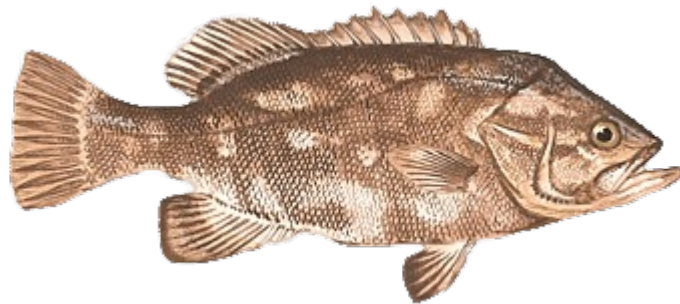


# Monterey Bay Aquarium Seafood Watch®

## **Wreckfish (US)**

*Polyprion americanus*



©Diane Rome Peebles

**United States of America/Western Central Atlantic**

**Handlines and hand-operated pole-and-lines**

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### **Disclaimer**

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Seafood Watch Standard used in this assessment: Standard for Fisheries vF2

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## **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](http://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 Report. Each report 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." The detailed evaluation methodology is available upon request. In producing the Seafood Reports, 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 Seafood Reports 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 Reports in any way they find useful. For more information about Seafood Watch® and Seafood Reports, please contact the Seafood Watch® program at Monterey Bay Aquarium by calling 1-877-229-9990.

## **Guiding Principles**

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

Based on this principle, Seafood Watch had developed four sustainability **criteria** for evaluating wildcatch fisheries for consumers and businesses. These criteria are:

- How does fishing affect the species under assessment?
- How does the fishing affect other, target and non-target species?
- How effective is the fishery's management?
- How does the fishing affect habitats and the stability of the ecosystem?

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.

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<sup>1</sup> "Fish" is used throughout this document to refer to finfish, shellfish and other invertebrates

## **Summary**

This report covers wreckfish caught with hydraulic hook and line off the U.S. Atlantic coast.

The U.S. wreckfish fishery expanded rapidly during the first years of exploitation, starting in 1987. It was during these years that landings increased every year until more strict management regulations, including limited entry, a total allowable catch (TAC), gear restrictions, and individual transferable quotas (ITQs), were implemented. These regulations resulted in a decrease in the number of participants, stabilized catches, and significantly reduced the fleet size.

In general, the hook and line gear used in the wreckfish fishery has minimal bycatch and habitat impacts, so impacts on non-target species are only of minimal concern. Management for this species is overseen by the South Atlantic Fishery Management Council (SAFMC), which in general has been proactive and responsible to maintain stocks through the implemented regulations stated above. The hook and line fishery in the South Atlantic U.S. is rated as a "Best Choice."

## 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
<b>Wreckfish</b> United States of America/Western Central Atlantic   Handlines and hand- operated pole-and- lines   United States of America	Green (3.831)	Green (3.318)	Green (4.472)	Green (4.123)	<b>Best Choice (3.912)</b>

### Summary

The wreckfish (*Polyprion americanus*) is a large, long-lived species living in deep water around the world's temperate oceans. The population that is found off the U.S. Atlantic coast (Blake Plateau, off South Carolina) is part of a bigger stock that inhabits the North Atlantic Ocean. Wreckfish juveniles remain pelagic for 2–3 years and are commonly found along floating objects. Wreckfish can take up to 8 years to fully mature and may live up to 80 years. The species-specific and limited habitat niche, in addition to its physiological characteristics, may increase its vulnerability to fishing pressure. In the U.S., the wreckfish fishery developed rapidly since it started in 1987.

Landings increased rapidly, and it was not until the implementation of limited access regulations in 1990 (TAC, ITQ system, and seasonal closures) that catches stabilized. The fleet size has been reduced significantly since then, reducing the probability that overfishing would occur. Wreckfish is caught using hydraulic hook and line, a fishing method that has minimal bycatch and habitat impacts.

Management has acted in a proactive and responsible way to maintain stocks through the implemented regulations stated above. Most recently (2014), the Scientific and Statistical Committee of the South Atlantic Fishery Management Council accepted the stock assessment of wreckfish in South Atlantic waters that indicated that the stock is neither overfished nor experiencing overfishing. Based on the assessment projections, allowable biological catches (ABCs) have been established for every season until 2020.

### 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 Concern<sup>2</sup>, 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.

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<sup>2</sup> 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**

Species: Wreckfish (*Polyprion americanus*)

Geographic coverage: U.S. Atlantic Ocean off South Carolina and Georgia on the Charleston Bump and the Blake Plateau.

Gear type: Handline

## **Species Overview**

Wreckfish (*Polyprion americanus*, Bloch and Schneider, 1801) is a deep-water marine fish (Roberts 1989) that inhabits continental slopes, oceanic islands, and seamounts at depths of 50 to 1,000 meters (m) (Sedberry et al. 2001) (Perez and Klippel 2003). Wreckfish is a long-lived, slow growing species found throughout the Atlantic Ocean and in some areas of the Indian and Pacific Oceans.

In the United States, the wreckfish fishery occurs mostly between 100 and 125 miles southeast of Charleston, off the coasts of South Carolina and Georgia. The Blake Plateau is located within this region, and is an area that provides a complex bottom feature with great topographic relief (Sedberry et al. 2001) (Goldman and Sedberry 2010). The Plateau is considered an important habitat and spawning ground for wreckfish (Goldman and Sedberry 2010). Wreckfish lurks in caves and comes out to feed during the day. The South Atlantic Fishery Management Council (SAFMC) is the body that recommends commercial and recreational management measures for the wreckfish fishery to the National Marine Fisheries Service. Wreckfish is managed under the SAFMC's Snapper Grouper Fishery Management Plan (FMP) with tools including an individual transferable quota (ITQ) system for the commercial fishery, allowable biological catch (ABC) and annual catch limits (ACLs), a spawning season closure, a recreational season, and gear specifications.

