



## **South Atlantic Species**

# **Productivity – Susceptibility Analyses**

Draft Report

To the Lenfest Ocean Program

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August 27, 2008

## Table of Contents

1	Introduction.....	1
1.1	The Risk Based Assessment.....	1
1.2	Information Collection.....	3
1.3	A Note about our Productivity Susceptibility Analysis Methodology.....	3
2	Non Snapper/Grouper Species.....	3
2.1	Pink Shrimp, <i>Penaeus [Farfantepenaeus] duorarum</i> .....	3
2.2	Red Drum, <i>Sciaenops ocellatus</i> .....	4
3	Snapper/Grouper Complex.....	5
3.1	Groupers.....	5
3.2	Snapper.....	13
3.3	Tilefish.....	18
3.4	Wrasses.....	20
3.5	Triggerfish and Spadefish.....	22
3.6	Jacks.....	24
3.7	Grunts.....	27
3.8	Porgies.....	32
3.9	Sea Basses.....	35
4	References.....	37

# 1 Introduction

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 1976 and the 1996 Amendments made progress toward recovery of depleted stocks and sustaining stock health, but many stocks remain overexploited or have not been rebuilt (NOAA, 2007; Rosenberg *et al.*, 2006). As a result, the 2007 amendments to the M-S act are designed to improve accountability in management to prevent overfishing and rebuild stocks to levels that will support maximum sustainable yield.

Section 104 (a)(15) of the 2007 Magnuson-Stevens Reauthorization Act (MSRA) establishes “a mechanism for specifying annual catch limits in the plan (including a multiyear plan), implementing regulations, or annual specifications, at a level such that overfishing does not occur in the fishery, including measures to ensure accountability.” Annual catch limits are the amount of each type of fish allowed to be caught in a year. Congress has set a “no fail” deadline to establish catch limits for all fisheries experiencing overfishing by 2010, and 2011 for all other fisheries.

In June, 2008, NOAA Fisheries developed guidelines to establish annual catch limits (ACL) and accountability measures; the proposed guidelines are presently open to public comment through September 2008. Regional fishery management councils will be responsible for developing ACL amendments for each fishery management plan. For many fisheries, no data exists to conduct traditional analyses sufficient to determine current status of the stocks or whether overfishing occurs. Without a means to objectively determine overfishing levels and a fishing mortality at or below overfishing, regional management councils will likely set ACLs using conservative best guesses.

Rosenberg *et al.* (2007) proposed a precautionary procedure for setting ACLs based on requirements of the M-S Act:

- ***As a default or starting point, preventing overfishing applies to ALL stocks, therefore, so should ACLs.***
- ***To successfully end and prevent overfishing,  $OFL > ABC \geq ACL$ .***
- ***ACLs should account for uncertainty in stock status and risk of overfishing for each stock.***
- ***Consideration of risk must include some evaluation of the vulnerability of a stock to the fishery.***
- ***The buffer or distance between the ACL and the OFL should be greater when the risk of overfishing is higher (i.e., when uncertainty is greater or the consequences of overfishing as expressed by vulnerability of the resource is higher).***

Central to this process is determining the “buffer” needed between the OFL and the ACL to increase the probability that overfishing doesn’t occur and that rebuilding proceeds as needed. That is, the process is designed to determine how far the ACL should be set below the OFL to account for the various sources of uncertainty referred to in the principles above. In general, buffers need to increase as risk of overfishing increases and amount of information decreases; conversely, low risk and more information allow a smaller buffer. This process will require a risk-based assessment using the procedure of Hobday *et al.* (2007) for all species.

## 1.1 The Risk Based Assessment

The ACL Working Group found that the framework developed by a recent joint Australian CSIRO/AFMA project (Hobday *et al.*, 2006) for Ecological Risk Assessment for the Effects of Fishing (ERAEF) provides a good basis for a precautionary evaluation of vulnerability of fishery resources.

The Working Group recommended Level 2 of the ERA, the Productivity and Susceptibility Analysis (PSA), for this purpose. The Marine Stewardship Council (MSC) also uses the PSA (plus the level 1 Scale Intensity Consequence Analysis) in a pilot program to assess sustainability of data deficient stocks (Hobday, 2007).

The PSA approach is a method of assessing a fishery species or stock based on a comprehensive screening of risk for a set of predetermined measurable attributes. The PSA methodology employed here was adapted from Hobday *et al.*, 2007. The results of the PSA measure risk from direct impacts of fishing only. In this case it is intended to illuminate if management complexes and regulations are appropriate for a given group of stocks and aid in the development of annual catch limits as mandated by the Magnuson-Stevens Reauthorization Act (MSRA).

The PSA approach is based on the assumption that the risk to a species will depend on two characteristics: (1) the productivity of the unit, which will determine the rate at which the unit can sustain fishing pressure or recover from depletion or other impacts due to the fishery; and the susceptibility of the unit to fishing activities. The PSA analysis essentially measures the relative risk or the vulnerability of the resource to the potential for fishery impacts. This

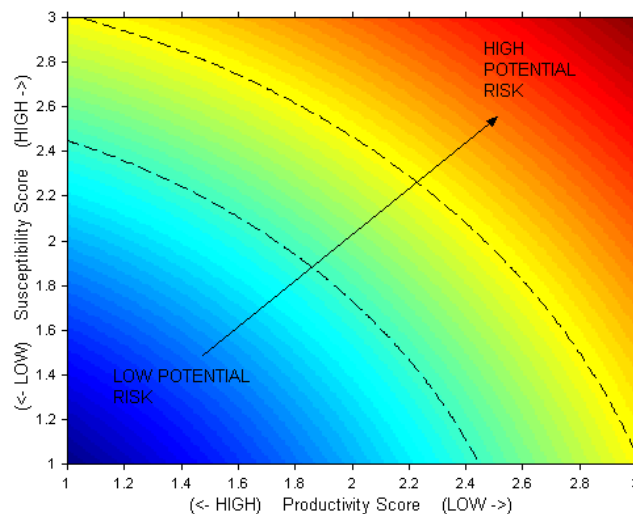
approach is especially useful as it allows for a baseline comparison between many species with varying levels of available information. In the stocks discussed below, there are cases where full assessments have been regularly conducted, while for other stocks little is known other than distribution or life history characteristics.

The PSA approach examines attributes of each unit (stock or assemblage) with respect to productivity or susceptibility to provide a relative measure of risk to the unit (Table 1).

**Table 1.** Productivity and susceptibility attributed utilized to score the risk to a unit.

Attribute	
<b>Productivity</b>	Average age at maturity
	Average size at maturity
	Average maximum age
	Average maximum size
	Fecundity
	Reproductive strategy
	Trophic level
<b>Susceptibility</b>	Availability considers overlap of fishing effort with a species distribution and takes into account species specific behaviors
	Encounterability considers the likelihood that a species will encounter fishing gear that is deployed within the geographic range of that species
	Selectivity considers the potential of the gear to capture or retain species
	Post capture mortality considers the condition and subsequent survival of a species that is captured and released (or discarded)

The productivity and susceptibility rankings determine the relative vulnerability of the unit of analysis (stock or assemblage) and are given a score (1 to 3 for high to low productivity, respectively; and 1-3 for low to high susceptibility, respectively). The output is graphed to produce a PSA plot (Figure 1).



**Figure 1.** The axes on which risk to the ecological units is plotted. The x-axis includes attributes that influence the productivity of a unit, or its ability to recover after impact from fishing. The y-axis includes attributes that influence the susceptibility of the unit to impacts from fishing. The combination of susceptibility and productivity determines the relative risk to a unit, i.e. units with high susceptibility and low productivity are at highest risk, while units with low susceptibility and high productivity are at lowest risk. The contour lines divide regions of equal risk and group units of similar risk levels (Hobday *et al.*, 2007).

