories on the Seafood Watch pocket guide and online guide:

Best Choice/Green: Are well managed and caught in ways that cause little harm to habitats or other wildlife.

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

Avoid/Red Take a pass on these for now. These items are overfished or caught 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 analyses and recommendations for seven grouper species fished in the commercial reef fish fishery in the US Gulf of Mexico and the commercial snapper-grouper fishery in the US South Atlantic portion of the FAO Western Central Atlantic fishing area. (Recreational fisheries are not explicitly evaluated in the Seafood Watch program). These species include four shallow water groupers: gag (*Mycteroperca microlepis*), red grouper (*Epinephelus morio*), scamp (*Mycteroperca phenax*), and black grouper (*Mycteroperca bonaci*) (found at shallower depths than the other shallow water groupers), and three deep water groupers: snowy grouper (*Hyporhodus niveatus*), yellowedge grouper (*Epinephelus flavolimbatus*), and Warsaw grouper (*Hyporhodus nigrilus*). For these species, US stocks are divided into the US Gulf of Mexico and South Atlantic stocks, except for black grouper, which is considered to be one stock across both regions. In both regions, groupers are fished with vertical gear (handline or bandit, also considered as handline) and bottom longline gear, with some caught using rod and reel. Across both regions, the majority of US commercially caught grouper is landed from the Gulf of Mexico, with 3485 metric tons (MT) or 92% coming from the Gulf in 2015, and 301 MT or 8% coming from the US South Atlantic region that year. Of the grouper landed commercially in the US, the overwhelming majority (67%) is red grouper from the Gulf, with 2570 MT landed in 2015.

Groupers have a low resiliency to fishing pressure; most of the species assessed in this report are listed in the International Union for Conservation of Nature and Natural Resources' (IUCN) list of "Threatened" species: Warsaw grouper ("Critically Endangered") yellowedge grouper (vulnerable), snowy grouper ("Vulnerable"), black grouper ("Near Threatened") and red grouper ("Near Threatened"). The species addressed here are long lived, having maximum ages between 29 (red grouper) and 85 (yellowedge grouper) years. Stock assessments, regularly conducted as part of the Southeast Data, Assessment, and Review (SEDAR) process for species in both management areas, indicate that some of these species are overfished (red grouper and snowy grouper in the South Atlantic and possibly gag in the Gulf of Mexico) and/or experiencing overfishing (Warsaw grouper in the South Atlantic). Several species are in the midst of rebuilding plans as part of their management (red and snowy groupers in the South Atlantic). Red grouper in the Gulf of Mexico is the one species that has been successfully rebuilt in either region. Warsaw grouper harvest or possession is banned in the South Atlantic.

Retained and bycatch species analyzed in this assessment were selected based on the number caught relative to the target species in either regional fishery and/or their IUCN conservation status ("Endangered," "Threatened," "Overfished," etc.). The fishing gears evaluated in this report are generally non-selective, and therefore capture a range of species and sizes, resulting in significant incidental catch. Primary bycatch species in the US South Atlantic include vermilion snapper (*Rhomboplites aurorubens*), red porgy (*Pagrus pagrus*), gray triggerfish (*Balistes capriscus*), red snapper (*Lutjanus campechanus*), and speckled hind (*Epinephelus drummondhayi*). In the Gulf of Mexico, bycatch species include tilefish (*Lopholatilus chamaeleonticeps*), blueline tilefish (*Caulolatilus microps*), red snapper (*Lutjanus campechanus*), smooth dogfish (*Mustelus canis*), red porgy (*Pagrus pagrus*), vermilion snapper (*Rhomboplites aurorubens*) and yellowtail snapper (*Ocyurus chrysurus*). Loggerhead sea turtle (*Caretta caretta*), an endangered sea turtle species, were historically caught in unacceptable numbers on Gulf of Mexico bottom longline gear, but interactions have been reduced through management measures and monitored by fisheries observers.

The overall management strategy for the assessed grouper species in both regions is generally appropriate, although data deficiencies prevent formal stock assessment for several species, hindering management effectiveness. All assessed fisheries have "high impacts" on non-target species as well as "moderately effective" management strategies, but the Gulf has a better management score than the South Atlantic due to ongoing observer programs in the Gulf, which are non-existent in the South Atlantic. Over both regions, ecosystem impacts to fish habitat are "low" for handline fisheries due to lack of or minimal gear contact with the seafloor, and are "moderate" for bottom longline fisheries which may or may not contact the seafloor. Factoring into the overall ecosystem impacts score, ecosystem based management is generally "low" concern in both regions due to the establishment of several fishing restricted areas. The exception is the Gulf of Mexico longline fishery due

to the interaction with the seafloor.

In the Gulf of Mexico, scamp, snowy grouper, and Warsaw grouper receive final recommendations of "Avoid," as does gag captured by longline gears. The remaining species/gear combinations in the Gulf of Mexico are scored as "Good Alternative." In the US South Atlantic, only black grouper and gag receive a score of "Good Alternative." All other species/gear combinations in the South Atlantic receive a rating of "Avoid."

Final Seafood Recommendations

SPECIES/FISHERY	CRITERION 1: IMPACTS ON THE SPECIES	CRITERION 2: IMPACTS ON OTHER SPECIES	CRITERION 3: MANAGEMENT EFFECTIVENESS	CRITERION 4: HABITAT AND ECOSYSTEM	OVERALL RECOMMENDATION
Scamp United States of America Gulf of Mexico, Set longlines, United States of America, Scamp	Red (1.732)	Red (0.750)	Yellow (3.000)	Yellow (2.739)	Avoid (1.807)
Yellowedge grouper United States of America Gulf of Mexico, Set longlines, United States of America, Yellowedge grouper	Green (4.284)	Red (0.750)	Yellow (3.000)	Yellow (2.739)	Good Alternative (2.266)
Black grouper United States of America Gulf of Mexico, Set longlines, United States of America, Black grouper	Green (3.413)	Red (0.750)	Yellow (3.000)	Yellow (2.739)	Avoid (2.141)
Red grouper United States of America Gulf of Mexico, Set longlines, United States of America, Red grouper	Green (4.284)	Red (0.750)	Yellow (3.000)	Yellow (2.739)	Good Alternative (2.266)
Snowy grouper United States of America Gulf of Mexico, Set longlines, United States of America, Snowy grouper	Red (1.732)	Red (0.750)	Yellow (3.000)	Yellow (2.739)	Avoid (1.807)
Warsaw grouper United States of America Gulf of Mexico, Set longlines, United States of America, Warsaw grouper	Red (1.732)	Red (0.750)	Yellow (3.000)	Yellow (2.739)	Avoid (1.807)
Scamp United States of America Gulf of Mexico, Vertical lines, United States of America, Scamp	Red (1.732)	Red (1.000)	Yellow (3.000)	Green (3.464)	Avoid (2.059)
Snowy grouper United States of America Gulf of Mexico, Vertical lines, United States of America, Snowy grouper	Red (1.730)	Red (1.000)	Yellow (3.000)	Green (3.460)	Avoid (2.058)

Warsaw grouper United States of America Gulf of Mexico, Vertical lines, United States of America, Warsaw grouper	Red (1.730)	Red (1.000)	Yellow (3.000)	Green (3.460)	Avoid (2.058)
Black grouper United States of America Gulf of Mexico, Vertical lines, United States of America, Black grouper	Green (3.413)	Red (1.000)	Yellow (3.000)	Green (3.464)	Good Alternative (2.440)
Red grouper United States of America Gulf of Mexico, Vertical lines, United States of America, Red grouper	Green (4.284)	Red (1.000)	Yellow (3.000)	Green (3.464)	Good Alternative (2.583)
Yellowedge grouper United States of America Western Central Atlantic, Set longlines, United States of America, Yellowedge grouper	Red (1.732)	Red (0.750)	Yellow (3.000)	Yellow (2.739)	Avoid (1.807)
Black grouper United States of America Western Central Atlantic, Vertical lines, United States of America, Black grouper	Green (3.413)	Red (1.000)	Yellow (3.000)	Green (3.464)	Good Alternative (2.440)
Red grouper United States of America Western Central Atlantic, Vertical lines, United States of America, Red grouper	Red (1.000)	Red (1.000)	Yellow (3.000)	Green (3.464)	Avoid (1.795)
Scamp United States of America Western Central Atlantic, Vertical lines, United States of America, Scamp	Red (1.732)	Red (1.000)	Yellow (3.000)	Green (3.464)	Avoid (2.059)
Yellowedge grouper United States of America Western Central Atlantic, Vertical lines, United States of America, Yellowedge grouper	Red (1.732)	Red (1.000)	Yellow (3.000)	Green (3.464)	Avoid (2.059)

Snowy grouper United States of America Western Central Atlantic, Vertical lines, United States of America, Snowy grouper	Yellow (2.236)	Red (1.000)	Yellow (3.000)	Green (3.464)	Avoid (2.195)
Snowy grouper United States of America Western Central Atlantic, Set longlines, United States of America, Snowy grouper	Yellow (2.236)	Red (0.750)	Yellow (3.000)	Yellow (2.739)	Avoid (1.926)
Gag United States of America Gulf of Mexico, Set longlines, United States of America, Gag	Green (3.413)	Red (0.750)	Yellow (3.000)	Yellow (2.739)	Avoid (2.141)
Gag United States of America Gulf of Mexico, Vertical lines, United States of America, Gag	Green (3.413)	Red (1.000)	Yellow (3.000)	Green (3.464)	Good Alternative (2.440)
Gag United States of America Western Central Atlantic, Vertical lines, United States of America, Gag	Green (3.318)	Red (1.000)	Yellow (3.000)	Green (3.464)	Good Alternative (2.423)

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 addresses US vertical line (e.g., hand line, bandit reel) and longline commercial fisheries in the Gulf of Mexico and the US South Atlantic portion of the Western Central Atlantic for seven grouper species. The species covered are black grouper (*Mycteroperca bonaci*), gag (*Mycteroperca microlepis*), red grouper (*Epinephelus morio*), scamp grouper (*Mycteroperca phenax*), snowy grouper (*Hyporthodus niveatus*), Warsaw grouper (*Hyporthodus nigritus*), and yellowedge grouper (*Epinephelus flavolimbatus*). These are the same six species covered in a previous Seafood Watch report (Max 2016), with the addition of scamp. In addition to possible changes in management measures and stock status over time for these species, SWAT evaluation and scoring criteria have been revised since publication of the original document, so the following report should be considered as a complete revision to the previous report.

Recreational fisheries contribute significantly to total removals for some of the species covered in this report. Although recreational removals are considered under Criterion 1 (fishing mortality and stock status), recreational recommendations are not provided in this report because the intent of the Seafood Watch program is to inform consumers about the sustainability of commercially available products.

Species Overview

The groupers covered within this report are generally long-lived, large-bodied, protogynous hermaphrodites (individuals mature as females then some portion of the population transforms into males), and reach sexual maturity between three and nine years of age (Parker and Mays 1998) (SAFMC 2012). The maximum age of these groupers range from 25 years for red grouper to 85 years for yellowedge grouper (SAFMC 2012). They range in maximum size from 1007 cm and 14.2 kg for scamp to 230 cm and 263 kg for Warsaw grouper. Though fecundity is unknown for most grouper species, studies have shown some species are prolific spawners, producing over one million eggs per spawn (SEDAR 2006a) (SEDAR 2010a) (SEDAR 2011a) (SEDAR 2013a). However, many grouper species have a slow population doubling time, ranging from 4.5 to 14 years (SEDAR 2006a) (SEDAR 2010a) (SEDAR 2011a) (SEDAR 2013a). Furthermore, many grouper species are relatively sedentary, making seasonal migrations to specific spawning sites where they form spawning aggregations, significantly increasing their susceptibility to fishing pressure. Grouper species vary in their spawning periods (Parker and Mays 1998) (SAFMC 2012). Of the groupers covered in this Seafood Watch report, black grouper are generally found from 10 to 20 m, red, scamp, and gag from 20 to 50 m, yellowedge from 70 to 110 m, and snowy and Warsaw out to 200 m or more (SAFMC 2012). Additional information for the assessed grouper species can be found in the following summary table (SAFMC 2012).

	Max age	Max size (cm)	Age at maturity	Size (cm) at maturity	Peak spawning	Mean capture depth	Home range
Black grouper	33	152	5	83	January-March	30-40	Small
Gag	26	145	3	62	March-April	20-50	Large
Red grouper	25	125	2	50	February-April	30-45	Small
Scamp	30	107	2	36	March-May	30-50	Possible seasonal

Snowy grouper	40	122	5	54	April-September	100-200	Unknown
Warsaw grouper	41	230	9		August-October	70-110	Unknown
Yellowedge grouper	85	114	5	57	April-October	100-200	Unknown

Fisheries for the species covered in this report generally occur in the US Exclusive Economic Zone (EEZ; 3-200 nautical miles from shore), and are therefore governed by the Magnuson-Stevens Fishery Conservation Management Act (MSA) (NMFS 2017a). Initially enacted in 1976, the MSA established eight regional fishery management councils authorized to recommend management actions for stocks within the respective region (NMFS 2017a). A reauthorization of the MSA in 1996 defined 10 national standards for sustainable and responsible fishery management that must be followed by all federal fishery management plans (NMFS 2017a). The National Marine Fisheries Service (NMFS), under authority of the U.S. Secretary of Commerce, is responsible for final review and implementation of management measures to ensure consistency with the MSA (NMFS 2017a).

In the Gulf of Mexico, the species in this report are managed by the Gulf of Mexico Fishery Management Council (GMFMC) through their Reef Fish Fishery Management Plan (FMP). The Reef Fish FMP covers a total of 31 species, including 11 snapper species, 11 groupers, three tilefishes, four jacks, one triggerfish, and one wrasse (GMFMC 2015a). Under Amendment 29 to the Reef Fish FMP, the GMFMC manages commercial harvest of Gulf grouper and tilefish under a limited access Individual Fishing Quota (IFQ) program with five share categories (gag, red grouper, other shallow-water groupers, deep water groupers, and tilefish) with strict reporting requirements (50 CFR 622.22). The total quota for each species is determined by an annual catch limit, which is then allocated between commercial and recreational fisherman. Black grouper and scamp are included in the "other shallow water grouper" category, and snowy, yellowedge and Warsaw are included in the "deep water grouper" category (NMFS 2017b). Other management measures for the Gulf reef fish fishery include gear and fishing location restrictions to reduce bycatch, minimum size limits to protect immature fish and commercial and recreational area closures to protect spawning groupers (GMFMC 2017).

The South Atlantic grouper species covered in this report are among 55 species managed under the South Atlantic Fishery Management Council (SAFMC) Snapper-Grouper FMP. In total, the FMP covers twenty grouper species, ten snappers, seven porgies, five grunts, five jacks, three tilefishes, wreckfish, hogfish, Atlantic spadefish, and two species of triggerfish (SAFMC 2017a). The SAFMC manages commercial harvest of the snapper-grouper complex via a limited access fishery including transferable and non-transferable permits with overall species quotas determined by annual catch limits (SAFMC 2017b). Other management measures for the snapper-grouper fishery include minimum size limits to prevent harvest of immature fish, gear restrictions to reduce bycatch and protect habitat, trip limits to control harvest, seasonal closures to protect shallow water grouper during their spawning season, and a series of marine protected areas (MPA) and specialized management zones (SMZ) closed to fishing or possession of snapper and grouper, to protect the spawning aggregations and habitat of for species in these management complexes (SAFMC 2017b).

Black grouper is considered to be one unit stock throughout the South Atlantic and Gulf of Mexico. It is assessed as a single population, then harvest specifications are split between the regions to allow management as two separate management units. It is included in both the GMFMC Reef Fish FMP and the SAFMC Snapper-Grouper FMP with separate regulations by region (GMFMC 2017) (SAFMC 2017b).

Management of the snapper-grouper and reef fish species complexes is difficult because of the wide range of

life history strategies for species covered under these plans. In particular, many species are long-lived, slow-growing, and late to mature making them particularly vulnerable to overharvest and slow to rebuild. Some species also exhibit serial hermaphroditism (change sex over time), so certain harvest strategies may affect population productivity more than others. Management is further complicated for some species in the complex because of insufficient biological or fishery data.

Production Statistics

US commercial harvest of grouper is dominated by the Gulf of Mexico, with Gulf of Mexico red grouper landings accounting for more than 50% of combined landings for these seven species in all but five years since 1986 (NMFS Fishery Statistics Division 2017a). Although red grouper is the predominant species caught in the Gulf, gag is the predominant species caught in the South Atlantic. In both regions, catches of shallow water grouper exceed those of deep water species, with deep water grouper catch dominated by snowy grouper in the South Atlantic and yellowedge in the Gulf of Mexico (NMFS Fishery Statistics Division 2017a). Commercial sale of Warsaw grouper has been prohibited since 1994, and possession of the species has been prohibited in Federal waters since 2011.

In both regions, recreational landings of grouper species are high, and in some cases may exceed commercial landings, as is the case with gag landings in the Gulf of Mexico (NMFS Fishery Statistics Division 2017a) (NMFS Fishery Statistics Division 2017b). Seafood Watch (SFW) does not assess the sustainability of recreational fisheries, but does factor recreational fishing into Criteria 1 assessment of fish stocks and their corresponding fishing mortality.

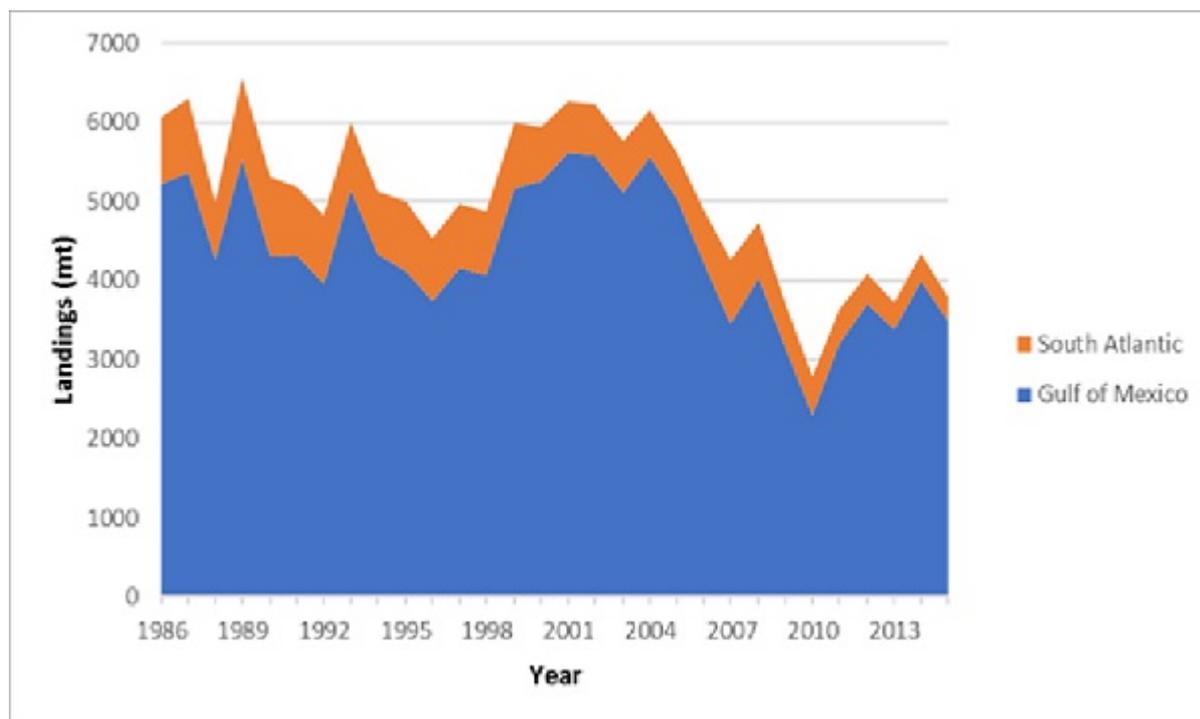


Figure 1 Total South Atlantic and Gulf of Mexico grouper commercial landings 1986-2015 (combined landings of black grouper, gag, red grouper, scamp, snowy grouper, Warsaw grouper, and yellowedge grouper), from NMFS Sustainable Fishery Division (2017a), downloaded August 2017.

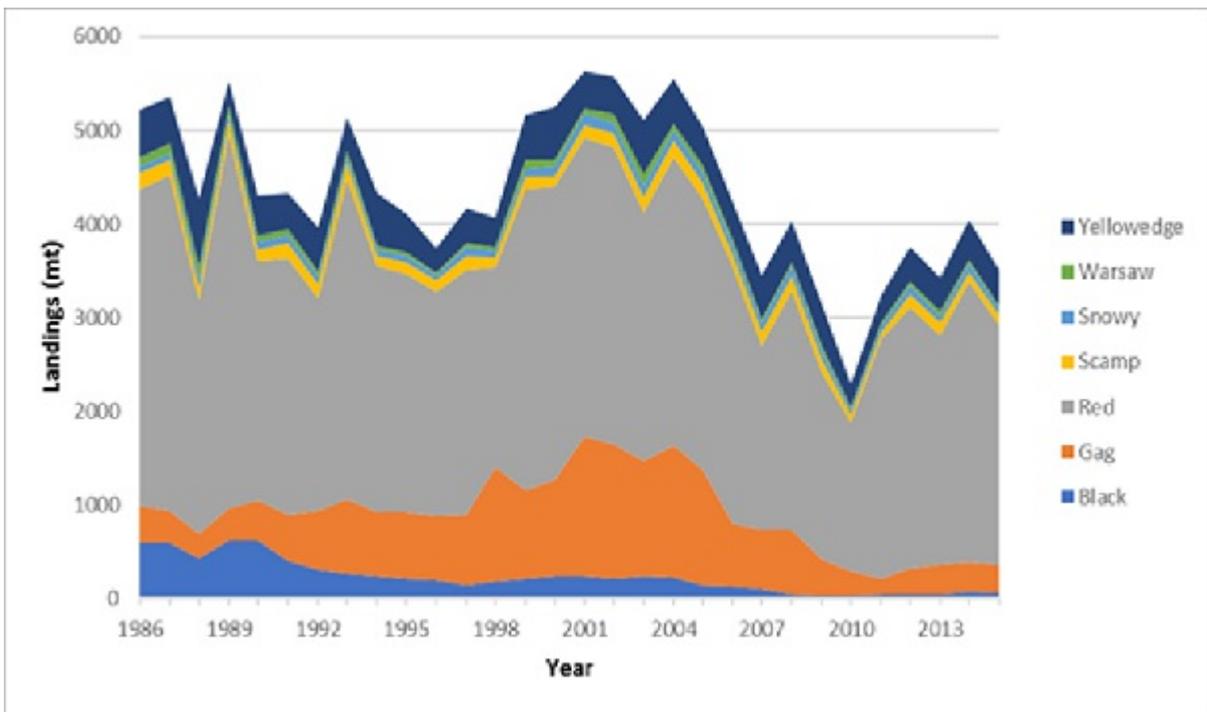


Figure 2 Gulf of Mexico grouper commercial landings by species 1986-2015, from NMFS Sustainable Fishery Division (2017a), downloaded August 2017.

Internationally, reported harvest of grouper species is increasing. Whether this is a real increase or an effect of improved reporting is unknown. We do note that the total US grouper harvest reported in United Nations Food and Agriculture Organization (FAO) is lower than reported by NMFS.

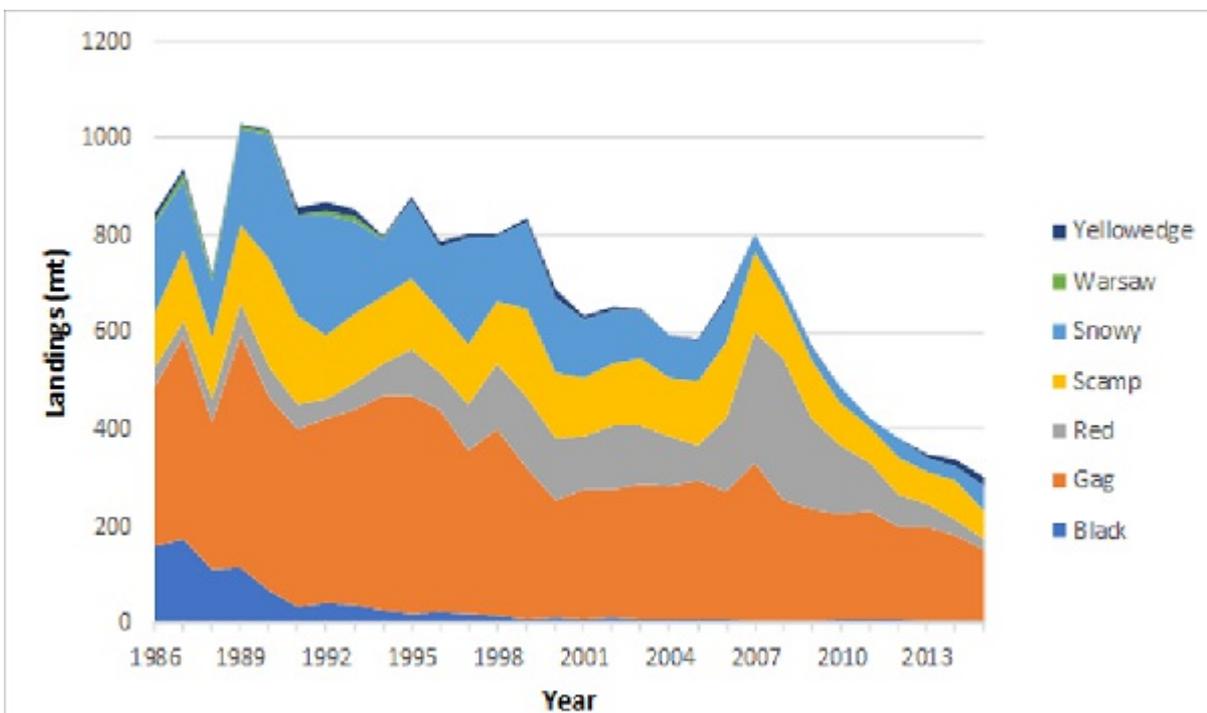


Figure 3 South Atlantic grouper commercial landings by species 1986-2015, from NMFS Sustainable Fishery Division (2017a), downloaded August 2017

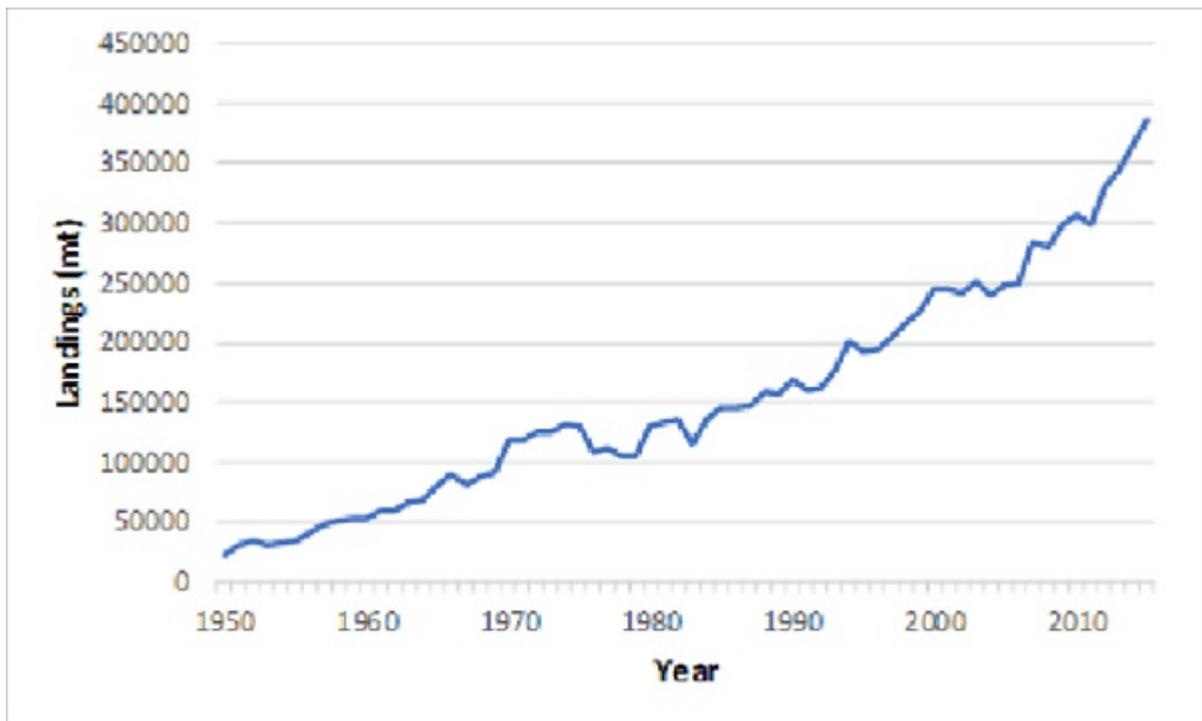


Figure 4 Global landings of all grouper (Serranidae) species 1950-2015. From FAO (2017), accessed August 2017.

For the species covered in this report, global harvest information is variable, although all of these species occur in US waters, south through the Caribbean into Brazilian waters. According to the FAO, large red grouper fisheries existed in Brazil and Cuba, peaking at over 11,000 MT in the late 1960s (FAO 2017). A small fishery is also prosecuted in the Dominican Republic. Landings from Cuba declined steadily since the peak, with zero landings reported from 2005 onward (FAO 2017). The Brazilian fishery was still reporting over 1,000 MT in the late 2000s, but no landings have been reported since 2010 (FAO 2017), either because the fishery has vanished or because of reporting delays. A small fishery (15 to 25 MT annually) for black grouper has been reported from Bermuda since 2005. Landings for gag, scamp, snowy grouper, Warsaw grouper, and yellowedge grouper are reported only from the US, but not until 1994 and at much lower tonnage than NMFS reports for most of these species (FAO 2017). It is likely that fisheries occur for these species in other countries, but may not be reported, or are not reported to species level. For example, grouper landings from Mexico are generally reported through FAO at the genus level.

Importance to the US/North American market.

The largest source of grouper imported to the US is Mexico, which has accounted for 50% or more of total grouper imports in every year from 1991 to 2016 (NMFS Fishery Statistics Division 2017a). Panama, the next highest importer, averages approximately 12% of total US grouper imports over the same time period (NMFS Fishery Statistics Division 2017a). For the period 2010 to 2015, imports from Mexico were nearly identical to combined South Atlantic and Gulf of Mexico landings of the seven species covered in this report (approximately 22,300 MT) (NMFS Fishery Statistics Division 2017a). Although the species composition of the Mexican catch is not reported in NMFS or FAO commercial fishery databases, it is highly likely that some portion of the imports is made up of the species covered by this report since their ranges extend through Mexican waters.

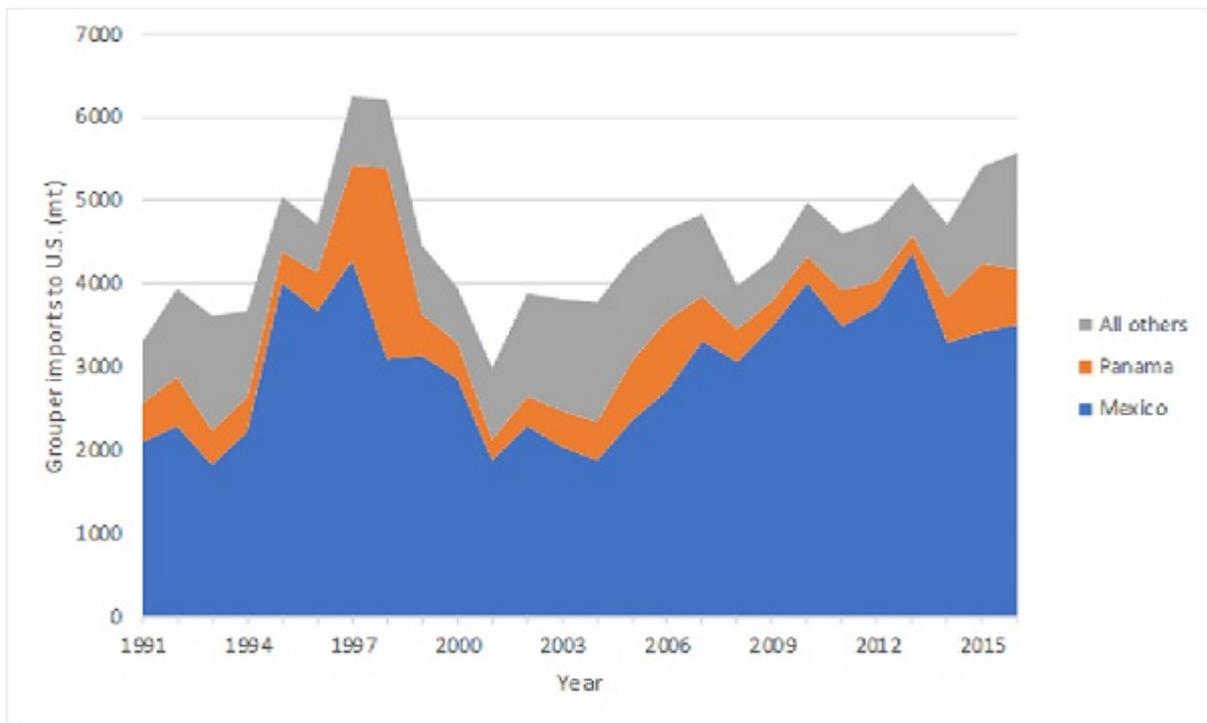


Figure 5 Grouper imports to the US from 1991 to 2016. From NMFS Sustainable Fishery Division (2017a) Foreign Trade database, accessed August 2017.

Common and market names.

Mycteroperca bonaci (black grouper): market name is grouper; vernacular names are rockfish, marbled rockfish, runner, springer, blackfin grouper, carbuerita, carbo

Mycteroperca microlepis (gag): market names are gag and grouper; vernacular names are velvet rockfish, small-scaled rockfish, charcoal belly, black grouper

Epinephelus morio (red grouper): market name is grouper; vernacular name is cherna americana, negre

Mycteroperca phenax (scamp): market name is grouper; vernacular names include broom tail, black grouper

Hyporthodus niveatus (snowy grouper): market name is grouper; vernacular name is spotted grouper, snowflake, brownie

Epinephelus nigritus (Warsaw grouper): market name is grouper; vernacular names are black jewfish, black grouper

Hyporthodus flavolimbatus (yellowedge grouper): market name is grouper; vernacular name is yellowfinned grouper (FDA 2017)

Primary product forms

Grouper are sold both as whole fish and fillets in fresh and frozen forms.

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 GROUPER			
Region Method	Abundance	Fishing Mortality	Score
United States of America/Gulf of Mexico Set longlines United States of America Black grouper	2.33: Moderate Concern	5.00: Low Concern	Green (3.413)
United States of America/Gulf of Mexico Vertical lines United States of America Black grouper	2.33: Moderate Concern	5.00: Low Concern	Green (3.413)
United States of America/Western Central Atlantic Vertical lines United States of America Black grouper	2.33: Moderate Concern	5.00: Low Concern	Green (3.413)

GAG			
Region Method	Abundance	Fishing Mortality	Score
United States of America/Gulf of Mexico Set longlines United States of America Gag	2.33: Moderate Concern	5.00: Low Concern	Green (3.413)
United States of America/Gulf of Mexico Vertical lines United States of America Gag	2.33: Moderate Concern	5.00: Low Concern	Green (3.413)
United States of America/Western Central Atlantic Vertical lines United States of America Gag	3.67: Low Concern	3.00: Moderate Concern	Green (3.318)

RED GROUPER			
Region Method	Abundance	Fishing Mortality	Score
United States of America/Gulf of Mexico Set longlines United States of America Red grouper	3.67: Low Concern	5.00: Low Concern	Green (4.284)
United States of America/Gulf of Mexico Vertical lines United States of America Red grouper	3.67: Low Concern	5.00: Low Concern	Green (4.284)
United States of America/Western Central Atlantic Vertical lines United States of America Red grouper	1.00: High Concern	1.00: High Concern	Red (1.000)

SCAMP			
Region Method	Abundance	Fishing Mortality	Score
United States of America/Gulf of Mexico Set longlines United States of America Scamp	1.00: High Concern	3.00: Moderate Concern	Red (1.732)

United States of America/Gulf of Mexico Vertical lines United States of America Scamp	1.00: High Concern	3.00: Moderate Concern	Red (1.732)
United States of America/Western Central Atlantic Vertical lines United States of America Scamp	1.00: High Concern	3.00: Moderate Concern	Red (1.732)

SNOWY GROUPER			
Region Method	Abundance	Fishing Mortality	Score
United States of America/Gulf of Mexico Set longlines United States of America Snowy grouper	1.00: High Concern	3.00: Moderate Concern	Red (1.732)
United States of America/Gulf of Mexico Vertical lines United States of America Snowy grouper	1.00: High Concern	3.00: Moderate Concern	Red (1.730)
United States of America/Western Central Atlantic Vertical lines United States of America Snowy grouper	1.00: High Concern	5.00: Low Concern	Yellow (2.236)
United States of America/Western Central Atlantic Set longlines United States of America Snowy grouper	1.00: High Concern	5.00: Low Concern	Yellow (2.236)

WARSAW GROUPER			
Region Method	Abundance	Fishing Mortality	Score
United States of America/Gulf of Mexico Set longlines United States of America Warsaw grouper	1.00: High Concern	3.00: Moderate Concern	Red (1.732)

United States of America/Gulf of Mexico Vertical lines United States of America Warsaw grouper	1.00: High Concern	3.00: Moderate Concern	Red (1.730)
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YELLOWEDGE GROUPER			
Region Method	Abundance	Fishing Mortality	Score
United States of America/Gulf of Mexico Set longlines United States of America Yellowedge grouper	3.67: Low Concern	5.00: Low Concern	Green (4.284)
United States of America/Western Central Atlantic Set longlines United States of America Yellowedge grouper	1.00: High Concern	3.00: Moderate Concern	Red (1.732)
United States of America/Western Central Atlantic Vertical lines United States of America Yellowedge grouper	1.00: High Concern	3.00: Moderate Concern	Red (1.732)

Criterion 1 Assessment

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 GROUPE

Factor 1.1 - Abundance

UNITED STATES OF AMERICA/GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPE

UNITED STATES OF AMERICA/GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPE

UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPE

Moderate Concern

A benchmark stock assessment for black grouper in the US South Atlantic and Gulf of Mexico region was completed through the Southeast Data, Assessment, and Review (SEDAR) process in 2010 with data through 2008 (SEDAR 2010a). A new benchmark, originally scheduled for 2015, was delayed until 2017, and has since been delayed again due to concerns over allocation of misreported gag landings in the early years of reporting (pers. comm., J. Byrd, SEDAR, 5/5/2017) and changes to management in both regions that complicated index development (pers. comm., J. Stephen, NMFS, 8/2/2018). The most recent stock assessment is therefore the 2010 benchmark (SEDAR 2010a).

The black grouper stock assessment uses a spawning biomass target that would occur at a fishing mortality rate that produces 30% of maximum spawning potential ($SSB_{30\%SPR}$) as a proxy for the target spawning biomass at maximum sustainable yield (SSB_{MSY}) (SEDAR 2010a). The biomass threshold is defined as $(1-M)^* SSB_{30\%SPR}$, where $M = 0.14$ is the natural mortality rate (SEDAR 2010a). The 2010 assessment estimated $SSB_{30\%SPR} = 5.92$ million lb and $SSB_{2008} = 8.3$ million lb, indicating that terminal year biomass exceeded the target by approximately 40% (SEDAR 2010a). This indicates that spawning biomass is well above the target reference point, and is corroborated by the 2017 NMFS third quarter summary of stock status report (NMFS 2017b). However, this status determination uses a terminal year of data from nearly 10 years ago. Further, Amendment 21 (SAFMC 2014b) redefined biomass reference points for several species, including black grouper, which may affect status determination when the next assessment is completed. For these reasons, black grouper in the South Atlantic and Gulf of Mexico receive an abundance score of "moderate" concern.

Justification:

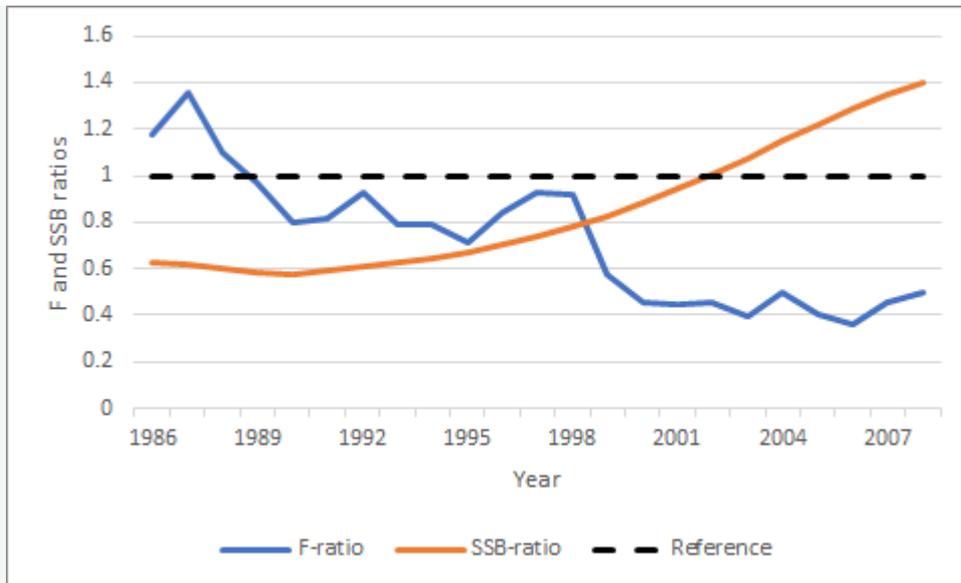


Figure 6 Black grouper fishing mortality and spawning biomass from the revised base model run relative to selected management reference points. Figure developed based on data provided in Section VI of SEDAR 19, Tables 3.3.4.10 (SSB) and 3.3.5.11c (F, age 5) (SEDAR 2010a).

Factor 1.2 - Fishing Mortality

UNITED STATES OF AMERICA/GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA/GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

Low Concern

Both the SAFMC and GMFMC define their fishing mortality limit reference point for black grouper as the fishing mortality that achieves 30% of maximum spawning potential (SEDAR 2010a). The 2010 benchmark assessment estimated a terminal year fishing mortality rate of $F_{2008} = 0.108$, which is well below the limit reference point $F_{30\%SPR} = 0.216$ (Figure 6) (SEDAR 2010a). Stock projections that maintained fishing mortality at the 2008 level resulted in increases to spawning stock biomass. This is supported by indications that fishing mortality was relatively stable from 2000 to 2008 and resulted in stock growth (SEDAR 2010a). Annual catch limits in recent years have ranged from approximately 520,000 to 560,000 lb (both areas combined) (pers. comm., M. Errigo, SAFMC, 5/26/2017), with total (commercial plus recreational) landings estimated at less than 100,000 lb in most years (NMFS Fishery Statistics Division 2017a) (NMFS Fishery Statistics Division 2017b). These findings indicate that fishing mortality rate for black grouper in the Gulf of Mexico and South Atlantic is sustainable, warranting a "low" concern for fishing mortality.

GAG

Factor 1.1 - Abundance

UNITED STATES OF AMERICA/GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG
 UNITED STATES OF AMERICA/GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

The most recent benchmark stock assessment for gag in the Gulf of Mexico (SEDAR 2014a) provided conflicting evidence regarding abundance, depending on whether SSB included both males and females (overfished) or females only (not overfished). The stock assessment peer review panel recommended using the more conservative result based on combined sexes (SEDAR 2014a). The assessment was recently updated with data through 2015 (SEDAR 2016a). The base model of the update assessment determined that the current biomass of $SSB_{2015} = 9,688$ MT. The biomass target uses an MSY proxy of $SSB_{F_{max}} = 7,171$ MT (SEDAR 2016a). The GMFMC accepted the base model, and the stock is therefore considered not overfished, with terminal year biomass greater than the biomass target. However, an alternative model that incorporated a different assumption in recreational discarding practices concluded that recent spawning biomass was only 32% of the associated biomass threshold, indicating some uncertainty in the stock status results (SEDAR 2016a). Further, the assessment team noted concerns that the recent stock growth estimated by the model was excessive given other available information (SEDAR 2016a). Conflicting evidence in biomass ratios in the benchmark and update assessment result in a biomass score of "moderate" concern for gag in the Gulf of Mexico.

Justification:

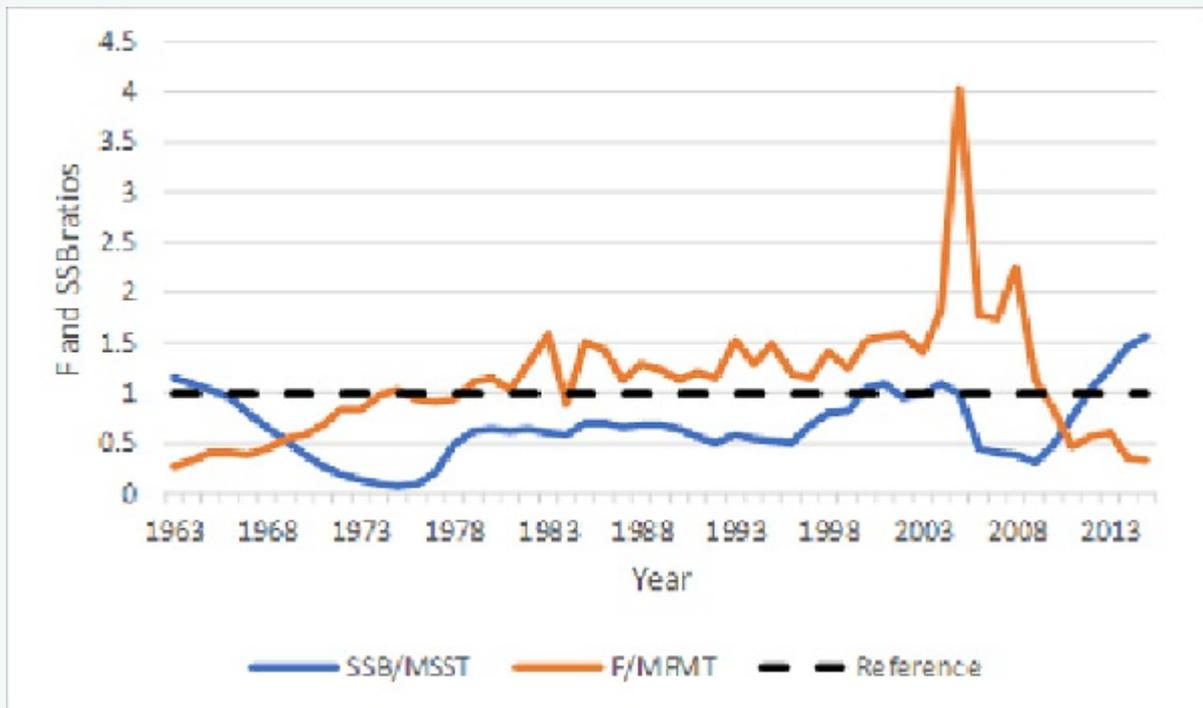


Figure 7 Gulf of Mexico gag fishing mortality and spawning biomass from the base model run relative to selected management reference points. Figure developed based on data provided in SEDAR 33 update Tables 8 (SEDAR 2016a).

UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Low Concern

A benchmark stock assessment for gag in the US South Atlantic was conducted and reviewed through the SEDAR process in 2006 using data through a terminal year of 2004. Results of the benchmark assessment

indicated that the US South Atlantic stock of gag was not overfished in 2004, but overfishing was occurring (SEDAR 2006a). An update to the assessment was completed in 2014 using the same methodology as the benchmark, with data updated through 2012 (SEDAR 2014b). Results of the assessment estimate a spawning stock biomass (SSB) in 2012 of 1776 metric tons (MT), while the biomass target for the stock, defined as SSB_{MSY} , was estimated as 1806.8 MT (SEDAR 2014b). Spawning biomass in the terminal year was approximately 97% of the biomass target and has been increasing since a recent low in 2009 (SEDAR 2014b). Stock status for gag in the South Atlantic meet all the criteria for a "very low" concern rating for abundance. Stock projections, however, indicate a greater than 50% probability that SSB will fall below the minimum stock size threshold (MSST) of 1373.8 MT during 2014 to 2017 even when fishing at F_{MSY} , due to low recruitment near the end of the time series (SEDAR 2014b). Since it is uncertain if abundance is above the target level, and abundance is projected to decline in the near term, we have awarded gag in the US South Atlantic region a score of "low" concern.