## **Production Statistics**

The U.S. Atlantic wreckfish fishery began in 1987 off the coasts of Georgia and South Carolina. Landings went from 13 metric tons (MT) in the first fishing season to more than 900 MT by 1990 (Sedberry et al. 2001) (Sedberry 2002). In order to promote a sustainable fishery, management regulations were put in place. In 1990, a total allowable catch (TAC) was set at 907 MT. The TAC was caught within the first 4 months of implementation (Gauvin et al. 1994). An ITQ program was established in 1992 and, by 1995, the levels of production dropped substantially, with reported landings around 292 MT (Reiss, Ray and Quigley 2009).

Wreckfish landings decreased from 519 MT during the 1993–1994 season to a little more than 95 MT during the 1998–1999 season (Table 1). Fishing effort and the number of vessels were reduced from 91 permitted vessels in 1991 to 14 in 1997 (Vaughan et al. 2001). By 2001, fewer than four vessels reported wreckfish landings totaling around 200,000 lbs—only 8% of the TAC (GAO 2002).

Table 1 Wreckfish landings since 1987 (Rademeyer and Butterworth 2014)

<b>Season</b>	<b>Landings(mt)</b>	<b>Year/ Season</b>	<b>Landings (mt)</b>
<b>1987</b>	12.701	<b>2001-2002</b>	Confidential
<b>1988</b>	206.824	<b>2002-2003</b>	Confidential



<b>1989</b>	1680.54	<b>2003-2004</b>	Confidential
<b>1990</b>	957.885	<b>2004-2005</b>	Confidential
<b>1991-1992</b>	873.658	<b>2005-2006</b>	Confidential
<b>1992-1993</b>	576.315	<b>2006-2007</b>	Confidential
<b>1993-1994</b>	519.243	<b>2007-2008</b>	Confidential
<b>1994-1995</b>	545.793	<b>2008-2009</b>	Confidential
<b>1995-1996</b>	292.563	<b>2009-2010</b>	98.179**
<b>1996-1997</b>	108.017	<b>2010-2011</b>	116.718**
<b>1997-1998</b>	113.264	<b>2011-2012</b>	N/A
<b>1998-1999</b>	95.618	<b>2012-2013</b>	N/A
<b>1999-2000</b>	95.481	<b>2013-2014</b>	N/A
<b>2000-2001</b>	76.246		

*\* Landings for 2001–2002 through 2008–2009 were confidential because there were fewer*

*than three vessels that fished wreckfish and/or fewer than three dealers purchased wreckfish during those years.*

*\*\* Data from SAFMC Amendment 20A. September 2011.*

### **Importance to the US/North American market.**

The wreckfish fishery is mostly based out of Charleston, South Carolina. Wreckfish are purchased by fish houses and sold to restaurants or directly to consumers; in some cases, product is shipped to dealers around the United States. U.S. fishers only commercially sell their Wreckfish catches into the domestic market. The 2012 harvest was valued at nearly \$700,000

(<http://www.nmfs.noaa.gov/fishnews/2012/01092012.htm#highlightAnchor10>). There are no reports of imports of wreckfish into the U.S..

### **Common and market names.**

The wreckfish is sometimes also called "sea bass" (Food and Drug Administration website).

### **Primary product forms**

This fish is sold fresh or frozen (GAO 2002).

## Assessment

This section assesses the sustainability of the fishery(s) relative to the Seafood Watch Criteria for Fisheries, available at <http://www.seafoodwatch.org>.

### Criterion 1: Impacts on the species under assessment

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

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

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

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

#### Criterion 1 Summary

WRECKFISH				
Region   Method	Inherent Vulnerability	Abundance	Fishing Mortality	Score
<b>United States of America/Western Central Atlantic   Handlines and hand-operated pole-and-lines</b> United States of America	1.00: High	4.00: Low Concern	3.67: Low Concern	Green (3.83)

#### Criterion 1 Assessment

##### SCORING GUIDELINES

##### Factor 1.1 - Inherent Vulnerability

- *Low*—The FishBase vulnerability score for species is 0-35, OR species exhibits life history characteristics that make it resilient to fishing, (e.g., early maturing).
- *Medium*—The FishBase vulnerability score for species is 36-55, OR species exhibits life history characteristics that make it neither particularly vulnerable nor resilient to fishing, (e.g., moderate age at sexual maturity (5-15 years), moderate maximum age (10-25 years), moderate maximum size, and middle of food chain).
- *High*—The FishBase vulnerability score for species is 56-100, OR species exhibits life history characteristics that make it particularly vulnerable to fishing, (e.g., long-lived (>25 years), late maturing (>15 years), low reproduction rate, large body size, and top-predator). Note: The FishBase vulnerability scores is an index of the inherent vulnerability of marine fishes to fishing based on life history parameters: maximum length, age at first maturity, longevity, growth rate, natural mortality rate, fecundity, spatial behaviors (e.g., schooling, aggregating for breeding, or consistently returning to the same sites for feeding or reproduction) and

geographic range.

## Factor 1.2 - Abundance

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

## Factor 1.3 - Fishing Mortality

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

## WRECKFISH

### Factor 1.1 - Inherent Vulnerability

#### UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC

Handlines And Hand-Operated Pole-And-Lines | United States Of America

#### High

The deepwater wreckfish (*Polyprion americanus*) is a long-lived, slow growing, late maturing species, and is believed to form spawning aggregations (Sedberry et al. 1996). Typically, species with these life history characteristics exhibit a high inherent vulnerability to fishing exploitation. FishBase also shows it as a very high vulnerability species (76 out of 100) (Cheung et al. 2005).

#### Justification:

*P. americanus* is broadly distributed and is found in areas with high vertical relief (Sedberry et al. 2001). This type of habitat is very limited, so fishing effort can be concentrated on these areas and can lead to high chances of overfishing (Erisman et al. 2011). A recent study that validated age and growth for this species in the U.S. found that *P. americanus* can reach a maximum age of 80 years (Lyttton et al. 2015). It also presents a slow growth rate (0.124/yr) and late maturation: at least age 8 or approximately 84 cm (Vaughan et al. 2001). Therefore, wreckfish reaches marketable size (85 cm) before full maturity (Wakefield et al. 2013).