## 1.2 Information Collection

Productivity and susceptibility analyses (PSA) were conducted for 73 species management by the South Atlantic Fishery Management Council (SAFMC). Of these, 71 are managed under the Snapper Grouper Fishery Management Plan (FMP). The other two are pink shrimp and red drum, (note that red drum management is being transferred to the Atlantic States Marine Fisheries Commission). Considerable time was spent collecting regionally specific information, where available for each unit. Reports and scientific publications were often consulted for the most recent and accurate information, along with stock assessments, FMPs, NMFS and other fishery management (i.e. ASMFC and State Fish and Wildlife Departments) websites for species specific information. When regionally specific information was unavailable, generic information was used (e.g., from Fish Base <http://www.fishbase.org>). A complete list of references is provided at the end of this document. In the absence of information, an attribute was given a default high risk score. Subsequently, attribute values assigned for each species were reviewed by experts for accuracy. Expert opinion provides access to additional information to add to the vulnerability assessment based on intimate knowledge of the species and fishery that would have been otherwise unavailable for our analyses. The resulting productivity and susceptibility scores for each species was plotted on a PSA graph and are provided by type of fish to save space and for ease of comparison.

## 1.3 A Note about our Productivity Susceptibility Analysis Methodology

The PSA methodology is a powerful tool that allows stakeholders and regulators to gain perspective on the inherent risk of a fishery stock to fishing activities. It also allows scientists to clarify specifically where information is lacking and where to focus resources to collect more information, since attributes weigh differently on risk. The methodology employed here was adopted from the CSIRO method as adjusted for the Marine Stewardship Council. MRAG made appropriate adjustments with respect to scoring guidelines for each attribute for US stocks. These analyses were limited by the timeframe for the study, but provide a powerful evaluation of vulnerability. They could be strengthened by stakeholder consultations and increased fishery specific information, to fine-tuning the determinations in the future. Additionally, this method does not weigh the status of the stock into the risk evaluations, which is undoubtedly critical. We have identified stock status, where known, for each species. Consistent with the definitions used by NOAA Fisheries as described in the MSA, overfishing is occurring when the fishing mortality rate has exceeded  $F_{MSY}$  (the fishing mortality rate that maximizes catch biomass in the long term), and a stock is overfished when the current biomass is less than the sustainable target (typically the minimum stock size threshold set below  $B_{MSY}$ ). A final assessment of risk should include some measure of status as a weighing factor into the overall risk score. Overall risk scores classified as follows: High ( $> 3.18$ ), Medium ( $2.64 - 3.18$ ) and Low ( $< 2.64$ ) (Hobday *et al.*, 2007).

The scoring guidelines utilized here were adjusted for US stocks as deemed appropriate by MRAG. These are provisional changes and represent a first cut at developing suitable scoring guidelines for all US fisheries; and as noted by the Annual Catch Limits Working Group (Rosenberg *et al.*, 2007) a peer review workshop should be conducted to evaluate the guidelines.

## 2 Non Snapper/Grouper Species

### 2.1 Pink Shrimp, *Penaeus [Farfantepenaeus] duorarum*

**Management / Conservation:** Pink shrimp is commercially important throughout the South Atlantic and Gulf of Mexico, with the majority of landings from the Gulf. Penaeid shrimp are short-lived and highly fecund, making them resilient to fishing pressure. Pink shrimp is caught primarily by trawl gear, therefore a large degree of regulatory measures in place for the shrimp fishery are designed to mitigate bycatch and environmental impacts. The overfished status of pink shrimp is based on consecutive years of low CPUE, and is assumed due to environmental conditions and not overfishing. Pink shrimp are an annual crop (18-24 month lifespan) and accordingly their abundances can vary greatly with environmental conditions. Pink shrimp is not listed as threatened on the IUCN Red List of Threatened Species.

**Overfishing: No**  
**Overfished: Yes**

**Productivity Score: 1.29**      **Susceptibility Score: 1.89**  
**Overall Risk Score: 2.28; Low**

## 2.2 Red Drum, *Sciaenops ocellatus*

**Management / Conservation:** The red drum is a popular game fish in coastal waters from Massachusetts to Mexico; commercial harvest of red drum is prohibited. Red drum form large aggregations. Data on the adult population is limited, complicating management. Red drum spawn prolifically and management strategies are aimed to ensure that a percentage of immature females survives to reproduce. Biomass of red drum is unknown; information suggests that overfishing is occurring. Management authority of red drum will be transferred to ASMFC in 2008 (proposed rule published 4/3/08). Red drum is not listed as threatened on the IUCN Red List of Threatened Species.

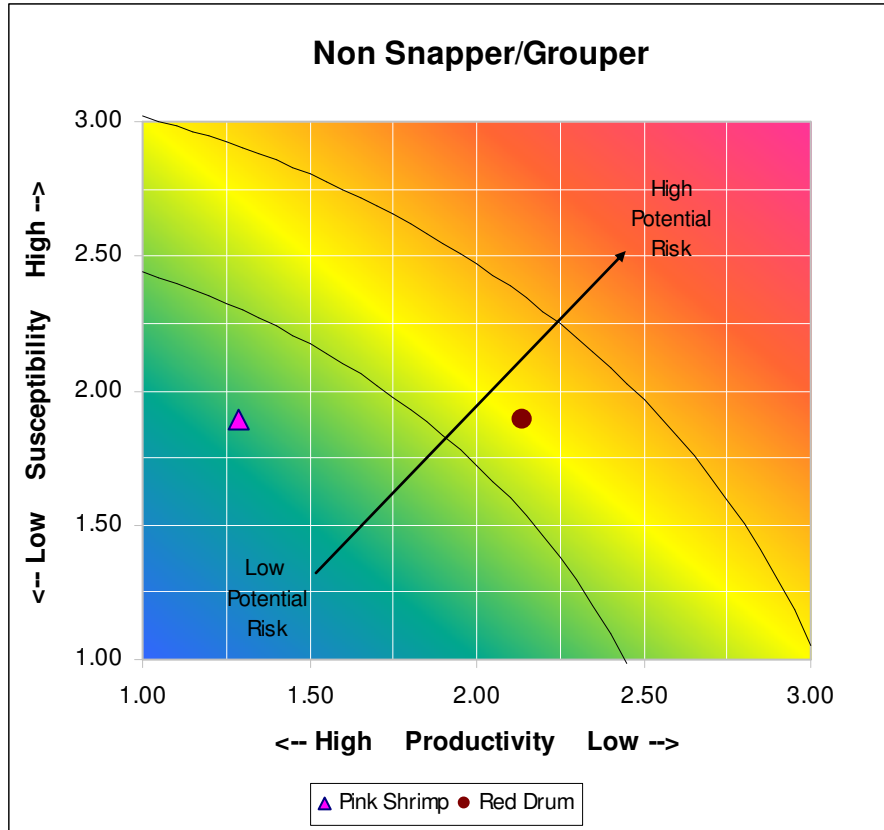
**Overfishing: Yes**  
**Overfished: Unknown**

**Productivity Score: 2.14**      **Susceptibility Score: 1.89**  
**Overall Risk Score: 2.86; Medium**

		Pink Shrimp	Red Drum
<b>Productivity</b>	Age at maturity	low	low
	Size at maturity	low	high
	Maximum age	low	high
	Maximum size	low	high
	Fecundity	low	low
	Reproductive strategy	low	low
	Trophic level	low	high
	<b>Total Productivity Score</b>	1.29	2.14
<b>Susceptibility</b>	Availability	med	med
	Encounterability	high	high
	Selectivity	med	high
	Post Capture Mortality	high	med
<b>Total Susceptibility Score</b>	1.89	1.89	
<b>Overall Risk Score</b>	2.28	2.86	
<b>Risk Ranking</b>	Low	Med	
<b>Overfishing</b>	no	yes	
<b>Overfished (Depleted)</b>	yes	unk	

unk = unknown attribute values are treated with precaution and assigned high risk; stock status unknown

low, med, high = risk score for attribute value



### 3 Snapper/Grouper Complex

The snapper/grouper complex managed by the SAFMC is composed of 73 species; many of which are valuable to commercial and/or recreational fisheries, others are bycatch species retained for food or aquarium use. Management of a large mixed-species complex poses considerable challenges. Below we present initial findings from Productivity-Susceptibility Analysis of 71 snapper/grouper species (excluding goliath grouper and yellowtail snapper, the latter of the two is jointly managed by the SAFMC and GMFMC and was assessed with the Gulf group of species) using the methodology previously described. All of the species attributes (inputs) for productivity and susceptibility have been collected through research of publicly available stock assessments, scientific and technical papers, and other reports. These inputs were subsequently reviewed by third party experts on the life histories of the selected species. PSA results are presented by species and grouped by type of fish for illustrative purposes. Attribute scores, productivity, susceptibility, and overall risk scores along with the resulting PSA plots are provided.