Justification:

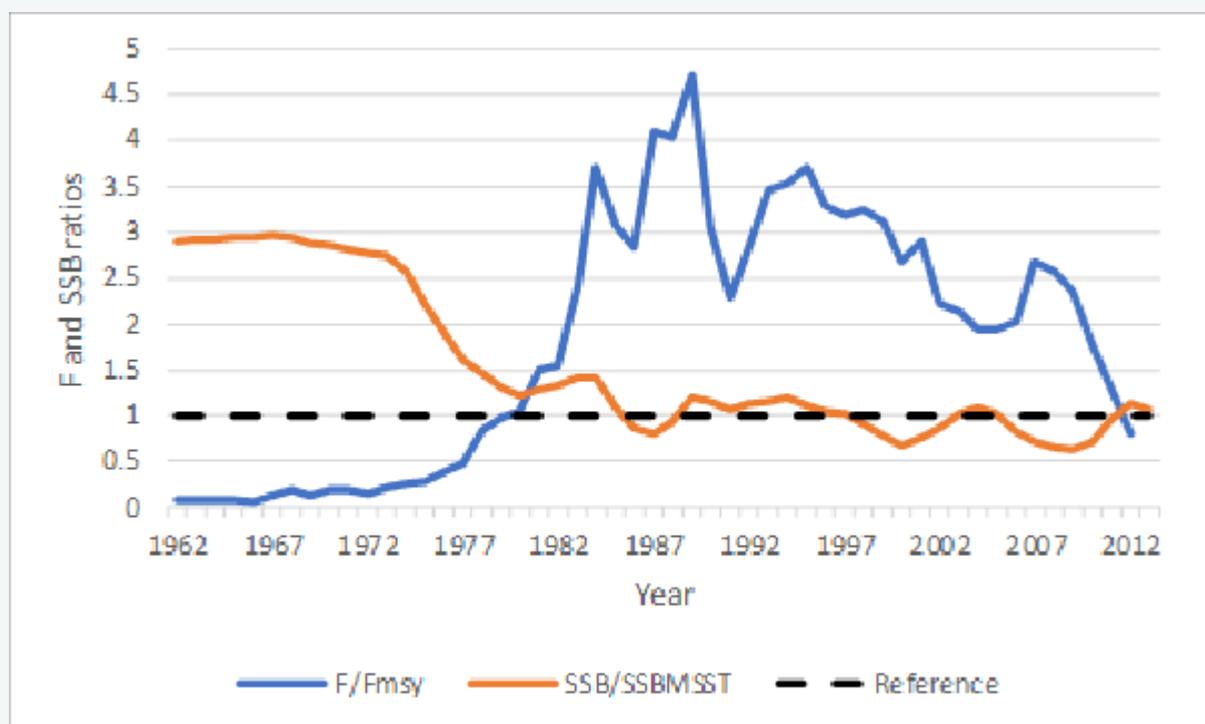


Figure 8 South Atlantic gag fishing mortality and spawning biomass from the base model run relative to selected management reference points. Figure developed based on data provided in SEDAR 10 update Table 10 (SEDAR 2104b).

Factor 1.2 - Fishing Mortality

UNITED STATES OF AMERICA/GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG
 UNITED STATES OF AMERICA/GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Low Concern

Following a determination from the 2009 stock assessment update (SEDAR 2009) that the stock was experiencing overfishing, the GMFMC enacted measures through Amendment 32 to reduce harvest of gag and implement a 10-year rebuilding plan (GMFMC 2011a). For the 2016 update assessment, the GMFMC selected an MSY proxy fishing mortality threshold of $F_{MAX} = 0.1964$ for the base model (SEDAR 2016a). Recent three-

year average fishing mortality was estimated as $F_{2013-2015} = 0.0817$, which is less than half of the threshold reference point, indicating the stock is not experiencing overfishing (SEDAR 2016a). Since implementation of harvest reduction measures in 2009, commercial harvest has been cut by more than 50% and total harvest has dropped from an average of 4.2 million lb for 2006 to 2008, to less than 1.8 million lb for 2013 to 2015 (NMFS Fishery Statistics Division 2017a) (NMFS Fishery Statistics Division 2017b), which may have contributed to stock growth indicated in the assessment results (SEDAR 2016a). During both these time periods, recreational harvest has accounted for approximately two thirds of the total harvest. NMFS considers the stock as fully rebuilt and no longer within a rebuilding plan (NMFS 2017b). Gag in the Gulf of Mexico receives a fishing mortality score of "low" concern.

UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

The 2014 update assessment identifies a maximum fishing mortality threshold of $F_{MSY} = 0.29$ (SEDAR 2014b). Stock status is determined using the average fishing mortality in the most recent three years of the assessment. A fishing mortality ratio of $F_{2010-2012} / F_{MSY} = 1.23$ indicates the stock was experiencing overfishing at the time (SEDAR 2014b). However, the South Atlantic Council's Scientific and Statistical Committee (SSC) noted that the fishing mortality rate for 2012, and the projected fishing mortality rate in 2013 based on the actual landings, suggested that overfishing did not occur in 2012 and 2013 (SAFMC 2015a). Also, following the 2014 assessment managers took action to revise the annual catch limit for gag for the 2015 to 2019 fishing years to ensure that overfishing does not occur (SAFMC 2015a). NOAA Fisheries currently considers gag in the South Atlantic to no longer be experiencing overfishing (NMFS 2017b), but a new assessment has yet to be completed. Because the defined stock status criteria (three year average) concluded the stock was experiencing overfishing, but fishing mortality in the most recent individual years was below the fishing mortality limit, fishing mortality for gag in the US South Atlantic is rated as "moderate" concern.

Justification:

The SAFMC Scientific and Statistical Committee (SSC) discussed the fishing mortality status determination at length during their April 2014 meeting (SAFMC 2014e). It was noted that, although the recent three year average was above the F_{MSY} value, there was a noticeable downward trend in fishing mortality in recent years, possibly due to a spawning closure implemented a few years previously. It was also noted that, because landings in 2012 were approaching the annual catch limit prior to the end of the open season, there was an early closure to the fishery. The SSC discussed how these actions may have addressed the concerns of overfishing in recent years and considered using only the terminal year for status determination. However, the SSC then reviewed the uncertainty analysis, which showed that, despite the declining trend, there was a high probability that overfishing was occurring in the terminal year. They concluded that a three-year average fishing mortality rate was the most appropriate for status determination (SAFMC 2014e). Regardless, NMFS has the final say in determining stock status (pers. comm., M. Errigo, SAFMC, 6/15/2018), and their decision resulted in a finding of overfishing not occurring.

RED GROUPER

Factor 1.1 - Abundance

UNITED STATES OF AMERICA/GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA/GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

Low Concern

The most recent benchmark stock assessment for red grouper in the Gulf of Mexico was conducted through the SEDAR process with data through 2013 (SEDAR 2015a). The assessment team developed stock status determinations using MSY based reference points, but the review panel recommended the use of MSY proxies based on spawning potential ratio (SPR) (SEDAR 2015a). Specifically, the biomass target was set to the spawning biomass equal to 30% of maximum spawning potential, $SSB_{30\%SPR} = 1.204$ million lb under the base model (SEDAR 2015a). Terminal year spawning biomass was estimated as $SSB_{2013} = 2.223$ million lb, ~83% greater than the biomass target and more than double the biomass threshold (SEDAR 2015a). Spawning biomass exceeds the biomass target reference point; however, recent survey data indicate the stock is declining despite the quota not being reached in recent years (pers. comm., R. Ellis, FL FWC, 7/13/2018). This suggests some uncertainty in the stock assessment results. Although biomass appears to be above target levels, the uncertainty moderates the score for red grouper in the Gulf of Mexico to "low" concern.

Justification:

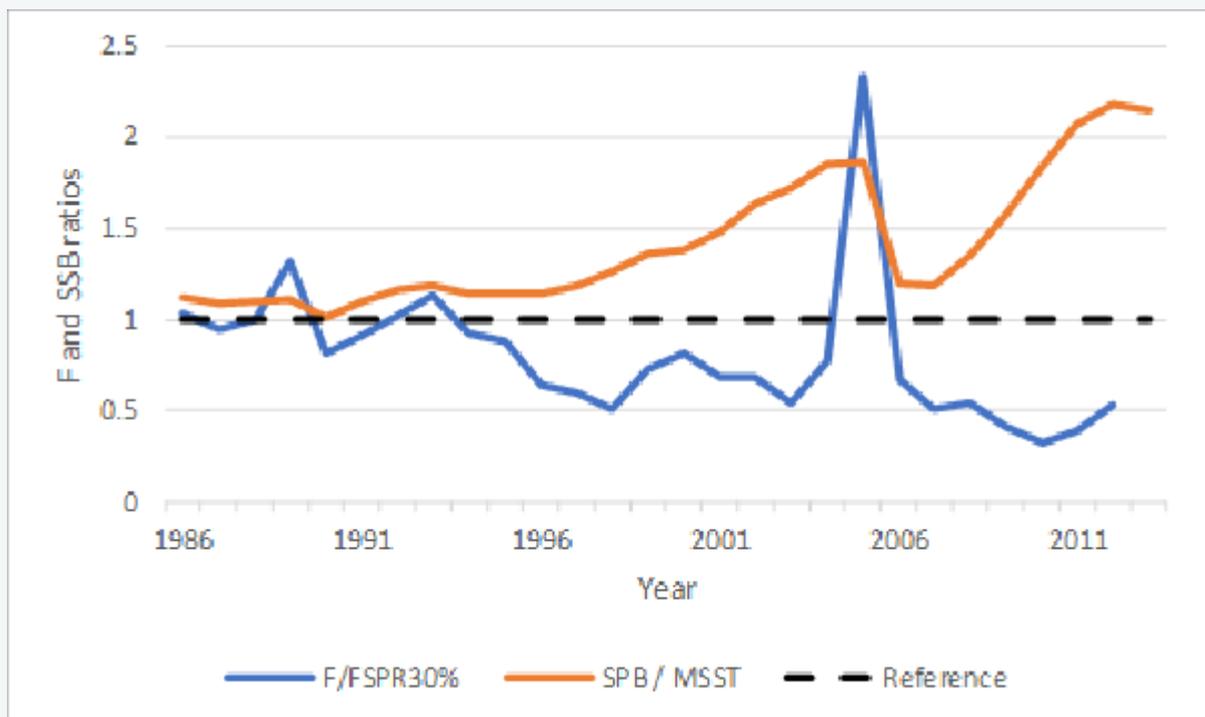


Figure 9 Gulf of Mexico red grouper fishing mortality and spawning biomass from the base model run relative to selected management reference points. Figure developed based on data provided in Tables A.1.5 and A.1.6 in Section 6 of SEDAR 42 (SEDAR 2015a).

UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

High Concern

A SEDAR benchmark peer review of red grouper in the US South Atlantic was completed in 2010 with data through 2008 (SEDAR 2010b). A standard stock assessment, which allows both new data and slight revisions to methodology relative to the benchmark (<http://sedarweb.org/sedar-process>), was recently completed with data through 2015 (SEDAR 2017a). Results of the assessment determined that SSB in the terminal year was approximately 911 MT, well below the biomass target of $SSB_{MSY} = 3183.4$ MT, and only 38% of the biomass threshold of $0.75 * SSB_{MSY} = 2387.6$ MT (SEDAR 2017a). Amendment 24 to the Snapper-Grouper FMP (SAFMC 2011a) implemented a ten-year rebuilding plan for red grouper. Since then, commercial harvest by hand lines and longlines has fallen to the lowest levels of the time series, as have total landings for all sectors combined (NMFS Fishery Statistics Division, 2017a) (NMFS Fishery Statistics Division, 2017b). However, results of the stock assessment suggest these reductions appear to have had little effect on stock abundance to date (SEDAR 2017a). Estimated fishing mortality in recent years of the assessment has not declined as dramatically as harvest, suggesting that low recruitment in recent years could be contributing to the reduction in landings. Based on the overfished status of red grouper in the South Atlantic, this stock receives a biomass score of "high" concern.

Justification:

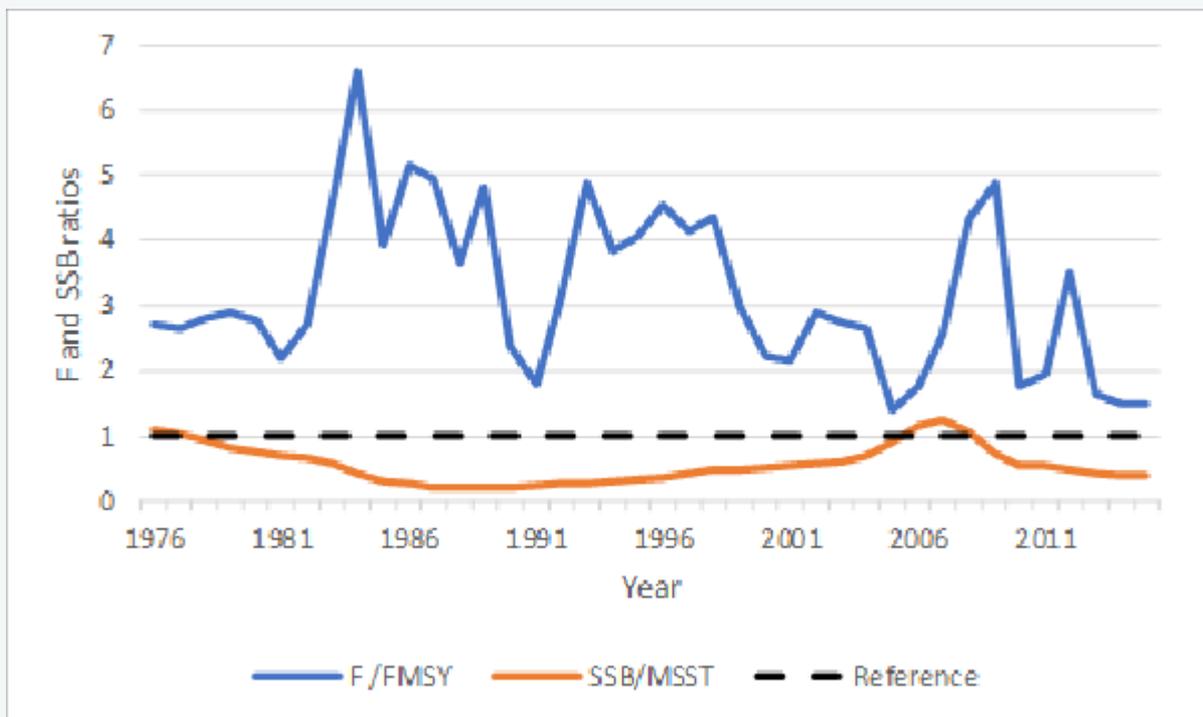


Figure 10 South Atlantic red grouper fishing mortality and spawning biomass from the base model run relative to selected management reference points. Figure developed based on data provided in SEDAR 53 Table 8 (SEDAR 2017a).

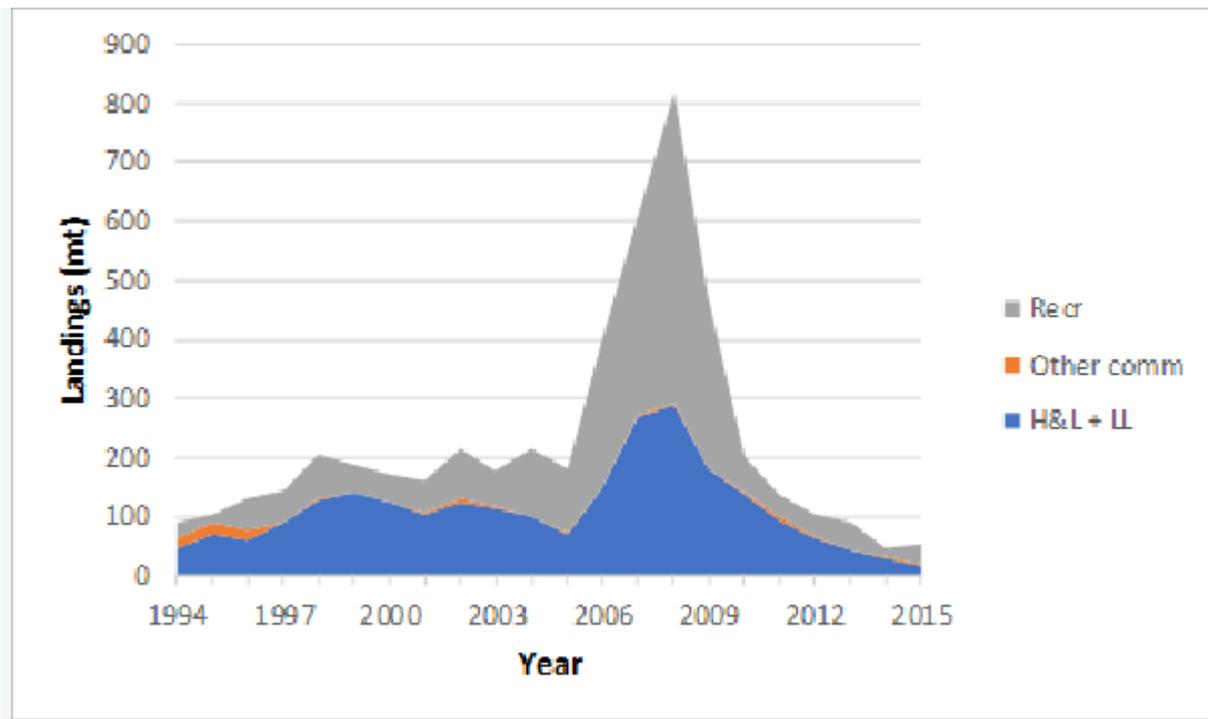


Figure 11 Landings of red grouper in the U.S. South Atlantic region by fishery. Data downloaded from the NMFS Sustainable Fishery Division (2017a, 2017b), accessed August 2017.

Factor 1.2 - Fishing Mortality

UNITED STATES OF AMERICA/GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPE

UNITED STATES OF AMERICA/GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPE

Low Concern

Fishing mortality status is determined using the terminal year F relative to the F threshold. For red grouper in the Gulf of Mexico, $F_{2013} = 0.121$ is ~59% of the fishing mortality threshold of $F_{30\%SPR} = 0.204$ (SEDAR 2015a) indicating the stock is not experiencing overfishing. Annual F has consistently been below the $F_{THRESHOLD}$ since 2006 (SEDAR 2015a), resulting in a fishing mortality score of "low" concern for this fishery.

UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPE

High Concern

A fishing mortality threshold of F_{MSY} was established in the benchmark assessment and is compared to the recent three year average fishing mortality to determine stock status (SEDAR 2010b). The standard assessment through 2015 estimated $F_{MSY} = 0.12$ and a recent fishing mortality rate of $F_{2013-2015} = 0.187$ (SEDAR 2017a). Recent fishing mortality exceeds the limit reference point by more than 50%. Although this ratio has declined since implementation of Amendment 24 in 2011 (SEDAR 2017a), the stock is still experiencing overfishing (NMFS 2017b). As such, red grouper in the South Atlantic receives a fishing mortality rating of "high" concern.

SCAMP

Factor 1.1 - Abundance

UNITED STATES OF AMERICA/GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA/GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

High Concern

Scamp has been managed as part of the GMFMC Reef Fish FMP since inception of the FMP (GMFMC 1981), but a formal stock assessment has never been conducted for this species. The abundance score for scamp is therefore based on proxy information, including a productivity-susceptibility analysis (PSA) that takes into account the species' life history and characteristics of the fishery.

A PSA score of 3.39 indicates that scamp have high inherent vulnerability. Because this species is highly vulnerable and there is no evidence to suggest that the stock is either above or below reference points, scamp in the Gulf of Mexico receive an abundance score of "high" concern.

Justification:

Gulf of Mexico Scamp

Productivity-Susceptibility Analysis:

Scoring Guidelines

1.) Productivity score (P) = average of the productivity attribute scores (p_1, p_2, p_3, p_4 (finfish only), p_5 (finfish only), p_6, p_7 , and p_8 (invertebrates only))

2.) Susceptibility score (S) = product of the susceptibility attribute scores (s_1, s_2, s_3, s_4), rescaled as follows:
 $S = [(s_1 * s_2 * s_3 * s_4) - 1/40] + 1$.

3.) Vulnerability score (V) = the Euclidean distance of P and S using the following formula: $V = \sqrt{(P^2 + S)^2}$

Productivity Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity	50% mature by age 2 (Harris et al. 2002) (Lombardi-Carlson et al. 2012)	1
Average maximum age	Ages recorded up to 30+ years (Harris et al. 2002) (Lombardi-Carlson et al. 2012)	3
Fecundity	1.3 million as estimated from Figure 11 of Harris et al. (2002)	1
Average maximum size (fish only)	80-90 cm based on growth curves (Harris et al. 2002) (Lombardi-Carlson et al. 2012)	1

Average size at maturity (fish only)	50% maturity by approximately 35 cm (Harris et al. 2002) (Lombardi-Carlson et al. 2012)	1
Reproductive strategy		
Trophic level	4.5 (Froese and Pauly 2017)	3
Density dependence (invertebrates only)		
Habitat quality	Moderately altered from non-fishing sources	2
Total Productivity (average)		1.714
Susceptibility Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Areal overlap (Considers all fisheries)	>30% of main geographic range is fished	3
Vertical overlap (Considers all fisheries)		3
Selectivity of fishery (Specific to fishery under assessment)	Protogynous hermaphrodite	3
Post-capture mortality (Specific to fishery under assessment)	>90% of captured scamp are retained (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013)	3
Total Susceptibility (multiplicative)		3.0

PSA score for scamp in Gulf of Mexico longline and handline fisheries is calculated as follows:

$$\text{Vulnerability (V)} = \sqrt{P^2 + S^2}$$

$$V = \sqrt{1.71^2 + 3.0^2}$$

$$V = 3.46$$

UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

High Concern

Scamp has been managed as part of the SAFMC Snapper-Grouper complex since inception of the FMP (SAFMC 1983), but a formal stock assessment has never been conducted for this species. A fishery independent index of abundance from the Marine Resources Monitoring, Assessment, and Prediction (MARMAP) Program chevron trap survey during 1990 to 2012 indicates a general decline in abundance from the mid 1990s to the mid 2000s, falling from nearly twice the time series mean in 1995 to less than half the time series mean by 2006 (MARMAP 2013). By 2012, stock size had increased slightly, but is still well below the time series mean abundance. Although the time series mean is not indicative of any management reference point (but it is a data-limited indicator), the sharp decline in abundance raises concern for the stock status.

The abundance score for scamp is therefore based on the negative data-limited indicator, as well as proxy information (PSA) that takes into account the species life-history and characteristics of the fishery, and available proxy information on stock abundance. The $PSA = 3.39$, which indicates that scamp have high inherent vulnerability. Because this species is highly vulnerable and there is some evidence that stock size has decreased over time, scamp in the US South Atlantic receive an abundance rating of "high" concern.

Justification:

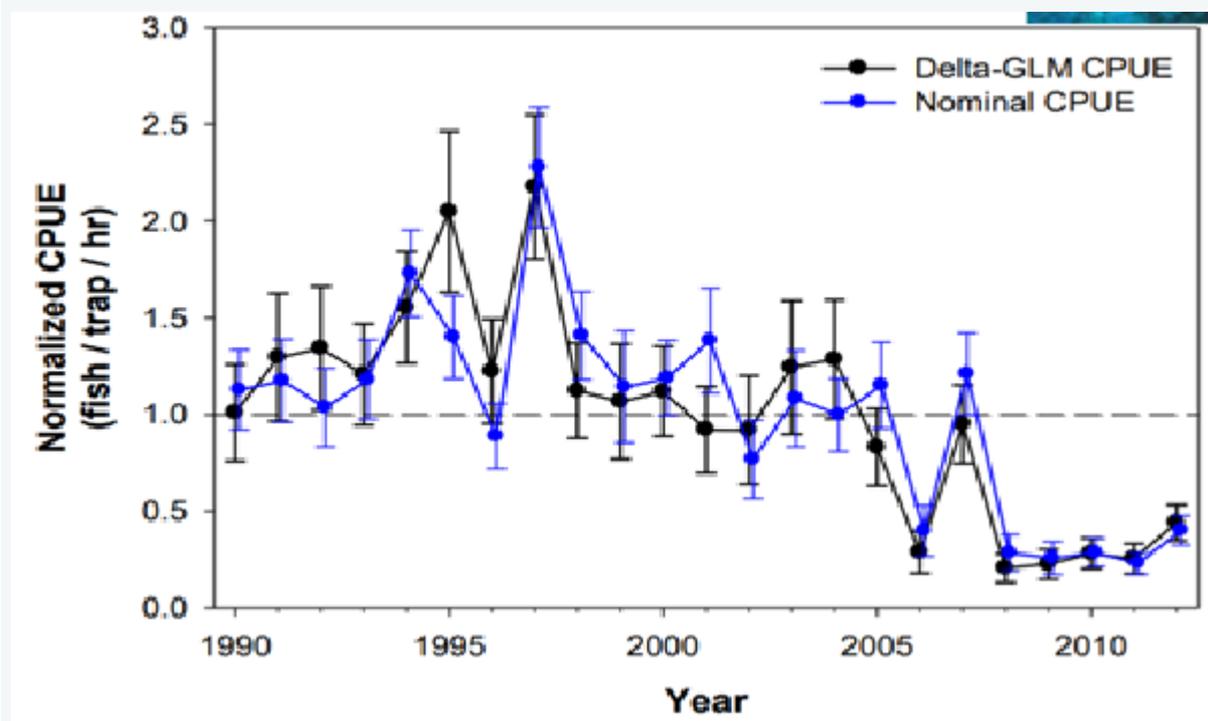


Figure 12 Normalized catch per unit effort of scamp in the SEAMAP South Atlantic chevron trap survey. Figure used directly from SEAMAP (2013).

US South Atlantic Scamp

Productivity-Susceptibility Analysis:

Scoring Guidelines

1.) Productivity score (P) = average of the productivity attribute scores (p_1, p_2, p_3, p_4 (finfish only), p_5 (finfish only), p_6, p_7 , and p_8 (invertebrates only))

2.) Susceptibility score (S) = product of the susceptibility attribute scores (s_1, s_2, s_3, s_4), rescaled as follows:
 $S = [(s_1 * s_2 * s_3 * s_4) - 1/40] + 1$.

3.) Vulnerability score (V) = the Euclidean distance of P and S using the following formula: $V = \sqrt{(P^2 + S^2)}$

Productivity Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity	50% mature by age 2 (Harris et al. 2002) (Lombardi-Carlson et al. 2012)	1
Average maximum age	Ages recorded up to 30+ years (Harris et al. 2002) (Lombardi-Carlson et al. 2012)	3
Fecundity	1.3 million (as estimated from Figure 11 of Harris et al. 2002)	1
Average maximum size (fish only)	80-90 cm based on growth curves (Harris et al. 2002) (Lombardi-Carlson et al. 2012)	1
Average size at maturity (fish only)	50% maturity by approximately 35 cm (Harris et al. 2002) (Lombardi-Carlson et al. 2012)	1
Reproductive strategy		
Trophic level	4.5 (Froese and Pauly 2017)	3
Density dependence (invertebrates only)		
Habitat quality	Moderately altered from non-fishing sources	2
Total Productivity (average)		1.714
Susceptibility Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Areal overlap (Considers all fisheries)	>30% of main geographic range is fished	3

Vertical overlap (Considers all fisheries)		3
Selectivity of fishery (Specific to fishery under assessment)	Protogynous hermaphrodite	3
Post-capture mortality (Specific to fishery under assessment)	>65-75% of captured scamp are retained (GSAFF 2008) (GSAFF 2010)	2
Total Susceptibility (multiplicative)		3.0

PSA score for scamp in US South Atlantic longline and handline fisheries is calculated as follows:

$$\text{Vulnerability (V)} = \sqrt{P^2 + S^2}$$

$$V = \sqrt{1.71^2 + 3.0^2}$$

$$V = 3.46$$

Factor 1.2 - Fishing Mortality

UNITED STATES OF AMERICA/GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA/GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

Moderate Concern

No formal stock assessment has been conducted for scamp in the Gulf of Mexico, so fishing mortality rate is unknown. Further, GMFMC includes scamp in the Shallow Water Grouper complex, which is managed as a unit. NMFS indicates that overfishing status of this complex is unknown (NMFS 2017b). Stocks for which fishing mortality is unknown receive a fishing mortality score of "moderate" concern.

UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

Moderate Concern

NMFS classifies scamp in the South Atlantic region as not experiencing overfishing (NMFS 2017b), but no formal stock assessment has been conducted for this stock, so fishing mortality rate is unknown. Stocks for which fishing mortality is unknown receive a fishing mortality score of "moderate" concern.

SNOWY GROUPE

Factor 1.1 - Abundance

UNITED STATES OF AMERICA/GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA/GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPE

High Concern

A stock assessment for snowy grouper in the Gulf of Mexico was conducted using data limited methods with data through 2014, and peer reviewed through the SEDAR process (SEDAR 2016b). Only one of three candidate models met the performance criteria (e.g., model convergence) for all the methods evaluated. This model, which uses a short time series of data (2010 to 2014), indicated the biomass in recent years was below threshold levels and fishing mortality exceeded a sustainable level; however, the time series was considered too short to provide reliable management advice (SEDAR 2016b). A similar model run with a longer time series of data (1990 to 2014) provided similar results for stock status, but did not meet all the performance criteria (SEDAR 2016b). Furthermore, no index of abundance is available for this species due to recent changes in the fishery distribution (SEDAR 2016b). For these reasons, the scores for Gulf of Mexico snowy grouper are based on proxy information, including a PSA analysis.

PSA results indicate that snowy grouper have moderate productivity and high susceptibility, resulting in an overall high inherent vulnerability score (PSA = 3.47). The combination of high vulnerability and a lack of data to evaluate stock status of snowy grouper in the Gulf of Mexico leads to an abundance score of "high" concern.

Justification:

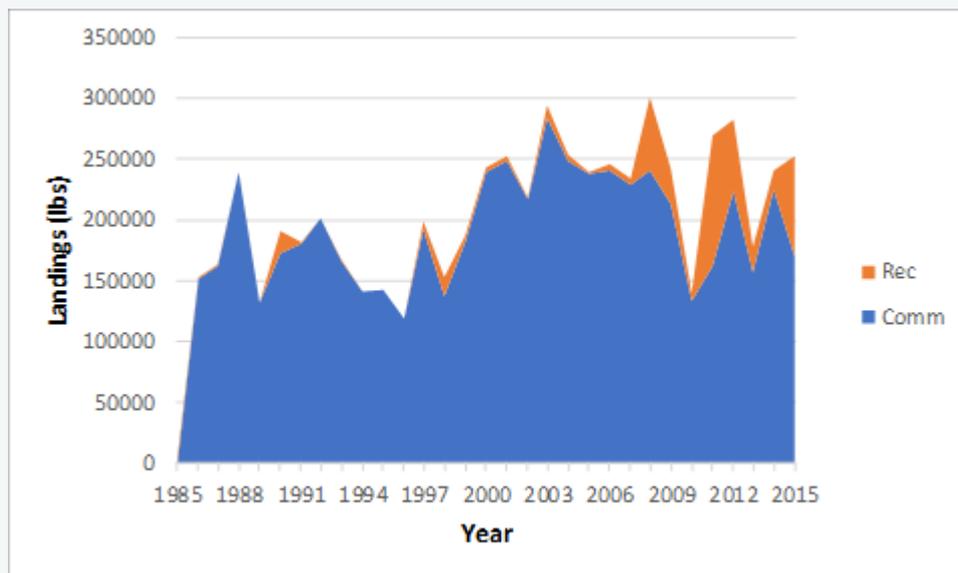


Figure 13 Commercial and recreational harvest of snowy grouper from the Gulf of Mexico. From the NMFS Sustainable Fishery Division (2017a, 2017b), accessed August 2017.

Gulf of Mexico Snowy Grouper Productivity-Susceptibility Analysis:

Scoring Guidelines

1.) Productivity score (P) = average of the productivity attribute scores (p_1, p_2, p_3, p_4 (finfish only), p_5 (finfish only), p_6, p_7 , and p_8 (invertebrates only))

2.) Susceptibility score (S) = product of the susceptibility attribute scores (s_1, s_2, s_3, s_4), rescaled as follows:
 $S = [(s_1 * s_2 * s_3 * s_4) - 1/40] + 1$.

3.) Vulnerability score (V) = the Euclidean distance of P and S using the following formula: $V = \sqrt{(P^2 + S)^2}$

Productivity Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity	4 to 5 (Wyanski et al. 1999);	2
Average maximum age	Ages recorded up to 16+ years (Wyanski et al. 1999); max reported age of 27 years (Froese and Pauly 2017)	2
Fecundity	2,000,000 eggs (https://safmc.net/regulations/regulations-by-species/snowy-grouper/)	1
Average maximum size (fish only)	90 to 100 cm (Wyanski et al. 1999)	1
Average size at maturity (fish only)	47 to 55 cm (Wyanski et al. 1999)	2
Reproductive strategy	Broadcast spawner	1
Trophic level	4 (Froese and Pauly 2017)	3
Density dependence (invertebrates only)		
Habitat quality		1
Total Productivity (average)		1.75
Susceptibility Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Areal overlap (Considers all fisheries)	Default score	3

Vertical overlap (Considers all fisheries)	Default score	3
Selectivity of fishery (Specific to fishery under assessment)	Snowy grouper are protogynous hermaphrodites (Wyanski et al. 1999), which increases susceptibility	3
Post-capture mortality (Specific to fishery under assessment)	Greater than 95% of snowy grouper captured in the longline fishery are retained (Scott-Denton et al. 2011; Scott-Denton and William 2013)	3
Total Susceptibility (multiplicative)		3

PSA score for snowy grouper in the Gulf of Mexico longline fishery is calculated as follows:

$$\text{Vulnerability (V)} = \sqrt{P^2 + S^2}$$

$$V = \sqrt{1.75^2 + 3.0^2}$$

$$V = 3.47$$

UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER
UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

High Concern

A benchmark stock assessment was completed in 2004 with data through 2002, followed by a standard assessment update with data through 2012 (SEDAR 2013a). Terminal year spawning biomass of $SSB_{2012} = 427$ MT is only 65% of the minimum stock size threshold ($MSST = .75 * SSB_{MSY}$) of 654.2 MT (SEDAR 2013a), indicating the stock is overfished.

IUCN lists snowy grouper populations as "Vulnerable," due primarily to large declines in abundance in the US South Atlantic (Thierry et al. 2008). SAFMC implemented regulations to end overfishing in the stock in 2006 (SAFMC 2006), and defined a rebuilding plan (34 years) in 2008 (SAFMC 2007a). Due to the continued overfished status, as determined from the 2012 stock assessment (SEDAR 2013a), Amendment 20 was

passed to adjust the rebuilding strategy and recovery plan (SAFMC 2014a). Regardless, estimated biomass levels relative to management benchmarks result in an abundance rating of "high" concern for snowy grouper in the South Atlantic region.

Justification:

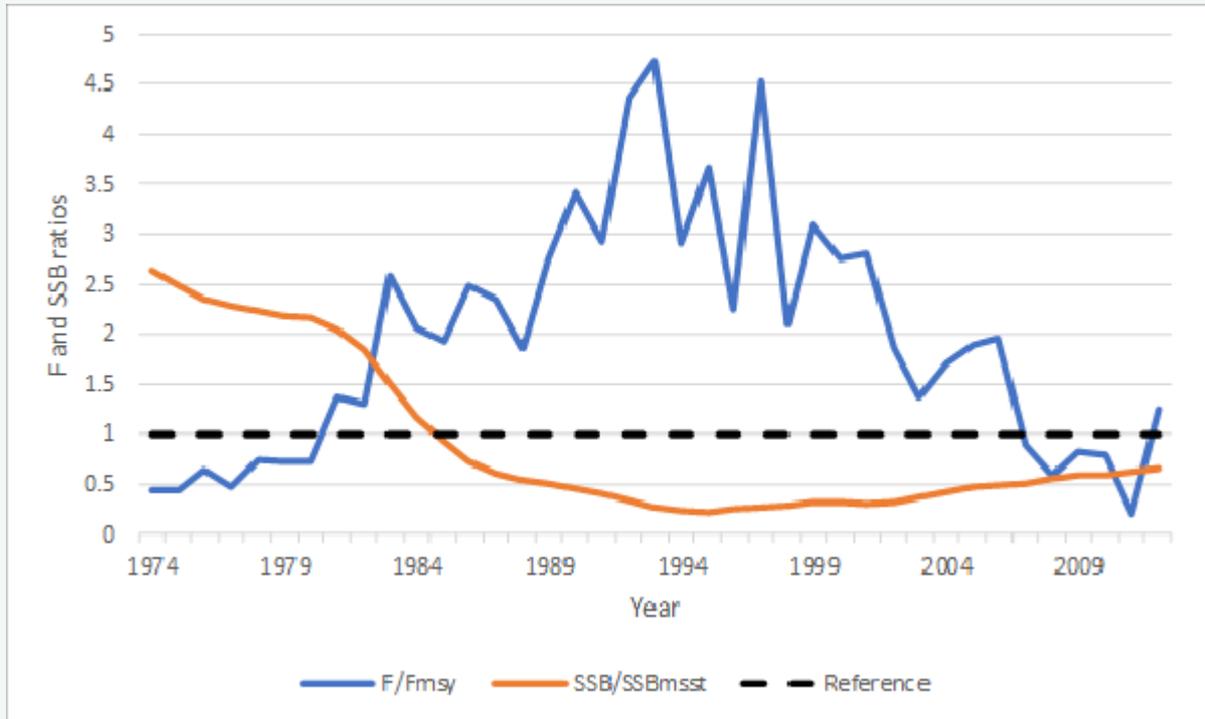


Figure 14 South Atlantic snowy grouper fishing mortality and spawning biomass from the base model run relative to selected management reference points. Figure developed based on data provided in SEDAR 36 Table 10 (SEDAR 2013a).

Factor 1.2 - Fishing Mortality

UNITED STATES OF AMERICA/GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE
 UNITED STATES OF AMERICA/GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPE

Moderate Concern

Reported commercial harvest, which generally accounts for more than 90% of total harvest, has fluctuated without trend between 150,000 and 250,000 lb since the early 1980s (NMFS Fisheries Statistics Division 2017a). NMFS manages snowy grouper as part of the "deep water grouper" complex, which is considered not to be experiencing overfishing (NMFS 2017b). However, no quantitative information could be found for fishing mortality of Gulf of Mexico snowy grouper, resulting in a fishing mortality score of "moderate" concern.

UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

Low Concern

Estimated fishing mortality in the most recent three years of the stock assessment are used to evaluate fishing pressure relative to management benchmarks (SEDAR 2013a). The fishing mortality target was established as 75% of F_{MSY} in the assessment (SEDAR 2013a). Recent fishing mortality of $F_{2010-2012} = 0.085$ is below the target fishing mortality of $F_{target} = 0.11$, and is estimated to be only 59% of the overfishing threshold of $F_{MSY} = 0.14$ (SEDAR 2013a). Because fishing mortality is below the limit reference point, snowy grouper in the South Atlantic receives a fishing mortality score of "low" concern.

WARSAW GROUPE

Factor 1.1 - Abundance

UNITED STATES OF AMERICA/GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPE

UNITED STATES OF AMERICA/GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPE

High Concern

Warsaw grouper has been managed as part of the GMFMC Reef Fish complex since inception of the FMP (GMFMC 1981), but a formal stock assessment has never been conducted for this species. The abundance score for this stock is therefore based on proxy information, including a productivity-susceptibility analysis (PSA) that takes into account the species life history and characteristics of the fishery, and available proxy information on stock abundance.

The PSA indicates that warsaw grouper have moderate productivity and high susceptibility, resulting in an overall high inherent vulnerability score ($PSA = 3.69$). Further, IUCN list Warsaw grouper as "Critically Endangered" (Ng Wai Chuen and Huntsman 2006a) and the species is listed as a "species of concern" by the NMFS (NMFS 2017d). These factors, in combination with the lack of a current stock assessment, warrant an abundance score of "high" concern for Gulf of Mexico Warsaw grouper.

Justification:

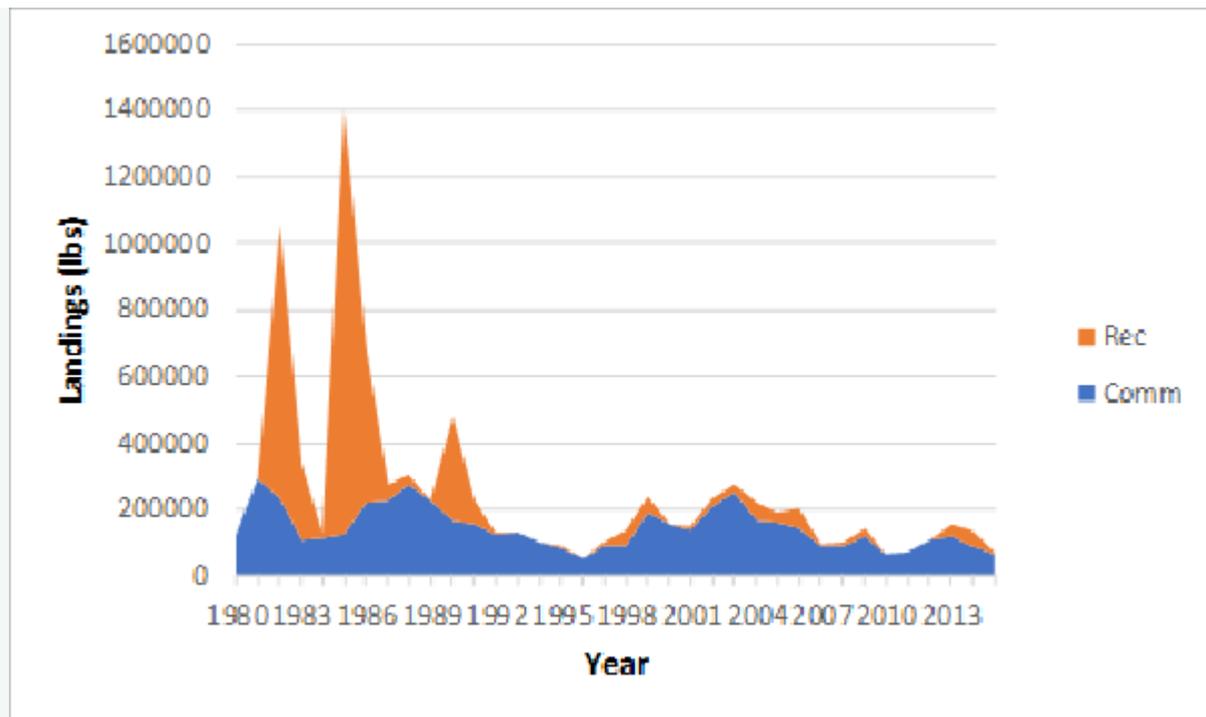


Figure 15 Commercial and recreational harvest of Warsaw grouper from the Gulf of Mexico. From NMFS Sustainable Fishery Division (2017a, 2017b), accessed August 2017.

Gulf of Mexico Warsaw Grouper

Productivity-Susceptibility Analysis:

Scoring Guidelines

1.) Productivity score (P) = average of the productivity attribute scores (p_1, p_2, p_3, p_4 (finfish only), p_5 (finfish only), p_6, p_7 , and p_8 (invertebrates only))

2.) Susceptibility score (S) = product of the susceptibility attribute scores (s_1, s_2, s_3, s_4), rescaled as follows:
 $S = [(s_1 * s_2 * s_3 * s_4) - 1/40] + 1$.

3.) Vulnerability score (V) = the Euclidean distance of P and S using the following formula: $V = \sqrt{(P^2 + S)^2}$

Productivity Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity	9 (Parker and Mays 1998)	2
Average maximum age	41 (Parker and Mays 1998)	3
Fecundity		

Average maximum size (fish only)	Modeled growth data indicate max size of 163 cm to 239 cm (Froese and Pauly 2017); Maximum observed size of 230 cm (Froese and Pauly 2017)	2
Average size at maturity (fish only)	120 cm estimated from data in (Parker and Mays 1998)	2
Reproductive strategy	Expected to be broadcast spawners (Parker and Mays 1998)	1
Trophic level	4 (Froese and Pauly 2017)	3
Density dependence (invertebrates only)		
Habitat quality	Moderately altered from non-fishing impacts	2
Total Productivity (average)		2.143
Susceptibility Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Areal overlap (Considers all fisheries)	>30% of main geographic range is fished	3
Vertical overlap (Considers all fisheries)		3
Selectivity of fishery (Specific to fishery under assessment)	Although it has not been confirmed for Warsaw grouper, most grouper species are protogynous hermaphrodites (NOAA 2010), which increases susceptibility.	3
Post-capture mortality (Specific to fishery under assessment)	Greater than 90% of captured Warsaw grouper are retained (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013)	3

Total Susceptibility (multiplicative)		3
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PSA score for Warsaw grouper in the Gulf of Mexico longline and vertical line fisheries is calculated as follows:

$$\text{Vulnerability (V)} = \sqrt{P^2 + S^2}$$

$$V = \sqrt{2.14^2 + 3.0^2}$$

$$V = 3.69$$

Factor 1.2 - Fishing Mortality

UNITED STATES OF AMERICA/GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPE

UNITED STATES OF AMERICA/GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPE

Moderate Concern

Reported commercial landings for Warsaw grouper in the Gulf of Mexico increased during the 1990s and reached a recent peak of more than 200,000 lb (all gears combined) in the early 2000s (NMFS Fishery Statistics Division 2017a). Since then, reported landings generally declined, and have been below 100,000 lb in 7 of the last 10 years (NMFS Fisheries Statistics Division 2017a). Warsaw grouper are a member of the "deep water grouper" management complex in the Gulf of Mexico, and included in the deepwater grouper IFQ category (NMFS 2016a), so harvest is limited by shares and allocation. NMFS characterizes the complex as not experiencing overfishing (NMFS 2017b). However, no formal stock assessment has ever been conducted for this stock, and no information could be found regarding fishing mortality for Warsaw grouper in the Gulf of Mexico, justifying a fishing mortality score of "moderate" concern.

YELLOWEDGE GROUPE

Factor 1.1 - Abundance

UNITED STATES OF AMERICA/GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

Low Concern

The most recent benchmark stock assessment of yellowedge grouper in the Gulf of Mexico was peer reviewed through the SEDAR process with data through 2009 (SEDAR 2011a). The GMFMC adopted a biomass target of $SSB_{30\%SPR} = 8.62$ million pounds gutted weight (lb gw), and a corresponding threshold of 7.99 million lb gw (SEDAR 2011a). Corrections to the stock assessment base run conducted during the review workshop estimate a terminal year biomass of $SSB_{2009} = 9.53$ million lb gw (SEDAR 2011a), indicating that the stock is not overfished. Short term projections that apply the target fishing mortality rate suggest SSB will decrease

over time to the target level, but not below (SEDAR 2011a).

IUCN lists yellowedge grouper as "Vulnerable" due to expected declines in abundance of at least 30% throughout its range (Ferreira and Peres 2008). The peer reviewed assessment indicates steep declines in abundance during the 1980s, but relatively stable populations from the 1990s through the terminal year (SEDAR 2011a). The most recent NMFS stock status summary reflects the conclusion of the assessment that the stock is not overfished (NMFS 2017b). Terminal biomass greater than a target reference point supports a score of "very low" concern, but the age of the assessment and IUCN listing moderate the score to "low" concern for yellowedge grouper in the Gulf of Mexico.

Justification:

As reported in the previous Seafood Watch grouper report (Max 2016), an alternate biomass target of $SSB_{40\%SPR} = 11.698$ million lb gw was also considered (SEDAR 2011a). Terminal biomass is estimated to be approximately 81% of this alternate target value. The GMFMC Generic Sustainable Fishery Act Amendment (GMFMC 1999a) defines $SSB_{SPR30\%}$ as an appropriate biomass target for most reef species, but even using the more conservative target of $SSB_{SPR40\%}$, the terminal biomass exceeds 75% of the target, which also results in an abundance score of "low" concern.