Additionally, Sedberry (2002) reported that the Blake Plateau/Charleston Bump area was the only documented spawning area for the North Atlantic wreckfish population (Sedberry 2002). But Carbonara et al. (Carbonara et al. 2003) found some evidence of reproductive activity among wreckfish in the Mediterranean Sea. In 2009, a Productivity and Susceptibility Analysis was conducted by MRAG Americas and, based on information available, it also categorized wreckfish with a high risk (MRAG 2009).

## Factor 1.2 - Abundance

### UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC

Handlines And Hand-Operated Pole-And-Lines | United States Of America

#### Low Concern

The most recent wreckfish population assessment was started in 2012, using a Statistical Catch at Age (SCAA) methodology (Rademeyer and Butterworth 2014). This model used similar fishery-dependent data as the previous assessment by Vaughan et al. (historical landings, annual length-frequency distributions, and annual or seasonal age-length keys that were obtained through logbook data for participating vessels) (Vaughan et al. 2001). But for the values of natural mortality (M), the authors adopted the Lytton somatic growth curve, which removed conflict between the catch per unit effort (CPUE) and catch at length (CAL) data and allowed a more precise estimate of natural mortality (M) of 0.037 yr<sup>-1</sup> (Vaughan estimated 0.11–0.14 yr<sup>-1</sup>). The new method was accepted by the Scientific and Statistical Committee (SSC) of the SAFMC, which recommended it as appropriate for management decisions (SAFMC and NMFS 2015). During its implementation, the model ran a series of different scenarios in which a single stock along the North Atlantic was considered. The assessment concluded that the U.S. South Atlantic wreckfish stock is not overfished and is not undergoing overfishing, and present levels of biomass are above the Spawning Stock Biomass (which is the amount of spawning stock biomass needed to produce the maximum sustainable yield, SSBMSY) (SAFMC 2015) (NMFS 2015).

Because of these reasons, the factor is rated "low" concern.

#### Justification:

In 2010, the SSC of the SAFMC stated that the 2001 assessment (Vaughan et al. 2001) needed to be updated because it could not be applied to the fishery's current levels of production (SAFMC 2015) (NMFS 2015). Because the assessment could not be used for management, a historical average of the landings (from 1997 to 2010) was implemented as the new limit of allowable biological catch (ABC). The reduced number of vessels and confidentiality restrictions affected the SSC's ability to recommend a more precise ABC limit at the time (SAFMC 2015) (NMFS 2015).

By the end of 2012, Butterworth and Rademeyer presented an alternative approach to the SSC that used a statistical catch at age (SCAA) methodology. The SCAA methodology was chosen to produce a more scientifically acceptable basis to specify the wreckfish ABC (Butterworth and Rademeyer 2012). This type of assessment (SCAA) has been used in other fisheries, such as the New England groundfish fishery (GARM III 2008) and the lean lake trout populations in Michigan (Carofino and Lenart 2000). Given sufficient data, an SCAA assessment is a refined and reliable form of analysis (GARM III 2008).

This SCAA assessment (Rademeyer and Butterworth 2014) was subjected to a SEDAR-like review (South East Data, Assessment, and Review, a process by which stock assessments are conducted in the U.S. Southeast Region) and a third-party peer review process by recommendation of the SSC. During its April/May 2014 meeting, the SSC accepted the wreckfish assessment and recommended it as appropriate for management decisions (SAFMC and NMFS 2015). During the peer review process, the panel recommended that (because of data limitations) the new stock assessment should be considered as a data-limited method, but the assessment is robust, the model is consistent with standard practices, and it is appropriate for the available data (SAFMC 2014).

### Factor 1.3 - Fishing Mortality

#### UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC

Handlines And Hand-Operated Pole-And-Lines | United States Of America

#### Low Concern

The most recent SCAA assessment for wreckfish states that, based on the available information and using combinations of four different values of natural mortality (M) and three steepness (H) values, the U.S. Atlantic wreckfish is not experiencing overfishing (NMFS 2015c). According to the model, estimations of maximum sustainable yield (MSY) ranged from 278,000 lbs to 1,293,000 lbs, which resulted in an increase of the allowable biological catch (ABC) (Butterworth and Rademeyer 2012).

This factor is rated "low" concern because the assessment found that there are no signs of overfishing in the U.S. fishery.

#### Justification:

In 1990, the SAFMC included wreckfish in the Snapper-Grouper Fishery Management Plan due to a rapid increase in landings and effort that resulted in overfishing of the species in 1989 (NMFS 2011a) (Vaughan et al. 2001). By 2012, information on catches, CPUE, and catch-at-length distributions allowed the application of the SCAA methodology to assess the status of the wreckfish stock in the U.S. South Atlantic (Rademeyer and Butterworth 2014).

The model concluded that, for the range of M values ( $M = 0.05$  to  $0.075$ ), overfishing was not occurring (NMFS 2015c). It is important to consider that both models, (Vaughan et al. 2001) and (Rademeyer and Butterworth 2014), used fishery-dependent data to calculate CPUE, which is assumed to be proportional to the population size. But Erisman et al. (2011) state that CPUE may not accurately reflect changes in abundance, because the relationship between these two parameters is often disproportional and nonlinear (Erisman et al. 2011). According to the authors, the wreckfish fishery could be experiencing a case of hyperstability, which is what frequently happens when CPUE remains stable while true abundance declines (Hilborn and Walters 1992). This situation could lead to an underestimate of fishing mortality (Erisman et al. 2011).

## **Criterion 2: Impacts on other species**

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

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

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

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

### **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.

<b>WRECKFISH</b>					
United States Of America/Western Central Atlantic   Handlines And Hand-Operated Pole-And-Lines   United States Of America					
<b>Subscore:</b>	<b>3.318</b>	<b>Discard Rate:</b>	<b>1.00</b>	<b>C2 Rate:</b>	<b>3.318</b>
<b>Species   Stock</b>	<b>Inherent Vulnerability</b>	<b>Abundance</b>	<b>Fishing Mortality</b>	<b>Subscore</b>	
Finfish	2.00:Medium	3.00:Moderate Concern	3.67:Low Concern	Green (3.318)	

There is little information about the bycatch associated with the hook and line Wreckfish fishery. Experts suggest that the finfish species represent less than 5% of the total catch.