#### 3.1 Groupers

##### 3.1.1 Gag, *Mycteroperca microlepis*

**Management / Conservation:** Gag grouper is an important commercial and recreational reef fish caught along the southeastern US and Gulf of Mexico. Gag grouper is vulnerable to overfishing, particularly when in spawning aggregates. Gag grouper show site fidelity and are protogynous hermaphrodites. Both commercial and recreational catch of gag is permitted, with size, gear, seasonal and allowable take restrictions. Gag is caught with hook-and-line. The IUCN Red List lists gag grouper as Vulnerable.

**Overfishing: Yes**  
**Overfished: No**

**Productivity Score: 2.14**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.69; High**

### 3.1.2 Red grouper, *Epinephelus morio*

**Management / Conservation:** Red grouper is considered one of the most important commercial reef fish caught off the coast of Florida. Red grouper is caught along with other groupers and snappers by hook-and-line. Red grouper populations have been heavily impacted by overfishing, and juveniles are regularly caught as bycatch. Red grouper show site fidelity and are protogynous hermaphrodites. Both commercial and recreational catch of red grouper is permitted, with size, gear and allowable take restrictions. Red grouper is listed as Near Threatened by the IUCN Red List.

**Overfishing: Yes**  
**Overfished: Unknown**

**Productivity Score: 2.14**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.69; High**

### 3.1.3 Scamp, *Mycteroperca phenax*

**Management / Conservation:** Scamp is a highly prized grouper in fisheries along the Gulf of Mexico, southeastern US and Venezuela. It is an aggregate spawner and protogynous hermaphrodite; the larvae and juveniles inhabit nursery grounds. Biomass and fishing mortality rate for scamp are unknown. Both commercial and recreational catch of scamp is permitted, with size, gear and allowable take restrictions. Scamp is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.29**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.77; High**

### 3.1.4 Black grouper, *Mycteroperca bonaci*

**Management / Conservation:** Black grouper is an important commercial and recreational reef fish. It is an aggregate spawner and protogynous hermaphrodite; the larvae and juveniles inhabit nursery grounds. Both commercial and recreational catch is permitted, with size, gear, seasonal and allowable take restrictions. Black grouper is caught with hook-and-line. Black grouper is not listed by the IUCN.

**Overfishing: Yes**  
**Overfished: Unknown**

**Productivity Score: 2.29**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.77; High**

### 3.1.5 Rock hind, *Epinephelus adscensionis*

**Management / Conservation:** Rock hind is caught in both commercial and recreational fisheries, though is less common than other grouper species and is caught mainly with hook-and-line and with spears. It is an aggregate spawner and protogynous hermaphrodite, but otherwise leads a primarily solitary existence. Gear restrictions and a recreational retention limit apply. Rock hind is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.00**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.61; High**

### 3.1.6 Red hind, *Epinephelus guttatus*

**Management / Conservation:** Red hind is caught in both commercial and recreational fisheries with hook-and-line and spears. It is an aggregate spawner and protogynous hermaphrodite, but otherwise leads a primarily solitary (and territorial) existence. Gear restrictions and a recreational retention limit apply. Red hind is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**



Productivity Score: 1.86      Susceptibility Score: 3.00  
Overall Risk Score: 3.53; **High**

### 3.1.7      **Graysby, *Cephalopholis cruentata***

**Management / Conservation:** Graysby is a small reef fish of little commercial importance, but is permitted for both commercial and recreational catch. It is a protogynous hermaphrodite that is sedentary and solitary. Graysby is caught primarily with hook-and-line; gear restrictions and a recreational retention limit apply. The graysby is not listed by the IUCN.

Overfishing: Unknown  
Overfished: Unknown

Productivity Score: 1.86      Susceptibility Score: 2.33  
Overall Risk Score: 2.98; **Medium**

### 3.1.8      **Yellowfin grouper, *Mycteroperca venenosa***

**Management / Conservation:** Yellowfin grouper is abundant throughout the South Atlantic and the Caribbean and is caught in both commercial and recreational fisheries with spears and hook-and-line in the South Atlantic. It is a protogynous hermaphrodite and aggregate spawner. Both gear restrictions and a recreational retention limit apply. Yellowfin is listed as near threatened by the IUCN.

Overfishing: Unknown  
Overfished: Unknown

Productivity Score: 2.29      Susceptibility Score: 3.00  
Overall Risk Score: 3.77; **High**

### 3.1.9      **Coney, *Cephalopholis fulva***

**Management / Conservation:** Coney is a small grouper of little commercial importance, though is permitted for retention in both commercial and recreational fisheries. It is an aggregate spawner (small groups of one male and several females) and protogynous hermaphrodite. Coney is primarily caught with hook-and-line; gear restrictions and a recreational retention limit apply. Coney is not listed by the IUCN.

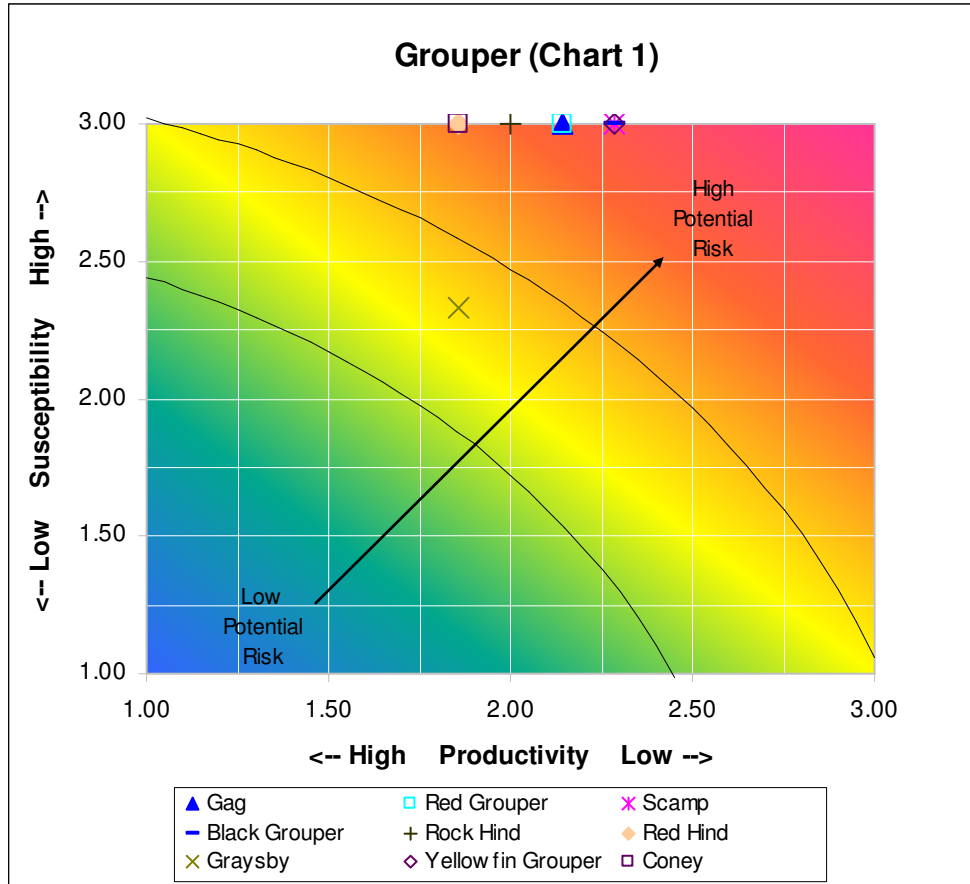
Overfishing: Unknown  
Overfished: Unknown