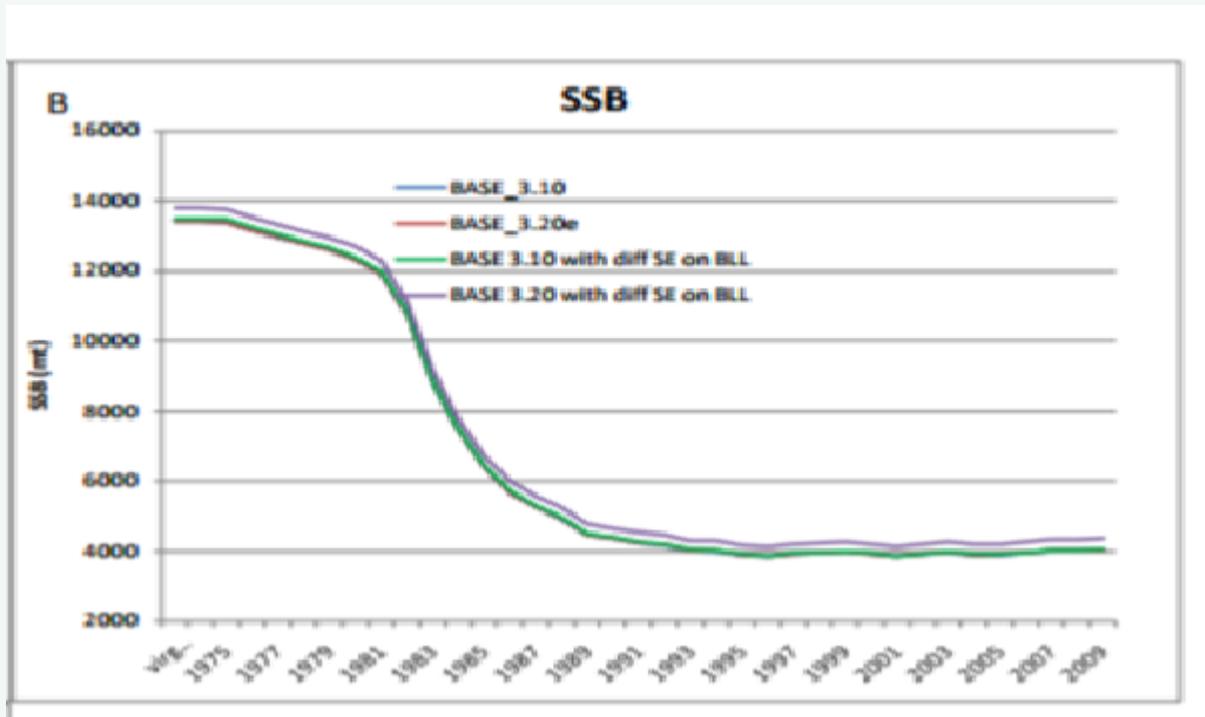


Figure 16 Gulf of Mexico yellowedge grouper spawning stock biomass. Figure taken from Figure 11 of Section 6 of SEDAR 22 (SEDAR 2011a). Dashed blue line added to show approximate location of biomass threshold.

UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE
UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

High Concern

Yellowedge grouper has been managed as part of the SAFMC Snapper-Grouper complex since inception of the FMP (SAFMC 1983), but a formal stock assessment has never been conducted for this species. The abundance score for yellowedge grouper is therefore based on a proxy information, including a productivity-susceptibility analysis (PSA) that takes into account the species life history and characteristics of the fishery, and available proxy information on stock abundance.

The PSA indicates that yellowedge grouper have moderate productivity and high susceptibility, resulting in an overall high inherent vulnerability score (PSA = 3.52). Further, IUCN lists yellowedge grouper as "Vulnerable" due to perceived declines in abundance of more than 30% throughout its range. An analysis of for-hire catch per unit effort conducted for the SEDAR #4 shows that CPUE declined by approximately 75% between the late 1970s and early 1990s (Williams and Dixon 2003). No reference points have been defined to determine official stock status, but high inherent vulnerability and significant declines in abundance justify an abundance score of "high" concern for yellowedge grouper in the SAFMC management unit.

Justification:

US South Atlantic Yellowedge Grouper

Productivity-Susceptibility Analysis:

Scoring Guidelines

1.) *Productivity score (P) = average of the productivity attribute scores (p1, p2, p3, p4 (finfish only), p5 (finfish only), p6, p7, and p8 (invertebrates only))*

2.) *Susceptibility score (S) = product of the susceptibility attribute scores (s1, s2, s3, s4), rescaled as follows: $S = [(s1 * s2 * s3 * s4) - 1/40] + 1$.*

3.) *Vulnerability score (V) = the Euclidean distance of P and S using the following formula: $V = \sqrt{(P^2 + S)^2}$*

Productivity Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity	12 (range 6 to 17) (Comyns et al. 2006)	2
Average maximum age	Approximately 35 (Comyns et al. 2006)	3
Fecundity		
Average maximum size (fish only)	89.5 cm (Froese and Pauly 2017); 93.9 if include results from Comyns et al. (2006)	1

Average size at maturity (fish only)	55.8 cm, estimated as mid point of range (47.5 to 64.0 cm) from Comyns et al. (2006)	2
Reproductive strategy	Broadcast spawner	1
Trophic level	3.8 (Froese and Pauly 2017)	3
Density dependence (invertebrates only)		
Habitat quality	Moderately altered	2
Total Productivity (average)		2.00
Susceptibility Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Areal overlap (Considers all fisheries)	Default value	3
Vertical overlap (Considers all fisheries)	Default value	3
Selectivity of fishery (Specific to fishery under assessment)	Protogynous hermaphrodites (Comyns et al. 2006)	3
Post-capture mortality (Specific to fishery under assessment)	Nearly 100% retention in US South Atlantic vertical line and Gulf of Mexico longline fisheries (GSAFF 2008) (GSAFF 2010) (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013)	3

Total Susceptibility (multiplicative)		3.00
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PSA score for yellowedge grouper in US South Atlantic vertical line and longline fisheries is calculated as follows:

$$\text{Vulnerability (V)} = \sqrt{P^2 + S^2}$$

$$V = \sqrt{2.0^2 + 3.0^2}$$

$$V = 3.61$$

Factor 1.2 - Fishing Mortality

UNITED STATES OF AMERICA/GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

Low Concern

The fishing mortality threshold for yellowedge grouper was established as the fishing mortality rate that produces 30% of maximum spawning potential (SEDAR 2011a). The corrected base run suggests that average fishing mortality in the most recent three years ($F_{2007-2009} = 1.0$) is above the target fishing mortality rate of $F_{TARGET} = 0.795$, but below the $F_{THRESHOLD} = 1.06$ (SEDAR 2011a). Optimum yield for the years 2012 to 2015 were estimated by the model around 700,000 lb gw per year (SEDAR 2011a), and observed commercial harvest from all gears were generally at or below optimum yield levels when converted to gutted weight using conversion factors based on dockside sampling data (NMFS Fishery Statistics Division 2017a) (Chih 2007). Fishing mortality rates appear to be stable below the fishing mortality threshold, allowing a fishing mortality score of "low" concern for GMFMC yellowedge grouper.

Justification:

The previous Seafood Watch grouper report discusses how a more conservative fishing mortality threshold might be more appropriate for yellowedge grouper (Max 2016), and a threshold of FSPR40% would result in an overfishing determination ($F_{2007-2009} / F_{SPR40\%} = 1.42$) (SEDAR 2011a). Two of the individual peer reviewers state that appropriate reference point levels are a function of manager risk tolerance (Cook 2011) (Medley 2011), while a third reviewer provides an argument that 20% SPR might be more appropriate for yellowedge grouper (Sparholt 2011). The GMFMC Generic Sustainable Fishery Act Amendment (GMFMC 1999a) provides justification for using reference points based on 30% SPR in the reef fish fishery. As such, the score for yellowedge grouper is based on a fishing mortality threshold of FSPR30%.

UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

Moderate Concern

No information could be found regarding fishing mortality for yellowedge grouper in the South Atlantic. The species is included as part of the deepwater snapper-grouper complex by the SAFMC, for which fishing mortality is unknown (NMFS 2017b). Lack of quantitative information on fishing mortality justifies a fishing mortality score of "moderate" concern.

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 Critical

Guiding Principles

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

Criterion 2 Summary

Only the lowest scoring main species is/are listed in the table and text in this Criterion 2 section; a full list and assessment of the main species can be found in Appendix A.

BLACK GROUPER - UNITED STATES OF AMERICA/GULF OF MEXICO - SET LONGLINES - UNITED STATES OF AMERICA - BLACK GROUPER					
Subscore:	1.000	Discard Rate:	0.75	C2 Rate:	0.750
Species	Abundance	Fishing Mortality	Subscore		
Speckled hind	1.00:High Concern	1.00:High Concern	Red (1.000)		
Scamp	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Blacknose shark	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Loggerhead turtle / Mid Atlantic	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Gag	2.33:Moderate Concern	5.00:Low Concern	Green (3.413)		
Blue tilefish	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Smooth dogfish	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Red grouper	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Yellowedge grouper	3.67:Low Concern	5.00:Low Concern	Green (4.284)		

Atlantic sharpnose shark	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)
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BLACK GROUPER - UNITED STATES OF AMERICA/GULF OF MEXICO - VERTICAL LINES - UNITED STATES OF AMERICA - BLACK GROUPER

Subscore:	1.000	Discard Rate:	1.00	C2 Rate:	1.000
Species	Abundance	Fishing Mortality	Subscore		
Speckled hind	1.00:High Concern	1.00:High Concern	Red (1.000)		
Gray triggerfish	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Red porgy	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Scamp	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Red snapper	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Gray snapper	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Gag	2.33:Moderate Concern	5.00:Low Concern	Green (3.413)		
Red grouper	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Vermilion snapper	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)		
Yellowtail snapper	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)		

BLACK GROUPER - UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC - VERTICAL LINES - UNITED STATES OF AMERICA - BLACK GROUPER

Subscore:	1.000	Discard Rate:	1.00	C2 Rate:	1.000
Species	Abundance	Fishing Mortality	Subscore		
Red snapper	1.00:High Concern	1.00:High Concern	Red (1.000)		
Red grouper	1.00:High Concern	1.00:High Concern	Red (1.000)		
Hogfish / Florida Keys/East Florida (FLK/EFL)	1.00:High Concern	1.00:High Concern	Red (1.000)		
Hogfish / Georgia through North Carolina (GA/NC)	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Scamp	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Red porgy	1.00:High Concern	5.00:Low Concern	Yellow (2.236)		
Almaco jack	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Gray triggerfish	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Gag	3.67:Low Concern	3.00:Moderate Concern	Green (3.318)		
Black seabass	2.33:Moderate Concern	5.00:Low Concern	Green (3.413)		
Atlantic sharpnose shark	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)		

Vermilion snapper	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)
Yellowtail snapper	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)

GAG - UNITED STATES OF AMERICA/GULF OF MEXICO - SET LONGLINES - UNITED STATES OF AMERICA - GAG					
Subscore:	1.000	Discard Rate:	0.75	C2 Rate:	0.750
Species	Abundance	Fishing Mortality	Subscore		
Speckled hind	1.00:High Concern	1.00:High Concern	Red (1.000)		
Scamp	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Loggerhead turtle / Mid Atlantic	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Blacknose shark	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Red snapper	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Yellowedge grouper	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Smooth dogfish	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Red grouper	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Blue tilefish	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Atlantic sharpnose shark	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)		

GAG - UNITED STATES OF AMERICA/GULF OF MEXICO - VERTICAL LINES - UNITED STATES OF AMERICA - GAG					
Subscore:	1.000	Discard Rate:	1.00	C2 Rate:	1.000
Species	Abundance	Fishing Mortality	Subscore		
Speckled hind	1.00:High Concern	1.00:High Concern	Red (1.000)		
Gray triggerfish	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Red porgy	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Scamp	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Gray snapper	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Red snapper	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Red grouper	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Vermilion snapper	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)		

GAG - UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC - VERTICAL LINES - UNITED STATES OF AMERICA - GAG

Subscore:	1.000	Discard Rate:	1.00	C2 Rate:	1.000
Species	Abundance	Fishing Mortality	Subscore		
Speckled hind	1.00:High Concern	1.00:High Concern	Red (1.000)		
Red grouper	1.00:High Concern	1.00:High Concern	Red (1.000)		
Warsaw grouper	1.00:High Concern	1.00:High Concern	Red (1.000)		
Red snapper	1.00:High Concern	1.00:High Concern	Red (1.000)		
Scamp	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Yellowedge grouper	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Red porgy	1.00:High Concern	5.00:Low Concern	Yellow (2.236)		
Gray triggerfish	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Almaco jack	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Black seabass	2.33:Moderate Concern	5.00:Low Concern	Green (3.413)		
Vermilion snapper	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)		
Atlantic sharpnose shark	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)		

RED GROUPER - UNITED STATES OF AMERICA/GULF OF MEXICO - SET LONGLINES - UNITED STATES OF AMERICA - RED GROUPER

Subscore:	1.000	Discard Rate:	0.75	C2 Rate:	0.750
Species	Abundance	Fishing Mortality	Subscore		
Speckled hind	1.00:High Concern	1.00:High Concern	Red (1.000)		
Scamp	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Blacknose shark	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Red snapper	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Gag	2.33:Moderate Concern	5.00:Low Concern	Green (3.413)		
Blue tilefish	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Smooth dogfish	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Yellowedge grouper	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Atlantic sharpnose shark	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)		

RED GROUPER - UNITED STATES OF AMERICA/GULF OF MEXICO - VERTICAL LINES - UNITED STATES OF AMERICA - RED GROUPER

Subscore:	1.000	Discard Rate:	1.00	C2 Rate:	1.000
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Species	Abundance	Fishing Mortality	Subscore
Speckled hind	1.00:High Concern	1.00:High Concern	Red (1.000)
Gray triggerfish	1.00:High Concern	3.00:Moderate Concern	Red (1.732)
Red porgy	1.00:High Concern	3.00:Moderate Concern	Red (1.732)
Scamp	1.00:High Concern	3.00:Moderate Concern	Red (1.732)
Red snapper	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)
Gray snapper	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)
Gag	2.33:Moderate Concern	5.00:Low Concern	Green (3.413)
Vermilion snapper	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)

RED GROUPER - UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC - VERTICAL LINES - UNITED STATES OF AMERICA - RED GROUPER

Subscore:	1.000	Discard Rate:	1.00	C2 Rate:	1.000
Species	Abundance	Fishing Mortality	Subscore		
Red snapper	1.00:High Concern	1.00:High Concern	Red (1.000)		
Warsaw grouper	1.00:High Concern	1.00:High Concern	Red (1.000)		
Speckled hind	1.00:High Concern	1.00:High Concern	Red (1.000)		
Scamp	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Yellowedge grouper	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Red porgy	1.00:High Concern	5.00:Low Concern	Yellow (2.236)		
Almaco jack	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Gray triggerfish	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Gag	3.67:Low Concern	3.00:Moderate Concern	Green (3.318)		
Black seabass	2.33:Moderate Concern	5.00:Low Concern	Green (3.413)		
Atlantic sharpnose shark	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)		
Vermilion snapper	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)		

SCAMP - UNITED STATES OF AMERICA/GULF OF MEXICO - SET LONGLINES - UNITED STATES OF AMERICA - SCAMP

Subscore:	1.000	Discard Rate:	0.75	C2 Rate:	0.750
Species	Abundance	Fishing Mortality	Subscore		
Speckled hind	1.00:High Concern	1.00:High Concern	Red (1.000)		
Blacknose shark	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		

Loggerhead turtle / Mid Atlantic	1.00:High Concern	3.00:Moderate Concern	Red (1.732)
Red snapper	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)
Gag	2.33:Moderate Concern	5.00:Low Concern	Green (3.413)
Blue tilefish	3.67:Low Concern	5.00:Low Concern	Green (4.284)
Smooth dogfish	3.67:Low Concern	5.00:Low Concern	Green (4.284)
Red grouper	3.67:Low Concern	5.00:Low Concern	Green (4.284)
Yellowedge grouper	3.67:Low Concern	5.00:Low Concern	Green (4.284)
Atlantic sharpnose shark	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)

SCAMP - UNITED STATES OF AMERICA/GULF OF MEXICO - VERTICAL LINES - UNITED STATES OF AMERICA - SCAMP

Subscore:	1.000	Discard Rate:	1.00	C2 Rate:	1.000
Species	Abundance	Fishing Mortality	Subscore		
Speckled hind	1.00:High Concern	1.00:High Concern	Red (1.000)		
Gray triggerfish	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Red porgy	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Red snapper	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Gray snapper	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Gag	2.33:Moderate Concern	5.00:Low Concern	Green (3.413)		
Red grouper	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Vermilion snapper	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)		

SCAMP - UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC - VERTICAL LINES - UNITED STATES OF AMERICA - SCAMP

Subscore:	1.000	Discard Rate:	1.00	C2 Rate:	1.000
Species	Abundance	Fishing Mortality	Subscore		
Red snapper	1.00:High Concern	1.00:High Concern	Red (1.000)		
Speckled hind	1.00:High Concern	1.00:High Concern	Red (1.000)		
Red grouper	1.00:High Concern	1.00:High Concern	Red (1.000)		
Warsaw grouper	1.00:High Concern	1.00:High Concern	Red (1.000)		
Yellowedge grouper	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Red porgy	1.00:High Concern	5.00:Low Concern	Yellow (2.236)		

Almaco jack	2.33: Moderate Concern	3.00: Moderate Concern	Yellow (2.644)
Gray triggerfish	2.33: Moderate Concern	3.00: Moderate Concern	Yellow (2.644)
Gag	3.67: Low Concern	3.00: Moderate Concern	Green (3.318)
Black seabass	2.33: Moderate Concern	5.00: Low Concern	Green (3.413)
Atlantic sharpnose shark	5.00: Very Low Concern	5.00: Low Concern	Green (5.000)
Vermilion snapper	5.00: Very Low Concern	5.00: Low Concern	Green (5.000)

SNOWY GROUPE - UNITED STATES OF AMERICA/GULF OF MEXICO - SET LONGLINES - UNITED STATES OF AMERICA - SNOWY GROUPE

Subscore:	1.000	Discard Rate:	0.75	C2 Rate:	0.750
Species	Abundance	Fishing Mortality	Subscore		
Speckled hind	1.00: High Concern	1.00: High Concern	Red (1.000)		
Blacknose shark	1.00: High Concern	3.00: Moderate Concern	Red (1.732)		
Warsaw grouper	1.00: High Concern	3.00: Moderate Concern	Red (1.732)		
Scamp	1.00: High Concern	3.00: Moderate Concern	Red (1.732)		
Loggerhead turtle / Mid Atlantic	1.00: High Concern	3.00: Moderate Concern	Red (1.732)		
Blueline tilefish	2.33: Moderate Concern	3.00: Moderate Concern	Yellow (2.644)		
Red snapper	2.33: Moderate Concern	3.00: Moderate Concern	Yellow (2.644)		
Gag	2.33: Moderate Concern	5.00: Low Concern	Green (3.413)		
Blue tilefish	3.67: Low Concern	5.00: Low Concern	Green (4.284)		
Smooth dogfish	3.67: Low Concern	5.00: Low Concern	Green (4.284)		
Yellowedge grouper	3.67: Low Concern	5.00: Low Concern	Green (4.284)		
Red grouper	3.67: Low Concern	5.00: Low Concern	Green (4.284)		
Atlantic sharpnose shark	5.00: Very Low Concern	5.00: Low Concern	Green (5.000)		

SNOWY GROUPE - UNITED STATES OF AMERICA/GULF OF MEXICO - VERTICAL LINES - UNITED STATES OF AMERICA - SNOWY GROUPE

Subscore:	1.000	Discard Rate:	1.00	C2 Rate:	1.000
Species	Abundance	Fishing Mortality	Subscore		
Speckled hind	1.00: High Concern	1.00: High Concern	Red (1.000)		
Greater amberjack	1.00: High Concern	1.00: High Concern	Red (1.000)		
Gray triggerfish	1.00: High Concern	3.00: Moderate Concern	Red (1.730)		

Red porgy	1.00:High Concern	3.00:Moderate Concern	Red (1.730)
Scamp	1.00:High Concern	3.00:Moderate Concern	Red (1.730)
Warsaw grouper	1.00:High Concern	3.00:Moderate Concern	Red (1.730)
Red snapper	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.640)
Blueline tilefish	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.640)
Blue tilefish	3.67:Low Concern	5.00:Low Concern	Green (4.280)
Yellowedge grouper	3.67:Low Concern	5.00:Low Concern	Green (4.280)
Vermilion snapper	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)

SNOWY GROUPEr - UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC - SET LONGLINES - UNITED STATES OF AMERICA - SNOWY GROUPEr

Subscore:	1.000	Discard Rate:	0.75	C2 Rate:	0.750
Species	Abundance	Fishing Mortality	Subscore		
Blacknose shark	1.00:High Concern	1.00:High Concern	Red (1.000)		
Speckled hind	1.00:High Concern	1.00:High Concern	Red (1.000)		
Warsaw grouper	1.00:High Concern	1.00:High Concern	Red (1.000)		
Red grouper	1.00:High Concern	1.00:High Concern	Red (1.000)		
Red snapper	1.00:High Concern	1.00:High Concern	Red (1.000)		
Yellowedge grouper	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Scamp	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Blue tilefish	3.67:Low Concern	1.00:High Concern	Red (1.916)		
Blueline tilefish	3.67:Low Concern	1.00:High Concern	Red (1.916)		
Gag	3.67:Low Concern	3.00:Moderate Concern	Green (3.318)		
Yellowtail snapper	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)		
Atlantic sharpnose shark	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)		

SNOWY GROUPEr - UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC - VERTICAL LINES - UNITED STATES OF AMERICA - SNOWY GROUPEr

Subscore:	1.000	Discard Rate:	1.00	C2 Rate:	1.000
Species	Abundance	Fishing Mortality	Subscore		
Red snapper	1.00:High Concern	1.00:High Concern	Red (1.000)		
Red grouper	1.00:High Concern	1.00:High Concern	Red (1.000)		
Warsaw grouper	1.00:High Concern	1.00:High Concern	Red (1.000)		

Yellowedge grouper	1.00:High Concern	3.00:Moderate Concern	Red (1.732)
Blueline tilefish	3.67:Low Concern	1.00:High Concern	Red (1.916)
Red porgy	1.00:High Concern	5.00:Low Concern	Yellow (2.236)
Almaco jack	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)
Gray triggerfish	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)
Gag	3.67:Low Concern	3.00:Moderate Concern	Green (3.318)
Atlantic sharpnose shark	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)
Vermilion snapper	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)

WARSAW GROUPEr - UNITED STATES OF AMERICA/GULF OF MEXICO - SET LONGLINES - UNITED STATES OF AMERICA - WARSAW GROUPEr

Subscore:	1.000	Discard Rate:	0.75	C2 Rate:	0.750
Species	Abundance	Fishing Mortality	Subscore		
Speckled hind	1.00:High Concern	1.00:High Concern	Red (1.000)		
Scamp	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Snowy grouper	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Blacknose shark	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Loggerhead turtle / Mid Atlantic	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Red snapper	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Blueline tilefish	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Gag	2.33:Moderate Concern	5.00:Low Concern	Green (3.413)		
Blue tilefish	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Smooth dogfish	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Yellowedge grouper	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Red grouper	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Atlantic sharpnose shark	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)		

WARSAW GROUPEr - UNITED STATES OF AMERICA/GULF OF MEXICO - VERTICAL LINES - UNITED STATES OF AMERICA - WARSAW GROUPEr

Subscore:	1.000	Discard Rate:	1.00	C2 Rate:	1.000
Species	Abundance	Fishing Mortality	Subscore		
Greater amberjack	1.00:High Concern	1.00:High Concern	Red (1.000)		

Speckled hind	1.00:High Concern	1.00:High Concern	Red (1.000)
Gray triggerfish	1.00:High Concern	3.00:Moderate Concern	Red (1.730)
Red porgy	1.00:High Concern	3.00:Moderate Concern	Red (1.730)
Scamp	1.00:High Concern	3.00:Moderate Concern	Red (1.730)
Snowy grouper	1.00:High Concern	3.00:Moderate Concern	Red (1.730)
Red snapper	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.640)
Blueline tilefish	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.640)
Blue tilefish	3.67:Low Concern	5.00:Low Concern	Green (4.280)
Yellowedge grouper	3.67:Low Concern	5.00:Low Concern	Green (4.280)
Vermilion snapper	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)

YELLOWEDGE GROUPER - UNITED STATES OF AMERICA/GULF OF MEXICO - SET LONGLINES - UNITED STATES OF AMERICA - YELLOWEDGE GROUPER

Subscore:	1.000	Discard Rate:	0.75	C2 Rate:	0.750
Species	Abundance	Fishing Mortality	Subscore		
Speckled hind	1.00:High Concern	1.00:High Concern	Red (1.000)		
Snowy grouper	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Blacknose shark	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Warsaw grouper	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Scamp	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Loggerhead turtle / Mid Atlantic	1.00:High Concern	3.00:Moderate Concern	Red (1.732)		
Blueline tilefish	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Red snapper	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Gag	2.33:Moderate Concern	5.00:Low Concern	Green (3.413)		
Blue tilefish	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Smooth dogfish	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Red grouper	3.67:Low Concern	5.00:Low Concern	Green (4.284)		
Atlantic sharpnose shark	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)		

YELLOWEDGE GROUPER - UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC - SET LONGLINES - UNITED STATES OF AMERICA - YELLOWEDGE GROUPER

Subscore:	1.000	Discard Rate:	0.75	C2 Rate:	0.750
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Species	Abundance	Fishing Mortality	Subscore
Blacknose shark	1.00:High Concern	1.00:High Concern	Red (1.000)
Speckled hind	1.00:High Concern	1.00:High Concern	Red (1.000)
Warsaw grouper	1.00:High Concern	1.00:High Concern	Red (1.000)
Red grouper	1.00:High Concern	1.00:High Concern	Red (1.000)
Red snapper	1.00:High Concern	1.00:High Concern	Red (1.000)
Scamp	1.00:High Concern	3.00:Moderate Concern	Red (1.732)
Blue tilefish	3.67:Low Concern	1.00:High Concern	Red (1.916)
Blueline tilefish	3.67:Low Concern	1.00:High Concern	Red (1.916)
Snowy grouper	1.00:High Concern	5.00:Low Concern	Yellow (2.236)
Gag	3.67:Low Concern	3.00:Moderate Concern	Green (3.318)
Atlantic sharpnose shark	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)
Yellowtail snapper	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)

YELLOWEDGE GROUPER - UNITED STATES OF AMERICA/WESTERN CENTRAL ATLANTIC - VERTICAL LINES - UNITED STATES OF AMERICA - YELLOWEDGE GROUPER

Subscore:	1.000	Discard Rate:	1.00	C2 Rate:	1.000
Species	Abundance	Fishing Mortality	Subscore		
Red grouper	1.00:High Concern	1.00:High Concern	Red (1.000)		
Warsaw grouper	1.00:High Concern	1.00:High Concern	Red (1.000)		
Red snapper	1.00:High Concern	1.00:High Concern	Red (1.000)		
Blueline tilefish	3.67:Low Concern	1.00:High Concern	Red (1.916)		
Snowy grouper	1.00:High Concern	5.00:Low Concern	Yellow (2.236)		
Red porgy	1.00:High Concern	5.00:Low Concern	Yellow (2.236)		
Almaco jack	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Gray triggerfish	2.33:Moderate Concern	3.00:Moderate Concern	Yellow (2.644)		
Gag	3.67:Low Concern	3.00:Moderate Concern	Green (3.318)		
Atlantic sharpnose shark	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)		
Vermilion snapper	5.00:Very Low Concern	5.00:Low Concern	Green (5.000)		

A number of data sources were used to identify important species for Criterion 2 (C2). First, species-specific landings data from the SEFSC Trip Interview Program (TIP) (pers. comm., L. Beerkircher, NMFS) were used to identify which non-target (i.e., not C1) species were landed in association with each C1 species by gear and area. Species that made up at least 5% of retained catch for a given C1 species by area and gear were selected as C2 species, as well as species that made up from 1.0% to 4.9% of retained catch that are listed as

“Threatened,” “Endangered,” or “Critically Endangered” by the IUCN.

Next, for the Gulf of Mexico, two reports (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013) summarizing the reef fish observer program were used to identify which species made up at least 1% of the total catch (retained and discarded, data from all years combined) by gear. Species that contributed at least 5% of total catch were retained as important C2 species, as were species comprising 1.0% to 4.9% of total catch if they met the above listed IUCN criteria. These non-target species were then “assigned” to individual C1 species using results of a study to identify species groupings in the Gulf of Mexico reef fish fishery (Farmer et al. 2010a). Specifically, associations for each C2 species included any C1 species highlighted in red from Table 6 from that report, any C1 species shown in Table 7 from that report, and any C1 species that explained greater than about 75% of variability in catch for the species in question from the gear-specific dendrograms (Figure 3 for longlines and Figure 5 for vertical lines) (Farmer et al. 2010).

For the US South Atlantic vertical line fishery, a similar method was used based on the test observer program data (GSAFF 2008) (GSAFF 2010), combining all years of data and assuming discard CPUE and harvest CPUE are additive. C1 species associations were determined from a study identifying species groupings in the US South Atlantic snapper-grouper fishery (Farmer et al. 2010b) using Tables 6 and 7 and Figure 5 of that report.

No observer data is available for the US South Atlantic snapper-grouper longline fishery. Instead, important bycatch species were identified as any species that was present in at least 10% of commercial longline “data matrix bins” as reported in Table 3 of Farmer et al. (2010b). The 10% value was chosen as an appropriate cut off because important bycatch species were generally present in >20% of gear-specific data bins for each of the other three gear/area fisheries. C1 species associations for these species were then identified using Table 6 and 7 and Figure 3 from Farmer et al. (2010b).

The TIP data, as well as the tables and figures in the Farmer et al. reports, are all based on landings only; they do not include discard information. Further, the tables in the Farmer et al. reports are based on averaging across different data sources (i.e., life history, commercial vertical line, commercial longline, recreational, fishery independent). It is likely that these caveats (including multiple sources and using landings only) would generally increase the number of species associations relative to using gear-specific catch data, so the species associations included in this report should be considered a conservative evaluation of C2 species.

The table below identifies the C2 species with the lowest score for each fishery, as well as a summary justification for the score.

Fishery	Lowest C2	Score	Justification
Black grouper Gulf of Mexico Vertical lines	Speckled hind	1.0	The species is considered data limited and a peer reviewed stock assessment indicates poor stock status with a high probability that overfishing is occurring. The IUCN lists the species as "Critically Endangered" due to large stock declines.

Gag			
Gulf of Mexico	Speckled hind	1.0	The species is considered data limited and a peer reviewed stock assessment indicates poor stock status with a high probability that overfishing is occurring. The IUCN lists the species as "Critically Endangered" due to large stock declines.
Vertical lines			
Red grouper			
Gulf of Mexico	Speckled hind	1.0	The species is considered data limited and a peer reviewed stock assessment indicates poor stock status with a high probability that overfishing is occurring. The IUCN lists the species as "Critically Endangered" due to large stock declines.
Vertical lines			
Scamp			
Gulf of Mexico	Speckled hind	1.0	The species is considered data limited and a peer reviewed stock assessment indicates poor stock status with a high probability that overfishing is occurring. The IUCN lists the species as "Critically Endangered" due to large stock declines.
Vertical lines			
Snowy grouper			
Gulf of Mexico	Speckled hind	1.0	The species is considered data limited and a peer reviewed stock assessment indicates poor stock status with a high probability that overfishing is occurring. The IUCN lists the species as "Critically Endangered" due to large stock declines.
Vertical lines	Greater amberjack	1.0	The species is overfished and overfishing is occurring. A rebuilding strategy was no successful at rebuilding the stock within the original timeframe.
Warsaw grouper			
Gulf of Mexico	Speckled hind	1.0	The species is considered data limited and a peer reviewed stock assessment indicates poor stock status with a high probability that overfishing is occurring. The IUCN lists the species as "Critically Endangered" due to large stock declines.
Vertical lines	Greater amberjack	1.0	The species is overfished and overfishing is occurring. A rebuilding strategy was no successful at rebuilding the stock within the original timeframe.
Black grouper			
Gulf of Mexico	Speckled hind	1.0	The species is considered data limited and a peer reviewed stock assessment indicates poor stock status with a high probability that overfishing is occurring. The IUCN lists the species as "Critically Endangered" due to large stock declines.
Longlines			

Gag Gulf of Mexico Longlines	Speckled hind	1.0	The species is considered data limited and a peer reviewed stock assessment indicates poor stock status with a high probability that overfishing is occurring. The IUCN lists the species as "Critically Endangered" due to large stock declines.
Red grouper Gulf of Mexico Longlines	Speckled hind	1.0	The species is considered data limited and a peer reviewed stock assessment indicates poor stock status with a high probability that overfishing is occurring. The IUCN lists the species as "Critically Endangered" due to large stock declines.
Scamp Gulf of Mexico Longlines	Speckled hind	1.0	The species is considered data limited and a peer reviewed stock assessment indicates poor stock status with a high probability that overfishing is occurring. The IUCN lists the species as "Critically Endangered" due to large stock declines.
Snowy grouper Gulf of Mexico Longlines	Speckled hind	1.0	The species is considered data limited and a peer reviewed stock assessment indicates poor stock status with a high probability that overfishing is occurring. The IUCN lists the species as "Critically Endangered" due to large stock declines.
Warsaw grouper Gulf of Mexico Longlines	Speckled hind	1.0	The species is considered data limited and a peer reviewed stock assessment indicates poor stock status with a high probability that overfishing is occurring. The IUCN lists the species as "Critically Endangered" due to large stock declines.
Yellowedge grouper Gulf of Mexico Longlines	Speckled hind	1.0	The species is considered data limited and a peer reviewed stock assessment indicates poor stock status with a high probability that overfishing is occurring. The IUCN lists the species as "Critically Endangered" due to large stock declines.

Black grouper	Hogfish Florida Keys/Eastern Florida	1.0	This stock of hogfish is considered overfished, with fishing mortality estimated at nearly 100% greater than the overfishing threshold based on a recent peer reviewed stock assessment. IUCN lists the species as "Vulnerable" with declining biomass.	
	US South Atlantic	Red grouper	1.0	A recent stock assessment indicated that red grouper in the US South Atlantic is overfished, and overfishing is occurring. Spawning biomass is less than one-third of the biomass threshold, and fishing mortality exceeds the threshold F by 50%.
	Vertical lines	Red snapper	1.0	According to a recent peer reviewed stock assessment, spawning biomass of red snapper in the US South Atlantic is less than 20% of the biomass threshold, indicating the stock is overfished. In addition, the stock is experiencing overfishing, with fishing mortality more than 2.5 times the threshold F.
Gag	US South Atlantic	Red grouper	1.0	A recent stock assessment indicated that red grouper in the US South Atlantic is overfished, and overfishing is occurring. Spawning biomass is less than one-third of the biomass threshold, and fishing mortality exceeds the threshold F by 50%.
	Vertical lines	Red snapper	1.0	According to a recent peer reviewed stock assessment, spawning biomass of red snapper in the US South Atlantic is less than 20% of the biomass threshold, indicating the stock is overfished. In addition, the stock is experiencing overfishing, with fishing mortality more than 2.5 times the threshold F.
		Warsaw grouper	1.0	IUCN lists this species as "Critically Endangered," and NMFS has implemented a harvest moratorium due to suspected low stock sizes.
		Speckled hind	1.0	No stock assessment has ever been conducted, but the stock is listed by IUCN as "Critically Endangered" and by NMFS as a "species of concern."
Red grouper	US South Atlantic	Red snapper	1.0	According to a recent peer reviewed stock assessment, spawning biomass of red snapper in the US South Atlantic is less than 20% of the biomass threshold, indicating the stock is overfished. In addition, the stock is experiencing overfishing, with fishing mortality more than 2.5 times the threshold F.
	Vertical lines	Warsaw grouper	1.0	IUCN lists this species as "Critically Endangered," and NMFS has implemented a harvest moratorium due to suspected low stock sizes.
		Speckled hind	1.0	No stock assessment has ever been conducted, but the stock is listed by IUCN as "Critically Endangered" and by NMFS as a "species of concern."
Scamp		Red grouper	1.0	A recent stock assessment indicated that red grouper in the US South Atlantic is overfished, and overfishing is occurring. Spawning biomass is less than one-third of the biomass threshold, and fishing mortality exceeds the threshold F by 50%.

US South Atlantic Vertical lines	Red snapper	1.0	According to a recent peer reviewed stock assessment, spawning biomass of red snapper in the US South Atlantic is less than 20% of the biomass threshold, indicating the stock is overfished. In addition, the stock is experiencing overfishing, with fishing mortality more than 2.5 times the threshold F.
	Warsaw grouper	1.0	IUCN lists this species as "Critically Endangered," and NMFS has implemented a harvest moratorium due to suspected low stock sizes.
	Speckled hind	1.0	No stock assessment has ever been conducted, but the stock is listed by IUCN as "Critically Endangered" and by NMFS as a "species of concern."
Snowy grouper US South Atlantic Vertical lines	Red snapper	1.0	According to a recent peer reviewed stock assessment, spawning biomass of red snapper in the US South Atlantic is less than 20% of the biomass threshold, indicating the stock is overfished. In addition, the stock is experiencing overfishing, with fishing mortality more than 2.5 times the threshold F.
	Red grouper	1.0	A recent stock assessment indicated that red grouper in the US South Atlantic is overfished, and overfishing is occurring. Spawning biomass is less than one-third of the biomass threshold, and fishing mortality exceeds the threshold F by 50%.
	Warsaw grouper	1.0	IUCN lists this species as "Critically Endangered," and NMFS has implemented a harvest moratorium due to suspected low stock sizes.
Yellowedge grouper US South Atlantic Vertical lines	Red snapper	1.0	According to a recent peer reviewed stock assessment, spawning biomass of red snapper in the US South Atlantic is less than 20% of the biomass threshold, indicating the stock is overfished. In addition, the stock is experiencing overfishing, with fishing mortality more than 2.5 times the threshold F.
	Red grouper	1.0	A recent stock assessment indicated that red grouper in the US South Atlantic is overfished, and overfishing is occurring. Spawning biomass is less than one-third of the biomass threshold, and fishing mortality exceeds the threshold F by 50%.
	Warsaw grouper	1.0	IUCN lists this species as "critically endangered," and NMFS has implemented a harvest moratorium due to suspected low stock sizes.
Snowy grouper US South Atlantic Longlines	Red grouper	1.0	A recent stock assessment indicated that red grouper in the US South Atlantic is overfished, and overfishing is occurring. Spawning biomass is less than one-third of the biomass threshold, and fishing mortality exceeds the threshold F by 50%.
	Red snapper	1.0	According to a recent peer reviewed stock assessment, spawning biomass of red snapper in the US South Atlantic is less than 20% of the biomass threshold, indicating the stock is overfished. In addition, the stock is experiencing overfishing, with fishing mortality more than 2.5 times the threshold F.
	Warsaw grouper	1.0	IUCN lists this species as "Critically Endangered," and NMFS has implemented a harvest moratorium due to suspected low stock sizes.

	Speckled hind	1.0	No stock assessment has ever been conducted, but the stock is listed by IUCN as "Critically Endangered" and by NMFS as a "species of concern."
	Blacknose shark	1.0	The stock is overfished with overfishing occurring. A rebuilding plan is in place through 2043. Occurrence in the fishery is poorly understood due to lack of observer coverage.
Yellowedge grouper US South Atlantic Longlines	Red grouper	1.0	A recent stock assessment indicated that red grouper in the US South Atlantic is overfished, and overfishing is occurring. Spawning biomass is less than one-third of the biomass threshold, and fishing mortality exceeds the threshold F by 50%.
	Red snapper	1.0	According to a recent peer reviewed stock assessment, spawning biomass of red snapper in the US South Atlantic is less than 20% of the biomass threshold, indicating the stock is overfished. In addition, the stock is experiencing overfishing, with fishing mortality more than 2.5 times the threshold F.
	Warsaw grouper	1.0	IUCN lists this species as "Critically Endangered," and NMFS has implemented a harvest moratorium due to suspected low stock sizes.
	Speckled hind	1.0	No stock assessment has ever been conducted, but the stock is listed by IUCN as "Critically Endangered" and by NMFS as a "species of concern."
	Blacknose shark	1.0	The stock is overfished with overfishing occurring. A rebuilding plan is in place through 2043. Occurrence in the fishery is poorly understood due to lack of observer coverage.

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)

RED GROUPEL

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

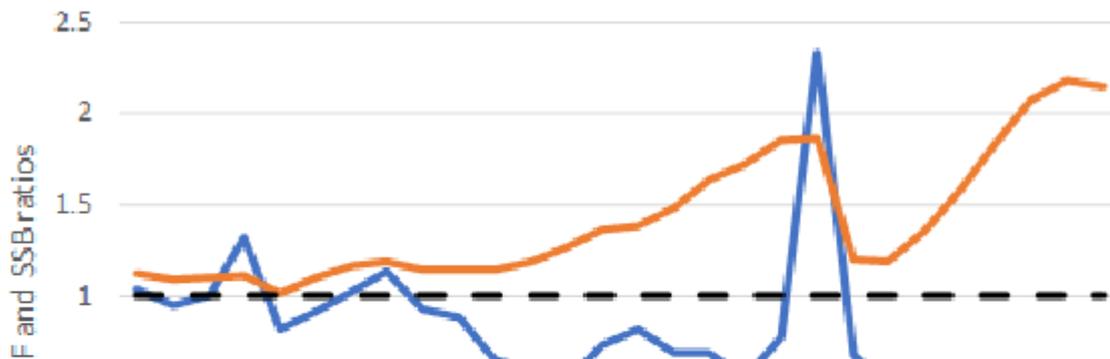
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Low Concern

The most recent benchmark stock assessment for red grouper in the Gulf of Mexico was conducted through the SEDAR process with data through 2013 (SEDAR 2015a). The assessment team developed stock status determinations using MSY based reference points, but the review panel recommended the use of MSY proxies based on spawning potential ratio (SPR) (SEDAR 2015a). Specifically, the biomass target was set to the spawning biomass equal to 30% of maximum spawning potential, $SSB_{30\%SPR} = 1.204$ million lb under the base model (SEDAR 2015a). Terminal year spawning biomass was estimated as $SSB_{2013} = 2.223$ million lb, ~83% greater than the biomass target and more than double the biomass threshold (SEDAR 2015a). Spawning biomass exceeds the biomass target reference point; however, recent survey data indicate the stock is declining despite the quota not being reached in recent years (pers. comm., R. Ellis, FL FWC, 7/13/2018). This suggests some uncertainty in the stock assessment results. Although biomass appears to be above target levels, the uncertainty moderates the score for red grouper in the Gulf of Mexico to "low" concern.

Justification:



UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPEUR
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPEUR
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPEUR
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPEUR
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPEUR
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPEUR
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

High Concern

A SEDAR benchmark peer review of red grouper in the US South Atlantic was completed in 2010 with data through 2008 (SEDAR 2010b). A standard stock assessment, which allows both new data and slight revisions to methodology relative to the benchmark (<http://sedarweb.org/sedar-process>), was recently completed with data through 2015 (SEDAR 2017a). Results of the assessment determined that SSB in the terminal year was approximately 911 MT, well below the biomass target of $SSB_{MSY} = 3183.4$ MT, and only 38% of the biomass threshold of $0.75 * SSB_{MSY} = 2387.6$ MT (SEDAR 2017a). Amendment 24 to the Snapper-Grouper FMP (SAFMC 2011a) implemented a ten-year rebuilding plan for red grouper. Since then, commercial harvest by hand lines and longlines has fallen to the lowest levels of the time series, as have total landings for all sectors combined (NMFS Fishery Statistics Division, 2017a) (NMFS Fishery Statistics Division, 2017b). However, results of the stock assessment suggest these reductions appear to have had little effect on stock abundance to date (SEDAR 2017a). Estimated fishing mortality in recent years of the assessment has not declined as dramatically as harvest, suggesting that low recruitment in recent years could be contributing to the reduction in landings. Based on the overfished status of red grouper in the South Atlantic, this stock receives a biomass score of "high" concern.

Justification:

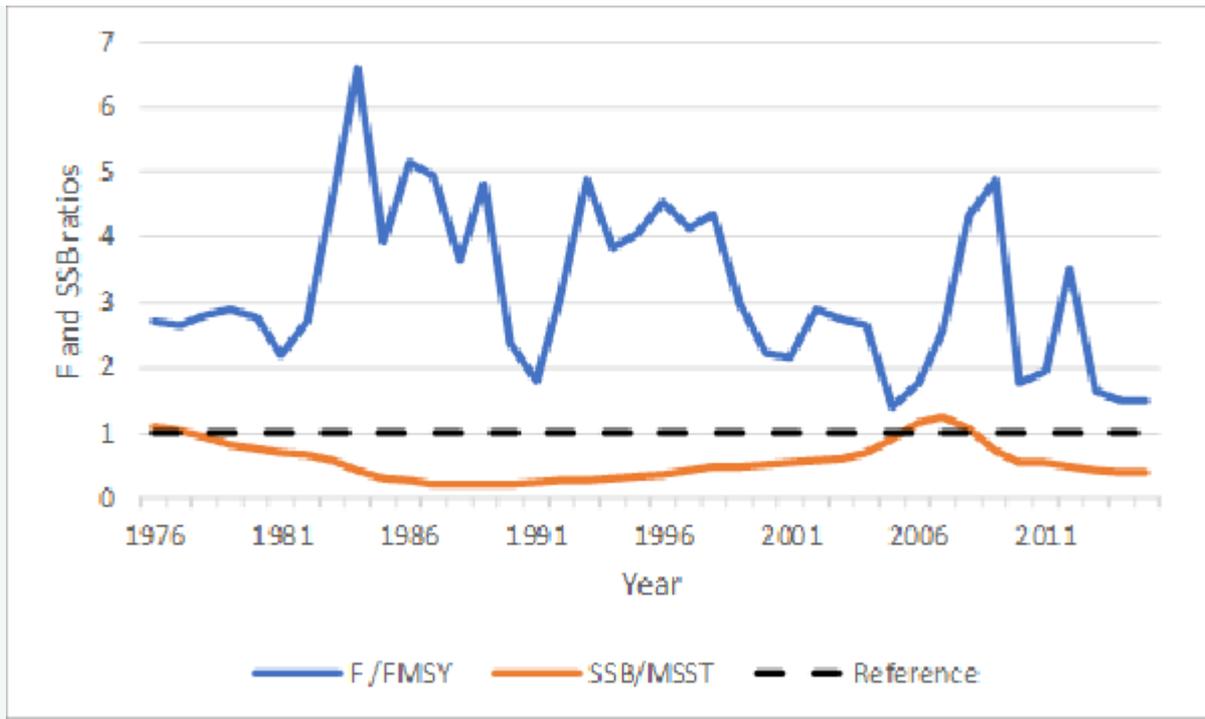


Figure 18 South Atlantic red grouper fishing mortality and spawning biomass from the base model run relative to selected management reference points. Figure developed based on data provided in SEDAR 53 Table 8 (SEDAR 2017a).

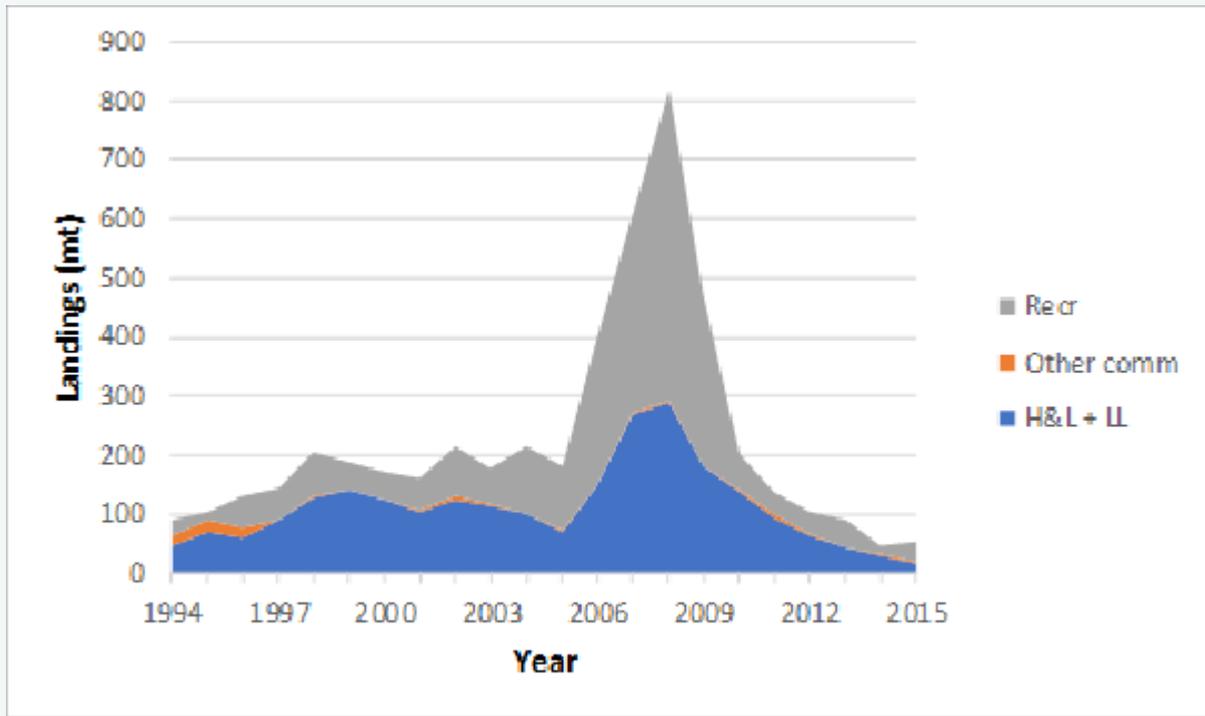


Figure 19 Landings of red grouper in the U.S. South Atlantic region by fishery. Data downloaded from the NMFS Sustainable Fishery Division (2017a, 2017b), accessed August 2017.