### **Criterion 2 Assessment**

#### **SCORING GUIDELINES**

#### **Factor 2.1 - Inherent Vulnerability**

(same as Factor 1.1 above)

#### **Factor 2.2 - Abundance**

(same as Factor 1.2 above)

#### **Factor 2.3 - Fishing Mortality**

(same as Factor 1.3 above)

#### **FINFISH**

## Factor 2.1 - Inherent Vulnerability

### UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC

Handlines And Hand-Operated Pole-And-Lines | United States Of America

#### Medium

There is limited information on species caught as bycatch in this fishery; however, an estimate by NMFS Southeast Region suggested that less than 5% of the total catch is bycatch (NMFS 2015a). Some of the species identified as bycatch in this fishery include red bream, barrelfish, splendid alfonsino, blackbelly rosefish, Atlantic pomfret, beardfish, and conger eel. Several shark species were reported caught occasionally (Goldman and Sedberry 2010). Of these bycatch species, red bream and barrelfish are the most common (NMFS 2015b). There is some information about the status of red bream; however, there is a lack of the same kind of information for the other finfish species caught as bycatch, and Seafood Watch grants a "medium" inherent vulnerability in these cases.

## Factor 2.2 - Abundance

### UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC

Handlines And Hand-Operated Pole-And-Lines | United States Of America

#### Moderate Concern

Little abundance information is available for those finfish species that are likely caught as bycatch when targeting wreckfish (see Inherent Vulnerability response for the list). Per Seafood Watch scoring guidance, unknown finfish abundance scores as "moderate" concern.

## Factor 2.3 - Fishing Mortality

### UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC

Handlines And Hand-Operated Pole-And-Lines | United States Of America

#### Low Concern

Information on fishing mortality of the likely bycatch species in this fishery is limited. Based on the Seafood Watch guidance, unknown finfish species fishing mortality for handline gears scores as "low" concern.

#### Justification:

Bycatch mortality of most, if not all, bycatch species is 100%, because they are brought up from great depth and cold darkness into warm sunlight (pers. comm., Sedberry, 2016).

## Factor 2.4 - Discard Rate

### UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC

Handlines And Hand-Operated Pole-And-Lines | United States Of America

#### < 20%

Data are not available to calculate the discard to landings ratio for the commercial wreckfish fishery. (It is likely that no wreckfish are discarded because there is no minimum size limit or trip limit for the commercial wreckfish fishery (pers. comm., Sedberry, 2016). In general, the level of bycatch in this fishery is considered low (NMFS 2015a).

## Criterion 3: Management Effectiveness

Management is separated into management of retained species (harvest strategy) and management of non-retained species (bycatch strategy).

The final score for this criterion is the geometric mean of the two scores. The Criterion 3 rating is determined as follows:

- Score >3.2=Green or Low Concern
- Score >2.2 and ≤3.2=Yellow or Moderate Concern
- Score ≤2.2 or either the Harvest Strategy (Factor 3.1) or Bycatch Management Strategy (Factor 3.2) is Very High Concern = Red or High Concern

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

### Criterion 3 Summary

Region   Method	Harvest Strategy	Bycatch Strategy	Score
<b>United States of America / Western Central Atlantic   Handlines and hand-operated pole-and-lines</b> United States of America	5.000	4.000	Green (4.472)

### Criterion 3 Assessment

#### SCORING GUIDELINES

#### Factor 3.1 - Harvest Strategy

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

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

#### Factor 3.1 Summary



FACTOR 3.1 - MANAGEMENT OF FISHING IMPACTS ON RETAINED SPECIES							
Region   Method	Strategy	Recovery	Research	Advice	Enforce	Track	Inclusion
<b>United States of America/Western Central Atlantic   Handlines and hand-operated pole-and-lines</b> United States of America	Highly Effective	N/A	Highly Effective	Highly Effective	Highly Effective	Highly Effective	Highly Effective

**Subfactor 3.1.1 – Management Strategy and Implementation**

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

**UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC**  
 Handlines And Hand-Operated Pole-And-Lines | United States Of America

**Highly Effective**

The wreckfish fishery is included in the Snapper-Grouper Fishery Management Plan (FMP) and managed by the South Atlantic Fishery Management Council (SAFMC).

The management strategies used are:

- Closed season during spawning (mid-January to mid-April)
- Gear restrictions (No longlines)
- Maintain catches within the annual catch limit (ACL)
- Limited entry
- Distribute the catch among the fleet through the use of individual transferable quotas (ITQs).

There are no minimum size limits in the commercial fishery; the small recreational fishery has a one fish per vessel per day bag limit.

Fishers are required to possess a federal snapper-grouper permit along with a federal wreckfish permit. Also, in order to fish for, land, or sell wreckfish, management requires the use of coupons that are annually generated as a way to monitor the levels of catch in relation to the ACL. Landings have been confidential for several years when too few fishers or dealers were involved in the fishery. Beginning in 2012, 5% of the ACL was allocated for harvest by recreational fishers. Recreational fishers are subject to a one-fish bag limit, seasonal opening (July and August), 5% of the ACL, use of dehooking tools, and non-stainless steel circle hooks.

Based on the results of the stock assessment, an increase of the ACL (from 220,000 lbs to 435,000 lbs) was accepted by the SAFMC Scientific and Statistical Committee (SSC) as the best available science. The management plan established some precautionary policies based on scientific advice and generated a 5-year projection for the ACL extending through the 2020 season. Because there is evidence that the stock can withstand this increase in ACL without becoming overfished, management strategy is considered “highly effective.”

**Justification:**

During the first years of exploitation (1987–1989), few management regulations were in place, and the

number of participants and landings grew exponentially. By 1990, a TAC was set at 2 million pounds (907 MT), half the record catch in 1989 (Yandle and Crosson 2015). The wreckfish fishery was showing a “derby” behavior, in which vessels were catching as much as they could; with the implementation of a limit in the middle of the season, the TAC was reached quickly and the fishery had to be shut down early (Vaughan et al. 2001).

In 1992, an individual transferable quota (ITQ) system was implemented (Gauvin et al. 1994). The system seemed to have succeeded in its goals, because fishing capacity and pressure decreased (Yandle and Crosson 2015). Other management measures included a closure of the fishery during the main spawning period from January 15 to April 15 every year (Vaughan et al. 2001). Catch statistics prior to this closure indicated vastly increased catches and CPUE during this period, perhaps because of aggregation of wreckfish during spawning.