Productivity Score: 1.86      Susceptibility Score: 3.00  
Overall Risk Score: 3.53; **High**

		Groupers (Table 1)								
		Gag	Red Grouper	Scamp	Black Grouper	Rock Hind	Red Hind	Graysby	Yellowfin Grouper	Coney
Productivity	Age at maturity	low	med	low	med	med	unk	low	unk	unk
	Size at maturity	high	med	med	high	low	low	low	high	low
	Maximum age	high	high	high	high	med	med	med	med	med
	Maximum size	high	high	high	high	med	med	med	high	med
	Fecundity	low	low	unk	low	unk	low	unk	low	low
	Reproductive strategy	low	low	low	low	low	low	low	low	low
	Trophic level	high	high	high	high	high	high	high	high	high
<b>Total Productivity Score</b>		2.14	2.14	2.29	2.29	2.00	1.86	1.86	2.29	1.86
Susceptibility	Availability	high	high	high	high	high	high	high	high	high
	Encounterability	high	high	high	high	high	high	high	high	high
	Selectivity	high	high	high	high	high	high	high	high	high
	Post Capture Mortality	high	high	high	high	high	high	med	high	high
<b>Total Susceptibility Score</b>		3.00	3.00	3.00	3.00	3.00	3.00	2.33	3.00	3.00
<b>Overall Risk Score</b>		3.69	3.69	3.77	3.77	3.61	3.53	2.98	3.77	3.53
<b>Risk Ranking</b>		High	High	High	High	High	High	Med	High	High
<b>Overfishing</b>		yes	yes	unk	yes	unk	unk	unk	unk	unk
<b>Overfished (Depleted)</b>		no	unk	unk	unk	unk	unk	unk	unk	unk

unk = unknown attribute values are treated with precaution and assigned high risk; stock status unknown

low, med, high = risk score for attribute value



### 3.1.10 Yellowmouth grouper, *Mycteroperca interstitialis*

**Management / Conservation:** Yellowmouth grouper is caught in both commercial and recreational fisheries and is more commonly found in deeper water around islands. It is a protogynous hermaphrodite. The yellowmouth grouper is managed with gear restrictions, size and a recreational retention limit. Yellowmouth is listed as Vulnerable by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.14**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.69; High**

### 3.1.11 Tiger grouper, *Mycteroperca tigris*

**Management / Conservation:** Tiger grouper is permitted for catch in both the commercial and recreational fisheries of the South Atlantic. It is a protogynous hermaphrodite that spawns in aggregations and displays site fidelity. It is caught with hook-and-line and with spears; gear restrictions and a recreational retention limit apply. Tiger grouper is listed as a Species of Least Concern by the IUCN, although landings data are lacking.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.43**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.86; High**

### 3.1.12 Nassau grouper, *Epinephelus striatus*

**Management / Conservation:** Possession or harvest of Nassau grouper has been prohibited in the South Atlantic Exclusive Economic Zone (EEZ) since 1992; though it remains a food fish throughout the Caribbean. It shows strong site fidelity and spawns in aggregations. Nassau grouper is listed as Endangered by the IUCN.

**Overfishing: No**  
**Overfished: Unknown**

**Productivity Score: 2.71**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 4.05; High**

### 3.1.13 Snowy grouper, *Epinephelus niveatus*

**Management / Conservation:** Snowy grouper is the dominant species in the deep-water grouper fishery caught by hook-and-line and bottom longlines. It is an aggregate spawner and protogynous hermaphrodite; the larvae and juveniles inhabit nursery grounds. Snowy grouper is managed through gear restrictions and retention limits. Snowy grouper is listed as Vulnerable by the IUCN.

**Overfished: Yes**  
**Overfishing: Yes**

**Productivity Score: 2.29**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.77; High**

### 3.1.14 Yellowedge grouper, *Epinephelus flavolimbatus*

**Management / Conservation:** Yellowedge grouper is an important species in both the commercial and recreational fisheries, with the large majority of catch from the Gulf of Mexico. It is a protogynous hermaphrodite that spawns in aggregations but is otherwise solitary. Larvae and juveniles inhabit inshore nursery grounds. Permitted for catch by longline, other gear restrictions and a recreational retention limit apply. Yellowedge grouper is listed as Vulnerable by the IUCN.

**Overfishing: No**  
**Overfished: Unknown**

**Productivity Score: 2.43**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.86; High**

### 3.1.15 Warsaw grouper, *Epinephelus nigritus*

**Management / Conservation:** Warsaw grouper is a protogynous hermaphrodite primarily caught by hook-and-line and bottom longlines; the species is caught incidentally in the deepwater snapper/grouper fishery. The major threat to the Warsaw Grouper is mortality as a result of fishing or by-catch release mortality. Warsaw retention is limited to one fish per vessel per trip; sale or transfer of Warsaw grouper is strictly prohibited and gear restrictions apply. Warsaw is listed as Critically Endangered by the IUCN.

**Overfishing: Yes**  
**Overfished: Unknown**

**Productivity Score: 2.71**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 4.05; High**

### 3.1.16 Speckled hind, *Epinephelus drummondhayi*

**Management / Conservation:** Speckled hind is mainly caught with hook-and-line, but some might also be taken by bottom-set longlines. It is a protogynous hermaphrodite that spawns in aggregate. The major threat to the Speckled Hind is mortality as a result of fishing or by-catch release mortality (due to barotraumas since it is a deepwater species). Retention of Speckled hind is limited to one fish per vessel per trip; it may not be sold or transferred and gear restrictions apply. Speckled hind is listed as Critically Endangered by the IUCN.

**Overfishing: Yes**

**Overfished: Unknown**

**Productivity Score: 2.43**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.86; High**

### **3.1.17**      **Misty grouper, *Epinephelus mystacinus***

**Management / Conservation:** Very little is known about the life history of Misty grouper, a deep water species. Permitted for retention in both commercial and recreational fisheries, gear restrictions and a recreational retention limit apply. Misty grouper is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.71**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 4.05; High**

### **3.1.18**      **Wreckfish, *Polyprion americanus***

**Management / Conservation:** The wreckfish is long-lived and susceptible to overfishing because of limited habitat availability. Juveniles are pelagic until age two or three and are commonly caught as bycatch. Recreational retention of wreckfish is prohibited and commercial harvest is limited to Individual Transfer Quota (ITQ) shareholders or their designees. Found in locally abundant populations and congregated around wrecks and debris, the wreckfish is caught mainly with bottom longlines and vertical lines; there is a seasonal closure for spawning January 15 through April 15. Wreckfish is listed as Data Deficient by the IUCN.