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Low Concern

Fishing mortality status is determined using the terminal year F relative to the F threshold. For red grouper in the Gulf of Mexico, $F_{2013} = 0.121$ is ~59% of the fishing mortality threshold of $F_{30\%SPR} = 0.204$ (SEDAR 2015a) indicating the stock is not experiencing overfishing. Annual F has consistently been below the $F_{THRESHOLD}$ since 2006 (SEDAR 2015a), resulting in a fishing mortality score of "low" concern for this fishery.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

High Concern

A fishing mortality threshold of F_{MSY} was established in the benchmark assessment and is compared to the recent three year average fishing mortality to determine stock status (SEDAR 2010b). The standard assessment through 2015 estimated $F_{MSY} = 0.12$ and a recent fishing mortality rate of $F_{2013-2015} = 0.187$ (SEDAR 2017a). Recent fishing mortality exceeds the limit reference point by more than 50%. Although this ratio has declined since implementation of Amendment 24 in 2011 (SEDAR 2017a), the stock is still experiencing overfishing (NMFS 2017b). As such, red grouper in the South Atlantic receives a fishing mortality rating of "high" concern.

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

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

≥ 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish longline fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 195 trips and 5,015 sets between 2006 to 2011, the (bait + discards)/landings ratio is 103% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio greater than 100% warrants a Criterion 2 score modifier of 0.75.

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish vertical line fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be

conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 398 trips and 13,827 sets between 2006 and 2011, the (bait + discards)/landings ratio is 37.2% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the US South Atlantic snapper-grouper vertical line fishery. A pilot observer program conducted from 2007 to 2009 collected information on species composition and disposition (kept or discarded) (GSAFF 2008) (GSAFF 2010). The (bait+discards)/landings ratio uses the total discarded CPUE (all species combined) divided by total retained CPUE. This ratio should be considered a minimum estimate because it does not account for bait needs, nor does it distinguish between species retained for food vs. bait. Based on 2,664 stations sampled between 2007 and 2009, the (bait + discards)/landings ratio is 29.9% (GSAFF 2008) (GSAFF 2010). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

≥ 100%

No information could be found to directly calculate the (discards + bait)/landings ratio for the South Atlantic snapper grouper longline fishery. No observer data are available. Harvesters are required to report discard data through the SEFSC Coastal Fishery Logbook Program (NMFS SEFSC 2017a). However, ratios of discards to harvest cannot be calculated from these data because landings are reported in pounds while discards are reported in numbers of fish (NMFS 2011) (NMFS 2013) (NMFS 2016b). Given the similarities in gear and catch between this region and the Gulf of Mexico longline reef fishery, we use the ratio for the Gulf of Mexico (103%) as a substitute.

RED SNAPPER

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

Maximum Sustainable Yield (MSY) is undetermined for the GOM red snapper fishery as the stock-recruitment variable is incalculable. The 2018 assessment used proxy reference points to determine the biomass for GOM Red Snapper, where the limit reference point (LRP) is Spawning Stock Biomass ($SSB_{CURRENT}$)/Minimum Stock Size Threshold (MSST) ratio is $SSB_{CURRENT}/MSST = 1.41$ and the target reference point (TRP) is $SSB_{CURRENT}/SSB_{FSR26\%} = 0.7$ (SEDAR 2018). However, $SSB_{CURRENT}/SSB_0$ is 0.18 (SEDAR 2018) and Seafood Watch standards require that appropriate reference points do not allow biomass to fall below 30% of B_0 . The stock is in a rebuild program with a target date of 2032 (SEDAR 2018).

The Red Snapper's biological status has changed from overfished in the 2015 assessment to not overfished in the recent 2018 assessment. These changes are the result of stock recovery, but also important changes in the reference point, MSST (discussed below) (SEDAR 2018).

Since the 2018 stock assessment deems GOM red snapper as no longer overfished, it is well over the LRP, but below the TRP, and well below virgin levels. Therefore, Seafood Watch deems abundance as a "moderate" concern.

Justification:

According to reference points, GOM red snapper have been overfished since 1988, but managers believe that the tide is shifting (SEDAR 2005) (GMFMC 2011c). Stock abundance and commercial landings have exhibited declines in the long-term; in the short-term, trends are increasing due to high recruitment and the presence of strong year classes produced between 2004 and 2006 especially in the western component of the fishery (SEDAR 2009b).

There have been significant differences between the results of the last two stock assessments: the most recent GOM red snapper stock assessment (published in 2018) declared that the stock is no longer overfished. The previous report (published in 2015) estimated $SSB_{2013}/SSB_{FSR26\%} = 0.54$; deeming the stock as overfished (Cass-Calay et al. 2015) and biomass was showing signs of increasing, but was well below the limit reference point (Cass-Calay et al. 2015).

These changes have largely been a result of the reduction in MSST. MSST has reduced due to changes in how it is calculated, following requirements in Amendment 44 to the Gulf of Mexico Reef Fish Fishery Management Plan. In the previous stock assessment, MSST was calculated as $(1-M) * SSB_{F_{SPR26\%}}$, where $M = 0.09$ (i.e., the average value of M from the Lorenzen M curve for fully selected ages) (Cass-Calay et al. 2015). This has been changed to $0.5 * SSB_{F_{SPR26\%}}$ (SEDAR 2018). If the previous MSST calculation had still been used with the most up-to-date stock information, the 2018 stock assessment states "the red snapper resource would still be considered overfished ($SSB_{2016} / MSST_{Old} = 0.77$)" (SEDAR 2018).

The biggest uncertainty in the 2018 stock assessment is still the poor understanding of the stock-recruit relationship (SEDAR 2018). This has meant that MSY is not able to be calculated and used as a reference point in the red snapper assessment. The stock-recruit function relationship is poorly defined because of unpredictable recruitment and a lack of data. Proxies have been created to replace MSY. The SPR has been selected as the optimal proxy. However, SPR26% does not include recruitment into the calculation 2013 FSPR26% OLD; therefore, it does not aim to determine the maximum yield for economic gain. An SPR at 26% has been considered as too low a percentage for such a long-lived species (SEDAR 2013f). Other proxies of varying SPR, including $F_{SPR22\%}$, $F_{SPR24\%}$, $F_{SPR30\%}$ and F_{SPRmax} or $F_{SPR20\%}$, have been suggested. When $F_{SPR30\%}$ was considered, it was suggested that $F_{SPR26\%}$ would be the optimum proxy for MSY. If a different proxy to the current one is adopted, the projected rebuild timeframe would also likely change; the Magnuson-Stevens Act would require the rebuild timeframe to be 10 years or less, which could require stricter management measures to be implemented (SEDAR 2015g).

Another important issue with the red snapper stock assessment is the difference in recovery in the eastern and western regions of the GOM. In general, red snapper are steadily rebuilding across both regions since the mid-2000s, but rebuilding in the eastern region appears to have leveled off or declined over the last 3 to 5 years.

The population sizes in the eastern region are expected to decline rapidly, while the western region's sizes are continuing to steadily rebuild (SEDAR 2018).

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

High Concern

A 2008 stock assessment of South Atlantic red snapper conducted through the SEDAR process determined that the stock was overfished and overfishing was occurring (SEDAR 2008a). These results prompted the

SAFMC to implement emergency actions (SAFMC 2017b) in 2009, followed by Amendment 17A in 2010 (SAFMC 2010) to end overfishing and rebuild the red snapper population. A rebuilding timeframe of 35 years (through 2044) was initiated through the amendment. Subsequent peer reviewed stock assessments were conducted in 2010, and more recently in 2016 with data through 2014 (SEDAR 2017b). The most recent assessment determined that spawning biomass (measured in population fecundity) remains well below the biomass threshold, with $SSB_{2014} / MSST = 0.18$ (SEDAR 2017b). The high probability that red snapper in the SAFMC management unit is below the threshold biomass level justifies an abundance score of "high" concern for this species.

Justification:

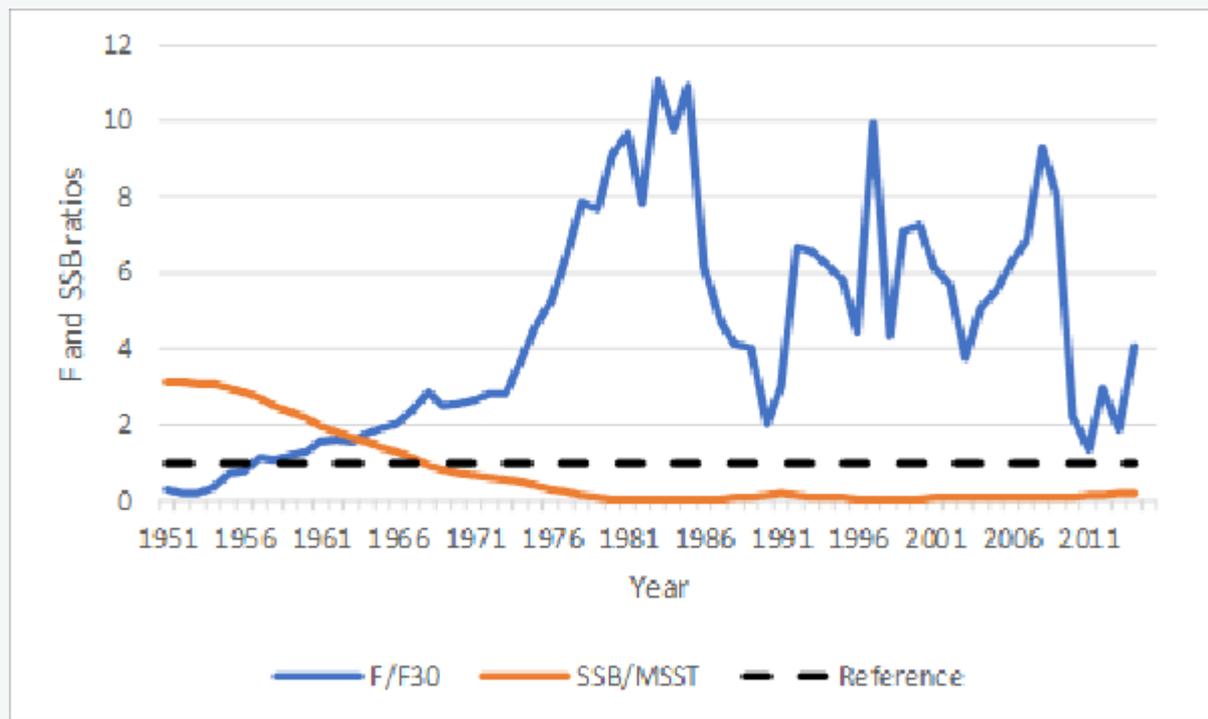


Figure 20 South Atlantic red snapper fishing mortality and spawning biomass from the preferred model run relative to selected management reference points. Figure developed based on data provided in SEDAR 41 Table 10 (SEDAR 2017b).

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

$F_{CURRENT} / MFMT = 0.823$ (SEDAR 2018) where MFMT is the maximum fishing mortality threshold (defined as FSPR26%). Overfishing is not occurring, fishing mortality is fluctuating around sustainable proxy levels, and has decreased since previous stock assessments. There is concern that the 2017 landings (which have not been included in the 2018 stock assessment) may change the outcome of the overfishing status due to quota overages (of 50%) in the private sector (NOAA 2017).

Since fishing mortality trending downwards and is fluctuating around the F_{MSY} proxy, fishing mortality is rated as a "moderate" concern.

Justification:

While overfishing is not occurring, some concerns about the long-term prognosis of the stock remain. The most recent stock assessment does not contain the provisional landings data for 2017 (SEDAR 2018) yet, in 2017, the length of the recreational seasons was extended by 39 days (NOAA 2017) and the state water management area in Louisiana were increased from 0-3 miles to 0-9 miles in 2016 (NMFS 2017f), which has caused the private (recreational fishery accounts for just over half of the GOM red snapper quota (GMFMC 2017b) (50 CFR §622.2017) in the red snapper sector to exceed its ACL by over 50% (NOAA 2017). The Department of Commerce stated that that will likely delay the rebuilding timeline by six years, but will still allow the continued growth of the stock (albeit at a reduced rate) (50 CFR §622.2017).

Other sources of mortality mainly originate from the recreational fishery, discarding and the shrimp trawl fishery as bycatch. In three out of the past five years, the recreational fishery has exceeded its quota (NMFS 2016d). Additionally, discards contribute to a major source of red snapper fishing mortality in the GOM (NMFS 2016e), particularly due to barotrauma (where large changes in pressure causes swim bladders to inflate) (NMFS 2016e). Discard mortality is variable according to depth, handling techniques, gear type, speed of retrieval from depths, and the size of the fish, water / air temperature and predation (Cass-Calay et al. 2015). Reliable discard estimates are unavailable, yet critical to estimating overall fishing mortality.

Historically, a main source of GOM Red Snapper fishing mortality is from shrimp trawls: the shrimp fishery has

been estimated to cause up to 90% of age-0 and 1 red snapper mortality (Parsons and Foster 2007). Therefore, shrimp trawls operating in the US South Atlantic and western GOM have been required to use bycatch reduction devices (BRDs) since 1997 (GMFMC 2016b). Many authors have claimed that the reduction in shrimp trawl effort (by around 75% to 85% (SEDAR 2009b) (Hart et al. 2012) and bycatch of red snapper in the shrimp trawl fishery was instrumental in reducing overall red snapper mortality (Gillig et al. 2001) (Peabody 2004) (Saillant and Gold 2006) (McDonough 2009).

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

High Concern

The recent stock assessment for red snapper in the US South Atlantic indicates that recent fishing mortality exceeds the approved fishing mortality threshold by over 180% ($F_{2012-2014} / F_{30\%SPR} = 2.84$) (SEDAR 2017b). The NMFS quarterly stock status update confirms that the stock is still experiencing overfishing (NMFS 2017b), resulting in a fishing mortality score of "high" concern for SAFMC red snapper.

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

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

≥ 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish longline fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 195 trips and 5,015 sets between 2006 to 2011, the (bait + discards)/landings ratio is 103% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio greater than 100% warrants a Criterion 2 score modifier of 0.75.

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish vertical line fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 398 trips and 13,827 sets between 2006 and 2011, the (bait + discards)/landings ratio is 37.2% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the US South Atlantic snapper-grouper vertical line fishery. A pilot observer program conducted from 2007 to 2009 collected information on species composition and disposition (kept or discarded) (GSAFF 2008) (GSAFF 2010). The (bait+discards)/landings ratio uses the total discarded CPUE (all species combined) divided by total retained CPUE. This ratio should be considered a minimum estimate because it does not account for bait needs, nor does it distinguish between species retained for food vs. bait. Based on 2,664 stations sampled between 2007 and 2009, the (bait + discards)/landings ratio is 29.9% (GSAFF 2008) (GSAFF 2010). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

≥ 100%

No information could be found to directly calculate the (discards + bait)/landings ratio for the South Atlantic snapper grouper longline fishery. No observer data are available. Harvesters are required to report discard data through the SEFSC Coastal Fishery Logbook Program (NMFS SEFSC 2017a). However, ratios of discards to harvest cannot be calculated from these data because landings are reported in pounds while discards are reported in numbers of fish (NMFS 2011) (NMFS 2013) (NMFS 2016b). Given the similarities in gear and catch between this region and the Gulf of Mexico longline reef fishery, we use the ratio for the Gulf of Mexico (103%) as a substitute.

SPECKLED HIND

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

High Concern

A data-limited stock assessment for speckled hind in the Gulf of Mexico was conducted and peer reviewed through SEDAR 49 (SEDAR 2016b). Only catch data are available for speckled hind, limiting the assessment to three catch-based models. One of these models did not meet specified performance criteria within the management strategy evaluation, and another is not suitable for providing management advice because it does not take into account historic harvest levels (SEDAR 2016b). The remaining method indicates that there is greater than a 50% probability that stock biomass is below 50% of B_{MSY} (SEDAR 2016b). The GMFMC commonly sets biomass thresholds at 75% of B_{MSY} (or its proxy). The peer review concluded that data limitations prevented development of reference points for speckled hind (SEDAR 2016b) (GMFMC 2017c), assuming similar reference point criteria as used for other species suggests there is an overwhelming probability that stock biomass is below a biomass threshold. Further, IUCN lists speckled hind as "Critically Endangered" due to population declines and excessive fishing pressure (Ng Wai Chuen and Huntsman 2006b). Speckled hind have also been identified as a "species of concern" under the US Endangered Species Act, indicating there is concern regarding its status but insufficient data to inform a formal determination (NMFS 2017d). Because Gulf of Mexico speckled hind has only a data-limited assessment model, and the model results indicate an unknown, but very likely poor, stock status, the stock receives an abundance score of "high" concern.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

High Concern

No stock assessment has been conducted for speckled hind in the South Atlantic, so scoring criteria are based on productivity-susceptibility analysis (PSA) results and other proxy information. A PSA score of 2.86 indicates speckled hind have moderate inherent vulnerability. However, IUCN lists the species as "Critically Endangered" (Ng Wai Chuen and Huntsman 2006b), and they are also considered by NMFS as a species of concern (NMFS 2017d). These attributes combined produce an abundance score of "high" concern for speckled hind in the US South Atlantic.

Justification:

US South Atlantic Speckled Hind

Productivity-Susceptibility Analysis:

Scoring Guidelines

1.) Productivity score (P) = average of the productivity attribute scores (p_1, p_2, p_3, p_4 (finfish only), p_5 (finfish only), p_6, p_7 , and p_8 (invertebrates only))

2.) Susceptibility score (S) = product of the susceptibility attribute scores (s_1, s_2, s_3, s_4), rescaled as follows:
 $S = [(s_1 * s_2 * s_3 * s_4) - 1/40] + 1$.

3.) Vulnerability score (V) = the Euclidean distance of P and S using the following formula: $V = \sqrt{(P^2 + S)^2}$

Productivity Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity	4 (Parker and Mays 1998)	1
Average maximum age	25 (Parker and Mays 1998) (SAFMC 2012)	2
Fecundity		
Average maximum size (fish only)	97 cm (Froese and Pauly 2017)	1

Average size at maturity (fish only)	50 (SAFMC 2012)	2
Reproductive strategy		
Trophic level	4 (Froese and Pauly)	3
Density dependence (invertebrates only)		
Habitat quality	Moderately altered by non-fishing impacts	2
Total Productivity (average)		1.833
Susceptibility Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Areal overlap (Considers all fisheries)	3 (default value)	3
Vertical overlap (Considers all fisheries)	3 (default value)	3
Selectivity of fishery (Specific to fishery under assessment)	Protogynous hermaphrodites (SAFMC 2012)	3
Post-capture mortality (Specific to fishery under assessment)	Observer data from the Gulf of Mexico indicate approximately 40% of captured speckled hind are released alive (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013)	2
Total Susceptibility (multiplicative)		2.325

PSA score for speckled hind in US South Atlantic vertical line fishery is calculated as follows:

$$\text{Vulnerability (V)} = \sqrt{P^2 + S^2}$$

$$V = \sqrt{1.83^2 + 2.33^2}$$

$$V = 2.96$$

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

High Concern

No explicit fishing mortality reference points are defined for Gulf of Mexico speckled hind, but the data-limited model conducted during SEDAR 49 indicates that there is only a 33.1% probability that overfishing is not occurring (SEDAR 2016b). These results justify a fishing mortality score of "high" concern for this stock.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

High Concern

No stock assessment has ever been conducted for speckled hind in the US South Atlantic, which would generally qualify for a fishing mortality score of "moderate" concern. However, NMFS (2017b) indicates the stock is experiencing overfishing, the species is listed as a "species of concern" under the Endangered Species Act (NMFS 2017d), and they are considered "Critically Endangered" by the IUCN (Ng Wai Chuen and Huntsman 2006b). For these reasons, we are awarding a more conservative score of "high" concern for speckled hind in the SAFMC management area.

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

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

≥ 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish longline fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-

Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 195 trips and 5,015 sets between 2006 to 2011, the (bait + discards)/landings ratio is 103% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio greater than 100% warrants a Criterion 2 score modifier of 0.75.

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish vertical line fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 398 trips and 13,827 sets between 2006 and 2011, the (bait + discards)/landings ratio is 37.2% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the US South Atlantic snapper-grouper vertical line fishery. A pilot observer program conducted from 2007 to 2009 collected information on species composition and disposition (kept or discarded) (GSAFF 2008) (GSAFF 2010). The (bait+discards)/landings ratio uses the total discarded CPUE (all species combined) divided by total retained CPUE. This ratio should be considered a minimum estimate because it does not account for bait needs, nor does it distinguish between species retained for food vs. bait. Based on 2,664 stations sampled between 2007 and 2009, the (bait + discards)/landings ratio is 29.9% (GSAFF 2008) (GSAFF 2010). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

≥ 100%

No information could be found to directly calculate the (discards + bait)/landings ratio for the South Atlantic snapper grouper longline fishery. No observer data are available. Harvesters are required to report discard data through the SEFSC Coastal Fishery Logbook Program (NMFS SEFSC 2017a). However, ratios of discards to harvest cannot be calculated from these data because landings are reported in pounds while discards are reported in numbers of fish (NMFS 2011) (NMFS 2013) (NMFS 2016b). Given the similarities in gear and catch between this region and the Gulf of Mexico longline reef fishery, we use the ratio for the Gulf of Mexico (103%) as a substitute.

HOGFISH / FLORIDA KEYS/EAST FLORIDA (FLK/EFL)

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPE

High Concern

Hogfish have historically been managed as a single stock within the US South Atlantic and Gulf of Mexico; however, recent genetic analysis indicates several distinct stocks within this management area (SEDAR 2013). A peer reviewed stock assessment conducted through the SEDAR process with data through 2012 assessed three separate stocks, including Western Florida (WFL), the Florida Keys and East Florida (FLK/EFL), and Georgia to North Carolina (GA-NC) (SEDAR 2013). Subsequently, Amendment 37 was passed, which split the SAFMC management unit into two separate stocks, consistent with the genetic evidence presented in the stock assessment (SAFMC 201b). The following analysis is relevant to the GA-NC stock of hogfish under SAFMC rule. The following analysis is relevant to the FLK/EFL stock of hogfish under SAFMC rule.

Amendment 37 defined MSY-based reference points for the FLK/EFL stock of hogfish (SAFMC 2017b). The biomass threshold is defined as 75% of the equilibrium spawning biomass that would occur at a fishing mortality equal to the fishing mortality target ($0.75 * SSB_{F_{MSY}} = 856.64$ MT) (SEDAR 2013). Terminal year spawning biomass was estimated as 399.29 MT, indicating the stock is overfished ($SSB_{2012} / MSST = 0.466$) (SEDAR 2013). Further, the IUCN lists hogfish as "Vulnerable" with declining biomass (Choat et al. 2010). For these reasons, the FLK/EFL stock of hogfish receive an abundance score of "high" concern.

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPE

High Concern

Amendment 37 establishes the fishing mortality threshold as $F_{MSY} = 0.138$ (SAFMC 2017b). The base run of the recent stock assessment for FLK/EFL hogfish estimated terminal year fishing mortality as $F_{2012} = 0.219$ (SEDAR 2013), indicating that the stock is overfished. Uncertainty analyses suggested that this finding is robust, and the most recent NMFS stock status update indicates overfishing is occurring (NMFS 2017b). For these reasons, fishing mortality for the FLK/EFL stock of hogfish receives a score of "high" concern.

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

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

< 100%

No information could be found regarding bait needs in the US South Atlantic snapper-grouper vertical line fishery. A pilot observer program conducted from 2007 to 2009 collected information on species composition and disposition (kept or discarded) (GSAFF 2008) (GSAFF 2010). The (bait+discards)/landings ratio uses the total discarded CPUE (all species combined) divided by total retained CPUE. This ratio should be considered a minimum estimate because it does not account for bait needs, nor does it distinguish between species retained for food vs. bait. Based on 2,664 stations sampled between 2007 and 2009, the (bait + discards)/landings ratio is 29.9% (GSAFF 2008) (GSAFF 2010). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

BLACKNOSE SHARK

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

High Concern

The abundance of blacknose sharks in the Gulf of Mexico is unknown (NMFS 2017b). According to a productivity-susceptibility analysis they have high vulnerability (PSA = 3.36) (Carlson et al. 1999) (Carlson et al. 2007) (Froese and Pauly 2017). As there is no evidence to suggest that the stock is above or below a reference point and the PSA indicates the species is highly vulnerable, blacknose shark in the Gulf of Mexico is rated as a "high" concern for abundance.

Justification:**Gulf of Mexico Blacknose Shark**Productivity-Susceptibility Analysis:*Scoring Guidelines*

1.) Productivity score (P) = average of the productivity attribute scores (p_1, p_2, p_3, p_4 (finfish only), p_5 (finfish only), p_6, p_7 , and p_8 (invertebrates only))

2.) Susceptibility score (S) = product of the susceptibility attribute scores (s_1, s_2, s_3, s_4), rescaled as follows:
 $S = [(s_1 * s_2 * s_3 * s_4) - 1/40] + 1$.

3.) Vulnerability score (V) = the Euclidean distance of P and S using the following formula: $V = \sqrt{(P^2 + S)^2}$

Productivity Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity	10	2
Average maximum age	13	2
Fecundity	4	3
Average maximum size (fish only)	140 cm	3
Average size at maturity (fish only)	105 cm	3
Reproductive strategy	Live bearer	3
Trophic level	4.4	3
Density dependence (invertebrates only)		
Habitat quality		
Total Productivity (average)		2.714
Susceptibility Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Areal overlap (Considers all fisheries)	Default value	3
Vertical overlap (Considers all fisheries)	Default value	3

Selectivity of fishery (Specific to fishery under assessment)	Default value	2
Post-capture mortality (Specific to fishery under assessment)	Default value	3
Total Susceptibility (multiplicative)		2.325

PSA score for blacknose shark in the Gulf of Mexico longline fishery is calculated as follows:

$$\text{Vulnerability (V)} = \sqrt{P^2 + S^2}$$

$$V = \sqrt{2.714^2 + 2.325^2}$$

$$V = 3.57$$

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

High Concern

Blacknose sharks in the Atlantic are classified as overfished ($B/B_{MSY} = 0.99$) and in a rebuilding plan projected until 2043 (NMFS 2017b). Due to their overfished status, abundance of blacknose sharks in the Atlantic is rated as a "high" concern.

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER
 UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER
 UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
 UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER
 UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER
 UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER
 UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

Fishing mortality is unknown for blacknose shark in the Gulf of Mexico, although limited observer coverage documented 816 individuals and 1048 individuals in the reef fish longline fishery during 2006 to 2009 and 2010 to 2011, respectively (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). These values represent approximately 1.1% and 0.5% of the catch in numbers for the two time periods. In both reports, the majority of individuals (576 and 929) were reported as released alive. Due to limited data availability, fishing mortality is rated as a "moderate" concern.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

High Concern

Overfishing is occurring for blacknose sharks in the Atlantic (NMFS 2017b). A benchmark stock assessment for blacknose shark in 2011 indicates that the majority of harvest comes from the gillnet fishery, the bottom longline fishery, and bycatch in the shrimp trawl fishery (SEDAR 2011e). The species is not targeted by the snapper-grouper fishery, and although there is no longline observer data to indicate the magnitude of blacknose shark captures in the US South Atlantic fishery, it is observed in the Gulf of Mexico reef fish longline fishery (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). Since overfishing is occurring and there is limited information on its occurrence in the snapper-grouper longline fishery, fishing mortality for blacknose shark in the US South Atlantic is rated as a "high" concern.

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

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPE
 UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPE
 UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
 UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE
 UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPE
 UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE
 UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

≥ 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish longline fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 195 trips and 5,015 sets between 2006 to 2011, the (bait + discards)/landings ratio is 103% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio greater than 100% warrants a Criterion 2 score modifier of 0.75.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

≥ 100%

No information could be found to directly calculate the (discards + bait)/landings ratio for the South Atlantic snapper grouper longline fishery. No observer data are available. Harvesters are required to report discard data through the SEFSC Coastal Fishery Logbook Program (NMFS SEFSC 2017a). However, ratios of discards to harvest cannot be calculated from these data because landings are reported in pounds while discards are reported in numbers of fish (NMFS 2011) (NMFS 2013) (NMFS 2016b). Given the similarities in gear and catch between this region and the Gulf of Mexico longline reef fishery, we use the ratio for the Gulf of Mexico (103%) as a substitute.

WARSAW GROUPE

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPE

High Concern

Warsaw grouper has been managed as part of the GMFMC Reef Fish complex since inception of the FMP (GMFMC 1981), but a formal stock assessment has never been conducted for this species. The abundance score for this stock is therefore based on proxy information, including a productivity-susceptibility analysis (PSA) that takes into account the species life history and characteristics of the fishery, and available proxy information on stock abundance.

The PSA indicates that warsaw grouper have moderate productivity and high susceptibility, resulting in an overall high inherent vulnerability score (PSA = 3.69). Further, IUCN list Warsaw grouper as "Critically Endangered" (Ng Wai Chuen and Huntsman 2006a) and the species is listed as a "species of concern" by the NMFS (NMFS 2017d). These factors, in combination with the lack of a current stock assessment, warrant an

abundance score of "high" concern for Gulf of Mexico Warsaw grouper.

Justification:

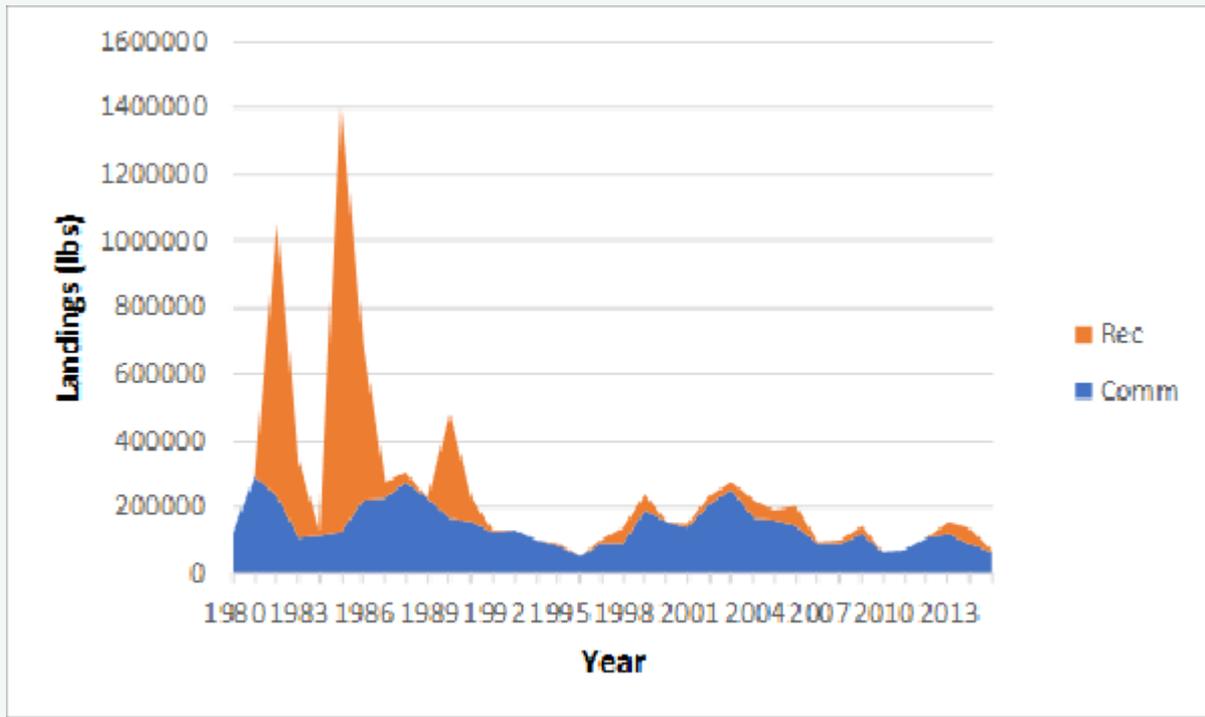


Figure 21 Commercial and recreational harvest of Warsaw grouper from the Gulf of Mexico. From NMFS Sustainable Fishery Division (2017a, 2017b), accessed August 2017.

Gulf of Mexico Warsaw Grouper

Productivity-Susceptibility Analysis:

Scoring Guidelines

1.) Productivity score (P) = average of the productivity attribute scores (p1, p2, p3, p4 (finfish only), p5 (finfish only), p6, p7, and p8 (invertebrates only))

2.) Susceptibility score (S) = product of the susceptibility attribute scores (s1, s2, s3, s4), rescaled as follows:
 $S = [(s1 * s2 * s3 * s4) - 1/40] + 1$.

3.) Vulnerability score (V) = the Euclidean distance of P and S using the following formula: $V = \sqrt{(P^2 + S)^2}$

Productivity Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity	9 (Parker and Mays 1998)	2
Average maximum age	41 (Parker and Mays 1998)	3

Fecundity		
Average maximum size (fish only)	Modeled growth data indicate max size of 163 cm to 239 cm (Froese and Pauly 2017); Maximum observed size of 230 cm (Froese and Pauly 2017)	2
Average size at maturity (fish only)	120 cm estimated from data in (Parker and Mays 1998)	2
Reproductive strategy	Expected to be broadcast spawners (Parker and Mays 1998)	1
Trophic level	4 (Froese and Pauly 2017)	3
Density dependence (invertebrates only)		
Habitat quality	Moderately altered from non-fishing impacts	2
Total Productivity (average)		2.143
Susceptibility Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Areal overlap (Considers all fisheries)	>30% of main geographic range is fished	3
Vertical overlap (Considers all fisheries)		3
Selectivity of fishery (Specific to fishery under assessment)	Although it has not been confirmed for Warsaw grouper, most grouper species are protogynous hermaphrodites (NOAA 2010), which increases susceptibility.	3

Post-capture mortality (Specific to fishery under assessment)	Greater than 90% of captured Warsaw grouper are retained (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013)	3
Total Susceptibility (multiplicative)		3

PSA score for Warsaw grouper in the Gulf of Mexico longline and vertical line fisheries is calculated as follows:

$$\text{Vulnerability (V)} = \sqrt{P^2 + S^2}$$

$$V = \sqrt{2.14^2 + 3.0^2}$$

$$V = 3.69$$

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

High Concern

Several stock assessments of SAFMC snapper-grouper species conducted in the early 1990s indicated that spawning biomass of Warsaw grouper in the US South Atlantic was between 6% and 12% of maximum spawning potential (SAFMC 1993). No assessments have been conducted for Warsaw grouper in recent years, so official biomass status is uncertain (NMFS 2017b). However, IUCN lists the species as "Critically Endangered." Further, the SAFMC has implemented management measures that support a determination of low population levels, such as prohibiting the sale of Warsaw grouper (SAFMC 1993) and establishing spawning special management zones (SAFMC 2016). For these reasons, Warsaw grouper in the US South Atlantic receive a biomass score of "high" concern.

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPEr

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPEr

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPEr

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPEr

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPEr

Moderate Concern

Reported commercial landings for Warsaw grouper in the Gulf of Mexico increased during the 1990s and reached a recent peak of more than 200,000 lb (all gears combined) in the early 2000s (NMFS Fishery Statistics Division 2017a). Since then, reported landings generally declined, and have been below 100,000 lb in 7 of the last 10 years (NMFS Fisheries Statistics Division 2017a). Warsaw grouper are a member of the "deep water grouper" management complex in the Gulf of Mexico, and included in the deepwater grouper IFQ category (NMFS 2016a), so harvest is limited by shares and allocation. NMFS characterizes the complex as not experiencing overfishing (NMFS 2017b). However, no formal stock assessment has ever been conducted for this stock, and no information could be found regarding fishing mortality for Warsaw grouper in the Gulf of Mexico, justifying a fishing mortality score of "moderate" concern.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPEr

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPEr

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPEr

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPEr

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPEr

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

High Concern

There have been no commercial landings reported for Warsaw grouper in the US South Atlantic since 2009 (NMFS Fishery Statistics Division 2017a), and sale of Warsaw grouper is prohibited (SAFMC 1993). No formal stock assessment has been conducted for Warsaw grouper in recent years, but NMFS indicates that overfishing is occurring. For that reason, Warsaw grouper in the US South Atlantic receives a score of "high" concern for fishing mortality.

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

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

≥ 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish longline fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 195 trips and 5,015 sets between 2006 to 2011, the (bait + discards)/landings ratio is 103% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio greater than 100% warrants a Criterion 2 score modifier of 0.75.

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

< 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish vertical line fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 398 trips and 13,827 sets between 2006 and 2011, the (bait + discards)/landings ratio is 37.2% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

≥ 100%

No information could be found to directly calculate the (discards + bait)/landings ratio for the South Atlantic snapper grouper longline fishery. No observer data are available. Harvesters are required to report discard data through the SEFSC Coastal Fishery Logbook Program (NMFS SEFSC 2017a). However, ratios of discards to harvest cannot be calculated from these data because landings are reported in pounds while discards are

reported in numbers of fish (NMFS 2011) (NMFS 2013) (NMFS 2016b). Given the similarities in gear and catch between this region and the Gulf of Mexico longline reef fishery, we use the ratio for the Gulf of Mexico (103%) as a substitute.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the US South Atlantic snapper-grouper vertical line fishery. A pilot observer program conducted from 2007 to 2009 collected information on species composition and disposition (kept or discarded) (GSAFF 2008) (GSAFF 2010). The (bait+discards)/landings ratio uses the total discarded CPUE (all species combined) divided by total retained CPUE. This ratio should be considered a minimum estimate because it does not account for bait needs, nor does it distinguish between species retained for food vs. bait. Based on 2,664 stations sampled between 2007 and 2009, the (bait + discards)/landings ratio is 29.9% (GSAFF 2008) (GSAFF 2010). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

GREATER AMBERJACK

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

High Concern

The most recent benchmark stock assessment indicates that greater amberjack have been overfished in all years since the late 1980s, with terminal year biomass relative to the MSST of $SSB_{2015}/MSST = 0.40$ (SEDAR 2016d). The SSB has been slightly increasing since 2010 but has plateaued in recent years (SEDAR 2016d). Amendment 44 to the Reef Fish FMP redefined (lowered) the MSST to $0.5 * B_{30\%SPR}$, but even with the new biomass threshold, the stock is considered overfished (GMFMC 2016d). Greater amberjack in the GOM were in a 10-year rebuilding plan, but did not achieve the rebuilding target. Therefore a new plan was implemented in January 2016 with a target of rebuilding by 2019 (NMFS 2017b). Due to its overfished status, Seafood Watch deems abundance as a "high" concern.

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

High Concern

$F_{CURRENT}/MFMT=1.68$. Greater amberjack has been undergoing overfishing since 1985 (SEDAR 2016d). Since the species continues to experience overfishing, Seafood Watch deems fishing mortality as a "high" concern.

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

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

< 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish vertical line fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 398 trips and 13,827 sets between 2006 and 2011, the (bait + discards)/landings ratio is 37.2% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

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.

Criterion 3 Summary

Fishery	Management Strategy	Bycatch Strategy	Research and Monitoring	Enforcement	Stakeholder Inclusion	Score
Fishery 1: United States of America / Gulf of Mexico Set longlines United States of America Black grouper	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)
Fishery 2: United States of America / Gulf of Mexico Set longlines United States of America Gag	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)
Fishery 3: United States of America / Gulf of Mexico Set longlines United States of America Red grouper	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)

Fishery 4: United States of America / Gulf of Mexico Set longlines United States of America Scamp	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)
Fishery 5: United States of America / Gulf of Mexico Set longlines United States of America Snowy grouper	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)
Fishery 6: United States of America / Gulf of Mexico Set longlines United States of America Warsaw grouper	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)
Fishery 7: United States of America / Gulf of Mexico Set longlines United States of America Yellowedge grouper	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)
Fishery 8: United States of America / Gulf of Mexico Vertical lines United States of America Black grouper	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)
Fishery 9: United States of America / Gulf of Mexico Vertical lines United States of America Gag	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)
Fishery 10: United States of America / Gulf of Mexico Vertical lines United States of America Red grouper	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)
Fishery 11: United States of America / Gulf of Mexico Vertical lines United States of America Scamp	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)
Fishery 12: United States of America / Gulf of Mexico Vertical lines United States of America Snowy grouper	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)

Fishery 13: United States of America / Gulf of Mexico Vertical lines United States of America Warsaw grouper	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)
Fishery 14: United States of America / Western Central Atlantic Set longlines United States of America Snowy grouper	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)
Fishery 15: United States of America / Western Central Atlantic Set longlines United States of America Yellowedge grouper	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)
Fishery 16: United States of America / Western Central Atlantic Vertical lines United States of America Black grouper	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)
Fishery 17: United States of America / Western Central Atlantic Vertical lines United States of America Gag	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)
Fishery 18: United States of America / Western Central Atlantic Vertical lines United States of America Red grouper	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)
Fishery 19: United States of America / Western Central Atlantic Vertical lines United States of America Scamp	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)
Fishery 20: United States of America / Western Central Atlantic Vertical lines United States of America Snowy grouper	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)

Fishery 21: United States of America / Western Central Atlantic Vertical lines United States of America Yellowedge grouper	Moderately Effective	Moderately Effective	Moderately Effective	Moderately Effective	Highly Effective	Yellow (3.000)
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Criterion 3 Assessment

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 managers 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.

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

Moderately Effective

The original FMP and a comprehensive list of all Amendments, along with a summary of each one, is available on the GMFMC website (GMFMC 2017). Overall, the management strategy implemented by the GMFMC for reef fish is deliberate and appropriate for the species in the complex. Management measures are in place for all species, including minimum sizes, effort control, and season and area closures. All seven grouper species covered by this report, and a number of other species in the reef fish complex, are managed through an IFQ system (NMFS 2016a). Reference points have been established for all species, control rules are in place to minimize overfishing and rebuild overfished stocks as necessary, and there is evidence that management has

been effective for the data rich species. For data poor species, management implementation is hampered due to data deficiencies. Stock status is not known for more than one-third of the species in the complex, but control rules are in place to establish harvest limits that minimize overfishing. For these reasons, Management Strategy and Implementation for GMFMC reef fish receives a score of "moderately effective."

Justification:

The GMFMC reef fish FMP was implemented in 1981 with the objectives to rebuild overfished stocks, implement fishery reporting, protect and expand reef fish habitat, minimize user conflicts, and promote fisheries for underutilized species (GMFMC 1981). Original management measures included establishment of a Special Management Zone (SMZ), gear restrictions and other gear requirements, implementation of possession limits and size limits for certain species, permitting requirements, development of a reporting system to monitor reef fish harvest, and implementation of measures to allow in-season adjustments to management measures (GMFMC 1981). Since initial implementation, and particularly since passage of the Sustainable Fisheries Act in 1997, the GMFMC has actively managed the Gulf of Mexico reef fish fishery to achieve the objectives of federal fisheries management in the US (GMFMC 2017). In particular, the Sustainable Fisheries Act Amendment (GMFMC 1999a) implemented changes to all FMP under the purview of GMFMC to bring management requirements in line with the Sustainable Fisheries Act of 1997, such as specification of overfishing criteria and rebuilding periods, and implementation of measures to address fishery bycatch. This amendment established biological reference points for biomass and fishing mortality for all species in the reef fish FMP (GMFMC 1999a), although several have since been refined (GMFMC 2017).

Following a subsequent reauthorization of the Magnuson Stevens Act (MSA) in 2006, the GMFMC implemented Amendment 30B to establish ACLs and AMs for red grouper and gag, which were considered overfished at the time (GMFMC 2008b). The Generic Annual Catch Limits/Accountability Measures Amendment was later adopted (GMFMC 2011b) for all remaining species and FMP, in order to maintain compliance with federal requirements, although the ACL for gag and red grouper have since been adjusted through the Framework process, based on interim evaluation of the rebuilding process (GMFMC 2017).

In addition to the SMZ established by the original FMP, several other closed areas or seasons have been established to protect spawning aggregations and habitat for reef fish. For example, a regulatory amendment in 1999 implemented a two-month commercial harvest closure for gag, black, and red grouper during the peak gag spawning season, and established the Steamboat Lumps and Madison-Swanson Marine Protected Areas (MPA) (GMFMC 1999b). These regulations were adopted to protect spawning habitat for gag and other reef species in response to an overfishing determination for gag. The MPAs were originally intended to last only four years, but were extended for an additional 6 years by Amendment 21 (GMFMC 2004b) and then indefinitely by Amendment 30B (GMFMC 2008b). Amendment 30B also repealed the two-month closed season, but replaced it with a four-month seasonal closure within a 390 mile² area of known gag spawning habitat. Further, Amendment 19 (GMFMC 2002) established two marine reserves in EEZ portions of the Florida Keys National Marine Sanctuary. All fishing operations and anchoring of fishing vessels is prohibited in these two areas to promote stock rebuilding and improve fishery habitat (GMFMC 2002).

The GMFMC has also addressed overcapitalization in the reef fish fishery through implementation of an Individual Fishing Quota (IFQ) program in Amendment 29 (GMFMC 2008a). Individual shares are available for red grouper and gag, with a provision for converting a small portion of gag shares to either gag or red grouper shares. Multispecies shares are also available for other shallow water grouper, deep water grouper, and tilefish. These species complexes were developed in the Generic ACL/AM Amendment for the purpose of developing multispecies ACLs (GMFMC 2011b). The IFQ program was implemented to minimize overcapacity in order to achieve and maintain optimum yield in the fishery (GMFMC 2008a).

Despite the active and intentional management measures implemented by the GMFMC for the species covered under the reef fish FMP, management is not as effective as it could be, primarily due to data limitations. Of the

31 species managed in the fishery, only 13 have quantitative stock assessments, with an additional 7 species assessed using data-limited approaches (pers. comm., R. Rindone, GMFMC 2018). The remaining 11 have had no assessments completed, so stock status is unknown for these species (pers. comm., R. Rindone, GMFMC 2018), as well as for several of the data limited species which did not pass peer review. Further, a tiered approach for developing ACLs was developed under the generic ACL/AM amendment (GMFMC 2011b), based on the data availability and assessment model used; however, of the 20 species with formal assessments, ACLs for four of the species were developed using an unspecified methodology. Accountability measures are in place to minimize overfishing and promote stock rebuilding where necessary, but the appropriateness of the ACLs for these species is less certain. Finally, the generic ACL/AM amendment established species complexes that allow multispecies ACLs (GMFMC 2011b). The ACL setting process for species assemblages incorporates additional uncertainty than for single species, but interannual variability in species composition of the catch and lack of information on stock status for many species in the assemblage make it difficult to know if harvest is detrimentally affecting any of the stocks.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

Moderately Effective

The original FMP document, as well as a comprehensive list of all Amendments, along with a summary of each one, is available on the SAFMC website (SAFMC 2017b). Overall, the management strategy implemented by the SAFMC for snapper-grouper species is deliberate and appropriate for the species in the complex. Management measures are in place for all species, including minimum sizes, effort control, and season and area closures. Reference points have been established for all species, control rules are in place to minimize overfishing and rebuild overfished stocks as necessary, and there is evidence that management has been effective for the data rich species. For data poor species, management implementation is hampered due to data deficiencies. Stock status is not known for nearly 75% of the species in the complex, but control rules are in place to establish harvest limits that minimize overfishing. For these reasons, management strategy and implementation for SAFMC snapper-grouper receives a score of "moderately effective."