Monitoring of catch is conducted through fish coupons and dockside sampling (NMFS 2015a).

In 2015, through the Regulatory Amendment 22, adjustments were made to the wreckfish ACL and optimum yield (OY) based on the stock assessment. The SSC also provided allowable biological catch (ABC) recommendations for wreckfish to the SAFMC. Although significant management structural changes have not occurred (ACL and the ITQ system are still in place, as well as a closure season), based on the results of the assessments, the Council established new commercial and recreational ACLs for wreckfish for the next six seasons. The commercial ACLs are:

411,350 lbs (186,585 kg) for 2015

402,515 lbs (182,578 kg) for 2016

393,490 lbs (178,484 kg) for 2017

385,985 lbs (175,080 kg) for 2018

376,960 lbs (170,986 kg) for 2019, and

369,645 lbs (167,668 kg) for 2020.

### **Subfactor 3.1.2 – Recovery of Species of Concern**

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

#### **UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC**

Handlines And Hand-Operated Pole-And-Lines | United States Of America

**N/A**

Wreckfish is not overfished, and there are no overfished, depleted, endangered, or threatened species targeted and/or retained in this fishery.

### **Subfactor 3.1.3 – Scientific Research and Monitoring**

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

**UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC**

Handlines And Hand-Operated Pole-And-Lines | United States Of America

**Highly Effective**

The wreckfish stock assessment has been recently updated. This process was independently started but it was revised and accepted by the SAFMC's SSC as the best available science. The SSC stated that the assessment provided information sufficient for management recommendations, so a new ACL was set in 2015 (NMFS 2015c). This assessment used a model that included relevant sources of fishing mortality and considered multiple scenarios. For these reasons, this factor is rated "highly effective."

**Justification:**

Prior to the most recent assessment, developed in 2012, the ACLs were produced by scientists at the NMFS Beaufort Laboratory (NMFS 2015c). It was not until 2014 that the most recent stock assessment, based on the statistical catch at age (SCAA) method, was conducted by a third party and was accepted through a series of workshops in coordination with the SAFMC. The SCAA model has been used to assess other resources, such as the Atlantic summer flounder fishery (Terceiro 2009), the Gulf of Maine cod stock (NEFSC 2011), and the South African hake (Rademeyer and Butterworth 2014).

**Subfactor 3.1.4 – Management Record of Following Scientific Advice**

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

**UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC**

Handlines And Hand-Operated Pole-And-Lines | United States Of America

**Highly Effective**

The management for this species follows scientific advice, and sets annual ACLs for the region. Since the implementation of the system in 1990, the landings have been maintained under the limits of the TAC (former limit) and ACL (current limit).

**Subfactor 3.1.5 – Enforcement of Management Regulations**

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

**UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC**

Handlines And Hand-Operated Pole-And-Lines | United States Of America

**Highly Effective**

The wreckfish fishery is managed with an ITQ system. This system uses coupons that add up to the commercial portion of the ACL set for the season. Coupons are provided so that commercial fishers can land, trade, and sell fish, so an overage of the quota is unlikely (NMFS 2015a). There is little recreational harvest of wreckfish off South Carolina and Georgia because wreckfish dwells so far offshore (SAFMC and NMFS

2015). Recreational captures are most common of South Florida (pers. comm., Sedberry, 2016). The recreational fishery does have an allocation of the ACL (5%); however, it is not required to report its catches. Commercial fishers report their catches via logbooks (NMFS 2015a). Enforcement rates as “highly effective.”

### **Subfactor 3.1.6 – Management Track Record**

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

#### **UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC**

Handlines And Hand-Operated Pole-And-Lines | United States Of America

#### **Highly Effective**

Based on the analysis of CPUE statistics from 1991 to the present, neither a clear trend that the stock has been overharvested nor changes in the average weight of landed wreckfish were found (Yandle and Crosson 2015). The latest stock assessment results supported an increase in the ACL for the 2015–2016 fishing season (NMFS 2015c) (SAFMC & NMFS 2015). Track record rates as “highly effective” because management measures have maintained the stock at appropriate levels for an extended period of time.

### **Subfactor 3.1.7 – Stakeholder Inclusion**

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

#### **UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC**

Handlines And Hand-Operated Pole-And-Lines | United States Of America

#### **Highly Effective**

The management process is transparent and includes stakeholders’ input. The SAFMC provides an open management process in which opportunities to add information to management plans are given to users, academia, or other organizations (<http://safmc.net/get-intvolved/management-process>). An example of this inclusive process was the recent evaluation of the fishery, which was promoted by the fishing industry, and dialogue involving the SSC and other managers at the SAFMC (Yandle and Crosson 2015). The management process is transparent and inclusive, so it rates as “highly effective.”

#### **Justification:**

The meetings of the SAFMC are open to the public, and public statements are taken prior to major decisions. Before the adoption of harvest specifications, the proposed specifications are published in the Federal Register, followed by a public review and comment period of no less than 15 days (NMFS 2015a). The SAFMC also takes advice from its advisory panel (which comprises representatives from commercial fishing companies, subsistence fishers, processors, observers, and environmental organizations) about trends in fisheries, environmental concerns relating to fishery ecosystems, and management impacts on fishers and fishing communities. (The SSC review of the assessment by Rademeyer and Butterworth (2014) included input from wreckfish fishers <http://www.safmc.net>.)

### **Factor 3.2 - Bycatch Strategy**

**SCORING GUIDELINES**

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

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

FACTOR 3.2 - BYCATCH STRATEGY						
Region   Method	All Kept	Critical	Strategy	Research	Advice	Enforce
<b>United States of America/Western Central Atlantic   Handlines and hand-operated pole-and-lines</b> United States of America	No	No	Highly Effective	Moderately Effective	Highly Effective	Highly Effective

The fishery management plan (FMP) for snapper-grouper was first implemented in 1983 (<http://safmc.net/resource-library/snapper-grouper>). Amendment 3 (1991) established a management program for wreckfish that defined an optimal yield (OY) and overfishing limits. Amendment 4 (1992) prohibited the use of fish traps and bottom longlines in the wreckfish fishery {SAFMC 1992} to limit impacts on other species and on the habitat.