**Overfishing: No**  
**Overfished: Unknown**

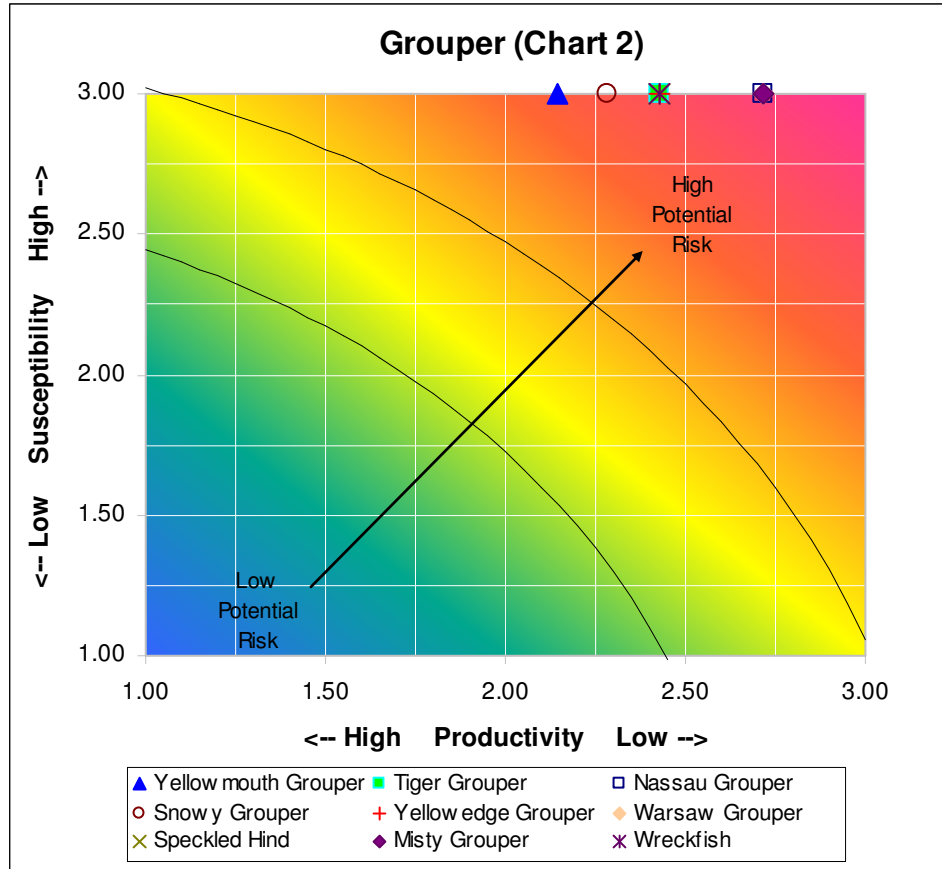
**Productivity Score: 2.43**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.86; High**

		Groupers (Table 2)								
		Yellowmouth Grouper	Tiger Grouper	Nassau Grouper	Snowy Grouper	Yellowedge Grouper	Warsaw Grouper	Speckled Hind	Misty Grouper	Wreckfish
Productivity	Age at maturity	low	med	high	low	med	high	med	unk	high
	Size at maturity	med	med	high	med	med	high	med	high	high
	Maximum age	high	high	high	high	high	high	high	unk	high
	Maximum size	med	high	high	high	high	high	high	high	high
	Fecundity	unk	unk	unk	unk	unk	unk	unk	unk	low
	Reproductive strategy	low	low	low	low	low	low	low	low	low
	Trophic level	high	high	high	high	high	high	unk	high	high
<b>Total Productivity Score</b>	2.14	2.43	2.71	2.29	2.43	2.71	2.43	2.71	2.43	
Susceptibility	Availability	high	high	high	high	high	high	high	high	high
	Encounterability	high	high	high	high	high	high	high	high	high
	Selectivity	high	high	high	high	high	high	high	high	high
	Post Capture Mortality	high	high	high	high	high	high	high	high	high
<b>Total Susceptibility Score</b>	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	
<b>Overall Risk Score</b>	3.69	3.86	4.05	3.77	3.86	4.05	3.86	4.05	3.86	
<b>Risk Ranking</b>	High	High	High	High	High	High	High	High	High	
<b>Overfishing</b>	unk	unk	no	yes	no	yes	yes	unk	no	
<b>Overfished (Depleted)</b>	unk	unk	unk	yes	unk	unk	unk	unk	unk	

unk = unknown attribute values are treated with precaution and assigned high risk; stock status unknown

low, med, high = risk score for attribute value

**RED** = overfished and overfishing is occurring



## 3.2 Snapper

### 3.2.1 Queen snapper, *Etelis oculatus*

**Management / Conservation:** Queen snapper is a deep water species caught mainly with handlines; gear and size restrictions and a recreational retention limit apply. Queen snapper is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.00**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.61; High**

### 3.2.2 Gray (mangrove) snapper, *Lutjanus griseus*

**Management / Conservation:** Gray snapper, also referred to as mangrove snapper, frequently forms large schools. The gray snapper is managed through gear and size restrictions and a recreational retention limit. Gray snapper is not listed by the IUCN.

**Overfishing: No**  
**Overfished: Unknown**

**Productivity Score: 1.71**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.46; High**

### 3.2.3 Mutton snapper, *Lutjanus analis*

**Management / Conservation:** Mutton snapper is typically a solitary species, but does form spawning aggregations. Mutton snapper is caught with handlines and traps and is also speared by divers. In the South Atlantic, regulations include size, gear, retention and seasonal restrictions. Mutton snapper is listed as Vulnerable by the IUCN.

**Overfishing: No**  
**Overfished: Unknown**

**Productivity Score: 2.14**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.69; High**

### 3.2.4 Lane snapper, *Lutjanus synagris*

**Management / Conservation:** Lane snapper is found in both near shore coastal waters and offshore deepwater waters and form large spawning aggregations. Permitted for retention in both commercial and recreational fisheries, gear and size restrictions and a recreational retention limit apply. Lane snapper is not listed by the IUCN.

**Overfishing: No**  
**Overfished: Unknown**

**Productivity Score: 1.86**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.53; High**

### 3.2.5 Cubera snapper, *Lutjanus cyanopterus*

**Management / Conservation:** Possession of Cubera snapper in the SA EEZ is restricted by size, gear and retention limits. The cubera snapper aggregates to spawn and is caught mainly by handlines and occasionally speared by divers; cubera snapper is listed as Vulnerable by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.71**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 4.05; High**

### 3.2.6 Dog snapper, *Lutjanus jocu*

**Management / Conservation:** Dog snapper is a solitary species that demonstrates site fidelity and spawning aggregations have been observed. Dog snapper is caught with handlines and often speared by scuba divers; size, gear and a recreational retention limit apply. Dog snapper is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.43**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.86; High**

### 3.2.7 Schoolmaster, *Lutjanus apodus*

**Management / Conservation:** Schoolmaster snapper is found in shallow, clear, warm, coastal waters over coral reefs; it is a protogynous species. Harvest is permitted in both commercial and recreational fisheries of the SA; though size, gear and a recreational retention limit apply. Schoolmaster is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.43**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.86; High**



### 3.2.8 Mahogany snapper, *Lutjanus mahogoni*

**Management / Conservation:** Mahogany snapper often forms large schools and is found in clear shallow waters over rocky bottoms. Harvest is permitted in both commercial and recreational fisheries of the SA, though size and gear restrictions apply. Mahogany snapper is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.57**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.95; High**

### 3.2.9 Vermilion snapper, *Rhomboplites aurorubens*

**Management / Conservation:** Vermilion snapper is the most frequently caught snapper along the southeastern United States, though not quite as popular in restaurants as red snapper. It aggregates to spawn and is caught mainly with handlines. Commercial and recreational harvest is permitted, though size and gear restrictions and retention limits apply. Vermilion snapper is not listed by the IUCN.

**Overfished: Unknown**  
**Overfishing: Yes**

**Productivity Score: 1.57**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.39; High**

### 3.2.10 Red snapper, *Lutjanus campechanus*

**Management / Conservation:** Red snapper is the most popular snapper along the southeastern US. The red snapper demonstrates considerable site fidelity and juveniles are common bycatch in shrimp trawls, contributing to population declines. Commercial and recreational harvest is permitted, though size and gear restrictions and a recreational retention limit apply. Red snapper is not listed by the IUCN.