Justification:

The SAFMC Snapper-Grouper Fishery Management Plan was first enacted in 1983 with the goals of addressing observed or predicted overfishing, and improving data collection to support management (SAFMC 1983). Specific measures of the original FMP included minimum size limits, gear and timing restrictions, designation of artificial reefs as Special Management Zones, and authorization of increased data collection efforts (SAFMC 1983). Since initial implementation, and particularly since passage of the Sustainable Fisheries

Act in 1997, the SAFMC has actively managed the South Atlantic snapper-grouper fishery to achieve the objectives of Federal fisheries management in the US (SAFMC 2017b). Management objectives for the SAFMC Snapper-Grouper FMP have been defined as achieving optimum yield (OY) for species that are not overfished or currently in a rebuilding plan (SAFMC 2012), and rebuilding overfished stocks to target biomass in a specified time frame while minimizing socio-economic impacts. Biological reference points for both fishing mortality and stock biomass were established for all species through Amendment 11 (SAFMC 1998), although many of these have since been revised through subsequent amendments based on improved biological information and monitoring, such as Regulatory Amendment 21, which adjusted minimum stock size thresholds (MSST) for a number of species with low natural mortality rates (SAFMC 2014b). Further, control rules and accountability measures that prevent overfishing and allow rebuilding of overfished stocks were first established in Amendment 17B (SAFMC 2017b) for overfished stocks and Amendment 25 (SAFMC 2011b) for stocks not considered to be overfished. Control rules and accountability measures were updated in Amendment 29 (SAFMC 2015b) and are being reviewed during 2017 for possible future updates to improve effectiveness (SAFMC 2017d).

Additional amendments have established spatial and temporal closures to protect snapper-grouper species covered by this FMP. For example, Amendment 14 (SAFMC 2007b) established 8 deep water Marine Protected Areas (MPAs) that prohibited targeting or possession of deep water snapper-grouper species. These species, including snowy grouper, Warsaw grouper, and yellowedge grouper, among others, are particularly vulnerable to overfishing due to slow growth, late maturation, and sequential hermaphroditism. Other area closures include Specialized Management Zones (SMZs) established on artificial reef locations in GA and SC through Regulatory Amendments 7 and 8, respectively (SAFMC 2017b). Amendment 16 (SAFMC 2008) implemented a spawning closure for gag, during January through April. This amendment also prohibited targeting or possession of all species in the shallow water complex (including gag, black grouper, red grouper, and scamp, among others) when the gag quota was met or projected to be met (SAFMC 2009). Regulatory Amendment 15 (SAFMC 2013) removed the provision preventing possession of these other species, but the spawning closure is still in effect.

Despite the active and intentional management measures implemented by the SAFMC for the snapper-grouper complex, management is not as effective as it could be, primarily due to data limitations. To establish harvest limits under Amendment 29, stocks are ranked into one of five levels based on the types of data available and the type of stock assessment model they can support, with increasing levels signifying decreasing data availability (SAFMC 2015b). Level 1 stocks have data to support a full quantitative assessment, while Levels 2 and 3 rely on data limited modeling approaches. Stocks classified as Level 4 or 5 are the most data poor and rely on mostly qualitative criteria to determine harvest levels (SAFMC 2015b). Of the 55 target species covered by the SAFMC snapper-grouper FMP, only 14 are classified as Level 1 stocks, with the remaining 41 stocks classified as either Level 4 or 5 (pers. comm., M. Errigo, SAFMC). No estimates of fishing mortality or stock abundance are available for these stocks, resulting in unknown stock status for the majority of species covered in the FMP. For these species, control rules and accountability measures are in place to establish annual catch targets, but these are generally based on expert judgement rather than quantitative analyses, and their effectiveness is unknown. For species that do have formal stock assessments, new assessments are only conducted once every 8 to 10 years (SEDAR 2017c), which is infrequent for many species, but may be intentional for long lived species like grouper.

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.

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

Moderately Effective

In addition to target species regulations, the GMFMC has taken steps to address bycatch issues in the reef fish fishery. Amendment 18A (GMFMC 2005) established careful release protocols for sea turtles, and Amendment 31 (GMFMC 2010) implemented gear restrictions and season-area closures in the bottom longline fishery to reduce interactions with sea turtles. In addition, a fishery observer program was established in the Gulf of Mexico reef fish fishery through Amendment 22 (GMFMC 2004a) (Scott-Denton et al. 2011). These data indicate that target species (those covered under the reef fish FMP) make up the majority of the catch. Regardless, gears used in the reef fish fishery are non-selective, resulting in bycatch of numerous species, many of which are unassessed. Further, the regulations to reduce interactions with sea turtles appear effective, but no formal analysis has been conducted to quantify the effect. For these reasons, the Gulf of Mexico reef fish fishery receives a score of "moderately effective" for bycatch strategy.

Justification:

Commercial reef fish harvester reporting requirements were implemented in 2001 (50 CFR 622.5), with bycatch reporting requirements for selected harvesters (20% per year) added in August 2001 (GMFMC 2004a). Amendment 22 (GMFMC 2004a) replaced the harvester reporting program with an at-sea observer program. Data collected from this program includes species composition, disposition of the catch, and fish condition (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). Information on interactions with protected species are also recorded. In addition, the SEFSC Coastal Fishery Logbook program also collects harvester-reported information on discards and protected species (NMFS 2011) (NMFS 2013) (NMFS 2016b). Further, Amendment 18A (GMFMC 2005) established careful release protocols for sea turtles incidentally captured by this fishery.

Several reports have been published summarizing the data collected from the observer program in the Gulf of Mexico reef fish fishery (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013), which was implemented in 2006 as a requirement of Amendment 22 to the GMFMC reef fish FMP (GMFMC 2004a) (Scott-Denton et al. 2011). Proportional coverage of the fishery is not reported by gear, but sampling effort (number of trips sampled) was proportional to fishing effort (sea days), stratified by season, gear, and region, with overall coverage increasing from 1.4% during 2006 to 2009, to 5.4% for 2010 and 2011 (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). Updated data on catch composition for the years 2012 to 2016 were obtained for this report (pers. comm., E. Scott-Denton, NMFS 2018). In the reef fish longline fishery, species covered under the reef fish FMP accounted for approximately 87.7% of the total catch based on the recently obtained data. The remaining 13.3% was composed of 172 species, although 27 of these species were seen only once in the five years of sampling, and an additional 45 species were only seen 2 to 5 times in those years (pers. comm., E. Scott-Denton, NMFS 2018). Cuban dogfish and Atlantic sharpnose shark had the

highest proportion of the total catch (1.6% each) for species not included in the FMP (pers. comm., E. Scott-Denton, NMFS 2018). Data from 2012 to 2016 provided for this report do not break down catch by disposition, but data from a previous report indicate that target species make up between 93.0% of retained catch and 83.1% of discarded catch (Scott-Denton and Williams 2013). Landings data from the SEFSC Trip Interview Program (TIP) (pers. comm., L. Beerkircher, NMFS 2018), and discard data from the SEFSC Coastal Fishery Logbook program (NMFS 2016b) corroborate that species in the reef fish FMP constitute the vast majority (>85%) of the harvest and discards in the longline fishery. Unfortunately, many of the species captured in this fishery, both targeted and non-targeted, do not have formal stock assessments, so acceptable harvest rates are unknown.

Little information is available regarding interactions with marine mammals in this fishery, but interactions with these species are considered to be low. No interactions were reported in the Coastal Fishery Logbook program (NMFS 2013) (NMFS 2016b) or the 2010 to 2011 observer program (Scott-Denton et al. 2011), but the 2017 List of Fisheries (NMFS 2017c) indicates that snapper-grouper fisheries (hook and line and bottom longline) in the South Atlantic, Gulf of Mexico and Caribbean collectively interact with greater than 5,000 bottlenose dolphin, yet still receives a Tier III rating by NMFS, indicating little potential harm to the population.

A biological opinion (BiOp) developed for the reef fish fishery under Section 7 of the Endangered Species Act anticipated 116 sea turtle interactions by the bottom longline fishery over three years (GMFMC 2010), but a number of reports released in 2008 and 2009 using observer and other monitoring data estimated actual interactions greatly exceeded the allowable levels. For example, a report released in 2009 estimated there were 967 sea turtle interactions in the longline fishery over a 30-month period (GMFMC 2010). In response, the GMFMC adopted Amendment 31, which established a seasonal closed area (inshore of 35 fathoms from June to August) to reduce the number of sea turtle interactions in this fishery (GMFMC 2010). Data from the coastal fishery logbook program suggest that the measures are working. More than 25 interactions were reported through the logbook program in 2010 and 2011 (NMFS 2013), and this number declined to only 12 in 2012 and 2013 (NMFS 2016b). However, no formal analysis could be found to confirm the effectiveness of these management measures.

Bycatch in the Gulf of Mexico reef fish longline fishery includes a wide range of species, including marine mammals, sea turtles, and numerous fish species. Measures are in place to monitor bycatch issues, and regulations have been implemented to reduce interactions with sea turtles. However, uncertainty remains regarding the effectiveness of some these measures for unassessed species and sea turtles.

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

Moderately Effective

In addition to target species regulations, the GMFMC has taken steps to address bycatch issues in the reef fish fishery. In particular, a fishery observer program was established in the Gulf of Mexico reef fish fishery through Amendment 22 (GMFMC 2004a) (Scott-Denton et al. 2011). These data indicate that target species (those covered under the reef fish FMP) make up the majority of the catch. Further, Amendment 18A (GMFMC 2005)

established careful release protocols for sea turtles. Regardless, gears used in the reef fish fishery are non-selective, resulting in bycatch of numerous species, many of which are unassessed, resulting in uncertainty in appropriate harvest rates. For this reason, the Gulf of Mexico reef fish fishery receives a score of "moderately effective" for bycatch strategy.

Justification:

Commercial reef fish harvester reporting requirements were implemented in 2001 (50 CFR 622.5), with bycatch reporting requirements for selected harvesters (20% per year) added in August 2001 (GMFMC 2004a). Amendment 22 (GMFMC 2004a) replaced the harvester reporting program with an at-sea observer program. Data collected from this program includes species composition, disposition of the catch, and fish condition (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). Information on interactions with protected species are also recorded. In addition, the SEFSC Coastal Fishery Logbook program also collects harvester-reported information on discards and protected species (NMFS 2011) (NMFS 2013) (NMFS 2016b). Further, Amendment 18A (GMFMC 2005) established careful release protocols for sea turtles incidentally captured by this fishery.

An observer program in the Gulf of Mexico reef fish fishery was implemented in 2006 as a requirement of Amendment 22 to the GMFMC reef fish FMP (GMFMC 2004a) (Scott-Denton et al. 2011). Several reports have been published summarizing the data collected from this program, such as catch composition, disposition, and condition (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). Proportional coverage of the fishery is not reported by gear, but sampling effort (number of trips sampled) was proportional to fishing effort (sea days), stratified by season, gear, and region, with overall coverage increasing from 1.4% during 2006 to 2009, to 5.4% for 2010 and 2011 (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). Updated data on catch composition for the years 2012 to 2016 were obtained for this report (E. Scott-Denton, NMFS, pers comm). According to these data, species covered under the reef fish FMP accounted for approximately 92.5% of the total catch in the reef fish handline fishery (pers. comm., E. Scott-Denton, NMFS). The remaining 7.5% was composed of 218 species, although 51 of these species were seen only once in the five years of sampling, and an additional 53 species were only seen 2 to 5 times in those years. White grunt had the highest proportion of the total catch (1.1%) for species not included in the FMP (pers. comm., E. Scott-Denton, NMFS). Data from 2012 to 2016 provided for this report do not break down catch by disposition, but data from a previous report indicate that target species make up between 81.7% of retained catch and 90.1% of discarded catch (Scott-Denton and Williams 2013). Landings data from the SEFSC Trip Interview Program (TIP) (pers. comm., L. Beerkircher, NMFS) and discard data from the SEFSC Coastal Fishery Logbook program (NMFS 2016b) corroborate that species in the reef fish FMP constitute the vast majority (>85%) of the harvest and discards in the hand line fishery. Unfortunately, many of the species captured in this fishery, both targeted and non-targeted, do not have formal stock assessments, so acceptable harvest rates are unknown.

Little information is available regarding interactions with marine mammals in this fishery, but interactions with these species are considered to be low. No interactions were reported in the Coastal Fishery Logbook program (NMFS 2013) (NMFS 2016b) or the 2010–2011 observer program (Scott-Denton and Williams 2013), but the 2017 List of Fisheries (NMFS 2017c) indicates that snapper-grouper fisheries (hook and line and bottom longline) in the South Atlantic, Gulf of Mexico and Caribbean collectively interact with greater than 5,000 bottlenose dolphin, but still receive a Tier III rating from NMFS, indicating little potential harm to the population.

A biological opinion (BiOp) developed under Section 7 of the Endangered Species Act identified a number of marine mammal and sea turtle species that may be encountered in the Gulf of Mexico reef fish fishery. The BiOp determined there was no impact to marine mammals (GMFMC 2010), and developed a list of anticipated take over a three year period for the fishery, by gear (e.g., see Table 1.1.1 from GMFMC 2010). In 2008, a report was published using available observer and other monitoring data that found sea turtle interactions in the hand line fishery were in line with the anticipated take, and was not excessive (GMFMC 2010). The BiOp

allows 98 sea turtle takes over a three year period (GMFMC 2010). Scott-Denton and Williams (2013) reported zero turtle interactions on 54 observed trips during 2010–2011. Harvesters reported an average of 26.5 interactions with sea turtles per year during 2006 to 2008, and 81 interactions in 2012, based on data in the coastal fishery logbook program (NMFS 2013) (NMFS 2016b). No turtles were reported in the logbook data from this fishery in any other year between 2006 and 2013 (NMFS 2013) (NMFS 2016b). NMFS has not issued any statement that this level of take is unacceptable.

Bycatch in the Gulf of Mexico reef fish vertical line fishery includes a wide range of species, including marine mammals, sea turtles, and numerous fish species. Measures are in place to monitor bycatch issues, and regulations have been implemented to reduce interactions with sea turtles. However, uncertainty remains regarding the effectiveness of these measures for unassessed and sensitive species.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

Moderately Effective

No observer data are available for the South Atlantic snapper-grouper longline fishery, so the level of bycatch in this fishery can not be quantified. Harvester data collected from the TIP sampling indicate that snapper-grouper species account for approximately 85% of the harvest in weight (pers. comm., L. Beerkircher, NMFS), but only approximately 7.6% of the discarded fish by number based on the coastal fishery logbooks from 2011 to 2013 (NMFS 2016b). Smooth dogfish made up nearly 47% of the discards, while other cartilaginous species made up an additional 32.1%. Hakes (unclassified), which accounted for 9.4% of the discards, were the most prevalent of bony fishes (NMFS 2016b).

Little information is available regarding interactions with protected species, such as sea turtles and marine mammals, in this fishery, but interactions with these species are considered to be low. Harvesters reporting through the coastal fishery logbook program identified 52 and 107 interactions with sea turtles in 2011 and 2012, respectively (NMFS 2016b). No turtles were reported from this fishery in any other year between 2006 and 2013 (NMFS 2013) (NMFS 2016b), but it is unclear if this indicates there were no interactions, or harvesters did not report their interactions. No information is available for marine mammal interactions for this fishery specifically (no interactions reported in the Coastal Fishery Logbook program) (NMFS 2013) (NMFS 2016b), but the 2017 List of Fisheries (NMFS 2017c) indicates that snapper-grouper fisheries (hook and line and bottom longline) in the South Atlantic, Gulf of Mexico, and Caribbean collectively interact with greater than 5,000 bottlenose dolphin, but still receive a Tier III rating from NMFS, indicating little potential harm to the population.

To address potential concerns with bycatch levels, the SAFMC adopted Amendment 15B, which developed a plan to monitor and assess bycatch in the snapper-grouper fisheries (SAFMC 2008). The plan utilizes the Atlantic Coastal Cooperative Statistics Program (ACCSP) Release, Discard, and Protected Species module, which includes several quantitative and qualitative data collection methods to monitor bycatch (ACCSP 2012). Unfortunately, this program has not received sufficient funding for comprehensive implementation. In the meantime, the SAFMC will use a variety of methods to collect bycatch information, such as logbooks, observers, and video monitoring (SAFMC 2008). For example, the SEFSC Coastal Fisheries Logbook program collects discard information from select fishermen within the US South Atlantic snapper-grouper fishery (NMFS SEFSC 2017a).

Amendment 15B also implemented requirements for handling and release of smalltooth sawfish and sea turtles from the snapper-grouper hook and line fishery (SAFMC 2008).

Bycatch of non-target (non snapper-grouper) species can not be quantified directly, but likely exceeds the 5% level required for a highly effective classification. In addition, the bycatch monitoring program adopted by SAFMC has not been fully implemented due to funding constraints. Finally, measures are in place to minimize the impacts of incidental takes on sea turtles, but their effect is unquantified. For these reasons, the bycatch strategy for the South Atlantic snapper-grouper hand line fishery receives a score of "moderately effective."

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

Moderately Effective

Although there is no standardized observer program for the SAFMC snapper-grouper handline fishery, a pilot observer program was conducted in this fishery during 2007 to 2009 (GSAFF 2008) (GSAFF 2010). Data from all years showed that species included in the snapper-grouper FMP accounted for approximately 93.6% of the total catch (kept plus discards) in numbers (GSAFF 2008) (GSAFF 2010). The remaining catch was composed of 61 non-target species, with the most common non-target species (Atlantic sharpnose shark) accounting for only 2.2% of the total catch. The proportion of total catch that was discarded varied by season and area (GSAFF 2008), but overall accounted for approximately 23% of the total catch numerically. Species managed under the snapper-grouper FMP made up over 97% of the retained catch and approximately 80% of the discarded catch (GSAFF 2008) (GSAFF 2010). Landings data from the SEFSC Trip Interview Program (TIP) (pers. comm., L. Beerkircher, NMFS) and discard data from the SEFSC Coastal Fishery Logbook program (NMFS 2013) (NMFS 2016b) corroborate that snapper-grouper species constitute the vast majority of the harvest and discards in the hand line fishery.

Little information is available regarding interactions with protected species, such as sea turtles and marine mammals, in this fishery, but interactions with these species are considered to be low. The pilot observer program collected information on sea turtle interactions, but the data were not reported in the final report (GSAFF 2008). Harvesters reported 56 interactions with sea turtles in 2007 and 215 in 2012 (NMFS 2013) (NMFS 2016b). No turtles were reported from this fishery in any other year between 2006 and 2013 (NMFS 2013) (NMFS 2016b), but it is unclear if this indicates there were no interactions, or harvesters did not report their interactions. No information is available for marine mammal interactions for this fishery specifically (no interactions reported in the Coastal Fishery Logbook program) (NMFS 2013) (NMFS 2016b), but the 2017 List of Fisheries (NMFS 2017c) indicates that snapper-grouper fisheries (hook and line and bottom longline) in the South Atlantic, Gulf of Mexico, and Caribbean collectively interact with greater than 5,000 bottlenose dolphin, but still receive a Tier III rating from NMFS, indicating little potential harm to the population.

To address potential concerns with bycatch levels, the SAFMC adopted Amendment 15B which developed a plan to monitor and assess bycatch in the snapper-grouper fisheries (SAFMC 2008). The plan utilizes the Atlantic Coastal Cooperative Statistics Program (ACCSP) Release, Discard, and Protected Species module, which includes several quantitative and qualitative data collection methods to monitor bycatch (ACCSP 2012). Unfortunately, this program has not received sufficient funding for comprehensive implementation. In the

meantime, the SAFMC will use a variety of methods to collect bycatch information, such as logbooks, observers, and video monitoring (SAFMC 2008). For example, the SEFSC Coastal Fisheries Logbook program collects discard information from select fishermen within the US South Atlantic snapper-grouper fishery (NMFS SEFSC 2017a).

Amendment 15B also implemented requirements for handling and release of smalltooth sawfish and sea turtles from the snapper-grouper hook and line fishery (SAFMC 2008).

Bycatch of non-target (non snapper-grouper) species is low, but exceeds the 5% level required for a "highly effective" classification. In addition, the bycatch monitoring program adopted by SAFMC has not been fully implemented due to funding constraints. Finally, measures are in place to minimize the impacts of incidental takes on sea turtles, but their effect is unquantified. For these reasons, the bycatch strategy for the South Atlantic snapper-grouper hand line fishery receives a score of "moderately effective."

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.

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

Moderately Effective

This report covers seven grouper species that occur in the Gulf of Mexico reef fish longline fishery, including four shallow water species (black grouper, gag, red grouper, and scamp) and three deep water species (snowy grouper, Warsaw grouper, and yellowedge grouper). A list of completed and planned projects is available on the SEDAR projects website (SEDAR 2017c). "Data rich" stock assessments, which incorporate species biological information, total harvest, and population abundance trends, have been peer reviewed through the SEDAR process for two of the species (gag and red grouper) within the last five years, while snowy grouper was evaluated using data limited approaches (SEDAR 2017c). Yellowedge grouper has also been peer reviewed, but the most recent assessment includes data only through 2009. A fifth species (black grouper) was most recently assessed in 2010, and was scheduled for stock assessment in 2017 (SEDAR 2017c), but has been delayed due to possible misidentification in early commercial landings (pers. comm., J. Byrd, SEDAR 2018). No peer reviewed assessments have been conducted for scamp or Warsaw grouper.

Harvest information is collected for all species in the GMFMC reef fish fishery through the Southeast Fishery Science Center (SEFSC) Coastal Fisheries Logbook program (NMFS SEFSC 2017a). This mandatory program was initiated in 1990 to quantify harvest in the fishery. In addition, biological samples are collected from the

fishery through the SEFSC Trip Interview Program (NMFS SEFSC 2017b). Harvest information and biological data are key components in stock assessments. Further, annual harvest levels are set using harvest control rules and accountability measures established by the GMFMC to minimize the risk of overfishing and allow rebuilding of overfished stocks (GMFMC 2011b).

Bycatch monitoring in the Gulf of Mexico program is conducted using both a logbook program and an observer program. A supplementary form in the Coastal Fishery Logbook Program (NMFS SEFSC 2017a) collects information on discards from a subset of fishers in the Gulf of Mexico reef fish fishery. In addition, Amendment 22 to the Reef Fish FMP (GMFMC 2004a) approved an observer program in the Gulf of Mexico reef fish fishery. The program was implemented in July 2006 (Scott-Denton et al. 2011) and has been running ever since. Data summaries (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013) provide information on species composition and fish condition for multiple dispositions (harvest, discard alive, discard dead, bait, and unknown).

The Gulf of Mexico reef fish longline fishery would receive a score of "highly effective" for the species that have undergone recent peer reviewed stock assessment. However, because several of the species in the fishery do not have recent peer reviewed assessments, the Gulf of Mexico longline fishery receives a score of "moderately effective" for scientific research and monitoring.

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

Moderately Effective

This report covers six grouper species that occur in the Gulf of Mexico reef fish handline fishery, including four shallow water species (black grouper, gag, red grouper, and scamp) and two deep water species (snowy grouper and Warsaw grouper). A list of completed and planned projects is available on the SEDAR projects website (SEDAR 2017c). "Data rich" stock assessments, which incorporate species biological information, total harvest, and population abundance trends, have been peer reviewed through the SEDAR process for two of the species (gag and red grouper) within the last five years, while snowy grouper was evaluated using data limited approaches (SEDAR 2017c). A fourth species (black grouper) was most recently assessed in 2010; it was scheduled for stock assessment in 2017 (SEDAR 2017c), but has been delayed due to possible misidentification in early commercial landings. No peer reviewed assessments have been conducted for scamp or Warsaw grouper.

Harvest information is collected for all species in the GMFMC reef fish fishery through the Southeast Fishery Science Center (SEFSC) Coastal Fisheries Logbook program (NMFS SEFSC 2017a). This mandatory program was initiated in 1990 to quantify harvest in the fishery. In addition, biological samples are collected from the fishery through the SEFSC Trip Interview Program (NMFS SEFSC 2017b). Harvest information and biological data are key components in stock assessments. Further, annual harvest levels are set using harvest control rules and accountability measures established by the GMFMC to minimize the risk of overfishing and allow rebuilding of overfished stocks (GMFMC 2011b).

Bycatch monitoring in the Gulf of Mexico program is conducted using both a logbook program and an observer program. A supplementary form in the Coastal Fishery Logbook Program (NMFS SEFSC 2017a) collects information on discards from a subset of fishers in the Gulf of Mexico reef fish fishery. In addition, Amendment 22 to the Reef Fish FMP (GMFMC 2004a) approved an observer program in the Gulf of Mexico reef fish fishery. The program was implemented in July 2006 (Scott-Denton et al. 2011) and has been running ever since. Data summaries (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013) provide information on species composition and fish condition for multiple dispositions (harvest, discard alive, discard dead, bait, and unknown).

The Gulf of Mexico reef fish handline fishery would receive a score of "highly effective" for the species that have undergone recent peer reviewed stock assessment. However, because several of the species in the fishery do not have recent peer reviewed assessments, the Gulf of Mexico handline fishery receives a score of "moderately effective" for scientific research and monitoring.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

Moderately Effective

This report covers only two species in the South Atlantic longline fishery for snapper-grouper: snowy grouper and yellowedge grouper. A peer-reviewed stock assessment was conducted for snowy grouper in 2013 through the SEDAR process (SEDAR 2013a), but no peer-reviewed assessments are available for yellowedge grouper in the US South Atlantic, including those that use data-limited methods.

Harvest information is collected for all species in the SAFMC snapper-grouper fishery through the Southeast Fishery Science Center (SEFSC) Coastal Fisheries Logbook program (NMFS SEFSC 2017a). This mandatory program was initiated in 1992 to quantify harvest in the fishery. In addition, biological samples are collected from the fishery through the SEFSC Trip Interview Program (NMFS SEFSC 2017b). Harvest information and biological data are key components in stock assessments. Further, annual harvest levels are set using harvest control rules and accountability measures established by the SAFMC to minimize the risk of overfishing and allow rebuilding of overfished stocks (SAFMC 2011b).

The SAFMC approved implementation of a comprehensive bycatch monitoring program through Amendment 15B, but this program has yet to be fully funded (SAFMC 2008). Information on discards is collected from a rotating subset of fishermen through the Coastal Fisheries Logbook program (NMFS SEFSC 2017a), but there is currently no observer coverage or other comprehensive bycatch monitoring program in place for the longline fishery.

Harvest levels are set using established criteria, and harvest information is collected for all species in this fishery. Some discard information is collected from this fishery, but there is no comprehensive bycatch monitoring program. Only one of the two species in this fishery covered by this report has undergone formal stock assessment. For these reasons, the South Atlantic snapper-grouper longline fishery receives a score of "moderately effective" for scientific research and monitoring.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

Moderately Effective

This report covers six South Atlantic grouper species that occur in the snapper-grouper handline fishery, including four shallow water species (gag, black grouper, red grouper, and scamp) and two deep water species (snowy grouper and yellowedge grouper). A list of completed and planned stock assessments is available on the SEDAR projects website (SEDAR 2017c). Peer reviewed stock assessments, which incorporate species' biological information, total harvest, and population abundance trends, have been conducted through the SEDAR process for three of the species (red grouper, snowy grouper, and gag) within the last five years (SEDAR 2017c). A fourth species (black grouper) was most recently assessed in 2010; it was scheduled for stock assessment in 2017 (SEDAR 2017c), but has been delayed due to possible misidentification in early commercial landings (pers. comm., J. Byrd, SEDAR). No peer reviewed assessments have been conducted for scamp or yellowedge grouper. Data from a pilot observer program (GSAFF 2008) (GSAFF 2010) and the TIP harvest data (pers. comm., L. Beerkircher, NMFS) indicate scamp is one of the primary grouper species in the total catch and harvest in this fishery.

Harvest information is collected for all species in the SAFMC snapper-grouper fishery through the Southeast Fishery Science Center (SEFSC) Coastal Fisheries Logbook program (NMFS SEFSC 2017a). This mandatory program was initiated in 1992 to quantify harvest in the fishery. In addition, biological samples are collected from the fishery through the SEFSC Trip Interview Program (NMFS SEFSC 2017b). Harvest information and biological data are key components in stock assessments. Further, annual harvest levels are set using harvest control rules and accountability measures established by the SAFMC to minimize the risk of overfishing and allow rebuilding of overfished stocks (SAFMC 2011b).

The SAFMC approved implementation of a comprehensive bycatch monitoring program through Amendment 15B, but this program has yet to be fully funded (SAFMC 2008). Information on discards is collected from a rotating subset of fishermen through the Coastal Fisheries Logbook program (NMFS SEFSC 2017c), and a pilot observer program was conducted from 2007 to 2009 to characterize catch and discards in the snapper-grouper handline fishery (GSAFF 2008) (GSAFF 2010); however, there is currently no observer coverage or other comprehensive bycatch monitoring program in place for this fishery.

Harvest levels are set using established criteria, and harvest information is collected for all species in this fishery. Recent assessments are available for most of the primary grouper species in this fishery. However, not all species covered in this report have been assessed, including one of the primary species. Some bycatch information is collected, but there is no comprehensive bycatch monitoring program. For these reasons, the South Atlantic snapper-grouper handline fishery receives a score of "moderately effective" for scientific research and monitoring.

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.

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

Moderately Effective

Enforcement of fishery management measures in Federal waters or for federally permitted harvesters or dealers is under the purview of NOAA Office of Law Enforcement (OLE), with established partnerships with state agencies, the US Coast Guard, and other entities (NOAA Office of Law Enforcement 2017a). The OLE Southeastern Division, which comprises the eight coastal states from North Carolina to Texas, plus Puerto Rico and the US Virgin Islands, is monitored by 34 full time enforcement agents (NOAA Office of Law Enforcement 2017b). Priorities for the Southeastern Division include monitoring of closed areas and seasons, dealer misreporting of overfished species, and tracking of IFQ species harvest (NOAA Office of Law Enforcement 2017c).

Beginning in 1990, the SEFSC Coastal Fishery Logbook program requires mandatory harvest reporting for all participants in the GMFMC reef fish fishery. Compliance is tracked by SEFSC, and failure to report or falsification of information is subject to civil or criminal penalties (NMFS 2016c). Amendment 18A (GMFMC 2005) requires all vessels in the reef fish fishery to be equipped with an onboard vessel monitoring system (VMS) to assist with monitoring of closed area regulations. Landings of IFQ managed species are required to be reported through the IFQ reporting system, and IFQ dealers have been required to submit electronic dealer reports since 2010. This expanded to all federally permitted dealers in 2014 (NMFS 2015a). No information is available on reporting compliance rate for these programs. The IFQ program also includes other regulations to assist with law enforcement, such as notifying NMFS before leaving and prior to returning to port, tracking of vessels using VMS, and restricting offload to certain hours (NMFS 2016a).

Enforcement priorities are established and reviewed on a regular basis for the OLE Southeastern Division, which includes the Gulf of Mexico. Appropriate monitoring measures are in place for all management requirements, such as harvest limits and closed areas, but overall compliance rates are unknown. For these

reasons, the Gulf of Mexico reef fish hand line and longline fisheries receive an enforcement score of "moderately effective."

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

Moderately Effective

Enforcement of fishery management measures in Federal waters or for federally permitted harvesters or dealers is under the purview of NOAA Office of Law Enforcement (OLE), with established partnerships with state agencies, the US Coast Guard, and other entities (NOAA Office of Law Enforcement 2017a). The OLE Southeastern Division, which comprises the eight coastal states from North Carolina to Texas, plus Puerto Rico and the US Virgin Islands, is monitored by 34 full time enforcement agents (NOAA Office of Law Enforcement 2017b). Priorities for the southeastern division include monitoring of closed areas and seasons, dealer misreporting of overfished species, and tracking of IFQ species harvest (NOAA Office of Law Enforcement 2017c).

Beginning in 1992, the SEFSC Coastal Fishery Logbook program requires mandatory harvest reporting for all participants in the SAFMC snapper-grouper fishery. Compliance is tracked by SEFSC, and failure to report or falsification of information is subject to civil or criminal penalties (NMFS 2016c). Beginning in 2014, commercial snapper-grouper dealers in the southeast region are required to report all purchases for these species electronically. No information is available on reporting compliance rate for either of these programs. A pilot test of electronic logbooks was initiated for the South Atlantic and Gulf of Mexico in 2014, but is not specific to the snapper-grouper fishery.

In 2010, a pilot program was conducted in the snapper-grouper vertical line fishery to evaluate the use of onboard electronic monitoring systems. The report found that EM provided reliable information on total catch (numbers of fish) and discard (number and species), but improvements to the system were needed to better capture overall species composition and size/age structure of the catch (Baker 2012). Amendment 30 to the Snapper-Grouper FMP proposed the requirement for vessel monitoring systems on all snapper-grouper vessels to increase scientific monitoring and enforcement capabilities. In particular, the SAFMC noted that VMS would improve monitoring of closed areas. However, Amendment 30 was never approved by SAFMC (SAFMC 2017b), and VMS is not required for the snapper-grouper fishery.

Enforcement measures are in place, and enforcement priorities are established and reviewed on a regular basis. Appropriate monitoring measures are in place, but overall compliance rates are unknown. Methods to improve monitoring of closed areas, a Southeastern Division enforcement priority, was proposed but never

implemented. For these reasons, the South Atlantic snapper-grouper hand line and longline fisheries receive an enforcement score of "moderately effective."

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.

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

Highly Effective

Federal fishery management through the regional Councils is a cooperative process that involves agency (state, federal, and territorial) fishery management officials, commercial and recreational stakeholders, and other interested parties with sufficient knowledge of fisheries science and management (NMFS 2015b). National operational guidelines are established and reviewed on a regular basis to guide the Councils on the development, implementation, and review of federal fishery regulations (NMFS 2015b). Each regional council expands on these through regional operating agreements (GMFMC 2016) (SAFMC 2014d). At the national level, one of the primary goals of the operational guidelines is to "Promote a timely, effective, and transparent public process for development of federal fishery management measures pursuant to the MSA" (NMFS 2015b). Objectives to achieve this transparency and public participation include promoting public accessibility to the process, providing a constructive and effective public input process, and providing mechanisms for stakeholders to track progress of the decision making process.

Adherence to these guidelines is apparent in several aspects of each of the Councils covered under this report. In addition to their required state and federal agency representatives, the SAFMC and GMFMC have eight and eleven voting members, respectively, who are selected from industry or other stakeholder organizations (NMFS 2017a). This makeup ensures industry and public input is incorporated into management decisions and allows an avenue to address user conflicts. Transparency is achieved through the Council websites (GMFMC 2017) (SAFMC 2017b), where all fishery management plans, as well as plan amendments (both completed and under development) are available to the public. Prior to final decision making, the Council receives technical and stakeholder input through the Scientific and Statistical Committee and the species Advisory Panel (NMFS 2017a). The GMFMC also has several ad hoc advisory panels for certain key issues (GMFMC 2017). With few exceptions, all council meetings are open to the public, with the agenda (and often all meeting materials) made publicly available prior to the meeting, and opportunity for public comment during the meeting (NMFS 2017a). Councils must also allow public comment periods for any proposed regulations, including both written comments and in-person public hearings. Finally, following approval by a council, NMFS publishes draft regulations through the Federal Register, allowing an additional 60-day public comment period prior to final approval through NMFS (NMFS 2015c).

In addition to the management process through the Councils, the NMFS Southeast Regional Office (SERO) produces several products intended to improve stakeholder engagement and inclusion. These include fishery bulletins, IFQ annual reports, and a Catch Share newsletter, all of which can be found on the SERO website (sero.nmfs.noaa.gov).

The makeup of Council voting membership, transparency in the process, cooperation between managers, scientists, and user groups, and the numerous opportunities to incorporate public and stakeholder participation in the management process meet all the requirements for a score of "highly effective" for stakeholder inclusion.

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

Region / Method	Gear Type and Substrate	Mitigation of Gear Impacts	EBFM	Score
United States of America / Gulf of Mexico / Set longlines / United States of America / Scamp	2	+0.5	Moderate Concern	Yellow (2.739)
United States of America / Gulf of Mexico / Set longlines / United States of America / Yellowedge grouper	2	+0.5	Moderate Concern	Yellow (2.739)
United States of America / Gulf of Mexico / Set longlines / United States of America / Black grouper	2	+0.5	Moderate Concern	Yellow (2.739)
United States of America / Gulf of Mexico / Set longlines / United States of America / Red grouper	2	+0.5	Moderate Concern	Yellow (2.739)
United States of America / Gulf of Mexico / Set longlines / United States of America / Snowy grouper	2	+0.5	Moderate Concern	Yellow (2.739)
United States of America / Gulf of Mexico / Set longlines / United States of America / Warsaw grouper	2	+0.5	Moderate Concern	Yellow (2.739)
United States of America / Gulf of Mexico / Vertical lines / United States of America / Scamp	4	0	Moderate Concern	Green (3.464)

United States of America / Gulf of Mexico / Vertical lines / United States of America / Snowy grouper	4	0	Moderate Concern	Green (3.460)
United States of America / Gulf of Mexico / Set longlines / United States of America / Gag	2	+0.5	Moderate Concern	Yellow (2.739)
United States of America / Gulf of Mexico / Vertical lines / United States of America / Gag	4	0	Moderate Concern	Green (3.464)
United States of America / Gulf of Mexico / Vertical lines / United States of America / Warsaw grouper	4	0	Moderate Concern	Green (3.460)
United States of America / Gulf of Mexico / Vertical lines / United States of America / Black grouper	4	0	Moderate Concern	Green (3.464)
United States of America / Gulf of Mexico / Vertical lines / United States of America / Red grouper	4	0	Moderate Concern	Green (3.464)
United States of America / Western Central Atlantic / Vertical lines / United States of America / Black grouper	4	0	Moderate Concern	Green (3.464)
United States of America / Western Central Atlantic / Vertical lines / United States of America / Red grouper	4	0	Moderate Concern	Green (3.464)
United States of America / Western Central Atlantic / Vertical lines / United States of America / Scamp	4	0	Moderate Concern	Green (3.464)
United States of America / Western Central Atlantic / Vertical lines / United States of America / Snowy grouper	4	0	Moderate Concern	Green (3.464)
United States of America / Western Central Atlantic / Vertical lines / United States of America / Yellowedge grouper	4	0	Moderate Concern	Green (3.464)
United States of America / Western Central Atlantic / Vertical lines / United States of America / Gag	4	0	Moderate Concern	Green (3.464)
United States of America / Western Central Atlantic / Set longlines / United States of America / Snowy grouper	2	+0.5	Moderate Concern	Yellow (2.739)
United States of America / Western Central Atlantic / Set longlines / United States of America / Yellowedge grouper	2	+0.5	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 - Physical Impact of Fishing Gear on the Habitat/Substrate

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

2

Due to the biology and habitat preferences of the target species, these fisheries operate over, or in close proximity to, sensitive habitat such as coral reefs or outcrops and other live-bottom habitats. Longline gear are in contact with the substrate, which may negatively impact sensitive habitats. Longline gear in the snapper-grouper and reef fish fisheries therefore receive a score of 2 out of 5.

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

4

Due to the biology and habitat preferences of the target species, the handline fisheries operate over, or in close proximity to, sensitive habitat such as coral reefs or outcrops and other live bottom habitats. Handline gear generally have minimal to no impact on habitat or the substrate. However, due to their proximity to sensitive habitat types, handline gear in the snapper-grouper and reef fish fisheries receive a score of 4 out of 5.

Factor 4.2 - Modifying Factor: Mitigation of Gear Impacts

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

+0.5

The GMFMC reef fish FMP and subsequent amendments have established management measures that protect coral and hard bottom habitats necessary to many species managed through this plan. The original FMP established a "stressed area" akin to a specialized management zone (SMZ) within which several bottom damaging gears, including fish traps and rollerhead trawls, were prohibited (GMFMC 1981). The intent of this

gear restriction was to prevent further damage from these gears and allow regrowth in areas previously affected. Amendment 1 extended the boundaries of the stressed area and also implemented restrictions on the use of bottom longline gear in inshore areas (GMFMC 1989). Although the longline restrictions were not specifically intended for habitat protection, their implementation protected large areas of nearshore waters where coral and live bottom habitats are common. A regulatory amendment in 1999 created the Steamboat Lumps and Madison-Swanson marine reserves which prohibited fishing with any gear within the combined 219-mi² reserves (GMFMC 1999b). The reserves were originally created for a limited time, but their duration was extended through Amendment 21 (GMFMC 2004b), and made permanent through Amendment 30B (GMFMC 2008b). Additional closed areas were established through Amendment 19 (GMFMC 2002), which developed the Tortugas Ecological Reserves and prohibited all fishing activity and anchoring within the reserves.

In addition to the habitat protection measures implemented through the reef fish FMP, a number of beneficial measures have been implemented through other means. In particular, the joint GMFMC/SAFMC Fishery Management Plan for Coral and Coral Reefs (GMFMC 1982) established three Coral habitat areas of particular concern (HAPC) within the Gulf of Mexico where fishing with certain bottom tending gear (including longlines) is prohibited. The Coral FMP also prohibits the harvest of stony corals and most gorgonian corals. Subsequent amendments to the plan also address harvest of live rock.

Although the proportion of protected areas relative to fishable areas could not be quantified for this report, the system of managed areas (HAPC, MPA, SMZ) appears to comprise a substantial component of the fishing area. Collectively, the inshore stressed area, marine reserves, and Coral HAPC appear to protect more than 20% of the representative habitats within the region from bottom contact from fishing gear, allowing a habitat modifier of +0.5 for the GMFMC longline fisheries.

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

0

Vertical line gear is perceived to have minimal contact or adverse effect on sensitive habitats. The GMFMC reef fish vertical line fishery therefore is not eligible to receive a habitat score modifier.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

+0.5

The SAFMC snapper-grouper FMP and subsequent amendments have established management measures that protect coral and hard bottom habitats necessary to many snapper-grouper species. The original FMP prevented the use of explosives and poisons throughout the management area and established a process to

designate artificial reefs and other modified habitats as SMZs (SAFMC 1983), while Regulatory Amendment 1 prohibited all gears except handheld hook and line and spear fishing within SMZs (SAFMC 2017b). Original documentation could not be acquired, but the SAFMC Snapper Grouper FMP website (SAFMC 2017b) indicates that SMZs were later designated in Florida in 1988 (Regulatory Amendment 2) and 1989 (Regulatory Amendment 3), South Carolina in 1992 (Regulatory Amendment 5) and 1998 (Regulatory Amendment 7), and Georgia in 2000 (Regulatory Amendment 8). Further, Amendment 6 (SAFMC 1993) created the 92-mi² Oculina Experimental Closed Area in 1994 which prohibits targeting or harvesting snapper-grouper using any gear within the area, and also prohibits anchoring within the closed area. These regulations not only provide a refuge free from exploitation for snapper-grouper species, but protect critical habitat as well.

A number of HAPC have also been established in US South Atlantic Region that are relevant to snapper-grouper longline fishery. The SAFMC established the 92-mi² Oculina HAPC in 1984 through the Coral, Coral Reef and Live/Hardbottom Habitat Plan in conjunction with the GMFMC (SAFMC 2005). The boundaries of the Oculina HAPC were later expanded to incorporate an area closed to trawling for rock shrimp, plus two "satellite" *Oculina* areas (SAFMC 2005), bringing the total area of the HAPC to approximately 300 mi². Eight additional HAPC were later established through Amendment 14 to the snapper-grouper FMP to protect deep water snapper-grouper populations and the habitats they depend upon (SAFMC 2007b). The SAFMC then approved the Comprehensive Ecosystem-Based Amendment (SAFMC 2009a) that established Coral HAPC covering more than 23,000 mi² to protect what may be the largest contiguous distribution of pristine deep water corals in the world. Regulations within all of the HAPC established by the SAFMC prohibit the use of all bottom-tending gear, including bottom trawls, bottom longlines, dredges, fish pots and fish traps, to protect the sensitive coral and other hard bottom habitats within the HAPC. Additionally, Amendment 4 to the snapper-grouper FMP (SAFMC 1991) prohibited the use of longline gear shoreward of 50 fathoms to protect live bottom areas.

Although the proportion of protected areas relative to fishable areas could not be quantified for this report, the system of managed areas (HAPC, MPA, SMZ) comprises a substantial proportion of the representative habitat. Amendment 4 states that longline use in deep waters (> 50 fathoms) is appropriate due to the primarily mud habitat with sparse hard bottom (SAFMC 1991). The deepwater HAPC and the Coral HAPC were later established at depths greater than 50 fathoms to protect much of the known hard bottom habitat within this fishery. Collectively, the managed areas appear to protect more than 20% of the sensitive live bottom habitats within the region from bottom longline gear, justifying a habitat modifier of +0.5 for the SAFMC snapper-grouper longline fishery.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

0

Vertical line gear is perceived to have minimal contact or adverse effect on sensitive habitats. The SAFMC snapper-grouper vertical line fishery therefore is not eligible to receive a mitigation score.

Factor 4.3 - Ecosystem-Based Fisheries Management

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

Moderate Concern

No information could be found that describes explicit ecosystem-based fishery management within the Gulf of Mexico. However, the GMFMC have enacted many regulations within the reef fish FMP and other FMP that indirectly address ecosystem function. A comprehensive essential fish habitat (EFH) amendment was implemented in 1998 that describes EFH for 26 representative species managed by the GMFMC (GMFMC 1998). These 26 species account for approximately one third of all species managed by the GMFMC, but represent the majority of landings in the region and occur in all habitat types within the Gulf of Mexico, so additional species would not result in additional areas of EFH (GMFMC 1998). The EFH amendment defines EFH for each species or species complex, identifies threats to these habitats, describes predator-prey relationships for the included species, and provides recommendations to minimize impacts to these habitats (GMFMC 1998).

Many grouper species are mid-level to apex predators and have been shown to have direct or indirect cascading effects on the ecosystem (Stallings 2008). Some species of grouper are considered overfished in the management region. Further, heavy localized exploitation may affect local species composition. The GMFMC implements harvest control rules and accountability measures for all managed species, and considers relevant species groupings when setting quotas. For example, in the reef fish fishery, quotas and IFQ shares for overfished red grouper and gag are separate from other shallow water grouper species that are not considered overfished (GMFMC 2017). This strategy promotes stock rebuilding for the overfished species, but allows harvest of non-overfished shallow water groupers proportional to their ecological occurrence. Because no deep water grouper species are considered overfished, a single deep water quota and IFQ share system also promotes proportional harvest for this species complex. GMFMC management take into consideration the diversity and abundance of the various grouper species; however, the harvest of top predators may lead to impacts on food webs.

Within the GMFMC management structure, management measures are in place that protect ecosystem function, including habitat protection, spatial management, and quota/IFQ designations. However, no explicit ecosystem-based management plan has been adopted, suggesting stronger policies may be needed to fully protect the ecological role of harvested species. This justifies an ecosystem-based fisheries management score of "moderate" concern for the Gulf of Mexico reef fish fisheries.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

Moderate Concern

The SAFMC implemented an ecosystem approach to fishery management for all its managed species in 2010 with the adoption of a Fishery Ecosystem Plan (FEP) (SAFMC 2009b) and the first Comprehensive Ecosystem-Based Amendment (CE-BA) (SAFMC 2009a). The SAFMC views habitat preservation as a primary role in achieving ecosystem management; as such, the FEP and CE-BA focus heavily on protecting sensitive coral and live bottom habitats on which many of the SAFMC managed species rely (SAFMC 2009a) (SAFMC 2009b). The FEP was crafted to guide ecosystem policy, with specific management measures implemented through the first and subsequent CE-BA. Specific ecosystem management goals identified in the FEP include maintaining or improving 1) ecosystem structure and function; 2) social, economic, and cultural benefits derived from the natural resources; and 3) biological, economic, and cultural diversity (SAFMC 2009b). Through several volumes, the FEP addresses ecosystem interactions (e.g., food webs), human interactions, essential fish habitat, fishing and non-fishing threats to the South Atlantic ecosystem, and research needs. CE-BA 1 (SAFMC 2010) and CE-BA 2 (SAFMC 2011c) focus primarily on development of protection of habitat, while CE-BA 3 (under development) deals specifically with improved bycatch data collection.

Many grouper species are mid-level to apex predators and have been shown to have direct or indirect cascading effects on the ecosystem (Stallings 2008). Some species of grouper are considered overfished in the management region. Further, heavy localized exploitation may affect local species composition. Although the SAFMC implements harvest control rules and accountability measures for all managed species to minimize overfishing and promote stock rebuilding for overfished species, the harvest of top predators may lead to impacts on food webs.