**Subfactor 3.2.2 – Management Strategy and Implementation**

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

**UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC**  
 Handlines And Hand-Operated Pole-And-Lines | United States Of America

**Highly Effective**

According to the Bycatch Practicability Analysis (BPA) included in Regulatory Amendment 22 to the Snapper-Grouper FMP, little information is available on bycatch for the commercial wreckfish fishery, but barrelfish and red bream are described as the most abundant co-occurring species caught. Other species are caught and it is unknown if they are retained (NMFS 2015b). The fishery has a low level of bycatch, although it presents “fairly” high landings of barrelfish; along with other species, these volumes represent around 4% and 1% of the total landings, respectively (NMFS 2015b). Because of the small amount of bycatch in this fishery as well as a small number of operators (three), this factor is rated as “highly effective.”

### **Subfactor 3.2.3 – Scientific Research and Monitoring**

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

#### **UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC**

Handlines And Hand-Operated Pole-And-Lines | United States Of America

#### **Moderately Effective**

There is no regular collection or analysis of bycatch data for the wreckfish fishery and there is currently no observer program covering this fishery. For fisheries in the Snapper-Grouper FMP, NMFS SEFSC collects logbook information on landed catch from 100% of commercial vessels, and 20% of them are randomly subsampled to report all discards. Since 2001, all commercial vessels with Snapper-Grouper FMP permits are required to complete a separate form that describes those fish discarded at sea, including disposition, estimated weight, the number of fish, and reason for discard. Underreporting is suspected in this self-reporting program, and compliance is difficult to estimate because vessels can submit a report of "no discards" (NMFS 2011b). Because of the small fraction of wreckfish permits within the Snapper-Grouper FMP and the limited number of vessels operating in the wreckfish fishery (three boats or fewer during most years), this detailed information is infrequently collected for these trips.

This sub-criterion scores as "moderately effective" because there is no observer coverage and there is minimal information available on bycatch.

### **Subfactor 3.2.4 – Management Record of Following Scientific Advice**

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

#### **UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC**

Handlines And Hand-Operated Pole-And-Lines | United States Of America

#### **Highly Effective**

A series of amendments to the Snapper-Grouper FMP have been made in order to minimize bycatch, following scientific advice. In the Snapper/Grouper fishery, for example, trawl gears were prohibited in 1989 and fish traps and entanglement nets were prohibited in 1992. Also, SAFMC follows scientific advice as set out by its Science and Statistical Committee (SSC). Because managers follow scientific advice in this fishery, this sub-criterion is scored as "highly effective."

### **Subfactor 3.2.5 – Enforcement of Management Regulations**

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

**UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC**

Handlines And Hand-Operated Pole-And-Lines | United States Of America

**Highly Effective**

See Subfactor 3.1.5 response in the Harvest Strategy section.

## **Criterion 4: Impacts on the habitat and ecosystem**

*This Criterion assesses the impact of the fishery on seafloor habitats, and increases that base score if there are measures in place to mitigate any impacts. The fishery's overall impact on the ecosystem and food web and the use of ecosystem-based fisheries management (EBFM) principles is also evaluated. Ecosystem Based Fisheries Management aims to consider the interconnections among species and all natural and human stressors on the environment.*

*The final score is the geometric mean of the impact of fishing gear on habitat score (plus the mitigation of gear impacts score) and the Ecosystem Based Fishery Management score. The Criterion 2 rating is determined as follows:*

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

*Rating cannot be Critical for Criterion 4.*

### **Criterion 4 Summary**

<b>Region   Method</b>	<b>Gear Type and Substrate</b>	<b>Mitigation of Gear Impacts</b>	<b>EBFM</b>	<b>Score</b>
<b>United States of America/Western Central Atlantic   Handlines and hand-operated pole-and-lines</b> United States of America	4.00: Very Low Concern	0.25: Minimal Mitigation	4.00: Low Concern	Green (4.123)

### **Criterion 4 Assessment**

#### **SCORING GUIDELINES**

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

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

#### **Factor 4.2 - Mitigation of Gear Impacts**

- *+1 (Strong Mitigation)—Examples include large proportion of habitat protected from fishing (>50%) with gear, fishing intensity low/limited, gear specifically modified to reduce damage to seafloor and modifications*



*shown to be effective at reducing damage, or an effective combination of 'moderate' mitigation measures.*

- *+0.5 (Moderate Mitigation)—20% of habitat protected from fishing with gear or other measures in place to limit fishing effort, fishing intensity, and spatial footprint of damage caused from fishing.*
- *+0.25 (Low Mitigation)—A few measures are in place (e.g., vulnerable habitats protected but other habitats not protected); there are some limits on fishing effort/intensity, but not actively being reduced*
- *0 (No Mitigation)—No effective measures are in place to limit gear impacts on habitats*

### **Factor 4.3 - Ecosystem-Based Fisheries Management**

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

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

#### **UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC**

Handlines And Hand-Operated Pole-And-Lines | United States Of America

#### **Very Low Concern**

The wreckfish fishery uses hook and line gear: fishers use hydraulic reels to attach multiple baited circle hooks (NMFS 2015c). The SAFMC banned bottom longlines to catch wreckfish because of frequent gear loss and impacts to the bottom habitat (Gauvin et al. 1994). The current method has minimal effects on the bottom habitat. For these reasons, this factor is rated as "very low" concern.

### **Factor 4.2 - Mitigation of Gear Impacts**

#### **UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC**

Handlines And Hand-Operated Pole-And-Lines | United States Of America

#### **Minimal Mitigation**

Mitigation of gear impacts for vertical line gear with little interaction with the benthos scores as "minimal" mitigation.