**Overfishing: Yes**  
**Overfished: Yes**

**Productivity Score: 1.86**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.53; High**

### 3.2.11 Silk snapper, *Lutjanus vivanus*

**Management / Conservation:** Silk snapper is a deep water schooling species permitted for harvest in both commercial and recreational fisheries; management measures include size and gear restrictions and a recreational retention limit. Silk snapper is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.29**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.77; High**

### 3.2.12 Black snapper, *Apsilus dentatus*

**Management / Conservation:** Black snapper is permitted for harvest in commercial and recreational fisheries of the SA EEZ. The black snapper forms schools and is caught mainly with handlines; management measures include size and gear restrictions and a recreational retention limit. Black snapper is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.14**      **Susceptibility Score: 2.33**  
**Overall Risk Score: 3.17; Medium**

### 3.2.13 Blackfin snapper, *Lutjanus buccanella*

**Management / Conservation:** Blackfin snapper is a popular game fish found in offshore waters and is a schooling species. Caught mainly with handlines, management measures include size and gear restrictions and a recreational retention limit. Blackfin snapper is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

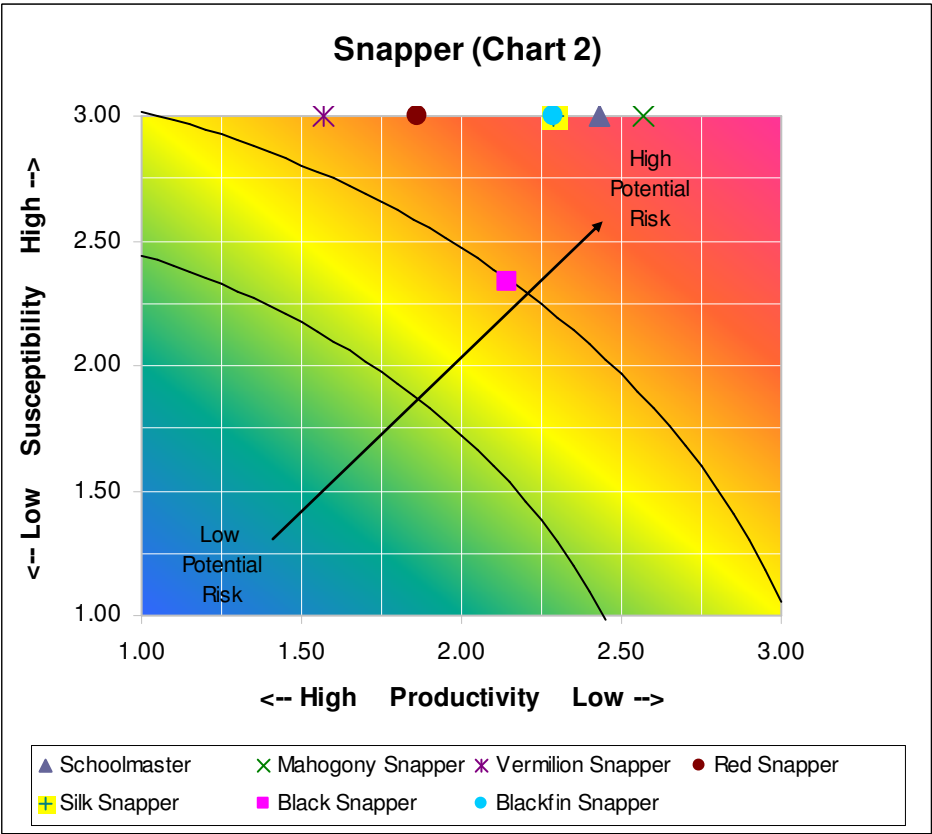
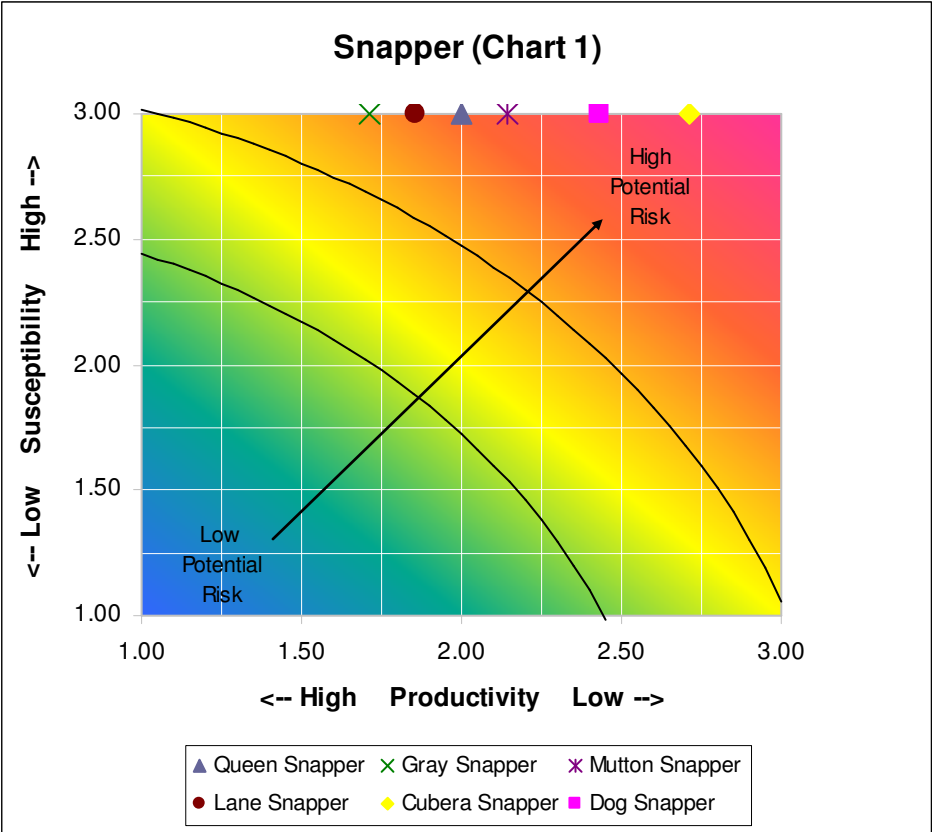
**Productivity Score: 2.29**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.77; High**

		Snapper												
		Queen Snapper	Gray Snapper	Mutton Snapper	Lane Snapper	Cubera Snapper	Dog Snapper	Schoolmaster	Mahogany Snapper	Vermilion Snapper	Red Snapper	Silk Snapper	Black Snapper	Blackfin Snapper
Productivity	Age at maturity	low	low	low	low	unk	med	unk	unk	low	low	med	low	unk
	Size at maturity	med	low	med	low	unk	med	med	unk	low	low	med	med	low
	Maximum age	low	med	high	med	unk	high	unk	unk	med	high	unk	unk	unk
	Maximum size	high	med	med	med	high	high	med	med	med	med	med	med	med
	Fecundity	unk	med	unk	unk	unk	unk	unk	unk	low	low	unk	unk	unk
	Reproductive strategy	low	low	low	low	low	low	low	low	low	low	low	low	low
	Trophic level	high	high	high	high	high	high	high	high	high	high	high	high	high
<b>Total Productivity Score</b>		2.00	1.71	2.14	1.86	2.71	2.43	2.43	2.57	1.57	1.86	2.29	2.14	2.29
Susceptibility	Availability	high	high	high	high	high	high	high	high	high	high	high	high	high
	Encounterability	high	high	high	high	high	high	high	high	high	high	high	high	high
	Selectivity	high	high	high	high	high	high	high	high	high	high	high	high	high
	Post Capture Mortality	high	high	high	high	high	high	high	high	high	high	high	med	high
<b>Total Susceptibility Score</b>		3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.33	3.00
<b>Overall Risk Score</b>		3.61	3.46	3.69	3.53	4.05	3.86	3.86	3.95	3.39	3.53	3.77	3.17	3.77
<b>Risk Ranking</b>		High	High	High	High	High	High	High	High	High	High	High	Med	High
<b>Overfishing</b>		unk	no	no	no	unk	unk	unk	unk	unk	yes	unk	unk	unk
<b>Overfished (Depleted)</b>		unk	unk	unk	unk	unk	unk	unk	unk	yes	yes	unk	unk	unk

unk = unknown attribute values are treated with precaution and assigned high risk; stock status unknown

low, med, high = risk score for attribute value

RED = overfished and overfishing is occurring



### 3.3 Tilefish

#### 3.3.1 Tilefish, *Lopholatilus chamaeleonticeps*

**Management / Conservation:** Tilefish is of commercial importance with greater than three-quarters of the catch taken by bottom longlines. Tilefish is a shelter-seeking species that constructs burrows in the substrate. Along with a select few grouper species, tilefish is the only other species permitted for retention by bottom longlines in the southeastern U.S. Management measures include gear restrictions, annual quota and commercial and recreational trip limits. Tilefish is not listed by the IUCN.