The SAFMC has implemented policies to protect ecosystem function, primarily through spatial management and habitat protection. Further, the FEP provides a well defined plan for advancing and guiding the ecosystem approach to fishery management within the region. However, the ecosystem approach was only recently implemented, and there are still many data gaps (such as bycatch monitoring) that make it difficult to evaluate the effectiveness of the FEP. In addition, there are concerns regarding food webs due to harvest of top

predators. For these reasons, the SAFMC snapper-grouper fishery scores as a "moderate" concern for ecosystem-based fishery management.

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Appendix A: Extra By Catch Species

BLUE TILEFISH

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

Low Concern

A peer reviewed stock assessment for tilefish (*aka* golden tilefish, blue tilefish) in the Gulf of Mexico was conducted through the SEDAR process with data through 2009 (SEDAR 2011b). Changes to the base model were made during and following the review workshop, based on recommendations from the review panel and errors identified by the assessment team, that resulted in changes to status determination of the base model (SEDAR 2011b). The scores below are based on the revised methodology, presented in Section VI of the assessment report (SEDAR 2011b).

The review panel recommended using a biomass target equal to the spawning biomass that achieves 30% of maximum spawning potential ($SSB_{F30\%SPR} = 17,986.44$ lb gonad weight) (SEDAR 2011b). Results of the model indicate that terminal year biomass of 35,932.13 lb gonad weight exceeds the target biomass level by nearly 100% ($SSB_{2009} / SSB_{TARGET} = 1.99$) (SEDAR 2011b), suggesting the stock is not overfished. An uncertainty analysis showed that there was 0% probability that the stock was overfished. This determination is reflected in the NMFS stock status update (NMFS 2017b). IUCN characterizes the species as "Endangered" based on population declines of greater than 50% over three generation (48 years) (Aiken et al. 2015); however, the 2011 stock assessment indicated that "current spawning stock biomass was greater than the reference point spawning stock biomass, which means the stock must be fished down to maximize yield" (SEDAR 2011b). The stock status would qualify for a biomass score of "very low" concern; however, due to the age of the assessment and concerns that tilefish are data poor, the final abundance score for tilefish in the Gulf of Mexico is "low" concern.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

Low Concern

A peer reviewed stock assessment for golden tilefish (*aka* blue tilefish) in the US South Atlantic region was completed through the SEDAR process with data through 2010 (SEDAR 2011c). The assessment found the stock was not overfished and was not experiencing overfishing (SEDAR 2011c). The assessment model was recently updated with data through 2014 using the same model as the 2011 peer reviewed assessment, but with some modifications (SEDAR 2016c). The updated model structure resulted in some differences in model fit compared to the benchmark assessment, but the assessment team explicitly state that the new model is an improvement over the peer reviewed results (SEDAR 2016c). The update assessment found that golden tilefish is not overfished, with a biomass ratio of $SSB_{2014} / MSST = 1.13$ (SEDAR 2016c). Terminal year biomass was also found to be 85% of the biomass target. Projections under current (2014) levels of fishing mortality resulted in relatively constant biomass over the short term, while fishing at F_{MSY} or $75\%F_{MSY}$ allowed for stock growth (SEDAR 2016c). IUCN lists golden tilefish as "Endangered" based on stock declines of more than 50% over the last three generations (42 years) (Aiken et al. 2015). The 2016 stock assessment reflects this decline, indicating total biomass dropped from over 7,000 MT in the late 1960s to approximately 1,300 MT by the late 1990s. However, since 2000 the stock has increased to approximately 2,300 MT in recent years (SEDAR 2016c). The recent stock assessment showing terminal year biomass above the biomass threshold and at least 75% of the biomass target warrant an abundance score of "low" concern for golden tilefish in the SAFMC management unit.

Justification:

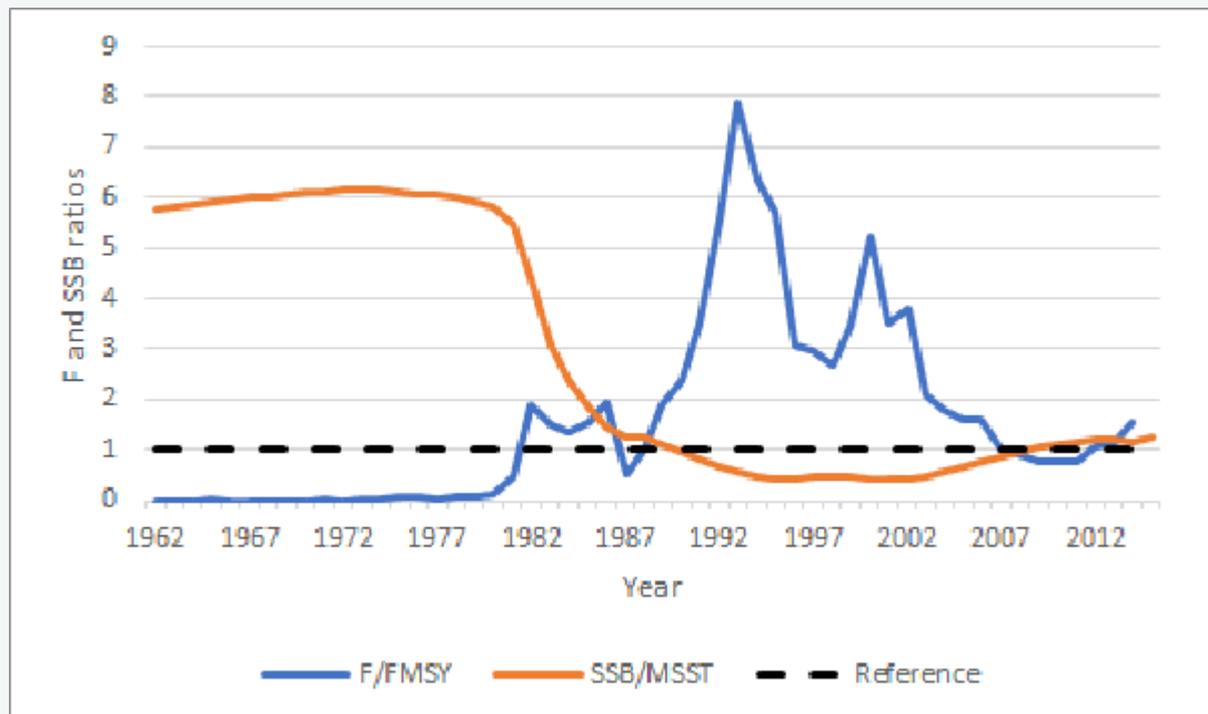


Figure 22 South Atlantic golden tilefish fishing mortality and spawning biomass from the preferred model run relative to selected management reference points. Figure developed based on data provided in SEDAR 25 update Table 7.11 (SEDAR 2016c).

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

Low Concern

The fishing mortality threshold for Gulf of Mexico tilefish is defined as the fishing mortality rate that results in a spawning potential ratio of 30% ($F_{30\%SPR}$) (SEDAR 2011b). The 2011 benchmark stock assessment determined that the recent three year fishing mortality rate of $F_{2007-2009} = 1.0$ was roughly half of the threshold level of $F_{30\%SPR} = 2.07$ (SEDAR 2011b), indicating that overfishing is not occurring. In 2010, the GMFMC implemented an IFQ program for tilefishes, including golden tilefish, blueline tilefish, and goldface tilefish (GMFMC 2008a). IFQ shares for this were 440,000 for the years 2009 to 2012, increasing to 582,000 lb thereafter (GMFMC 2008a). Throughout the program, golden tilefish is reported to make up between 67 to 90% of all tilefish landings, but the full allocation has never been harvested (NMFS 2016a). Based on this information, golden tilefish in the Gulf of Mexico receive a fishing mortality score of "low" concern.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

High Concern

Improvements to the 2016 stock assessment update model relative to the 2011 benchmark resulted in different fishing mortality status results (SEDAR 2016c). The terminal year fishing mortality of $F_{2014} = 0.36$ was estimated to be more than 50% greater than the fishing mortality target of $F_{MSY} = 0.24$. (SEDAR 2016c). The high probability that fishing mortality exceeds a sustainable level requires a fishing mortality score of "high" concern for SAFMC golden tilefish.

Factor 2.3 - Discard Rate

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

≥ 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish longline fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 195 trips and 5,015 sets between 2006 to 2011, the (bait + discards)/landings ratio is 103% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio greater than 100% warrants a Criterion 2 score modifier of 0.75.

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

< 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish vertical line fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 398 trips and 13,827 sets between 2006 and 2011, the (bait + discards)/landings ratio is 37.2% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

≥ 100%

No information could be found to directly calculate the (discards + bait)/landings ratio for the South Atlantic snapper grouper longline fishery. No observer data are available. Harvesters are required to report discard data through the SEFSC Coastal Fishery Logbook Program (NMFS SEFSC 2017a). However, ratios of discards to harvest cannot be calculated from these data because landings are reported in pounds while discards are

reported in numbers of fish (NMFS 2011) (NMFS 2013) (NMFS 2016b). Given the similarities in gear and catch between this region and the Gulf of Mexico longline reef fishery, we use the ratio for the Gulf of Mexico (103%) as a substitute.

ATLANTIC SHARPNOSE SHARK

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Very Low Concern

Atlantic sharpnose shark are managed through the NMFS Highly Migratory Species program and are considered a single stock through their range in US Atlantic and Gulf of Mexico waters (SEDAR 2013c). A benchmark stock assessment was conducted and peer reviewed through the SEDAR process with data through 2011 (SEDAR 2013c). The biomass target is the spawning stock fecundity that produces MSY, currently estimated at $SSF_{MSY} = 1.75 \times 10^7$ (SEDAR 2013c). The preferred model estimated terminal year fecundity as $SSF_{2011} = 3.03 \times 10^7$, which is approximately 73% greater than the biomass target (Figure 16). Only long term projections were reported, but most runs (base and sensitivity) indicated that there was greater than 70% probability SSF would exceed SSF_{MSY} in all years (2032 to 2041) assuming constant landings similar to recent year averages (SEDAR 2013c). A recent peer-reviewed stock assessment indicates stock abundance is greater than the biomass target justifying an abundance score of "very low" concern for the South Atlantic and Gulf of Mexico stock of Atlantic sharpnose shark.

Justification:

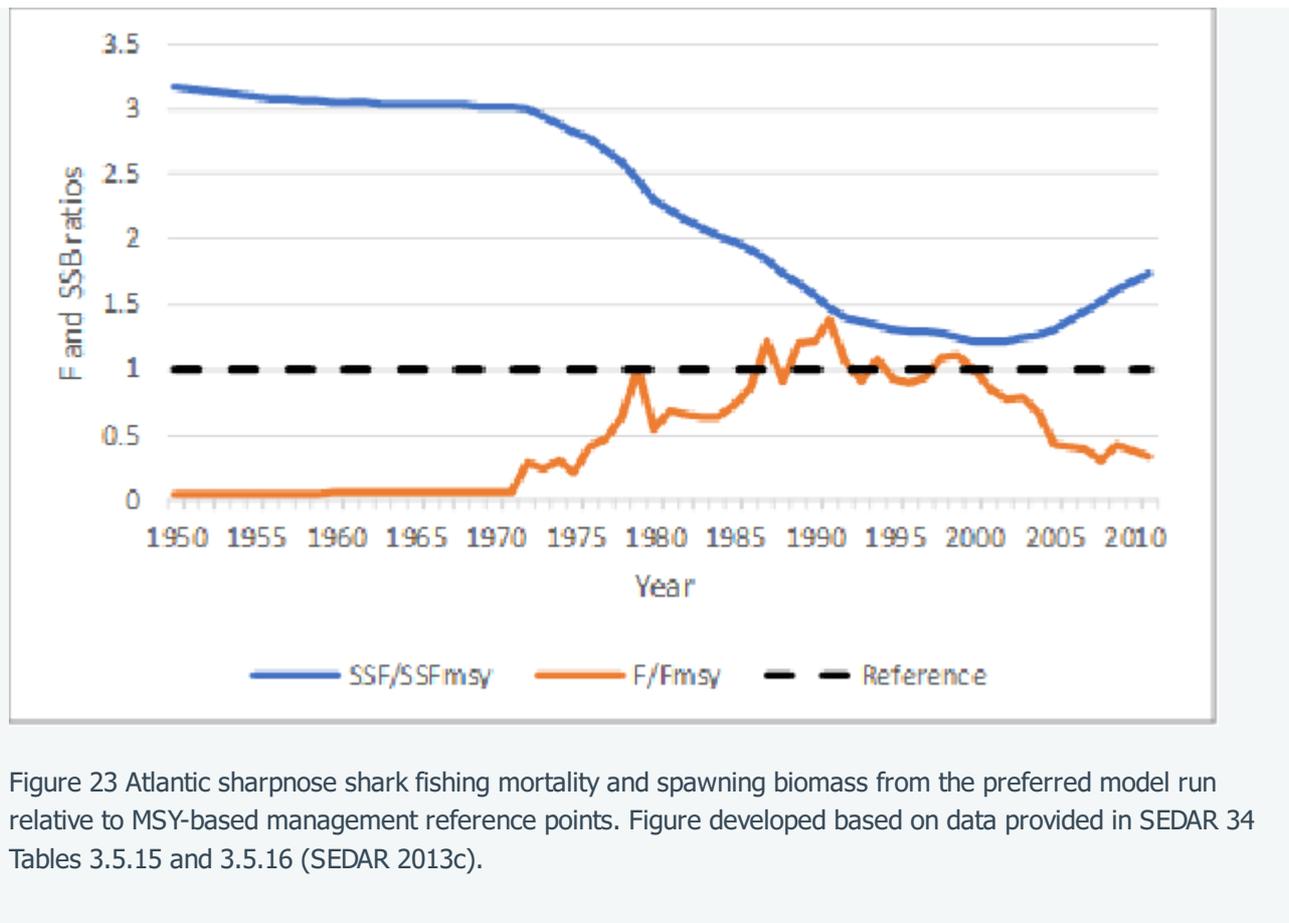


Figure 23 Atlantic sharpnose shark fishing mortality and spawning biomass from the preferred model run relative to MSY-based management reference points. Figure developed based on data provided in SEDAR 34 Tables 3.5.15 and 3.5.16 (SEDAR 2013c).

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Low Concern

The fishing mortality threshold for Atlantic sharpnose shark is defined as $F_{MSY} = 0.377$ (SEDAR 2013c). Terminal year fishing mortality rate was estimated as $F_{2011} = 0.128$ in the preferred model of the 2013 stock assessment (SEDAR 2013c). This results in a fishing mortality ratio of $F_{2011} / F_{MSY} = 0.34$, indicating the stock is not experiencing overfishing. Similar to the biomass projections, the majority of projection runs indicated there was less than a 30% probability that continuing to fish at recent harvest levels would result in fishing mortality rate greater than F_{MSY} in the future (SEDAR 2013c). For these reasons, the Atlantic sharpnose shark fishery in the Gulf of Mexico and US South Atlantic receives a fishing mortality score of "low" concern.

Factor 2.3 - Discard Rate

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

≥ 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish longline fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 195 trips and 5,015 sets between 2006 to 2011, the (bait + discards)/landings ratio is 103% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio greater than 100% warrants a Criterion 2 score modifier of 0.75.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the US South Atlantic snapper-grouper vertical line fishery. A pilot observer program conducted from 2007 to 2009 collected information on species composition and disposition (kept or discarded) (GSAFF 2008) (GSAFF 2010). The (bait+discards)/landings ratio uses the total discarded CPUE (all species combined) divided by total retained CPUE. This ratio should be considered a minimum estimate because it does not account for bait needs, nor does it distinguish between species retained for food vs. bait. Based on 2,664 stations sampled between 2007 and 2009, the (bait + discards)/landings ratio is 29.9% (GSAFF 2008) (GSAFF 2010). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

≥ 100%

No information could be found to directly calculate the (discards + bait)/landings ratio for the South Atlantic snapper grouper longline fishery. No observer data are available. Harvesters are required to report discard data through the SEFSC Coastal Fishery Logbook Program (NMFS SEFSC 2017a). However, ratios of discards to harvest cannot be calculated from these data because landings are reported in pounds while discards are reported in numbers of fish (NMFS 2011) (NMFS 2013) (NMFS 2016b). Given the similarities in gear and catch between this region and the Gulf of Mexico longline reef fishery, we use the ratio for the Gulf of Mexico (103%) as a substitute.

SMOOTH DOGFISH

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

Low Concern

A peer reviewed stock assessment of the Gulf of Mexico "smoothhound complex," which covers three species including smooth dogfish, was conducted through the SEDAR process with data through 2012 (SEDAR 2015c). MSY-based reference points have been defined for the complex (SEDAR 2015c). The preferred model run and all sensitivity runs were in agreement that recent (2012) abundance exceeded the biomass target by more than 65%, indicating the stock is not overfished. Short-term projections assuming constant harvest at 2012 level resulted in stock growth, while constant harvest at MSY levels resulted in stock declines, as would be expected for a stock above B_{MSY} . IUCN lists smooth dogfish as "Near Threatened" due to increased commercial importance in the US mid Atlantic region (Conrath 2005). However, the 2015 stock assessment cites genetic differences between Atlantic and Gulf of Mexico populations, indicating separate stocks (SEDAR 2015c). A recent stock assessment indicating abundance greater than a biomass target generally qualifies for an abundance score of "very low" concern, but assessment of the species within a stock complex requires modification of the score to "low" concern for smooth dogfish in the Gulf of Mexico.

Justification:

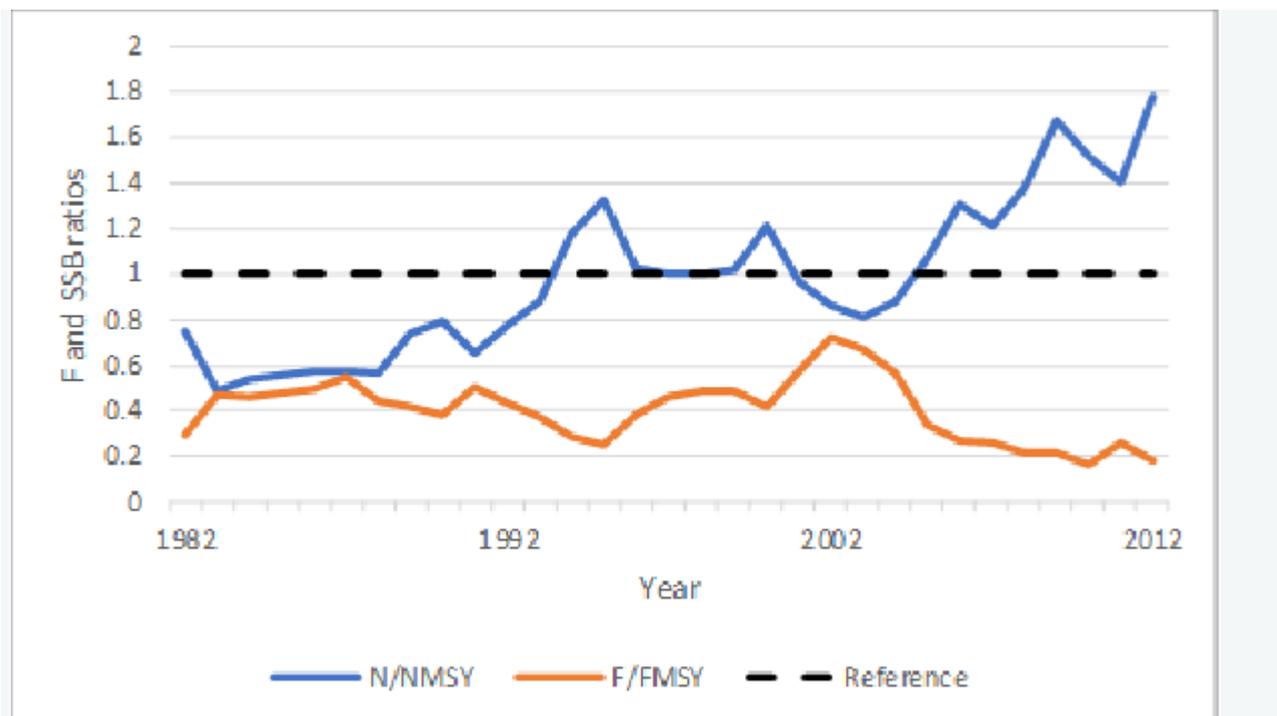


Figure 24 Gulf of Mexico red snapper fishing mortality and spawning biomass from the preferred model run relative to selected MSY management reference points. Figure developed based on data provided in SEDAR 39 update Table 3.4 (SEDAR 2015b).

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER
 UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER
 UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
 UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER
 UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER
 UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER
 UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

Low Concern

Fishing mortality estimates from the 2015 stock assessment indicate the smoothhound complex is not experiencing overfishing (SEDAR 2015c). The preferred model run and nearly all sensitivity runs estimated a fishing mortality ratio of $F_{2012} / F_{MSY} = 0.20$ or less (SEDAR 2015c). Projections assuming annual harvest continues at 2012 levels indicate that there is less than 10% probability that fishing mortality would exceed F_{MSY} levels (SEDAR 2015c). For these reasons, smooth dogfish in the Gulf of Mexico receive a fishing mortality score of "low" concern.

Factor 2.3 - Discard Rate

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

≥ 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish longline fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 195 trips and 5,015 sets between 2006 to 2011, the (bait + discards)/landings ratio is 103% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio greater than 100% warrants a Criterion 2 score modifier of 0.75.

SCAMP

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

High Concern

Scamp has been managed as part of the GMFMC Reef Fish FMP since inception of the FMP (GMFMC 1981), but a formal stock assessment has never been conducted for this species. The abundance score for scamp is therefore based on proxy information, including a productivity-susceptibility analysis (PSA) that takes into account the species' life history and characteristics of the fishery.

A PSA score of 3.39 indicates that scamp have high inherent vulnerability. Because this species is highly vulnerable and there is no evidence to suggest that the stock is either above or below reference points, scamp in the Gulf of Mexico receive an abundance score of "high" concern.

Justification:

Gulf of Mexico Scamp

Productivity-Susceptibility Analysis:

Scoring Guidelines

1.) Productivity score (P) = average of the productivity attribute scores (p1, p2, p3, p4 (finfish only), p5 (finfish only), p6, p7, and p8 (invertebrates only))

2.) Susceptibility score (S) = product of the susceptibility attribute scores (s1, s2, s3, s4), rescaled as follows:
 $S = [(s1 * s2 * s3 * s4) - 1/40] + 1$.

3.) Vulnerability score (V) = the Euclidean distance of P and S using the following formula: $V = \sqrt{(P^2 + S)^2}$

Productivity Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity	50% mature by age 2 (Harris et al. 2002) (Lombardi-Carlson et al. 2012)	1
Average maximum age	Ages recorded up to 30+ years (Harris et al. 2002) (Lombardi-Carlson et al. 2012)	3
Fecundity	1.3 million as estimated from Figure 11 of Harris et al. (2002)	1
Average maximum size (fish only)	80-90 cm based on growth curves (Harris et al. 2002) (Lombardi-Carlson et al. 2012)	1
Average size at maturity (fish only)	50% maturity by approximately 35 cm (Harris et al. 2002) (Lombardi-Carlson et al. 2012)	1
Reproductive strategy		
Trophic level	4.5 (Froese and Pauly 2017)	3
Density dependence (invertebrates only)		
Habitat quality	Moderately altered from non-fishing sources	2

Total Productivity (average)		1.714
Susceptibility Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Areal overlap (Considers all fisheries)	>30% of main geographic range is fished	3
Vertical overlap (Considers all fisheries)		3
Selectivity of fishery (Specific to fishery under assessment)	Protogynous hermaphrodite	3
Post-capture mortality (Specific to fishery under assessment)	>90% of captured scamp are retained (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013)	3
Total Susceptibility (multiplicative)		3.0

PSA score for scamp in Gulf of Mexico longline and handline fisheries is calculated as follows:

$$\text{Vulnerability (V)} = \sqrt{P^2 + S^2}$$

$$V = \sqrt{1.71^2 + 3.0^2}$$

$$V = 3.46$$

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

High Concern

Scamp has been managed as part of the SAFMC Snapper-Grouper complex since inception of the FMP (SAFMC 1983), but a formal stock assessment has never been conducted for this species. A fishery independent index of abundance from the Marine Resources Monitoring, Assessment, and Prediction (MARMAP) Program chevron trap survey during 1990 to 2012 indicates a general decline in abundance from the mid 1990s to the mid 2000s, falling from nearly twice the time series mean in 1995 to less than half the time series mean by 2006 (MARMAP 2013). By 2012, stock size had increased slightly, but is still well below the time series mean abundance. Although the time series mean is not indicative of any management reference point (but it is a data-limited indicator), the sharp decline in abundance raises concern for the stock status.

The abundance score for scamp is therefore based on the negative data-limited indicator, as well as proxy information (PSA) that takes into account the species life-history and characteristics of the fishery, and available proxy information on stock abundance. The PSA = 3.39, which indicates that scamp have high inherent vulnerability. Because this species is highly vulnerable and there is some evidence that stock size has decreased over time, scamp in the US South Atlantic receive an abundance rating of "high" concern.

Justification:

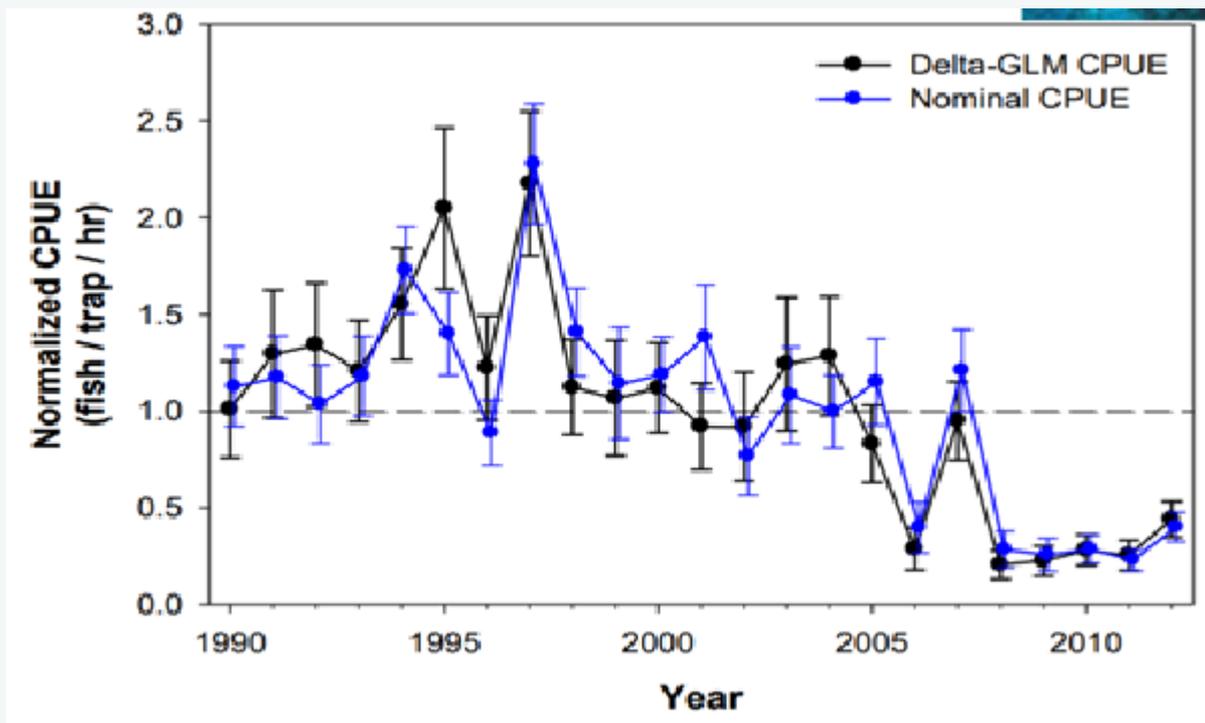


Figure 25 Normalized catch per unit effort of scamp in the SEAMAP South Atlantic chevron trap survey. Figure used directly from SEAMAP (2013).

US South Atlantic Scamp

Productivity-Susceptibility Analysis:

Scoring Guidelines

1.) Productivity score (P) = average of the productivity attribute scores (p1, p2, p3, p4 (finfish only), p5 (finfish only), p6, p7, and p8 (invertebrates only))

2.) Susceptibility score (S) = product of the susceptibility attribute scores (s1, s2, s3, s4), rescaled as follows:
 $S = [(s1 * s2 * s3 * s4) - 1/40] + 1$.

3.) Vulnerability score (V) = the Euclidean distance of P and S using the following formula: $V = \sqrt{(P^2 + S)^2}$

Productivity Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity	50% mature by age 2 (Harris et al. 2002) (Lombardi-Carlson et al. 2012)	1
Average maximum age	Ages recorded up to 30+ years (Harris et al. 2002) (Lombardi-Carlson et al. 2012)	3
Fecundity	1.3 million (as estimated from Figure 11 of Harris et al. 2002)	1
Average maximum size (fish only)	80-90 cm based on growth curves (Harris et al. 2002) (Lombardi-Carlson et al. 2012)	1
Average size at maturity (fish only)	50% maturity by approximately 35 cm (Harris et al. 2002) (Lombardi-Carlson et al. 2012)	1
Reproductive strategy		
Trophic level	4.5 (Froese and Pauly 2017)	3
Density dependence (invertebrates only)		
Habitat quality	Moderately altered from non-fishing sources	2
Total Productivity (average)		1.714
Susceptibility Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)

Areal overlap (Considers all fisheries)	>30% of main geographic range is fished	3
Vertical overlap (Considers all fisheries)		3
Selectivity of fishery (Specific to fishery under assessment)	Protogynous hermaphrodite	3
Post-capture mortality (Specific to fishery under assessment)	>65-75% of captured scamp are retained (GSAFF 2008) (GSAFF 2010)	2
Total Susceptibility (multiplicative)		3.0

PSA score for scamp in US South Atlantic longline and handline fisheries is calculated as follows:

$$\text{Vulnerability (V)} = \sqrt{P^2 + S^2}$$

$$V = \sqrt{1.71^2 + 3.0^2}$$

$$V = 3.46$$

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK
GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED
GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW
GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK
GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED
GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY
GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY
GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA,
YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW
GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

No formal stock assessment has been conducted for scamp in the Gulf of Mexico, so fishing mortality rate is unknown. Further, GMFMC includes scamp in the Shallow Water Grouper complex, which is managed as a unit. NMFS indicates that overfishing status of this complex is unknown (NMFS 2017b). Stocks for which fishing mortality is unknown receive a fishing mortality score of "moderate" concern.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF
AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF
AMERICA, RED GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF
AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF
AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF
AMERICA, BLACK GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF
AMERICA, GAG

Moderate Concern

NMFS classifies scamp in the South Atlantic region as not experiencing overfishing (NMFS 2017b), but no formal stock assessment has been conducted for this stock, so fishing mortality rate is unknown. Stocks for which fishing mortality is unknown receive a fishing mortality score of "moderate" concern.

Factor 2.3 - Discard Rate

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

≥ 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish longline fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 195 trips and 5,015 sets between 2006 to 2011, the (bait + discards)/landings ratio is 103% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio greater than 100% warrants a Criterion 2 score modifier of 0.75.

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish vertical line fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 398 trips and 13,827 sets between 2006 and 2011, the (bait + discards)/landings ratio is 37.2% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the US South Atlantic snapper-grouper vertical line fishery. A pilot observer program conducted from 2007 to 2009 collected information on species composition and disposition (kept or discarded) (GSAFF 2008) (GSAFF 2010). The (bait+discards)/landings ratio uses the total discarded CPUE (all species combined) divided by total retained CPUE. This ratio should be considered a minimum estimate because it does not account for bait needs, nor does it distinguish between species retained for food vs. bait. Based on 2,664 stations sampled between 2007 and 2009, the (bait + discards)/landings ratio is 29.9% (GSAFF 2008) (GSAFF 2010). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

≥ 100%

No information could be found to directly calculate the (discards + bait)/landings ratio for the South Atlantic snapper grouper longline fishery. No observer data are available. Harvesters are required to report discard data through the SEFSC Coastal Fishery Logbook Program (NMFS SEFSC 2017a). However, ratios of discards to harvest cannot be calculated from these data because landings are reported in pounds while discards are reported in numbers of fish (NMFS 2011) (NMFS 2013) (NMFS 2016b). Given the similarities in gear and catch between this region and the Gulf of Mexico longline reef fishery, we use the ratio for the Gulf of Mexico (103%) as a substitute.

GAG

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

The most recent benchmark stock assessment for gag in the Gulf of Mexico (SEDAR 2014a) provided

conflicting evidence regarding abundance, depending on whether SSB included both males and females (overfished) or females only (not overfished). The stock assessment peer review panel recommended using the more conservative result based on combined sexes (SEDAR 2014a). The assessment was recently updated with data through 2015 (SEDAR 2016a). The base model of the update assessment determined that the current biomass of $SSB_{2015} = 9,688$ MT. The biomass target uses an MSY proxy of $SSB_{F_{max}} = 7,171$ MT (SEDAR 2016a). The GMFMC accepted the base model, and the stock is therefore considered not overfished, with terminal year biomass greater than the biomass target. However, an alternative model that incorporated a different assumption in recreational discarding practices concluded that recent spawning biomass was only 32% of the associated biomass threshold, indicating some uncertainty in the stock status results (SEDAR 2016a). Further, the assessment team noted concerns that the recent stock growth estimated by the model was excessive given other available information (SEDAR 2016a). Conflicting evidence in biomass ratios in the benchmark and update assessment result in a biomass score of "moderate" concern for gag in the Gulf of Mexico.

Justification:

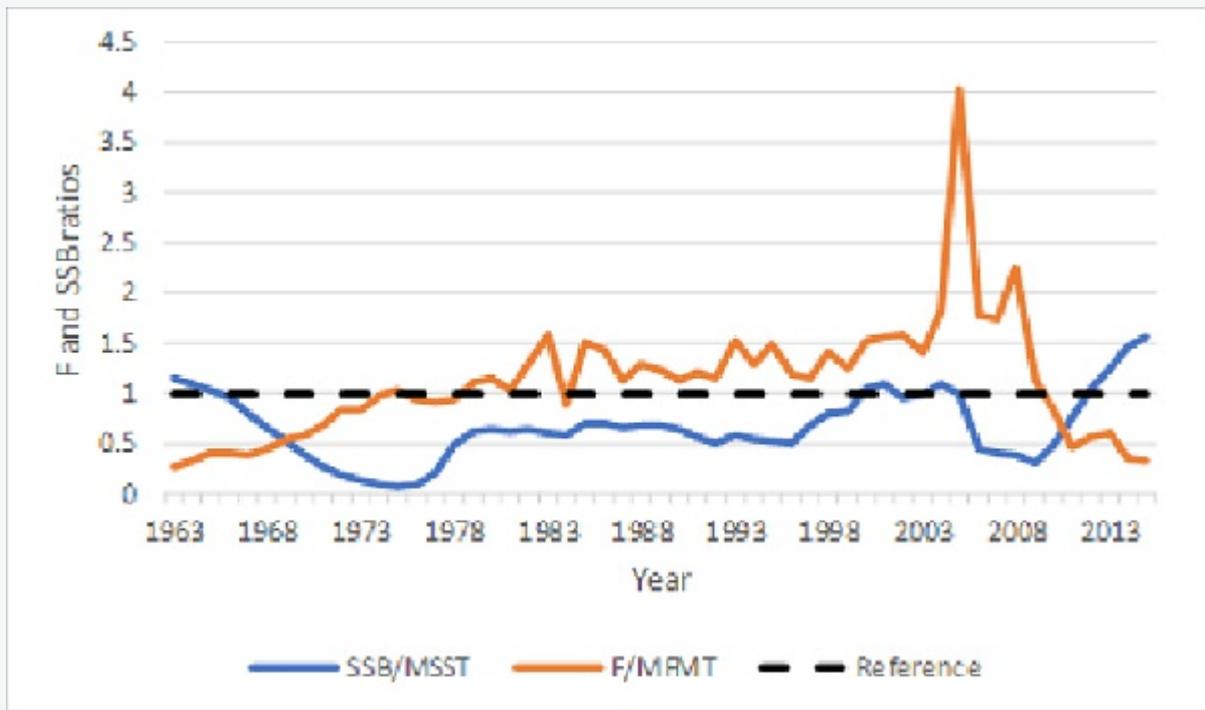


Figure 26 Gulf of Mexico gag fishing mortality and spawning biomass from the base model run relative to selected management reference points. Figure developed based on data provided in SEDAR 33 update Tables 8 (SEDAR 2016a).

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

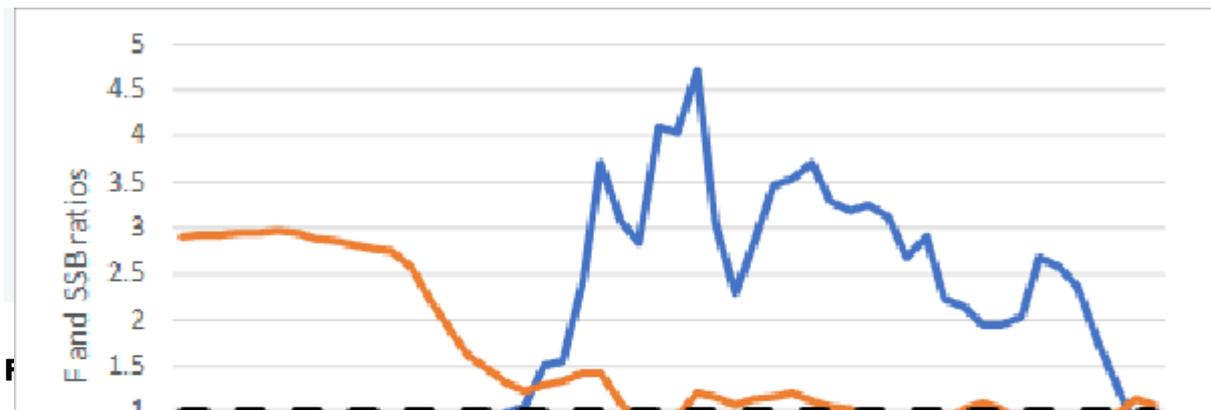
UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Low Concern

A benchmark stock assessment for gag in the US South Atlantic was conducted and reviewed through the SEDAR process in 2006 using data through a terminal year of 2004. Results of the benchmark assessment indicated that the US South Atlantic stock of gag was not overfished in 2004, but overfishing was occurring (SEDAR 2006a). An update to the assessment was completed in 2014 using the same methodology as the benchmark, with data updated through 2012 (SEDAR 2014b). Results of the assessment estimate a spawning stock biomass (SSB) in 2012 of 1776 metric tons (MT), while the biomass target for the stock, defined as $SSB_{M_{SY}}$, was estimated as 1806.8 MT (SEDAR 2014b). Spawning biomass in the terminal year was approximately 97% of the biomass target and has been increasing since a recent low in 2009 (SEDAR 2014b). Stock status for gag in the South Atlantic meet all the criteria for a "very low" concern rating for abundance. Stock projections, however, indicate a greater than 50% probability that SSB will fall below the minimum stock size threshold (MSST) of 1373.8 MT during 2014 to 2017 even when fishing at $F_{M_{SY}}$, due to low recruitment near the end of the time series (SEDAR 2014b). Since it is uncertain if abundance is above the target level, and abundance is projected to decline in the near term, we have awarded gag in the US South Atlantic region a score of "low" concern.

Justification:



UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Low Concern

Following a determination from the 2009 stock assessment update (SEDAR 2009) that the stock was experiencing overfishing, the GMFMC enacted measures through Amendment 32 to reduce harvest of gag and implement a 10-year rebuilding plan (GMFMC 2011a). For the 2016 update assessment, the GMFMC selected an MSY proxy fishing mortality threshold of $F_{MAX} = 0.1964$ for the base model (SEDAR 2016a). Recent three-year average fishing mortality was estimated as $F_{2013-2015} = 0.0817$, which is less than half of the threshold reference point, indicating the stock is not experiencing overfishing (SEDAR 2016a). Since implementation of harvest reduction measures in 2009, commercial harvest has been cut by more than 50% and total harvest has dropped from an average of 4.2 million lb for 2006 to 2008, to less than 1.8 million lb for 2013 to 2015 (NMFS Fishery Statistics Division 2017a) (NMFS Fishery Statistics Division 2017b), which may have contributed to stock growth indicated in the assessment results (SEDAR 2016a). During both these time periods, recreational harvest has accounted for approximately two thirds of the total harvest. NMFS considers the stock as fully rebuilt and no longer within a rebuilding plan (NMFS 2017b). Gag in the Gulf of Mexico receives a fishing mortality score of "low" concern.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

The 2014 update assessment identifies a maximum fishing mortality threshold of $F_{MSY} = 0.29$ (SEDAR 2014b). Stock status is determined using the average fishing mortality in the most recent three years of the assessment. A fishing mortality ratio of $F_{2010-2012} / F_{MSY} = 1.23$ indicates the stock was experiencing overfishing at the time (SEDAR 2014b). However, the South Atlantic Council's Scientific and Statistical Committee (SSC) noted that the fishing mortality rate for 2012, and the projected fishing mortality rate in 2013 based on the actual landings, suggested that overfishing did not occur in 2012 and 2013 (SAFMC 2015a). Also, following the 2014 assessment managers took action to revise the annual catch limit for gag for the 2015 to 2019 fishing years to ensure that overfishing does not occur (SAFMC 2015a). NOAA Fisheries currently considers gag in the South Atlantic to no longer be experiencing overfishing (NMFS 2017b), but a new assessment has yet to be completed. Because the defined stock status criteria (three year average) concluded the stock was experiencing overfishing, but fishing mortality in the most recent individual years was below the fishing mortality limit, fishing mortality for gag in the US South Atlantic is rated as "moderate" concern.

Justification:

The SAFMC Scientific and Statistical Committee (SSC) discussed the fishing mortality status determination at length during their April 2014 meeting (SAFMC 2014e). It was noted that, although the recent three year average was above the F_{MSY} value, there was a noticeable downward trend in fishing mortality in recent years, possibly due to a spawning closure implemented a few years previously. It was also noted that, because landings in 2012 were approaching the annual catch limit prior to the end of the open season, there was an early closure to the fishery. The SSC discussed how these actions may have addressed the concerns of overfishing in recent years and considered using only the terminal year for status determination. However, the SSC then reviewed the uncertainty analysis, which showed that, despite the declining trend, there was a high probability that overfishing was occurring in the terminal year. They concluded that a three-year average fishing mortality rate was the most appropriate for status determination (SAFMC 2014e). Regardless, NMFS has the final say in determining stock status (pers. comm., M. Errigo, SAFMC, 6/15/2018), and their decision resulted in a finding of overfishing not occurring.

Factor 2.3 - Discard Rate

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

≥ 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish longline fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 195 trips and 5,015 sets between 2006 to 2011, the (bait + discards)/landings ratio is 103% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio greater than 100% warrants a Criterion 2 score modifier of 0.75.

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

< 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish vertical line fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 398 trips and 13,827 sets between 2006 and 2011, the (bait + discards)/landings ratio is 37.2% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

< 100%

No information could be found regarding bait needs in the US South Atlantic snapper-grouper vertical line fishery. A pilot observer program conducted from 2007 to 2009 collected information on species composition and disposition (kept or discarded) (GSAFF 2008) (GSAFF 2010). The (bait+discards)/landings ratio uses the total discarded CPUE (all species combined) divided by total retained CPUE. This ratio should be considered a minimum estimate because it does not account for bait needs, nor does it distinguish between species retained for food vs. bait. Based on 2,664 stations sampled between 2007 and 2009, the (bait + discards)/landings ratio is 29.9% (GSAFF 2008) (GSAFF 2010). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

≥ 100%

No information could be found to directly calculate the (discards + bait)/landings ratio for the South Atlantic snapper grouper longline fishery. No observer data are available. Harvesters are required to report discard data through the SEFSC Coastal Fishery Logbook Program (NMFS SEFSC 2017a). However, ratios of discards to harvest cannot be calculated from these data because landings are reported in pounds while discards are reported in numbers of fish (NMFS 2011) (NMFS 2013) (NMFS 2016b). Given the similarities in gear and catch between this region and the Gulf of Mexico longline reef fishery, we use the ratio for the Gulf of Mexico (103%) as a substitute.

YELLOWEDGE GROUPE

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY
GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW
GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY
GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK
GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED
GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW
GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

Low Concern

The most recent benchmark stock assessment of yellowedge grouper in the Gulf of Mexico was peer reviewed through the SEDAR process with data through 2009 (SEDAR 2011a). The GMFMC adopted a biomass target of $SSB_{30\%SPR} = 8.62$ million pounds gutted weight (lb gw), and a corresponding threshold of 7.99 million lb gw

(SEDAR 2011a). Corrections to the stock assessment base run conducted during the review workshop estimate a terminal year biomass of $SSB_{2009} = 9.53$ million lb gw (SEDAR 2011a), indicating that the stock is not overfished. Short term projections that apply the target fishing mortality rate suggest SSB will decrease over time to the target level, but not below (SEDAR 2011a).

IUCN lists yellowedge grouper as "Vulnerable" due to expected declines in abundance of at least 30% throughout its range (Ferreira and Peres 2008). The peer reviewed assessment indicates steep declines in abundance during the 1980s, but relatively stable populations from the 1990s through the terminal year (SEDAR 2011a). The most recent NMFS stock status summary reflects the conclusion of the assessment that the stock is not overfished (NMFS 2017b). Terminal biomass greater than a target reference point supports a score of "very low" concern, but the age of the assessment and IUCN listing moderate the score to "low" concern for yellowedge grouper in the Gulf of Mexico.

Justification:

As reported in the previous Seafood Watch grouper report (Max 2016), an alternate biomass target of $SSB_{40\%SPR} = 11.698$ million lb gw was also considered (SEDAR 2011a). Terminal biomass is estimated to be approximately 81% of this alternate target value. The GMFMC Generic Sustainable Fishery Act Amendment (GMFMC 1999a) defines $SSB_{SPR30\%}$ as an appropriate biomass target for most reef species, but even using the more conservative target of $SSB_{SPR40\%}$, the terminal biomass exceeds 75% of the target, which also results in an abundance score of "low" concern.

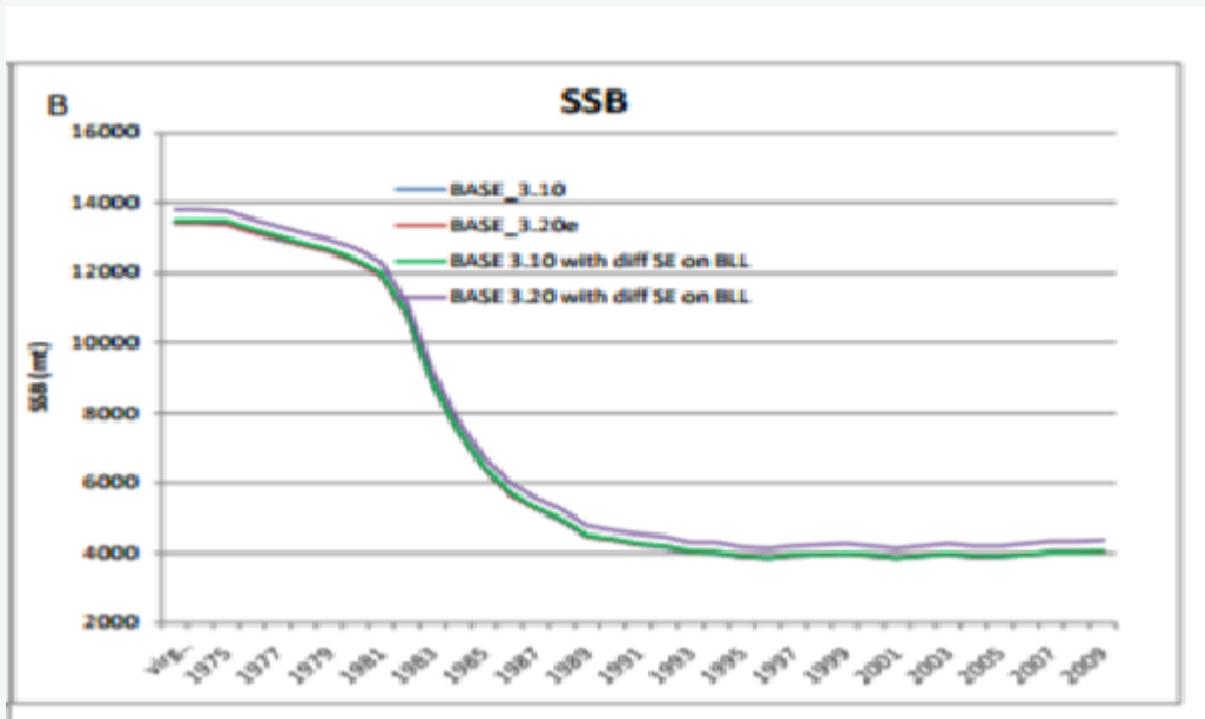


Figure 28 Gulf of Mexico yellowedge grouper spawning stock biomass. Figure taken from Figure 11 of Section 6 of SEDAR 22 (SEDAR 2011a). Dashed blue line added to show approximate location of biomass threshold.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

High Concern

Yellowedge grouper has been managed as part of the SAFMC Snapper-Grouper complex since inception of the FMP (SAFMC 1983), but a formal stock assessment has never been conducted for this species. The abundance score for yellowedge grouper is therefore based on a proxy information, including a productivity-susceptibility analysis (PSA) that takes into account the species life history and characteristics of the fishery, and available proxy information on stock abundance.