### **Factor 4.3 - Ecosystem-Based Fisheries Management**

## UNITED STATES OF AMERICA / WESTERN CENTRAL ATLANTIC

Handlines And Hand-Operated Pole-And-Lines | United States Of America

### Low Concern

The wreckfish is included in the Snapper-Grouper Fishery Management Plan (FMP). Neither wreckfish nor any of the species that are likely caught as bycatch in this fishery is considered a "species of exceptional importance" by Seafood Watch. The SAFMC is working toward adopting an ecosystem-based approach and has built a Fishery Ecosystem Plan. The plan addresses five key areas needed to implement this ecosystem approach: 1) an overview of the South Atlantic system; 2) species, habitats, and essential fish habitat; 3) information on coastal fishing communities; 4) threats to the system and recommendations; and 5) research and data needs (SAFMC 2009). The most recent adoption of the Comprehensive Ecosystem-Based Amendment 2 implements some goals of ecosystem-based management (which include providing special management zones for snapper-grouper species in South Carolina and requiring the review of potential Essential Fish Habitat closures in the future), but no particular plans are outlined for wreckfish (NOAA 2011). An ecosystem planning is underway, the current management policies protect ecosystem functioning (there is a maximum catch), and no species of exceptional importance are caught in this fishery, so a score of "low" concern is granted for this factor.

## **Acknowledgements**

*Scientific review does not constitute an endorsement of the Seafood Watch® program, or its seafood recommendations, on the part of the reviewing scientists. Seafood Watch® is solely responsible for the conclusions reached in this report.*

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## **References**

- Ball A.O., Sedberry G.R., Zatzoff R.W., Chapman R.W. & Carlin J.L. 2000. Population structure of the wreckfish *Polyprion americanus* determined with microsatellite genetic markers. *Marine Biology* 137: 1077-1090.
- Barnette, M. 2001. A review of the fishing gear utilized within the Southeast Region and their potential impacts on essential fish habitat. National Marine Fisheries Service Southeast Regional Office. NOAA Technical Memorandum NMFS-SEFSC-449.
- Butterworth, D. and Rademeyer, R. 2012. An Application of Statistical Catch-at-Age Assessment Methodology to Assess US South Atlantic Wreckfish. MARAM (Marine Resource Assessment and Management Group) Department of Mathematics and Applied Mathematics University of Cape Town, Rondebosch 7701, South Africa. October 2012
- Carbonara P., Constantino G., Giovine G., Lembo G., Spedicato M. & Machias A. Some aspects of the life history of *Polyprion americanus* (Schneider, 1801) along the coast of the North Western Ionian Sea. *Biol. Mar. Medit.* (2003, 10(2):102-112
- Carofino D. & Lenart, S. 2000. Statistical catch-at-age models used to describe the status of lean lake trout populations in the 1836-Treaty ceded waters of lakes Michigan, Huron, and Superior at the inception of the 2000 Consent Decree. A Report Completed by the Modeling Subcommittee for the Technical Fisheries Committee, Parties to the 2000 Consent Decree, and the Amici Curiae.
- Cheung W., Pitcher T. and, Pauly D. 2005. A fuzzy logic expert system to estimate intrinsic extinction vulnerabilities of marine fishes to fishing. *Biological Conservation* 124 (1) 97–111.
- Collette, B., Fernandes, P., Heessen, H. and Smith-Vaniz, W.F. 2015. *Polyprion americanus*. The IUCN Red List of Threatened Species. Last time visited 2015.
- Polyprion americanus* (Brazilian subpopulation) The IUCN Red List of threatened species, version 2015.2 <[www.iucnredlist.org](http://www.iucnredlist.org)>
- Erismann B., Allen G., Claisse J., Pondella D., Miller E., and Murray, J. 2011. The illusion of plenty: hyperstability masks collapses in two recreational fisheries that target fish spawning aggregations. *Canadian Journal of Fish and Aquatic Sciences*. 68:1705-1716.
- Filer R. & Sedberry G. 2008. Age, growth and reproduction of the barrelfish *Hyperoglyphe perciformis* (Mitchill) in the western North Atlantic. *Journal of Fish Biology* 72(4): 861-882
- Fournier, D., and Archibald C. 1982. A general theory for analyzing catch at age data. *Canadian Journal of Fisheries and Aquatic Sciences* 39:1195-1207.
- Friess, C. and Sedberry, G. 2011. Age, growth, and spawning season of red bream (*Beryx decadactylus*) off the southeastern United States. *Fisheries Bulletin*. 109:20-33
- GAO, 2002. Report to the Chairman and ranking minority member, subcommittee on Oceans, Atmosphere, and fisheries, Committee on Commerce, Science, and transportation, U.S. Senate. Individual Fishing Quotas. Better Information Could Improve Program Management. December 2002.
- Groundfish Assessment Review Meeting (GARM III) 2008. Panel Summary Report of the Groundfish Review Meeting. Part 2. Assessment Methodology (Models). Chairman: Robert O'Boyle. Review Panel: Jose De Oliveira,