**Overfishing: Yes**  
**Overfished: No**

**Productivity Score: 2.29**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.77; High**

#### 3.3.2 Blueline tilefish, *Caulolatilus microps*

**Management / Conservation:** Blueline tilefish is a burrowing species taken in the commercial fishery by bottom longlines. Gear restrictions apply, there is no size, and they are included in the 5 grouper recreational retention limit. Blueline tilefish is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 1.86**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.53; High**

#### 3.3.3 Sand tilefish, *Malacanthus plumieri*

**Management / Conservation:** Sand tilefish is a burrowing species taken in the commercial fishery by bottom longlines. Gear restrictions apply, there is no size, and they are included in the 5 grouper recreational retention limit. Sand tilefish is not listed by the IUCN.

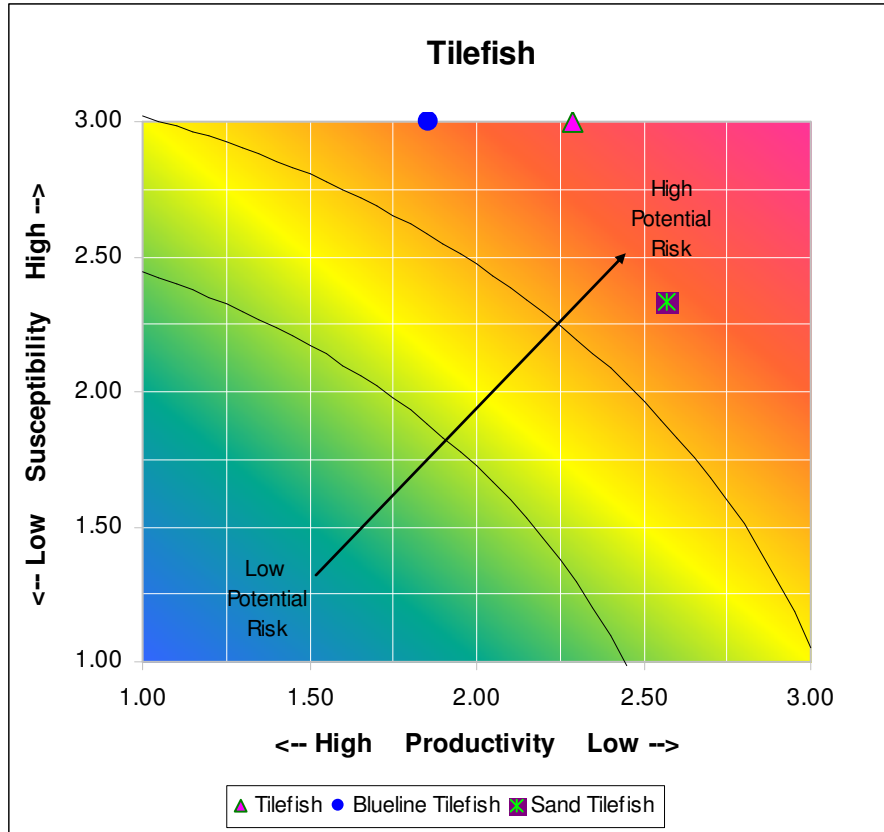
**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.57**      **Susceptibility Score: 2.33**  
**Overall Risk Score: 3.47; High**

		Tilefish		
		Tilefish	Blueline Tilefish	Sand Tilefish
Productivity	Age at maturity	med	low	unk
	Size at maturity	high	med	unk
	Maximum age	high	high	unk
	Maximum size	high	med	med
	Fecundity	low	low	unk
	Reproductive strategy	low	low	low
	Trophic level	high	high	high
	<b>Total Productivity Score</b>	2.29	1.86	2.57
Susceptibility	Availability	high	high	med
	Encounterability	high	high	high
	Selectivity	high	high	high
	Post Capture Mortality	high	high	high
<b>Total Susceptibility Score</b>	3.00	3.00	2.33	
<b>Overall Risk Score</b>	3.77	3.53	3.47	
<b>Risk Ranking</b>	High	High	High	
<b>Overfishing</b>	yes	unk	unk	
<b>Overfished (Depleted)</b>	no	unk	unk	

unk = unknown attribute values are treated with precaution and assigned high risk; stock status unknown

low, med, high = risk score for attribute value



### 3.4 Wrasses

#### 3.4.1 Hogfish, *Lachnolaimus maximus*

**Management / Conservation:** Hogfish is a prized food fish caught by hook-and-line and spear. Hogfish is a protogynous species that forms spawning aggregations. They are managed with size and gear restrictions and a recreational retention limit. Hogfish is listed as Vulnerable by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.14**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.69; High**

#### 3.4.2 Puddingwife, *Halichoeres radiatus*

**Management / Conservation:** Puddingwife is small wrasse of minor commercial importance as a foodfish, though it is sold in the aquarium trade. Puddingwife is a protogynous species and can often be found associated with Sargassum. Puddingwife is not listed by the IUCN.

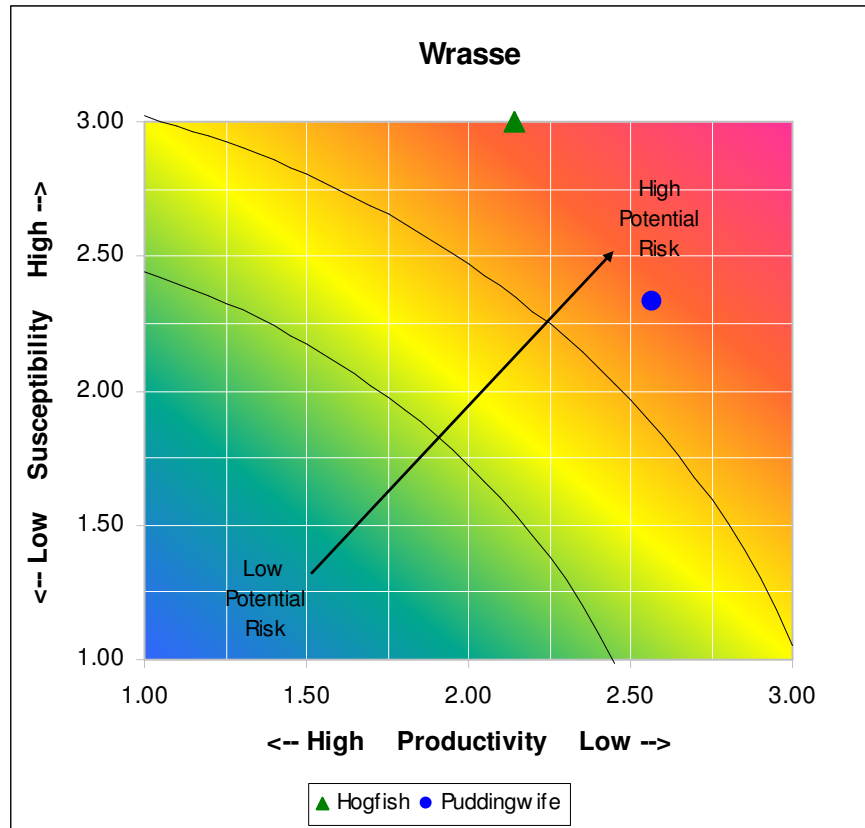
**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.57**      **Susceptibility Score: 2.33**  
**Overall Risk Score: 3.47; High**

		<b>Wrasses</b>	
		<b>Hogfish</b>	<b>Puddingwife</b>
<b>Productivity</b>	Age at maturity	unk	unk
	Size at maturity	unk	unk
	Maximum age	med	unk
	Maximum size	med	med
	Fecundity	low	unk
	Reproductive strategy	low	low
	Trophic level	high	high
	<b>Total Productivity Score</b>	2.14	2.57
<b>Susceptibility</b>	Availability	high	high
	Encounterability	high	high
	Selectivity	high	high
	Post Capture Mortality	high	med
	<b>Total Susceptibility Score</b>	3.00	2.33
<b>Overall Risk Score</b>		3.69	3.47
<b>Risk Ranking</b>		High	High
<b>Overfishing</b>		unk	unk
<b>Overfished (Depleted)</b>		unk	unk

unk = unknown attribute values are treated with precaution and assigned high risk; stock status unknown

low, med, high = risk score for attribute value



### 3.5 Triggerfish and Spadefish

#### 3.5.1 Gray triggerfish, *Balistes capriscus*

**Management / Conservation:** The gray triggerfish inhabits bays, lagoons, and seaward reefs and is of commercial and recreational importance. It is often found associated with Sargassum and is a demersal spawner. It is caught incidentally throughout its range. Management measures include size and gear restrictions and a recreational retention limit. Gray triggerfish is not listed by the IUCN.