The PSA indicates that yellowedge grouper have moderate productivity and high susceptibility, resulting in an overall high inherent vulnerability score (PSA = 3.52). Further, IUCN lists yellowedge grouper as "Vulnerable" due to perceived declines in abundance of more than 30% throughout its range. An analysis of for-hire catch per unit effort conducted for the SEDAR #4 shows that CPUE declined by approximately 75% between the late 1970s and early 1990s (Williams and Dixon 2003). No reference points have been defined to determine official stock status, but high inherent vulnerability and significant declines in abundance justify an abundance score of "high" concern for yellowedge grouper in the SAFMC management unit.

Justification:

US South Atlantic Yellowedge Grouper

Productivity-Susceptibility Analysis:

Scoring Guidelines

1.) Productivity score (P) = average of the productivity attribute scores (p_1, p_2, p_3, p_4 (finfish only), p_5 (finfish only), p_6, p_7 , and p_8 (invertebrates only))

2.) Susceptibility score (S) = product of the susceptibility attribute scores (s_1, s_2, s_3, s_4), rescaled as follows:
 $S = [(s_1 * s_2 * s_3 * s_4) - 1/40] + 1$.

3.) Vulnerability score (V) = the Euclidean distance of P and S using the following formula: $V = \sqrt{(P^2 + S)^2}$

Productivity Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity	12 (range 6 to 17) (Comyns et al. 2006)	2
Average maximum age	Approximately 35 (Comyns et al. 2006)	3
Fecundity		
Average maximum size (fish only)	89.5 cm (Froese and Pauly 2017); 93.9 if include results from Comyns et al. (2006)	1
Average size at maturity (fish only)	55.8 cm, estimated as mid point of range (47.5 to 64.0 cm) from Comyns et al. (2006)	2
Reproductive strategy	Broadcast spawner	1
Trophic level	3.8 (Froese and Pauly 2017)	3
Density dependence (invertebrates only)		
Habitat quality	Moderately altered	2
Total Productivity (average)		2.00
Susceptibility Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Areal overlap (Considers all fisheries)	Default value	3
Vertical overlap (Considers all fisheries)	Default value	3

Selectivity of fishery (Specific to fishery under assessment)	Protogynous hermaphrodites (Comyns et al. 2006)	3
Post-capture mortality (Specific to fishery under assessment)	Nearly 100% retention in US South Atlantic vertical line and Gulf of Mexico longline fisheries (GSAFF 2008) (GSAFF 2010) (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013)	3
Total Susceptibility (multiplicative)		3.00

PSA score for yellowedge grouper in US South Atlantic vertical line and longline fisheries is calculated as follows:

$$\text{Vulnerability (V)} = \sqrt{P^2 + S^2}$$

$$V = \sqrt{2.0^2 + 3.0^2}$$

$$V = 3.61$$

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

Low Concern

The fishing mortality threshold for yellowedge grouper was established as the fishing mortality rate that produces 30% of maximum spawning potential (SEDAR 2011a). The corrected base run suggests that average fishing mortality in the most recent three years ($F_{2007-2009} = 1.0$) is above the target fishing mortality rate of $F_{TARGET} = 0.795$, but below the $F_{THRESHOLD} = 1.06$ (SEDAR 2011a). Optimum yield for the years 2012 to 2015 were estimated by the model around 700,000 lb gw per year (SEDAR 2011a), and observed commercial harvest from all gears were generally at or below optimum yield levels when converted to gutted weight using conversion factors based on dockside sampling data (NMFS Fishery Statistics Division 2017a) (Chih 2007). Fishing mortality rates appear to be stable below the fishing mortality threshold, allowing a fishing mortality score of "low" concern for GMFMC yellowedge grouper.

Justification:

The previous Seafood Watch grouper report discusses how a more conservative fishing mortality threshold might be more appropriate for yellowedge grouper (Max 2016), and a threshold of FSPR40% would result in an overfishing determination ($F_{2007-2009} / F_{SPR40\%} = 1.42$) (SEDAR 2011a). Two of the individual peer reviewers state that appropriate reference point levels are a function of manager risk tolerance (Cook 2011) (Medley 2011), while a third reviewer provides an argument that 20% SPR might be more appropriate for yellowedge grouper (Sparholt 2011). The GMFMC Generic Sustainable Fishery Act Amendment (GMFMC 1999a) provides justification for using reference points based on 30% SPR in the reef fish fishery. As such, the score for yellowedge grouper is based on a fishing mortality threshold of FSPR30%.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

No information could be found regarding fishing mortality for yellowedge grouper in the South Atlantic. The species is included as part of the deepwater snapper-grouper complex by the SAFMC, for which fishing mortality is unknown (NMFS 2017b). Lack of quantitative information on fishing mortality justifies a fishing mortality score of "moderate" concern.

Factor 2.3 - Discard Rate

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, RED GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

≥ 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish longline fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 195 trips and 5,015 sets between 2006 to 2011, the (bait + discards)/landings ratio is 103% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio greater than 100% warrants a Criterion 2 score modifier of 0.75.

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

< 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish vertical line fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 398 trips and 13,827 sets between 2006 and 2011, the (bait + discards)/landings ratio is 37.2% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

≥ 100%

No information could be found to directly calculate the (discards + bait)/landings ratio for the South Atlantic snapper grouper longline fishery. No observer data are available. Harvesters are required to report discard data through the SEFSC Coastal Fishery Logbook Program (NMFS SEFSC 2017a). However, ratios of discards to harvest cannot be calculated from these data because landings are reported in pounds while discards are reported in numbers of fish (NMFS 2011) (NMFS 2013) (NMFS 2016b). Given the similarities in gear and catch between this region and the Gulf of Mexico longline reef fishery, we use the ratio for the Gulf of Mexico (103%) as a substitute.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the US South Atlantic snapper-grouper vertical line fishery. A pilot observer program conducted from 2007 to 2009 collected information on species composition and disposition (kept or discarded) (GSAFF 2008) (GSAFF 2010). The (bait+discards)/landings ratio uses the total discarded CPUE (all species combined) divided by total retained CPUE. This ratio should be considered a minimum estimate because it does not account for bait needs, nor does it distinguish between species retained for food vs. bait. Based on 2,664 stations sampled between 2007 and 2009, the (bait + discards)/landings ratio is 29.9% (GSAFF 2008) (GSAFF 2010). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

BLUELINE TILEFISH

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

Moderate Concern

No stock assessment has been conducted for blueline tilefish from the Gulf of Mexico. A productivity-susceptibility analysis (PSA) for the species resulted in a score of 2.86, indicating blueline tilefish have a moderate inherent vulnerability. There is no information to suggest the stock is above or below a biological reference point for biomass, and CPUE data evaluated during the golden tilefish stock assessments indicate no trend in catch rates (SEDAR 2011b). For these reasons, blueline tilefish in the Gulf of Mexico longline fishery receive an abundance score of "moderate" concern.

Justification:

US Gulf of Mexico Blueline Tilefish

Productivity-Susceptibility Analysis:

Scoring Guidelines

1.) Productivity score (P) = average of the productivity attribute scores (p_1, p_2, p_3, p_4 (finfish only), p_5 (finfish only), p_6, p_7 , and p_8 (invertebrates only))

2.) Susceptibility score (S) = product of the susceptibility attribute scores (s_1, s_2, s_3, s_4), rescaled as follows:
 $S = [(s_1 * s_2 * s_3 * s_4) - 1/40] + 1$.

3.) Vulnerability score (V) = the Euclidean distance of P and S using the following formula: $V = \sqrt{(P^2 + S)^2}$

Productivity Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity	3 (Parker and Mays 1998)	1
Average maximum age	15 (Parker and Mays 1998)	2
Fecundity		

Average maximum size (fish only)	55 (Froese and Pauly 2017)	1
Average size at maturity (fish only)	Estimated at 50 cm using data from Froese and Pauly (2017) and Parker and Mays (1998)	2
Reproductive strategy		
Trophic level	3.8 (Froese and Pauly 2017)	3
Density dependence (invertebrates only)		
Habitat quality	Moderately altered by non-fishing impacts	2
Total Productivity (average)		1.833
Susceptibility Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Areal overlap (Considers all fisheries)	Default value	3
Vertical overlap (Considers all fisheries)	Default value	3
Selectivity of fishery (Specific to fishery under assessment)	Targeted species but no information to indicate high risk	2
Post-capture mortality (Specific to fishery under assessment)	Greater than 80% of captured individuals were retained or discarded dead (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013)	3

Total Susceptibility (multiplicative)		2.325
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PSA score for blueline tilefish in US Gulf of Mexico longline fishery is calculated as follows:

$$\text{Vulnerability (V)} = \sqrt{P^2 + S^2}$$

$$V = \sqrt{1.83^2 + 2.33^2}$$

$$V = 2.96$$

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPE

Low Concern

A stock assessment for blueline tilefish is ongoing in 2017 (SEDAR 2017c), but final results are not available for inclusion in this report. The most recent available stock assessment was conducted through the SEDAR peer review process with data through 2011 (SEDAR 2013c). Abundance is evaluated as the terminal year female spawning biomass ($SSB_{2011} = 201.9$ MT) relative to the minimum stock size threshold ($MSST = 221.9$ MT) (SEDAR 2013c). The 2013 stock assessment estimated a biomass ratio of $SSB_{2011}/MSST = 0.91$, indicating the stock is overfished. However, Regulatory Amendment 21 to the SAFMC snapper-grouper FMP (SAFMC 2014b) redefined (reduced) the minimum stock size threshold for blueline tilefish (and a number of other species with low natural mortality rates) to 75% of the biomass target (SSB_{MSY}). For blueline tilefish, the new MSST is estimated as $0.75 * 246.6$ MT = 184.95 MT, and the biomass ratio is estimated as $SSB_{2011} / MSST = 0.82$, indicating blueline tilefish is not overfished (SAFMC 2014b). This determination is reflected in the NMFS third quarter stock status update (NMFS 2017b). Based on the most recent stock assessment, blueline tilefish in the US South Atlantic is not overfished with an estimated biomass greater than 75% of the target biomass, providing an abundance score of "low" concern.

Justification:

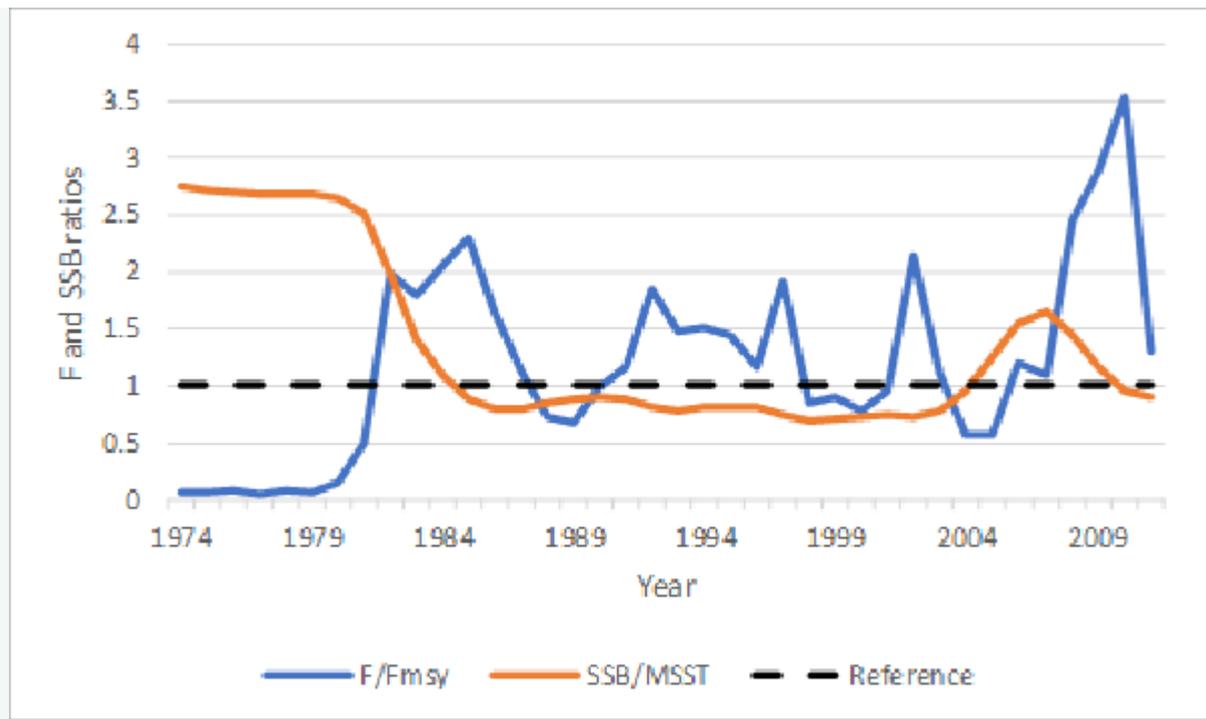


Figure 29 South Atlantic blueline tilefish fishing mortality and spawning biomass from the preferred model run relative to selected management reference points. Figure developed based on data provided in SEDAR 32 Table 3.4. (SEDAR 2013b)

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

Moderate Concern

Blueline tilefish is managed as part of the Tilefishes Complex in the Gulf of Mexico, which is reported as not experiencing overfishing (NMFS 2017a). Its stock was discussed in the golden tilefish assessment (SEDAR 2011b), since these two species comprise the majority of landings for the Gulf tilefish quota (IFQ). Prior to 1996, blueline tilefish were generally misreported as (golden) tilefish in the landings (SEDAR 2011b). Between 1996 and 2009, landings generally exceeded 100,000 lb per year, averaging 129,660 lb per year (SEDAR 2011b) (NMFS Fishery Statistics Division 2017a). The IFQ program established for tilefish through Amendment 29 went into effect in 2010 (GMFMC 2008a), which resulted in a substantial decrease in landings. Between 2010 and 2015, landings have ranged from 36,000 to 99,000 lb, with an average of just 68,250 lb per year (NMFS Fishery Statistics Division 2017a). Available observer data indicate discarding practices do not seem to have changed, with approximately 50% of all captured blueline tilefish being retained both before and after implementation of the IFQ program, although CPUE (catch per set) of observed sets declined from over 2.8

fish per set to less than 1.0 per set (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013), which may be a result of changing fishing practices under the IFQ program. Landings have declined under the IFQ program, but no stock assessment has been conducted for blueline tilefish in this region, so fishing mortality is unknown. Species with unknown fishing mortality receive a fishing mortality score of "moderate" concern.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

High Concern

Fishing mortality for SAFMC blueline tilefish is evaluated as the geometric mean of the three most recent years relative to the fishing mortality threshold (SEDAR 2013b). The 2013 stock assessment estimated a fishing mortality ratio of $F_{2009-2011} / F_{MSY} = 1.30$, indicating that overfishing was occurring (SEDAR 2013b). As a result of this finding, the SAFMC began development of Amendment 32 to the SAFMC snapper-grouper FMP in 2013 to end overfishing, and implemented emergency actions during development of the amendment (SAFMC 2014b). The major actions of the amendment and emergency action included removing blueline tilefish from the Deepwater Complex, redefining MSY, and defining species-specific ACL, catch targets, accountability measures, and possession limits for the commercial and recreational sectors (SAFMC 2014b). Regardless, NMFS reports that the SAFMC blueline tilefish is experiencing overfishing (NMFS 2017b), justifying a rating of "high" concern for fishing mortality.

Factor 2.3 - Discard Rate

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

≥ 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish longline fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 195 trips and 5,015 sets between 2006 to 2011, the (bait + discards)/landings ratio is 103% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio greater than 100% warrants a Criterion 2 score modifier of 0.75.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

≥ 100%

No information could be found to directly calculate the (discards + bait)/landings ratio for the South Atlantic snapper grouper longline fishery. No observer data are available. Harvesters are required to report discard data through the SEFSC Coastal Fishery Logbook Program (NMFS SEFSC 2017a). However, ratios of discards to harvest cannot be calculated from these data because landings are reported in pounds while discards are reported in numbers of fish (NMFS 2011) (NMFS 2013) (NMFS 2016b). Given the similarities in gear and catch between this region and the Gulf of Mexico longline reef fishery, we use the ratio for the Gulf of Mexico (103%) as a substitute.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

< 100%

No information could be found regarding bait needs in the US South Atlantic snapper-grouper vertical line fishery. A pilot observer program conducted from 2007 to 2009 collected information on species composition and disposition (kept or discarded) (GSAFF 2008) (GSAFF 2010). The (bait+discards)/landings ratio uses the total discarded CPUE (all species combined) divided by total retained CPUE. This ratio should be considered a minimum estimate because it does not account for bait needs, nor does it distinguish between species retained for food vs. bait. Based on 2,664 stations sampled between 2007 and 2009, the (bait + discards)/landings ratio is 29.9% (GSAFF 2008) (GSAFF 2010). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

< 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish vertical line fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 398 trips and 13,827 sets between 2006 and 2011, the (bait + discards)/landings ratio is 37.2% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

SNOWY GROUPER

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPE

High Concern

A stock assessment for snowy grouper in the Gulf of Mexico was conducted using data limited methods with data through 2014, and peer reviewed through the SEDAR process (SEDAR 2016b). Only one of three candidate models met the performance criteria (e.g., model convergence) for all the methods evaluated. This model, which uses a short time series of data (2010 to 2014), indicated the biomass in recent years was below threshold levels and fishing mortality exceeded a sustainable level; however, the time series was considered too short to provide reliable management advice (SEDAR 2016b). A similar model run with a longer time series of data (1990 to 2014) provided similar results for stock status, but did not meet all the performance criteria (SEDAR 2016b). Furthermore, no index of abundance is available for this species due to recent changes in the fishery distribution (SEDAR 2016b). For these reasons, the scores for Gulf of Mexico snowy grouper are based on proxy information, including a PSA analysis.

PSA results indicate that snowy grouper have moderate productivity and high susceptibility, resulting in an overall high inherent vulnerability score (PSA = 3.47). The combination of high vulnerability and a lack of data to evaluate stock status of snowy grouper in the Gulf of Mexico leads to an abundance score of "high" concern.

Justification:

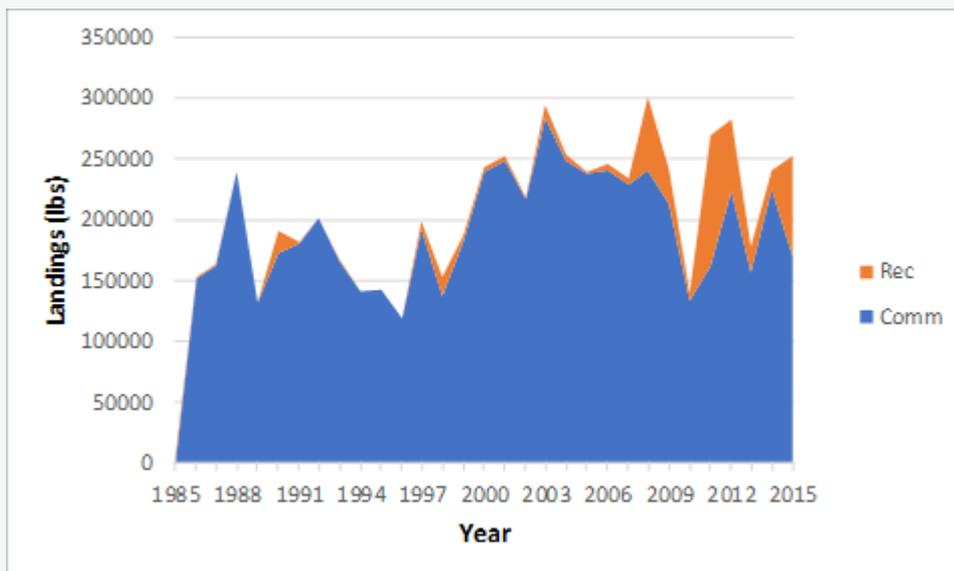


Figure 30 Commercial and recreational harvest of snowy grouper from the Gulf of Mexico. From the NMFS Sustainable Fishery Division (2017a, 2017b), accessed August 2017.

Gulf of Mexico Snowy Grouper Productivity-Susceptibility Analysis:

Scoring Guidelines

1.) Productivity score (*P*) = average of the productivity attribute scores (*p*1, *p*2, *p*3, *p*4 (finfish only), *p*5 (finfish only), *p*6, *p*7, and *p*8 (invertebrates only))

2.) Susceptibility score (*S*) = product of the susceptibility attribute scores (*s*1, *s*2, *s*3, *s*4), rescaled as follows:
 $S = [(s1 * s2 * s3 * s4) - 1/ 40] + 1 .$

3.) Vulnerability score (*V*) = the Euclidean distance of *P* and *S* using the following formula: $V = \sqrt{(P^2 + S)^2}$

Productivity Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity	4 to 5 (Wyanski et al. 1999);	2
Average maximum age	Ages recorded up to 16+ years (Wyanski et al. 1999); max reported age of 27 years (Froese and Pauly 2017)	2
Fecundity	2,000,000 eggs (https://safmc.net/regulations/regulations-by-species/snowy-grouper/)	1
Average maximum size (fish only)	90 to 100 cm (Wyanski et al. 1999)	1
Average size at maturity (fish only)	47 to 55 cm (Wyanski et al. 1999)	2
Reproductive strategy	Broadcast spawner	1
Trophic level	4 (Froese and Pauly 2017)	3
Density dependence (invertebrates only)		
Habitat quality		1
Total Productivity (average)		1.75
Susceptibility Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)

Areal overlap (Considers all fisheries)	Default score	3
Vertical overlap (Considers all fisheries)	Default score	3
Selectivity of fishery (Specific to fishery under assessment)	Snowy grouper are protogynous hermaphrodites (Wyanski et al. 1999), which increases susceptibility	3
Post-capture mortality (Specific to fishery under assessment)	Greater than 95% of snowy grouper captured in the longline fishery are retained (Scott-Denton et al. 2011; Scott-Denton and William 2013)	3
Total Susceptibility (multiplicative)		3

PSA score for snowy grouper in the Gulf of Mexico longline fishery is calculated as follows:

$$\text{Vulnerability (V)} = \sqrt{P^2 + S^2}$$

$$V = \sqrt{(1.75^2 + 3.0^2)}$$

$$V = 3.47$$

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPE
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

High Concern

A benchmark stock assessment was completed in 2004 with data through 2002, followed by a standard assessment update with data through 2012 (SEDAR 2013a). Terminal year spawning biomass of $SSB_{2012} = 427$ MT is only 65% of the minimum stock size threshold ($MSST = .75 * SSB_{MSY}$) of 654.2 MT (SEDAR 2013a), indicating the stock is overfished.

IUCN lists snowy grouper populations as "Vulnerable," due primarily to large declines in abundance in the US South Atlantic (Thierry et al. 2008). SAFMC implemented regulations to end overfishing in the stock in 2006 (SAFMC 2006), and defined a rebuilding plan (34 years) in 2008 (SAFMC 2007a). Due to the continued overfished status, as determined from the 2012 stock assessment (SEDAR 2013a), Amendment 20 was passed to adjust the rebuilding strategy and recovery plan (SAFMC 2014a). Regardless, estimated biomass levels relative to management benchmarks result in an abundance rating of "high" concern for snowy grouper in the South Atlantic region.

Justification:

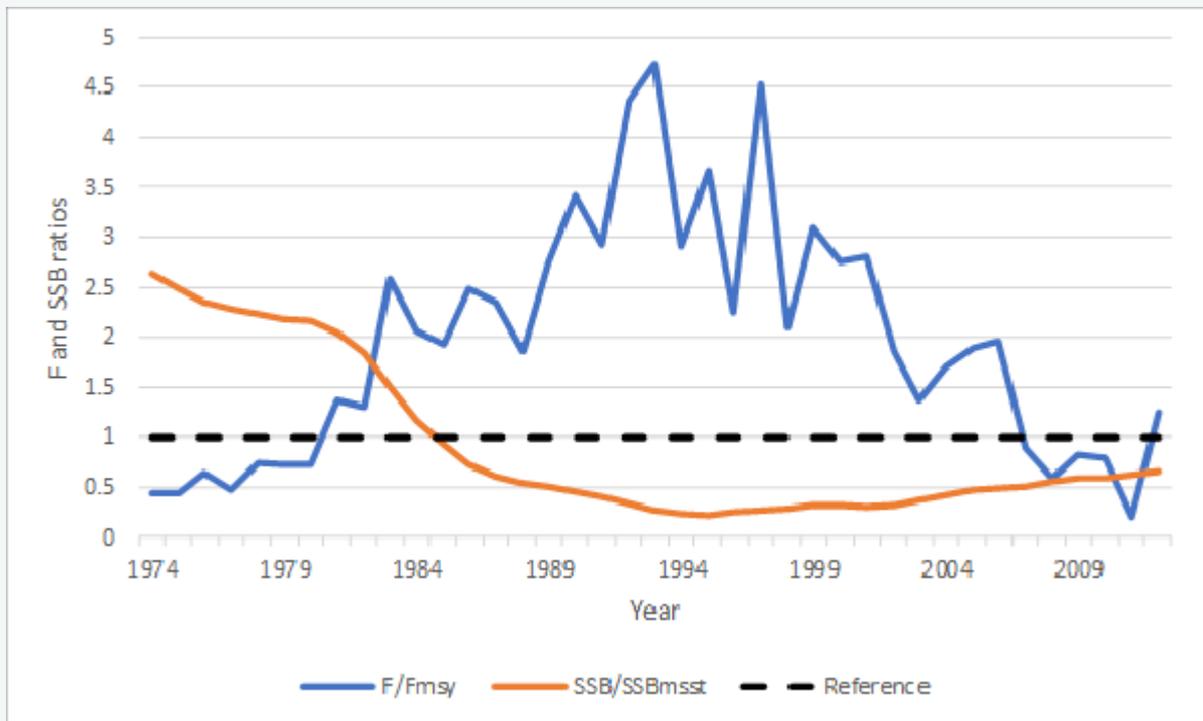


Figure 31 South Atlantic snowy grouper fishing mortality and spawning biomass from the base model run relative to selected management reference points. Figure developed based on data provided in SEDAR 36 Table 10 (SEDAR 2013a).

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPE

Moderate Concern

Reported commercial harvest, which generally accounts for more than 90% of total harvest, has fluctuated without trend between 150,000 and 250,000 lb since the early 1980s (NMFS Fisheries Statistics Division 2017a). NMFS manages snowy grouper as part of the "deep water grouper" complex, which is considered not to be experiencing overfishing (NMFS 2017b). However, no quantitative information could be found for fishing mortality of Gulf of Mexico snowy grouper, resulting in a fishing mortality score of "moderate" concern.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPE

Low Concern

Estimated fishing mortality in the most recent three years of the stock assessment are used to evaluate fishing pressure relative to management benchmarks (SEDAR 2013a). The fishing mortality target was established as 75% of F_{MSY} in the assessment (SEDAR 2013a). Recent fishing mortality of $F_{2010-2012} = 0.085$ is below the target fishing mortality of $F_{target} = 0.11$, and is estimated to be only 59% of the overfishing threshold of $F_{MSY} = 0.14$ (SEDAR 2013a). Because fishing mortality is below the limit reference point, snowy grouper in the South Atlantic receives a fishing mortality score of "low" concern.

Factor 2.3 - Discard Rate

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

≥ 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish longline fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative,

the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 195 trips and 5,015 sets between 2006 to 2011, the (bait + discards)/landings ratio is 103% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio greater than 100% warrants a Criterion 2 score modifier of 0.75.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

≥ 100%

No information could be found to directly calculate the (discards + bait)/landings ratio for the South Atlantic snapper grouper longline fishery. No observer data are available. Harvesters are required to report discard data through the SEFSC Coastal Fishery Logbook Program (NMFS SEFSC 2017a). However, ratios of discards to harvest cannot be calculated from these data because landings are reported in pounds while discards are reported in numbers of fish (NMFS 2011) (NMFS 2013) (NMFS 2016b). Given the similarities in gear and catch between this region and the Gulf of Mexico longline reef fishery, we use the ratio for the Gulf of Mexico (103%) as a substitute.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

< 100%

No information could be found regarding bait needs in the US South Atlantic snapper-grouper vertical line fishery. A pilot observer program conducted from 2007 to 2009 collected information on species composition and disposition (kept or discarded) (GSAFF 2008) (GSAFF 2010). The (bait+discards)/landings ratio uses the total discarded CPUE (all species combined) divided by total retained CPUE. This ratio should be considered a minimum estimate because it does not account for bait needs, nor does it distinguish between species retained for food vs. bait. Based on 2,664 stations sampled between 2007 and 2009, the (bait + discards)/landings ratio is 29.9% (GSAFF 2008) (GSAFF 2010). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

< 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish vertical line fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 398 trips and 13,827 sets between 2006 and 2011, the (bait + discards)/landings ratio is 37.2% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

GRAY TRIGGERFISH

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

High Concern

A 2006 benchmark stock assessment for gray triggerfish in the Gulf of Mexico determined that overfishing was occurring, but overfished status was uncertain (SEDAR 2015d). Amendment 30A to the GMFMC reef fish FMP addressed overfishing and established a plan to rebuild the stock by 2017 (GMFMC 2008c). An update to the stock assessment model in 2011 found that the stock was both overfished and experiencing overfishing (GMFMC 2012). Amendment 37 to the FMP revised the rebuilding plan, but did not extend the rebuilding period (GMFMC 2012).

A new benchmark assessment was conducted through the SEDAR process using data through 2013 (SEDAR 2015d). The model determined that biomass has generally declined throughout the time series and estimated a biomass ratio of $SSB_{2010} / MSST = 0.54$, indicating that the stock is overfished (SEDAR 2015d). Projections under a harvest moratorium suggest the stock would not rebuild within the approved rebuilding period (rebuilt by 2021), while fishing at the overfishing limit of F_{MSY} would require nearly 60 years for the stock to rebuild (SEDAR 2015d). Since the assessment, GMFMC passed Amendment 44, which lowered the MSST for gray snapper and changed the status to not overfishing (GMFMC 2017d). Although the new amendment changes the status determination for the species, it is due to a lowering of the threshold value (rather than an increase in abundance), and the stock is still considered to be in a rebuilding program (GMFMC 2017d). Further, the IUCN lists gray triggerfish as "Vulnerable" with a declining population trend (Liu et al. 2015). For these reasons, gray triggerfish in the Gulf of Mexico remains a species of concern, resulting in an abundance score of "high" concern.

Justification:

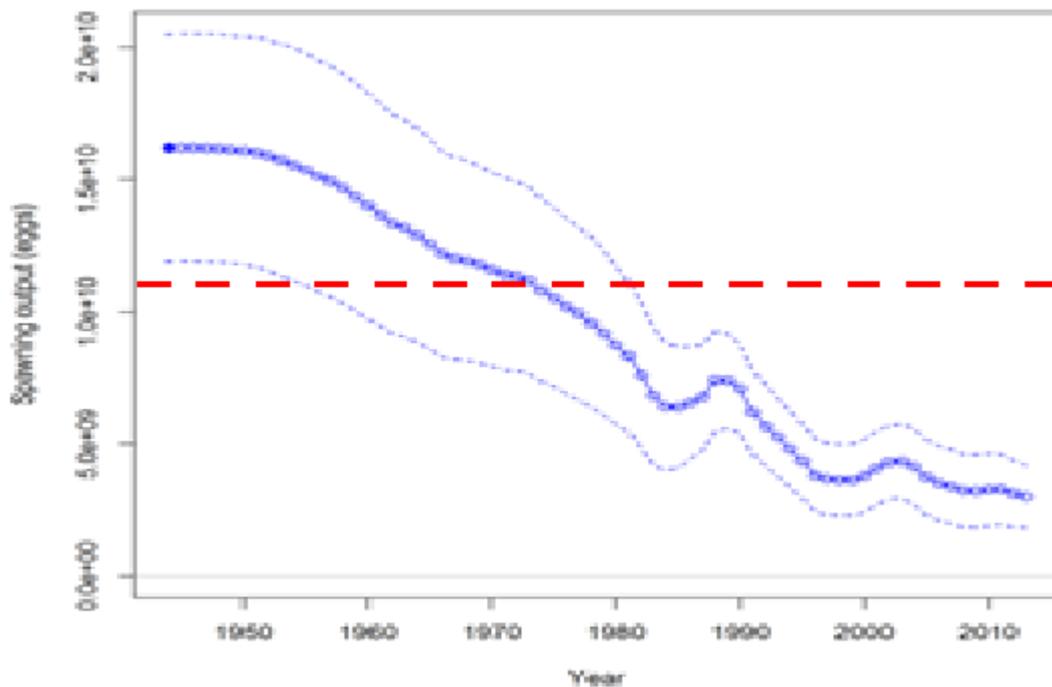


Figure 32 Estimated spawning output for Gulf of Mexico gray triggerfish. Red dashed line added to show approximate location of biomass threshold (1.11×10^{10}). Figure reprinted from SEDAR 43 Figure 3.2.48 (SEDAR 2015d).



UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

A recent assessment of Southeast Atlantic Gray Triggerfish could not estimate abundance relative to target and overfished abundance reference points because of high uncertainty in the assessment model (SEDAR 2015f) (NMFS 2016e). The review panel for the assessment stated "that there was no evidence of a decline in abundance or biomass at this time" (SEDAR 2015f). A previous assessment in 2011 also concluded that abundance status was "highly uncertain" due to a small data set (Broome et al. 2011). Because there is

conflicting and uncertain abundance information for gray triggerfish in the Southeast Atlantic, and the Productivity-Susceptibility Analysis indicates that this species does not have a high vulnerability to fishing (see detailed scoring below), we have awarded a score of "moderate" concern.

Justification:

Productivity Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity	<1 year (Kelly 2014) to 1.5 years (Fitzhugh et al. 2015)	1
Average maximum age	10+ years (Lombardi et al. 2015)	2
Fecundity	8,000,000 eggs/year (Lang and Fitzhugh 2015)	1
Average maximum size (fish only)	60 cm (Lombardi et al. 2015)	1
Average size at maturity (fish only)	17-19 cm (Kelly 2014) (Fitzhugh et al. 2015)	1
Reproductive strategy	Demersal egg layer (SEDAR 2016a)	2
Trophic level	4.1 (Froese and Pauly 2016a)	3
Density dependence (invertebrates only)		
Habitat quality	Moderately altered from non-fishing sources (SAFMC 2017i)	2
Total Productivity (average)		1.625
Susceptibility Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Areal overlap (Considers all fisheries)	Fished in nearly all of the species' range	3
Vertical overlap (Considers all fisheries)	Fished in nearly all of the species' vertical distribution	3
Selectivity of fishery (Specific to fishery under assessment)	Targeted and important contribution to the reef fish fishery	2

Post-capture mortality (Specific to fishery under assessment)	Retained species	3
Total Susceptibility (multiplicative)		2.325

PSA score for gray triggerfish in the US South Atlantic vertical line fishery is calculated as follows:

$$\text{Vulnerability (V)} = \sqrt{P^2 + S^2}$$

$$V = \sqrt{1.625^2 + 2.325^2}$$

$$V = 2.837$$

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

Based on the recent 2015 assessment, Gulf of Mexico gray triggerfish is no longer experiencing overfishing (SEDAR 2015d). Fishing mortality was estimated to be well below the fishing mortality at maximum sustainable yield (F_{MSY}) threshold ($F/F_{MSY} = 0.62$) (SEDAR 2015d), and below the overfishing limit since 2008, but there were a number of uncertainties and concerns with the assessment (GMFMC 2015c). Several previous assessments since 2001 have all indicated that overfishing was occurring in the past (SEDAR 2011e) (SEDAR 2015d). Landings in the Gulf of Mexico were 64,343 lb for the commercial fishery and 157,418 lb for the recreational fishery in 2013, with the majority of landings coming from the eastern Gulf of Mexico (SEDAR 2015d). Additionally, age-0 and age-1 juvenile gray triggerfish are common discards in the shrimp trawl fishery in the Gulf of Mexico (SEDAR 2011e). Because of the recent removal of gray triggerfish from overfishing status, but a lengthy prior period of overfishing and concerns over the lack of recovery of the gray triggerfish population, we have awarded a score of "moderate" concern.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

The first SEDAR assessment was completed for US Southeast Atlantic gray triggerfish in April 2016, and it determined that exploitation status is unknown due to uncertainty in the assessment model (SEDAR 2016a). The review panel's report from the SEDAR assessment states that, based on the information available to the panel, "there was no evidence that current levels of removals have resulted in overfishing" (SEDAR 2016a). Landings of this species are difficult to quantify because gray triggerfish is often listed in dealer reports as generic "triggerfishes," which include queen, ocean, and gray triggerfish in the Southeast Atlantic (pers. comm., J. Myers, SEDAR 2016). Gray triggerfish represent around 7% of the catch in the red snapper fishery, 10% in the vermilion fishery and 2% in the yellowtail snapper fishery. Therefore, the snapper fisheries assessed are not substantial contributors to gray triggerfish mortality. However, as fishing mortality is unknown for this species, we have scored this as "moderate" concern.

Factor 2.3 - Discard Rate

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish vertical line fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 398 trips and 13,827 sets between 2006 and 2011, the (bait + discards)/landings ratio is 37.2% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the US South Atlantic snapper-grouper vertical line fishery. A pilot observer program conducted from 2007 to 2009 collected information on species composition and disposition (kept or discarded) (GSAFF 2008) (GSAFF 2010). The (bait+discards)/landings ratio uses the total discarded CPUE (all species combined) divided by total retained CPUE. This ratio should be considered a minimum estimate because it does not account for bait needs, nor does it distinguish between species retained for food vs. bait. Based on 2,664 stations sampled between 2007 and 2009, the (bait + discards)/landings ratio is 29.9% (GSAFF 2008) (GSAFF 2010). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

RED PORGY

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

High Concern

No stock assessment has been conducted for red porgy from the Gulf of Mexico, requiring the use of productivity-susceptibility analysis (PSA) results to determine scoring criteria. A PSA score of 3.30 indicates that red porgy have a high inherent vulnerability. Further, no reference points have been defined for the species, and there is no data available to determine whether red porgy are above or below a reference point. For these reasons, red porgy in the Gulf of Mexico receive an abundance score of "high" concern.

Justification:

US Gulf of Mexico Red Porgy

Productivity-Susceptibility Analysis:

Scoring Guidelines

1.) Productivity score (P) = average of the productivity attribute scores (p_1, p_2, p_3, p_4 (finfish only), p_5 (finfish only), p_6, p_7 , and p_8 (invertebrates only))

2.) Susceptibility score (S) = product of the susceptibility attribute scores (s_1, s_2, s_3, s_4), rescaled as follows:
 $S = [(s_1 * s_2 * s_3 * s_4) - 1/40] + 1$.

3.) Vulnerability score (V) = the Euclidean distance of P and S using the following formula: $V = \sqrt{(P^2 + S)^2}$

Productivity Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity	3-4 (Froese and Pauly 2017) (Kokokiris et al 1999)	1
Average maximum age	Samples observed as old as 12 years, but more commonly 10-11 years (Harris and McGovern 1997)	2
Fecundity	50,000 eggs per year (Froese and Pauly 2017)	1
Average maximum size (fish only)	Median value from 11 studies is 47.3 cm (Froese and Pauly 2017)	1
Average size at maturity (fish only)	26.6 cm (Froese and Pauly 2017); 25-39 based on age data from Kokokiris et al. (1999) and growth data from Harris and McGovern (1997)	1
Reproductive strategy		
Trophic level	3.9 (Froese and Pauly 2017)	3
Density dependence (invertebrates only)		
Habitat quality	Moderately altered by non-fishing impacts	2
Total Productivity (average)		
		1.50
Susceptibility Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)

Areal overlap (Considers all fisheries)	3 (default value)	3
Vertical overlap (Considers all fisheries)	3 (default value)	3
Selectivity of fishery (Specific to fishery under assessment)	Protogynous hermaphrodites (Harris and McGovern 1997) (Kokokiris et al. 1999)	3
Post-capture mortality (Specific to fishery under assessment)	Greater than 95% of captured fish retained or discarded dead (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013)	3
Total Susceptibility (multiplicative)		3

PSA score for red porgy in US Gulf of Mexico vertical line fishery is calculated as follows:

$$\text{Vulnerability (V)} = \sqrt{P^2 + S^2}$$

$$V = \sqrt{1.50^2 + 3.0^2}$$

$$V = 3.35$$

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

High Concern

An early stock assessment for red porgy in the SAFMC management unit determined that the stock was overfished and that overfishing was occurring (SAFMC 2000). A benchmark stock assessment conducted through the SEDAR process in 2002 came to the same conclusion (SEDAR 2002). To address these concerns, the SAFMC implemented emergency rulings in 1999 prohibiting harvest of red porgy, followed by Amendment 12 to enact more permanent measures to address stock status, including implementation of an 18-year rebuilding plan (SAFMC 2000). Several updates to the SEDAR stock assessment have been conducted since then, with the most recent based on data through 2011 (SEDAR 2012a). The 2012 update indicates that red porgy biomass has increased under the rebuilding plan, but is still below the biomass threshold ($SSB_{2011} / MSST = 0.61$) (SEDAR 2012a). Projections under a number of harvest scenarios were conducted to evaluate the potential for stock rebuilding. Even under a harvest scenario of $F = 0$, assessment projections indicate red porgy had less than a 20% probability of being fully rebuilt by the end of the rebuilding period in 2018 (SEDAR 2012a). The NMFS quarterly status report indicates red porgy are still below the biomass threshold (NMFS 2017b), and therefore receive an abundance score of "high" concern.

Justification:

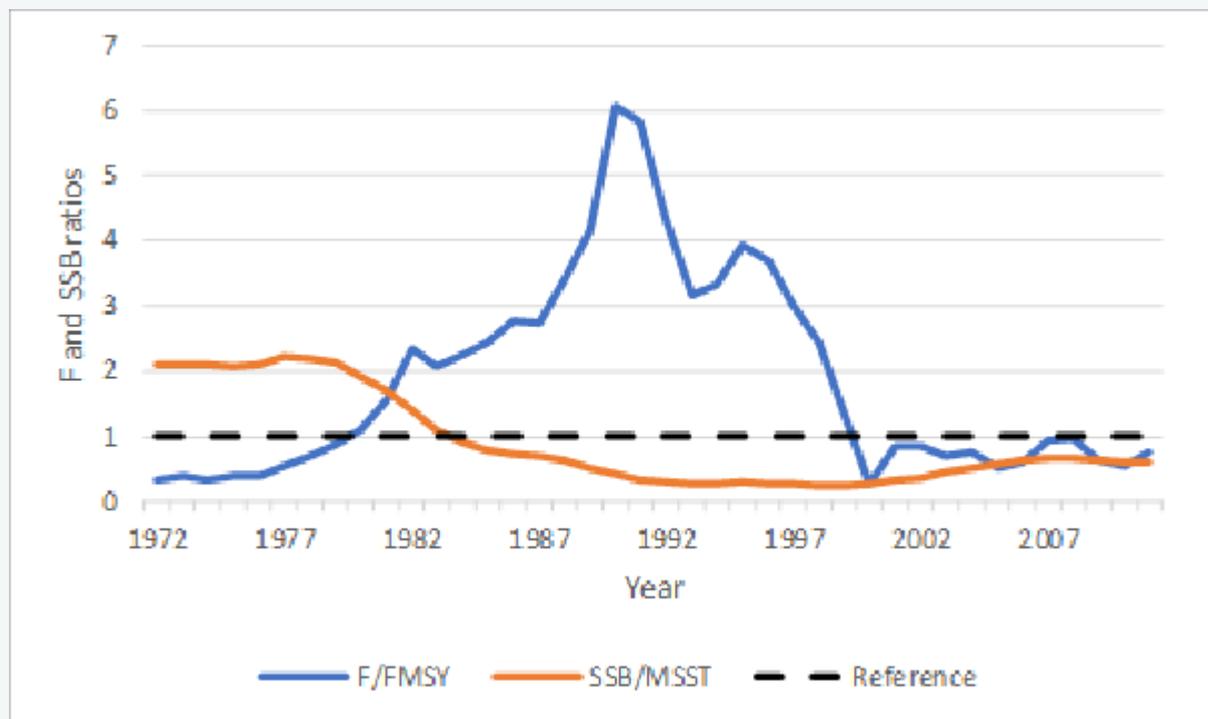


Figure 34 South Atlantic red porgy fishing mortality and spawning biomass from the preferred model run relative to selected management reference points. Figure developed based on data provided in SEDAR 01 update Table 10 (SEDAR 2012a).

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

Red porgy are not included in any of the GMFMC fishery management plans. A stock assessment in the Gulf of Mexico has never been conducted, and they are not included in the NMFS Status of the Stocks reports. Fishing mortality for red porgy in the Gulf of Mexico is unknown, requiring a fishing mortality score of "moderate" concern.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Low Concern

The fishing mortality threshold for red porgy in the US South Atlantic is defined as the fishing mortality that achieves maximum sustainable yield (F_{MSY}) (SEDAR 2012a). Early stock assessments determined that overfishing was occurring, which resulted in swift management action by the SAFMC to end overfishing (SAFMC 2000). Overfishing status is evaluated as the geometric mean fishing mortality rate in the most recent three years relative to F_{MSY} (SEDAR 2012a). The 2012 stock assessment indicates that $F_{2009-2011} / F_{MSY} = 0.64$ with annual fishing mortality rate below the threshold in every year since 2000 (SEDAR 2012a). Since 2007, total (commercial + recreational) landings of red porgy have remained relatively stable around a mean of 221,000 lb (range 188,000 to 292,000) (NMFS Fishery Statistics Division 2017a) (NMFS Fishery Statistics Division 2017b), suggesting fishing mortality rate remains below the threshold value. Evidence of fishing mortality below a threshold level justifies a fishing mortality score of "low" concern for red porgy in the US South Atlantic.

Factor 2.3 - Discard Rate

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPE

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish vertical line fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 398 trips and 13,827 sets between 2006 and 2011, the (bait + discards)/landings ratio is 37.2% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPE

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the US South Atlantic snapper-grouper vertical line fishery. A pilot observer program conducted from 2007 to 2009 collected information on species composition and disposition (kept or discarded) (GSAFF 2008) (GSAFF 2010). The (bait+discards)/landings ratio uses the total discarded CPUE (all species combined) divided by total retained CPUE. This ratio should be considered a minimum estimate because it does not account for bait needs, nor does it distinguish between species retained for food vs. bait. Based on 2,664 stations sampled between 2007 and 2009, the (bait + discards)/landings ratio is 29.9% (GSAFF 2008) (GSAFF 2010). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

VERMILION SNAPPER

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Very Low Concern

Vermilion snapper most recently underwent a peer reviewed stock assessment during SEDAR 45 (SEDAR 2016f). The target biomass for the stock is defined as $SSB_{F30\%SPR} = 1.97 \times 10^{14}$ eggs (SEDAR 2016f). Current (2014) spawning biomass was estimated as 2.08×10^{14} eggs, which exceeds the target, indicating the stock is not overfished (SEDAR 2016f). Population declines throughout the species' range have resulted in an IUCN listing of "Vulnerable" (Lindemnan et al. 2016). However, a recent peer-reviewed assessment that indicates biomass exceeds the target levels justifies an abundance score of "very low" concern for Gulf of Mexico vermilion snapper.