- Stratis Gavaris, Jim Ianelli, Yan Jiao, Cynthia Jones and Paul Medley. Woods Hole, Massachusetts, March, 2008.
- Gauvin, J. R., Ward, J. M. and Burgess, E.E. 1994. Description and Evaluation of the wreckfish (*Polyprion americanus*) Fishery under Individual Transferable Quotas. *Marine Reserve Economics*. 9:99-118.
- Goldman, S. 2007. Feeding habits of some demersal fishes on the continental slope off the southeastern United States. Thesis for Master of Science in Environmental Studies. The Graduate School of the College of Charleston.
- Goldman, S & Sedberry G. 2010. Feeding habits of some demersal fish on the Charleston Bump off the southeastern United States. *ICES Journal of Marine Science Advance*. June 2010.
- Hilborn, R. and Walters C. J. Editors. 1992. *Quantitative Fisheries Stock Assessment: Choice, Dynamics and Uncertainty*. Springer US. Springer Science+Business Media Dordrecht
- Koslow, J.A., Boehlert G.W., Gordon J.D.M., Haedrich R.L., Lorange P., & Parin N., 2000. Continental slope and deep-sea fisheries: implications for a fragile ecosystem. *ICES Journal of Marine Science*. 57: 548-557.
- Lytton R., Ballenger J., Reichert M. & Smart T.
- Methot, R. D. 1990. Synthesis model: An adaptable framework for analysis of diverse stock assessment data, p. 259-277. In: Loh-Lee Low (ed.), *Proceedings of the symposium on applications of stock assessment techniques to Gadids*. International North Pacific Fisheries Commission Bulletin 50. Seattle, Washington, USA. November 1989.
- MRAG Americas, 2009. *Productivity and Susceptibility Analyses: South Atlantic*. Results, March 2009.
- NMFS. 2006. *Endangered Species Act- Section 7 Consultation Biological Opinion. The Continued Authorization of Snapper-Grouper Fishing in the U.S. South Atlantic Exclusive Economic Zone (EEZ) as Managed under the Snapper-Grouper Fishery Management Plan (SGFMP) of the South Atlantic Region, including Amendment 13C to the SGFMP*. Southeast Regional Office (SERO) National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA) Issued Jun 7, 2006.
- NMFS. 2011a. *Depletion-Corrected Average Catch Estimates for U.S Southeast Regional Office (SERO) National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA)*. October 23, 2011; updated November 21, 2011 SERO-LAPP-2011-07
- NMFS. 2011b. *U.S. National Bycatch Report [ W. A. Karp, L. L. Desfosse, S. G. Brooke, Editors ]*. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-F/SPO-117E, 508 p. Available at: [http://www.nmfs.noaa.gov/by\\_catch/bycatch\\_nationalreport.htm](http://www.nmfs.noaa.gov/by_catch/bycatch_nationalreport.htm)
- NMFS. 2015c. *NOAA Fisheries Announces Catch Limit Changes for Commercial and Recreational South Atlantic Gag and Wreckfish*. Southeast Regional Office (SERO) National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA). *Southeast Fishery Bulletin*. FB15-058. August, 2015.
- NMFS. 2015b. *South Atlantic Snapper Grouper, Regulatory Amendment 22. Appendix E. Bycatch Practicability Analysis*. Southeast Regional Office (SERO) National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA).
- NMFS. 2015a. pers. comm. Southeast Regional Office (SERO) National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA).

Peres, M. B. & Haimovici, M. 2004. Age and growth of southwestern Atlantic wreckfish *Polyprion americanus*. *Fisheries Research*. 66:157-169.

Peres M.B. & Klippel, S. 2003. Reproductive biology of southwestern Atlantic Wreckfish, *Polyprion americanus* (Teleostei: Polyprionidae). *Environmental Biology of Fishes* 68: 163-173.

Peres J.A., Pezzuto, P.R., Wahrlich, R. & Souza A.L., 2009. Deep-water fisheries in Brazil: history, status and perspectives. *Latin America Journal of Aquatic Resources*, 3(73):513-541.

Rademeyer, R.A. & Butterworth, D.S., 2014. Assessment of the US South Atlantic Wreckfish using primarily Statistical Catch-at-Age Assessment Methodology following the Recommendations of the November 2013 SAFMC SSC Wreckfish Assessment Workshop. February 2014.

Reed J., Weaver, D. & Pomponi A. 2006. Habitat and fauna of deep-water *Lophelia pertusa* coral reefs off the southeastern U. S.: Blake Plateau, Straights of Florida, and Gulf of Mexico. *Bulletin of Marine Science*. 78(2): 343-375.

Roberts, C. D. 1989. Reproductive mode in the percomorph fish genus *Polyprion* Oken. *Journal of Fish Biology*. Volume 34 (1):1-9.

SAFMC 1991. Final Amendment 4. Regulatory Impact Review, Initial Regulatory Flexibility Analysis and Environmental Assessment for the Fisheries Management Plan for the Snapper-Grouper Fishery of the South Atlantic Region. April 1991

NMFS. 2009. Fishery Ecosystem Plan. available at: <http://www.safmc.net/ecosystem-management/fishery-ecosystem-plan-1>

South Atlantic Fisheries Management Council (SAFMC), 2011. Comprehensive annual catch limit (ACL) amendment for the south Atlantic Region. October 2011. San Petersburg, Florida.

SAFMC 2014. Wreckfish Stock Assessment. Peer review. March 17-18, 2014

SAFMC, 2015 website

SAFMC & NMFS, 2015. Regulatory Amendment 22 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. Revise the annual catch limits (ACLs) and optimum yield (OY) for gag and wreckfish, and revise management measures for gag. Environmental Assessment, Regulatory Impact Review and Regulatory Act Analysis. February 26, 2015.

Sedberry, G.R. 2002. Polyprionidae. Wreckfishes (giant sea basses). In: Carpenter KE (ed) *The living marine resources of the Western Central Atlantic, Vol 2: bony fishes, Part 1 (Acipenseridae to Grammatidae)*. FAO species identification Guide for Fishery Purposes and American Society of Ichthyologists and Herpetologists Special Publication No 5. FAO, Rome

Sedberry, G.R. 2015. The Charleston Bump: Managing A Unique Ecosystem. NOAA. *Ocean Explorer*

Sedberry, G.R., Carlin, J.L., Chapman R. W., and Eleby B. 1996. Population structure in the pan-oceanic wreckfish, *Polyprion americanus* (Teleostei: Polyprionidae), as indicated by mtDNA variation. *Journal of Fish Biology* 49(Supplement A):318-329.

Sedberry, G.R., McGovern J. C., and Pashuk O. 2001. The Charleston Bump: An Island of Essential Fish Habitat

in the Gulf Stream. American Fisheries Society Symposium 25:3-24.

Vaughan D., Manooch, C. & Potts J. 2001. Assessment of the Wreck Fishery on the Blake Plateau. National Oceanic and Atmospheric Administration, Beaufort Laboratory. American Fisheries Society Symposium 25:105-120.

Wakefield C., Newman J., and Boddington D. 2013. Exceptional longevity, slow growth and late maturation infer high inherent vulnerability to exploitation for Bass groper *Polyprion americanus* (Teleostei: Polyprionidae). Aquatic Biology. 18:161-174.

Yandle T. & Crosson S, 2015. Whatever Happened to the Wreckfish Fishery? An Evaluation of the Oldest Finfish ITQ Program in the United States. Marine Resource Economics. 30(2): 193-215.

## **Appendix A: Updates to Wreckfish Report**

This report was reviewed for any significant stock status and management updates to the fishery on April 14, 2020. None were found that would indicate the final rating is no longer accurate.