Justification:

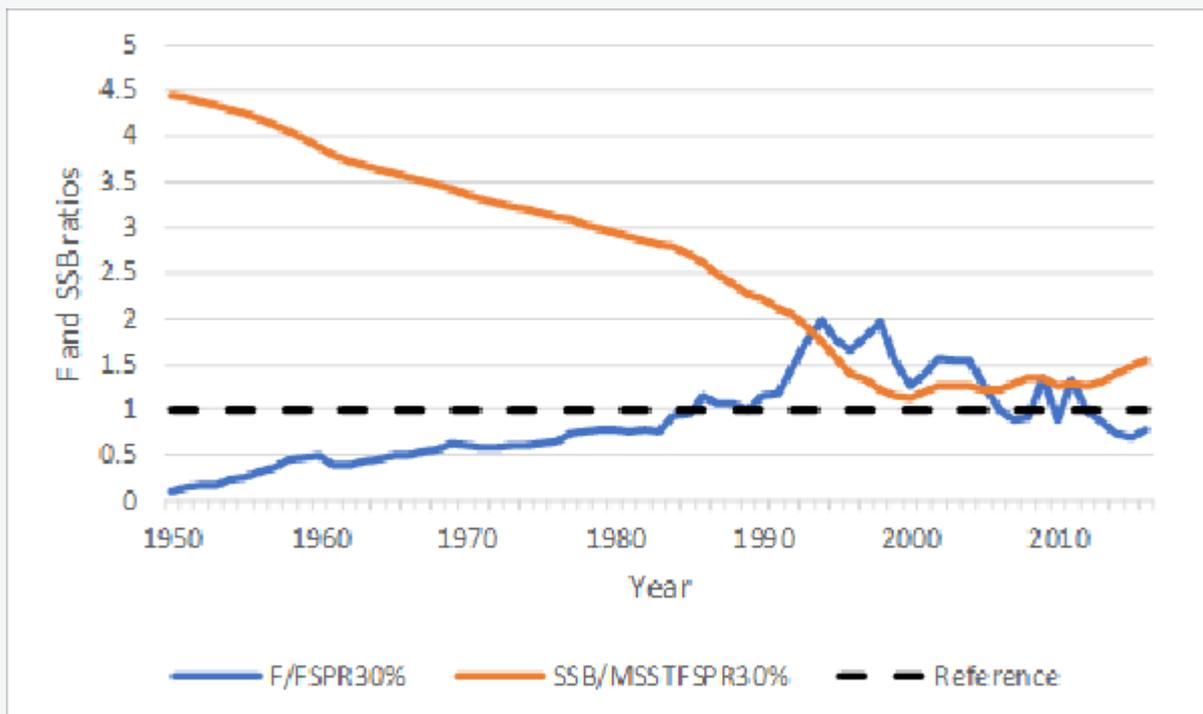


Figure 35 Gulf of Mexico vermilion snapper fishing mortality and spawning biomass from the preferred model run relative to selected MSY management reference points. Figure developed based on data provided in SEDAR 45 update Table 22 (SEDAR 2016e).

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Very Low Concern

The last stock assessment update for Vermilion Snapper in the SA was published in April 2018. $SSB_{2016}/MSST = 1.51$ and $SSB_{2016} /SSB_{MSY} = 1.13$ (SEDAR 2018c). Therefore, the biomass is above both the LRP and the TRP but is quite close to MSY. The age structure in the 2016 model run showed that there is an increasing proportion of old fish compared to previous years. This shows that there was strong recruitment in the 2000s, with slightly fewer young fish and average to below average recruitment in recent years (SEDAR 2018c).

Since a recent stock assessment suggests that biomass is above the target reference point with no scientific controversy, Seafood Watch scores vermilion snapper in the South Atlantic as "very low" concern.

Justification:

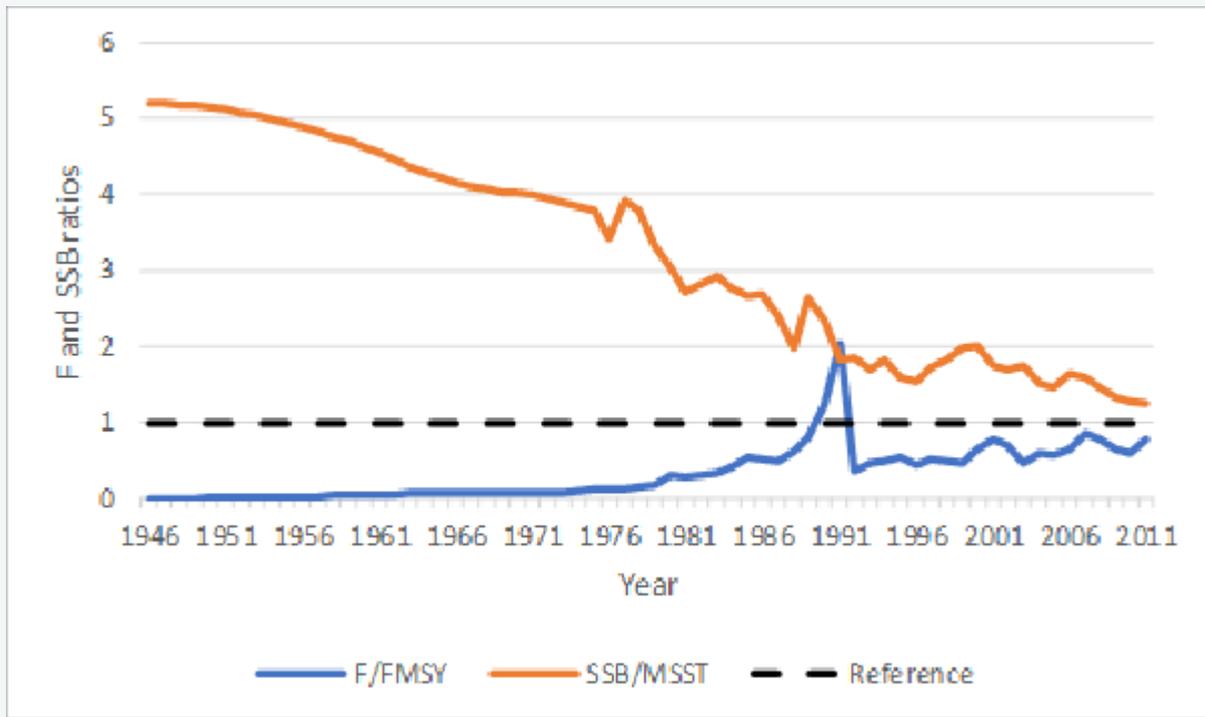


Figure 36 South Atlantic vermilion snapper fishing mortality and spawning biomass from the preferred model run relative to selected management reference points. Figure developed based on data provided in SEDAR 17 update Table 7 (SEDAR 2012b).

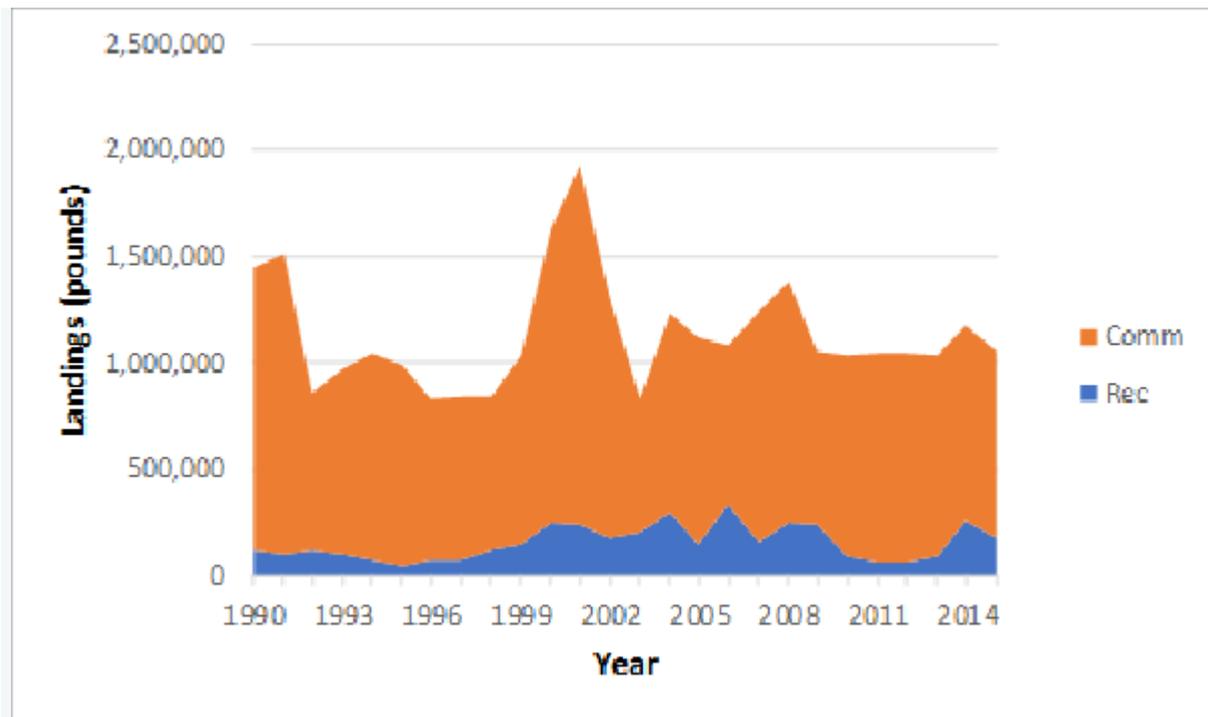


Figure 37 Combined commercial and recreational landings of South Atlantic vermilion snapper. Data downloaded from the NMFS Sustainable Fishery Division (2017a, 2017b), accessed August 2017.

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Low Concern

The fishing mortality threshold for vermilion snapper in the Gulf of Mexico is defined as $F_{SPR30\%} = 0.103$ (SEDAR 2016f). Terminal year fishing mortality was estimated as $F_{2014} = 0.075$, producing a fishing mortality ratio of $F / F_{THRESHOLD} = 0.73$ (SEDAR 2016f). Uncertainty analyses suggest there is limited probability that fishing mortality exceeds the threshold (SEDAR 2016f). These results indicate that the stock is not experiencing overfishing, resulting in a fishing mortality score of "low" concern for Gulf of Mexico vermilion snapper.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER
 UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Low Concern

The most recent update stock assessment for US South Atlantic vermilion snapper found that the current F (with the geometric mean from the period 2014 to 2016), was estimated by the base run to be $F_{2014-2016} / F_{MSY} = 0.609$, and the median value was $F_{2014-2016} / F_{MSY} = 0.564$ (SEDAR 2018c). There is much uncertainty in the assessment (see Justification), but there is less than a 50% chance that fishing mortality is less than the sustainable level. Since fishing mortality is much lower than F_{MSY} , the stock receives a biomass score of "low" concern.

Justification:

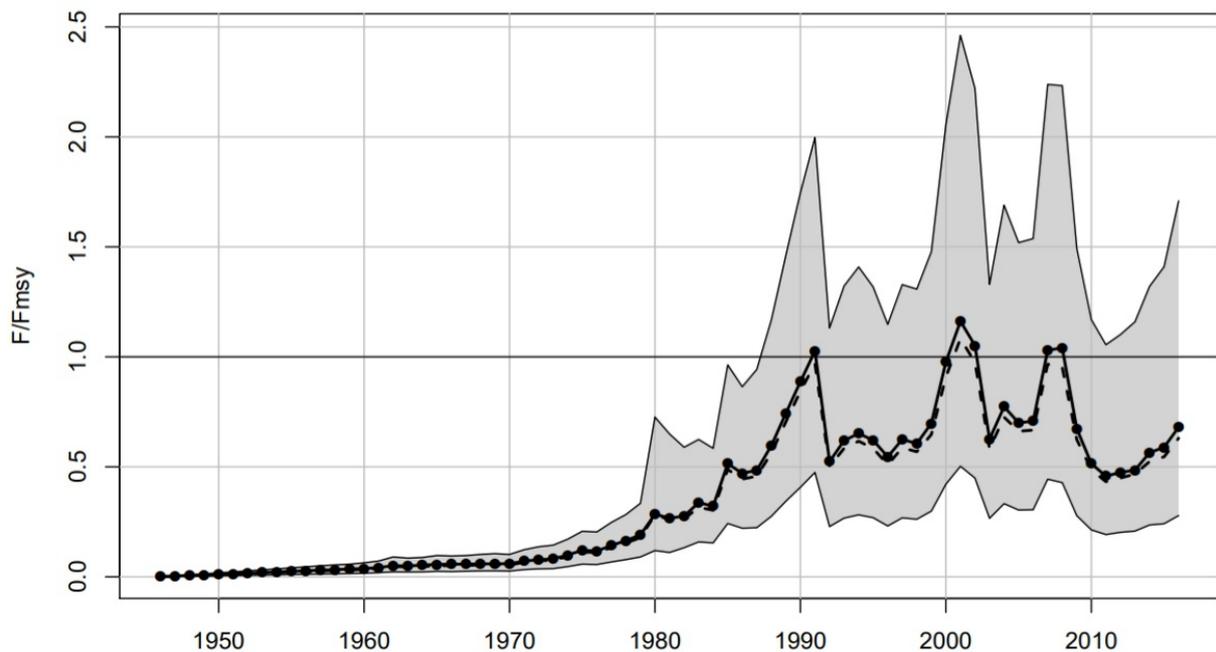


Figure 38 Estimated time series of F relative to FMSY. Solid line indicates estimates from base run of the Beaufort Assessment Model; dashed lines represent median values; gray error bands indicate 5th and 95th percentiles of the Monte Carlo bootstrap trials. Source (SEDAR 2018c).

Around 83.2% of MCB runs agreed with the base run that the stock is currently not experiencing overfishing, but there is "much uncertainty in the terminal years" which is demonstrated in the figure below (SEDAR 2018c).

Factor 2.3 - Discard Rate

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish vertical line fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 398 trips and 13,827 sets between 2006 and 2011, the (bait + discards)/landings ratio is 37.2% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the US South Atlantic snapper-grouper vertical line fishery. A pilot observer program conducted from 2007 to 2009 collected information on species composition and disposition (kept or discarded) (GSAFF 2008) (GSAFF 2010). The (bait+discards)/landings ratio uses the total discarded CPUE (all species combined) divided by total retained CPUE. This ratio should be considered a minimum estimate because it does not account for bait needs, nor does it distinguish between species retained for food vs. bait. Based on 2,664 stations sampled between 2007 and 2009, the (bait + discards)/landings ratio is 29.9% (GSAFF 2008) (GSAFF 2010). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

YELLOWTAIL SNAPPER

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

Very Low Concern

A benchmark stock assessment for yellowtail snapper for the US South Atlantic and Gulf of Mexico combined was conducted with data through 2010, and was reviewed through the SEDAR desk review process (SEDAR 2012c). Spawning biomass in 2010 exceeded the biomass threshold by over 200% ($SSB_{2010} / MSST = 3.357$), and results of the uncertainty analysis indicated there was 0% probability that the stock was overfished (SEDAR 2012c). Assessment results show that SSB has generally been increasing over the time series of the model, and projections at the current (2010) fishing mortality rate suggest SSB will remain stable in the short term (SEDAR 2012c). Although the assessment is more than five years old, the very robust stock status justifies an abundance score of "very low" concern for yellowtail snapper in the southeast region.

Justification:

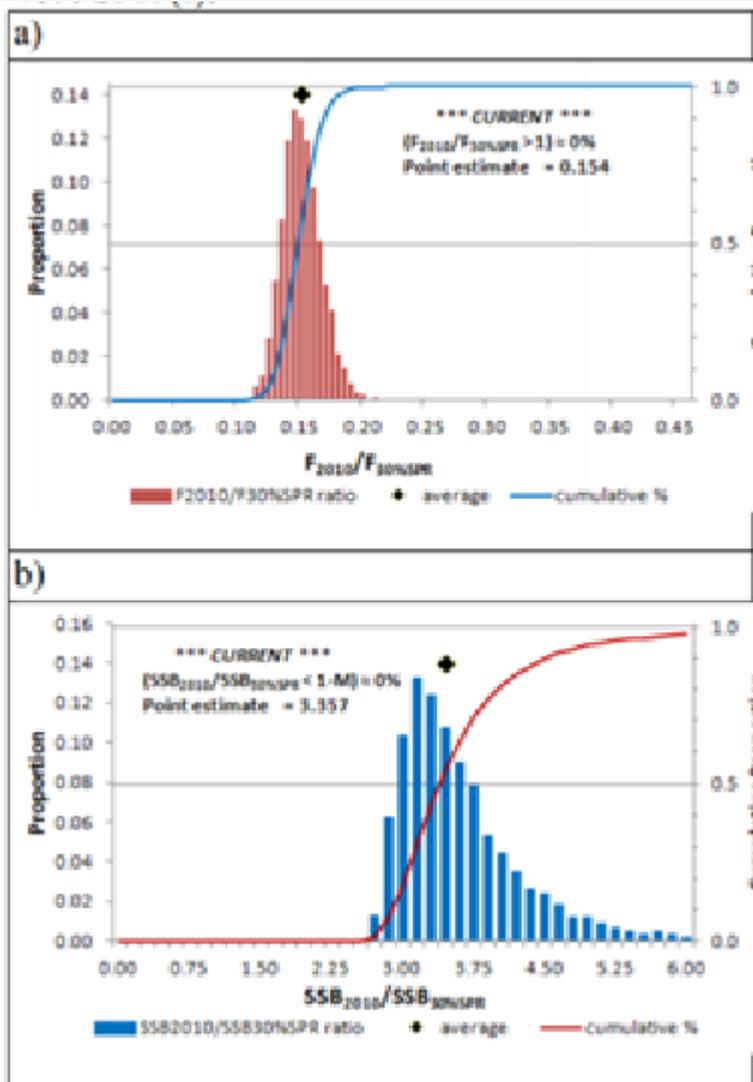


Figure 39 Uncertainty distributions of fishing mortality and spawning biomass relative to selected management reference points for Gulf of Mexico yellowtail snapper. Figure reprinted from SEDAR 27a Figure 10.7.15 (SEDAR 2012c).

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

Low Concern

Terminal year fishing mortality rate for yellowtail snapper ($F_{2010} = 0.0454$) was well below the fishing mortality threshold of $F_{30\%SPR} = 0.29$. A fishing mortality ratio of $F_{2010} / F_{30\%SPR} = 0.154$ indicates overfishing was not occurring (SEDAR 2012c). Uncertainty analyses suggest that this finding is robust. Combined landings have remained relatively stable since the completion of the stock assessment (NMFS Fishery Statistics Division 2017a) (NMFS Fishery Statistics Division 2017b), suggesting that fishing mortality has not increased significantly. Available evidence indicates that fishing mortality for yellowtail snapper in the US South Atlantic and Gulf of Mexico is below sustainable levels, resulting in a fishing mortality score of "low" concern.

Factor 2.3 - Discard Rate

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

< 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish vertical line fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 398 trips and 13,827 sets between 2006 and 2011, the (bait + discards)/landings ratio is 37.2% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

≥ 100%

No information could be found to directly calculate the (discards + bait)/landings ratio for the South Atlantic snapper grouper longline fishery. No observer data are available. Harvesters are required to report discard data through the SEFSC Coastal Fishery Logbook Program (NMFS SEFSC 2017a). However, ratios of discards

to harvest cannot be calculated from these data because landings are reported in pounds while discards are reported in numbers of fish (NMFS 2011) (NMFS 2013) (NMFS 2016b). Given the similarities in gear and catch between this region and the Gulf of Mexico longline reef fishery, we use the ratio for the Gulf of Mexico (103%) as a substitute.

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

< 100%

No information could be found regarding bait needs in the US South Atlantic snapper-grouper vertical line fishery. A pilot observer program conducted from 2007 to 2009 collected information on species composition and disposition (kept or discarded) (GSAFF 2008) (GSAFF 2010). The (bait+discards)/landings ratio uses the total discarded CPUE (all species combined) divided by total retained CPUE. This ratio should be considered a minimum estimate because it does not account for bait needs, nor does it distinguish between species retained for food vs. bait. Based on 2,664 stations sampled between 2007 and 2009, the (bait + discards)/landings ratio is 29.9% (GSAFF 2008) (GSAFF 2010). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

ALMACO JACK

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

No stock assessment has been conducted for Almaco jack in the US South Atlantic region. Scoring for Almaco jack is based on a productivity-susceptibility analysis (PSA).

Although life history information for Almaco jack is sparse, the results of the PSA (score = 2.77) indicate that the species has moderate inherent vulnerability. There is no information to indicate biomass is below a critical value, and the IUCN characterizes the species as "Least Concern" (Smith-Vaniz et al. 2015). These characteristics result in an abundance score of "moderate" concern for Almaco jack in the SAFMC headline fishery.

Justification:

US South Atlantic Almaco Jack

Productivity-Susceptibility Analysis:

Scoring Guidelines

1.) Productivity score (*P*) = average of the productivity attribute scores (*p*1, *p*2, *p*3, *p*4 (finfish only), *p*5 (finfish only), *p*6, *p*7, and *p*8 (invertebrates only))

2.) Susceptibility score (*S*) = product of the susceptibility attribute scores (*s*1, *s*2, *s*3, *s*4), rescaled as follows:
 $S = [(s1 * s2 * s3 * s4) - 1/ 40] + 1 .$

3.) Vulnerability score (*V*) = the Euclidean distance of *P* and *S* using the following formula: $V = \sqrt{(P^2 + S)^2}$

Productivity Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity		
Average maximum age		
Fecundity		
Average maximum size (fish only)	Max 160 cm; commonly 90 cm (Froese and Pauly 2017)	1
Average size at maturity (fish only)		
Reproductive strategy	Expected broadcast spawners (MarineBio.org 2017)	1
Trophic level	4.5 (Froese and Pauly 2017)	3
Density dependence (invertebrates only)		
Habitat quality	Moderately altered by non-fishing impacts	2
Total Productivity (average)		
		1.750
Susceptibility Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Areal overlap (Considers all fisheries)	Default	3

Vertical overlap (Considers all fisheries)	Default	3
Selectivity of fishery (Specific to fishery under assessment)	Species is vulnerable to gear but no information to indicate presence of high risk factors	2
Post-capture mortality (Specific to fishery under assessment)	Greater than 90% retained in US South Atlantic handline fishery (GSAFF 2008) (GSAFF 2010)	3
Total Susceptibility (multiplicative)		2.325

PSA score for Almaco jack in US South Atlantic vertical line fishery is calculated as follows:

$$\text{Vulnerability (V)} = \sqrt{P^2 + S^2}$$

$$V = \sqrt{1.75^2 + 2.33^2}$$

$$V = 2.91$$

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

No stock assessment has been conducted for Almaco jack, and NMFS reports that fishing mortality is unknown for the South Atlantic jack complex, which includes Almaco jack, banded rudderfish, and lesser amberjack (NMFS 2017b). The fishing mortality score for Almaco jack in the SAFMC region is therefore "moderate"

concern.

Factor 2.3 - Discard Rate

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the US South Atlantic snapper-grouper vertical line fishery. A pilot observer program conducted from 2007 to 2009 collected information on species composition and disposition (kept or discarded) (GSAFF 2008) (GSAFF 2010). The (bait+discards)/landings ratio uses the total discarded CPUE (all species combined) divided by total retained CPUE. This ratio should be considered a minimum estimate because it does not account for bait needs, nor does it distinguish between species retained for food vs. bait. Based on 2,664 stations sampled between 2007 and 2009, the (bait + discards)/landings ratio is 29.9% (GSAFF 2008) (GSAFF 2010). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

BLACK SEABASS

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

The most recent population assessment update for the US South Atlantic population of Black Sea Bass was published in April 2018. $SSB_{2016} / MSST = 1.15$ and $SSB_{2016} / SSB_{MSY} = 0.71$ (figure below). Therefore, SSB is above the LRP but below 75% of the TRP. There is a low level of uncertainty for the estimate of SSB/MSY, but SSB/MSST is less certain (see justification) (SEDAR 2018).

Since biomass is estimated to be above the LRP but less than 75% above the TRP, Seafood Watch deems abundance as a "moderate" concern.

Justification:

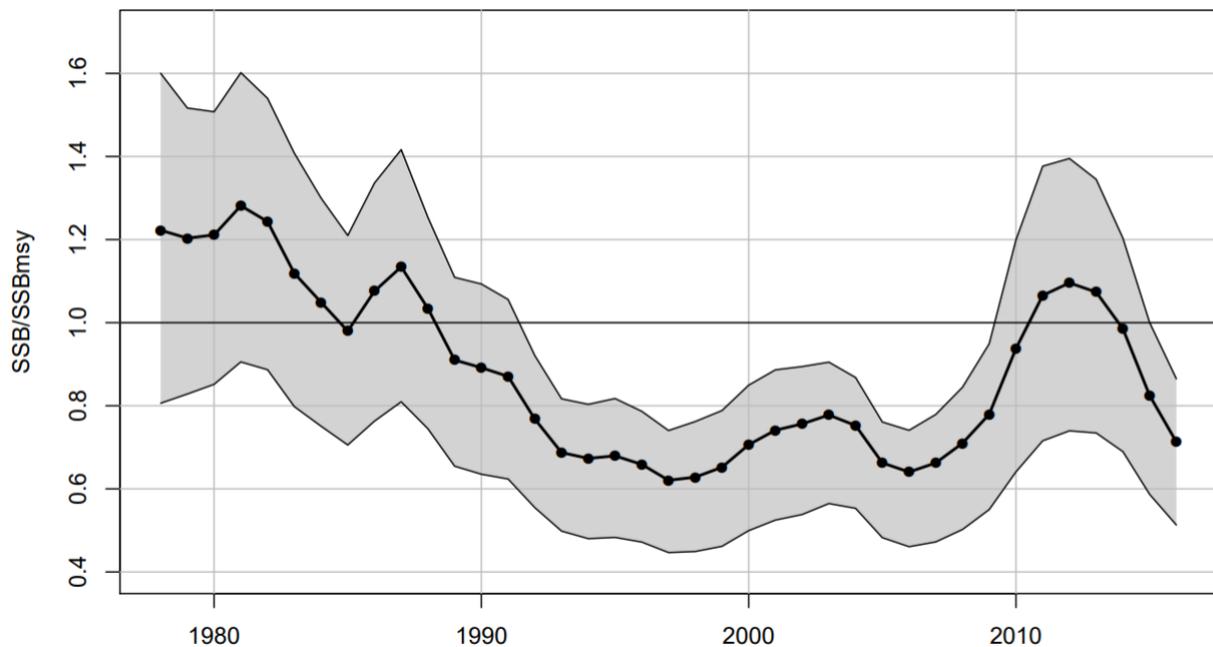


Figure 40 Estimated time series of spawning biomass relative to SSBMSY. Solid line indicates estimates from base run of the Beaufort Assessment Model; gray error bands indicate 5th and 95th percentiles of the Monte Carlo bootstrap trials.

Biomass and recruitment have been estimated to be declining in recent years. There have been proportionately fewer older fish in the last decade than expected in the MSY-based age structure, however there has been improved age-structure in 2016, particularly for ages younger than six (SEDAR 2018).

There is some uncertainty regarding the estimate for SSB/MSST: 76.7% agreement that the stock is not overfished ($SSB_{2016}/MSST > 1.0$). There is a very low level of uncertainty regarding SSB/MSY, estimate: about 99.8% of MCB runs indicate the stock is below SSB_{MSY} (SEDAR 2018).

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Low Concern

$F_{2014-2016} / F_{MSY} = 0.64$ and therefore the stock is not undergoing overfishing (SEDAR 2018). Since the last stock assessment determined that fishing mortality is below the F_{MSY} , Seafood Watch deems fishing mortality as a "low" concern.

Justification:

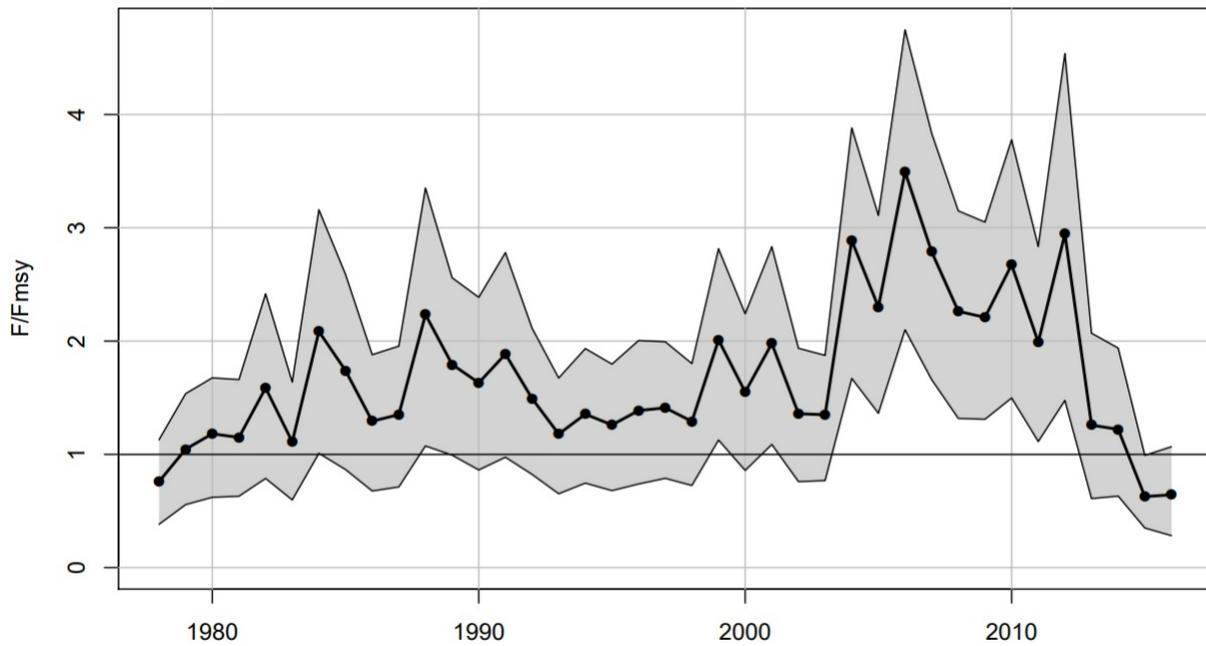


Figure 41 Estimated time series of F relative to F_{MSY} . Solid line indicates estimates from base run of the Beaufort Assessment Model; gray error bands indicate 5th and 95th percentiles of the Monte Carlo bootstrap trials (SEDAR 2018).

Overfishing has occurred through most of the assessment period for black sea bass, although fishing mortality fell below the overfishing threshold in only the last two years (Figure below). This reduction is due to a combination of reductions in F (Table 8; (SEDAR 2018)), improvements in data, changes in fishery selectivity, and slight reductions in F_{MSY} (SEDAR 2018).

There has been much uncertainty of F/F_{MSY} throughout the assessment period; however, in the 2018 assessment, only 5.2% of runs indicated that overfishing was occurring (SEDAR 2018).

Factor 2.3 - Discard Rate

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the US South Atlantic snapper-grouper vertical line fishery. A pilot observer program conducted from 2007 to 2009 collected information on species composition and disposition (kept or discarded) (GSAFF 2008) (GSAFF 2010). The (bait+discards)/landings ratio uses the total discarded CPUE (all species combined) divided by total retained CPUE. This ratio should be considered a minimum estimate because it does not account for bait needs, nor does it distinguish between species

retained for food vs. bait. Based on 2,664 stations sampled between 2007 and 2009, the (bait + discards)/landings ratio is 29.9% (GSAFF 2008) (GSAFF 2010). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

HOGFISH / GEORGIA THROUGH NORTH CAROLINA (GA/NC)

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

High Concern

Hogfish have historically been managed as a single stock within the US South Atlantic and Gulf of Mexico; however, recent genetic analysis indicates several distinct stocks within this management area (SEDAR 2013). A peer reviewed stock assessment conducted through the SEDAR process with data through 2012 assessed three separate stocks, including Western Florida (WFL), the Florida Keys and East Florida (FLK/EFL), and Georgia to North Carolina (GA-NC) (SEDAR 2013). Subsequently, Amendment 37 was passed which split the management unit into two separate stocks, consistent with the genetic evidence presented in the stock assessment (SAFMC 2017b). The following analysis is relevant to the GA-NC stock of hogfish under SAFMC rule.

The biomass threshold for hogfish is defined as 75% of the equilibrium spawning biomass that would occur at a fishing mortality equal to the fishing mortality target ($0.75 * SSB_{\text{targ}}$) (SEDAR 2013). Since no reference points had been defined for any of the substocks at the time of the assessment, the assessment team evaluated both SPR-and MSY-based reference points. However, the peer review panel recommended that results of the statistical catch at age model used in the assessment were not reliable for the GA-NC stock given the data deficiencies and poor model fit (SAFMC 2017d). Catch limits for the stock were established using a data-limited approach (SAFMC 2017b), and NMFS classifies stock status as unknown (NMFS 2017b). Further, IUCN lists hogfish as "Vulnerable" with declining abundance (Choat et al. 2010). Lack of a quantitative stock assessment and a "Vulnerable" listing by the IUCN justify a score of "high" concern for the GA-NC stock of hogfish in the US South Atlantic.

Justification:

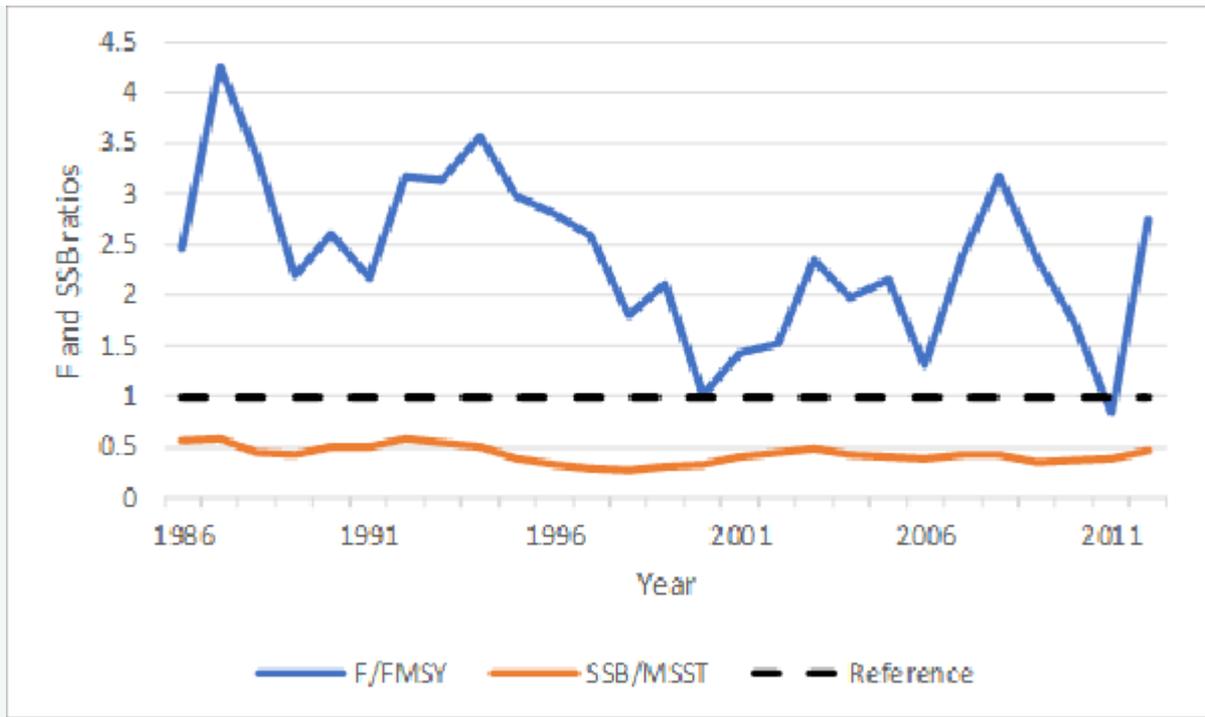


Figure 42 Florida Keys/Eastern Florida (FKEFL) hogfish fishing mortality and spawning biomass from the preferred model run relative to MSY-based management reference points in draft Amendment 37. Figure developed based on data provided in SEDAR 37 Table 11.2.4.2 (SEDAR 2013f).

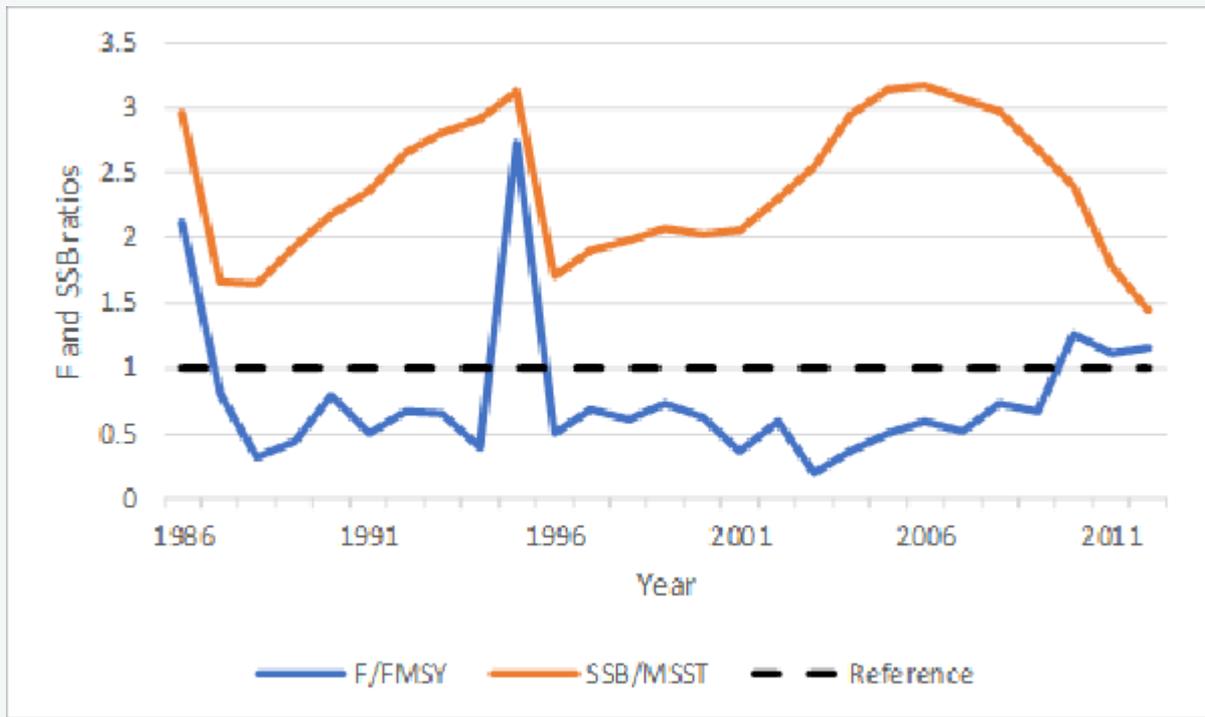


Figure 43 Georgia-North Carolina (GA-NC) hogfish fishing mortality and spawning biomass from the preferred model run relative to MSY-based management reference points proposed in draft Amendment 37. Figure developed based on data provided in SEDAR 37 Table 11.2.4.3 (SEDAR 2013f).

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

Moderate Concern

Results of a peer reviewed stock assessment were considered unreliable for management use (SAFMC 2017b). The most recent NMFS stock status update characterizes fishing mortality for the stock as unknown (NMFS 2017b). For these reasons, fishing mortality for the GA-NC stock of hogfish receives a score of "moderate" concern.

Factor 2.3 - Discard Rate

UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

< 100%

No information could be found regarding bait needs in the US South Atlantic snapper-grouper vertical line fishery. A pilot observer program conducted from 2007 to 2009 collected information on species composition and disposition (kept or discarded) (GSAFF 2008) (GSAFF 2010). The (bait+discards)/landings ratio uses the total discarded CPUE (all species combined) divided by total retained CPUE. This ratio should be considered a minimum estimate because it does not account for bait needs, nor does it distinguish between species retained for food vs. bait. Based on 2,664 stations sampled between 2007 and 2009, the (bait + discards)/landings ratio is 29.9% (GSAFF 2008) (GSAFF 2010). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

GRAY SNAPPER

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

Three genetically distinct gray snapper populations exist in US waters: the northwestern Gulf of Mexico, north central/northeastern Gulf, and the South Atlantic (east coast of Florida) (Gold et al. 2009). No formal stock assessments have been conducted for any population (SEDAR 2015e), though Gray snapper has been well-studied in recent years (FWRI 2011) (Flaherty et al. 2014) (Flaherty-Walia et al. 2015). Despite research, no target abundance or reference points have been defined (NOAA 2015a), but a formal stock assessment is planned for 2018 (SEDAR 2015e).

Some scientific studies have suggested that high fishing levels in South Florida have reduced biomass and spawning potential to low levels, and that gray snapper in this area was overfished (Ault et al. 1998) (Ault et al. 2005). South Florida likely includes fish from the northeastern Gulf and south Atlantic populations because the Florida Keys represent a common boundary between them. Because the abundance level of gray snapper is uncertain for all populations, and this species has a medium inherent vulnerability to fishing, abundance is rated a "moderate" concern.

Justification:

The PSA score for gray snapper in the GOM = 2.81. For this reason, the species is deemed to have a "medium" vulnerability. Detailed scoring of each attribute is shown below.

Productivity-Susceptibility Analysis:*Scoring Guidelines*

1.) Productivity score (P) = average of the productivity attribute scores (p_1, p_2, p_3, p_4 (finfish only), p_5 (finfish only), p_6, p_7 , and p_8 (invertebrates only))

2.) Susceptibility score (S) = product of the susceptibility attribute scores (s_1, s_2, s_3, s_4), rescaled as follows:
 $S = [(s_1 * s_2 * s_3 * s_4) - 1/40] + 1$.

3.) Vulnerability score (V) = the Euclidean distance of P and S using the following formula: $V = \sqrt{(P^2 + S)^2}$

Productivity Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Average age at maturity	2 years (Florida Museum 2016)	1
Average maximum age	28 years (Fischer et al. 2005)	3
Fecundity	Up to 6,000,000 eggs per female (Bortone and Williams 1986)	1
Average maximum size (fish only)	89 cm (Allen 1985)	1
Average size at maturity (fish only)	2.3 cm (Farmer et al. 2016)	1
Reproductive strategy	Broadcast spawner	1
Trophic level	4.2 (Froese and Pauly 2017)	3
Density dependence (invertebrates only)		
Habitat quality		
Total Productivity (average)		1.571
Susceptibility Attribute	Relevant Information	Score (1 = low risk, 2 = medium risk, 3 = high risk)
Areal overlap (Considers all fisheries)	Default value	3

Vertical overlap	Default value	3
(Considers all fisheries) Selectivity of fishery	Default value	2
(Specific to fishery under assessment)	Default value	2
Post-capture mortality	Default value	3
(Specific to fishery under assessment)	Default value	3
Total Susceptibility (multiplicative)		2.325

PSA score for gray snapper in the Gulf of Mexico vertical line fishery is calculated as follows:

$$\text{Vulnerability (V)} = \sqrt{P^2 + S^2}$$

$$V = \sqrt{1.571^2 + 2.325^2}$$

$$V = 2.806$$

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

There have been no formal population assessments for any of the gray snapper populations, so fishing mortality on all populations is unknown (NMFS 2017b). But some reports suggest that fishing mortality on gray snapper is high in South Florida waters (Ault et al. 1998). The highest fishing pressure in the commercial and recreational fisheries is centered around South Florida (FWRI 2014); following restrictions on red snapper, gray snapper are increasingly targeted by handline fishers in Louisiana (pers. comm., David Nieland 2015).

Between 2005 and 2014, the US commercial fisheries contributed substantially to gray snapper mortality, with yearly average catches of 288,000 lb. During the same period, recreational fishery catches averaged 1.8 million lb annually (NMFS Fishery Statistics Division 2017a) (NMFS Fishery Statistics Division 2017b). A data-limited study in 2005 estimated gray snapper fishing mortality in South Florida waters was 2.5 times the fishing mortality at maximum sustainable yield (F_{MSY}), indicating overfishing was occurring (Ault et al. 2005). More recent information is not available. Because the fishing mortality of gray snapper is unknown, Seafood Watch deems fishing mortality as a "moderate" concern for fishing mortality.

Factor 2.3 - Discard Rate

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, RED GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, VERTICAL LINES, UNITED STATES OF AMERICA, GAG

< 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish vertical line fishery. An observer program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 398 trips and 13,827 sets between 2006 and 2011, the (bait + discards)/landings ratio is 37.2% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio less than 100% warrants a Criterion 2 score modifier of 1.0.

LOGGERHEAD TURTLE / MID ATLANTIC

Factor 2.1 - Abundance

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

High Concern

Worldwide, loggerhead sea turtle populations are in decline. Under the US Endangered Species Act (ESA), loggerhead sea turtles are divided into distinct population segments (DPSs), five of which are listed as endangered and four as threatened (NMFS 2013b). Loggerheads in the Gulf of Mexico are part of the Northwest Atlantic Ocean DPS, which is listed as threatened under ESA (NMFS 2013b). In the northern Gulf of Mexico, nest abundance (a measure of population health), declined by almost half from 1994 to 2010 (Lamont et al. 2012). In 2013, NMFS proposed that the Northwest Atlantic Ocean DPS is critical habitat for loggerhead sea turtles (Federal Register 2013).

Factor 2.2 - Fishing Mortality

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

Moderate Concern

Bottom longline gear is known to adversely affect sea turtles via hooking, entanglement, trailing line, and forced submergence. Captured sea turtles can be released alive or may be found dead upon retrieval of the gear as a result of forced submergence (NMFS 2009b). According to a 2009 NMFS report, loggerhead turtle take in the Gulf of Mexico bottom longline reef fishery exceeded the number authorized by a 2005 NMFS Biological Opinion (BiOp) issued under the ESA (85 loggerheads over 3 years). The fishery took an estimated 714 loggerheads between July 2006 and December 2008 (the 95 % confidence interval was 296.9 – 1,720.5) (NMFS 2009a). The 2009 BiOp provides an estimate of 519 takes with 314 of those as mortalities (NMFS 2009b). These takes occurred despite the 2006 management measures to reduce sea turtle take established through Amendment 18A of the Gulf of Mexico Reef FMP (established due to the 2005 BiOp), which required reef fishery vessels to have sea turtle release gear and instructions for how to use it onboard (NMFS 2011). Due to the excessive take, NMFS formulated a new BiOp in 2009 (NMFS 2009b), and to reduce take to an acceptable level from the status quo, NMFS instituted management strategies via Amendment 31 to the Gulf of Mexico Reef Fishery FMP in April 2010. This amendment includes several measures aimed at reducing turtle hooking and entanglements, including a prohibition on bottom longline gears within the 35-fathom contour in the Gulf of Mexico (east of Cape San Blas, FL), a reduction in vessels holding reef fish permits via an endorsement program for those vessels landing at least 40,000 lb (18.1 MT) of reef fish per annum and a limit of 1,000 hooks onboard reef fish longline vessels, with a maximum of 750 hooks rigged for fishing at any time (75 FR 21512). Preliminary data suggest that these actions have effectively reduced sea turtle takes in the reef fishery. More than 25 interactions were reported through the logbook program in 2010 and 2011 (NMFS 2013), and this number declined to only 12 in 2012 and 2013 (NMFS 2016b). Although no formal analysis could be found to confirm the effectiveness of these management measures, the GMFMC has taken steps to minimize mortality of loggerhead sea turtles, justifying a mortality score of "moderate" concern.

Factor 2.3 - Discard Rate

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, BLACK GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SCAMP

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, SNOWY GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, WARSAW GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, YELLOWEDGE GROUPER

UNITED STATES OF AMERICA / GULF OF MEXICO, SET LONGLINES, UNITED STATES OF AMERICA, GAG

≥ 100%

No information could be found regarding bait needs in the Gulf of Mexico reef fish longline fishery. An observer

program implemented in 2006 collects information on species composition, disposition, and condition (Scott-Denton et al. 2011). Disposition categories reported by the observer program include harvested, discarded alive, retained for bait, discarded dead, and unknown (Scott-Denton et al. 2011). In order to be conservative, the (bait + discards)/landings ratio uses the sum of discarded alive, retained for bait, discarded dead, and unknown categories divided by the harvested category. Based on 195 trips and 5,015 sets between 2006 to 2011, the (bait + discards)/landings ratio is 103% (Scott-Denton et al. 2011) (Scott-Denton and Williams 2013). A ratio greater than 100% warrants a Criterion 2 score modifier of 0.75.