**Overfishing: No**  
**Overfished: Unknown**

**Productivity Score: 1.71**      **Susceptibility Score: 1.89**  
**Overall Risk Score: 2.55; Low**

#### 3.5.2 Ocean triggerfish, *Canthidermis sufflamen*

**Management / Conservation:** Ocean triggerfish is caught commercially, as game fish and for aquarium collections. The ocean triggerfish is often found associated with floating Sargassum and is of little commercial value. Management measures include gear restrictions and a recreational retention limit. Ocean triggerfish is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.00**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.61; High**



### 3.5.3 Queen triggerfish, *Balistes vetula*

**Management / Conservation:** Queen triggerfish is a demersal spawner caught commercially for game and aquarium collections. Gear restrictions apply. Queen triggerfish is listed as Vulnerable by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.14**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.69; High**

### 3.5.4 Atlantic spadefish, *Chaetodipterus faber*

**Management / Conservation:** Atlantic spadefish often forms large schools and is found in shallow water around wrecks and is of little commercial value, but it is valued by recreational fishermen due to its large size. There is not an extensive fishery for the Atlantic spadefish and juveniles are only occasionally caught for the aquarium trade. It is managed with a recreational retention limit. The Atlantic spadefish is not listed by the IUCN.

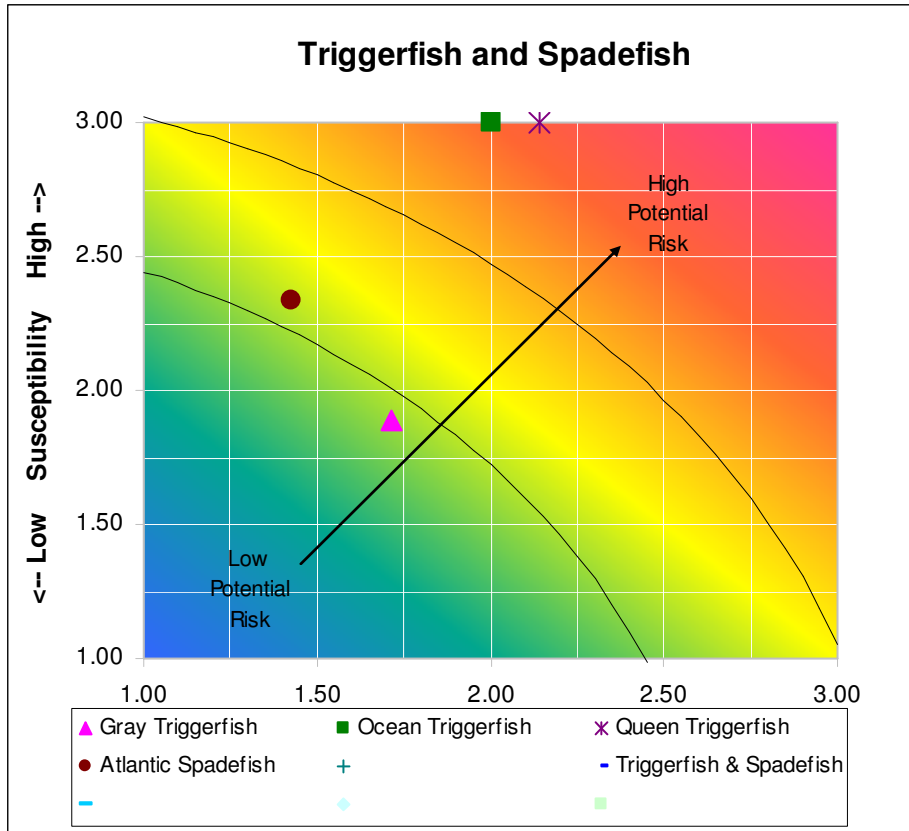
**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 1.43**      **Susceptibility Score: 2.33**  
**Overall Risk Score: 2.74; Medium**

		Triggerfish & Spadefish			
		Gray Triggerfish	Ocean Triggerfish	Queen Triggerfish	Atlantic Spadefish
Productivity	Age at maturity	low	unk	unk	low
	Size at maturity	low	low	low	low
	Maximum age	med	unk	med	low
	Maximum size	med	med	med	med
	Fecundity	low	low	med	low
	Reproductive strategy	med	med	med	low
	Trophic level	high	med	high	high
	<b>Total Productivity Score</b>	1.71	2.00	2.14	1.43
Susceptibility	Availability	med	high	high	high
	Encounterability	high	high	high	high
	Selectivity	high	high	high	high
	Post-Capture Mortality	med	high	high	med
	<b>Total Susceptibility Score</b>	1.89	3.00	3.00	2.33
<b>Overall Risk Score</b>		2.55	3.61	3.69	2.74
<b>Risk Ranking</b>		Low	High	High	Med
<b>Overfishing</b>		no	unk	unk	unk
<b>Overfished (Depleted)</b>		unk	unk	unk	unk

unk = unknown attribute values are treated with precaution and assigned high risk; stock status unknown

low, med, high = risk score for attribute value



### 3.6 Jacks

#### 3.6.1 Greater amberjack, *Seriola dumerili*

**Management / Conservation:** Greater amberjack is a popular game fish as well as a commercially caught species. It exhibits schooling behavior as a juvenile, but this behavior decreases with age. Fishing gear used includes hydraulic reels and handlines (bottom-fished) and rod-and-reels (trolled and bottom-fished); size, gear and seasonal restrictions, commercial and recreational retention limits. Greater amberjack is not listed by the IUCN.

**Overfishing: No**  
**Overfished: No**

**Productivity Score: 2.00**      **Susceptibility Score: 1.67**  
**Overall Risk Score: 2.60; Low**

#### 3.6.2 Crevalle jack, *Caranx hippos*

**Management / Conservation:** Crevalle jack is a schooling species found in shallow water, is fished commercially throughout the year and is a valuable sport fish. There is no distinct management for this species. Crevalle jack is not listed by the IUCN; however is regarded as a Species of Concern in South Carolina due to heavy recreational fishing.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.43**      **Susceptibility Score: 1.67**  
**Overall Risk Score: 2.95; Medium**

### 3.6.3 Blue runner, *Caranx crysos*

**Management / Conservation:** Blue runner is caught as a sport fish recreationally and primarily used for bait by commercial fishermen. It is a schooling species found inshore though not common around reefs; juveniles are often associated with floating Sargassum communities. There is no distinct management for this species. Blue runner is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.14**      **Susceptibility Score: 1.67**  
**Overall Risk Score: 2.71; Medium**

### 3.6.4 Almaco jack, *Seriola rivoliana*

**Management / Conservation:** Almaco jack is found in small groups and is rarely encountered inshore. This species is not targeted commercially but is a reputable sportfish in the Bahamas. It is mainly caught on handlines and with hook-and-line and must be landed with the head and fins intact. Almaco jack is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.71**      **Susceptibility Score: 1.30**  
**Overall Risk Score: 3.01; Medium**

### 3.6.5 Banded rudderfish, *Seriola zonata*

**Management / Conservation:** Banded rudderfish is found nearshore and offshore, often caught incidentally and for sport. This species is caught on handlines and with hook-and-line and must be landed with the head and fins intact. Banded rudderfish is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.57**      **Susceptibility Score: 1.30**  
**Overall Risk Score: 2.88; Medium**

### 3.6.6 Bar jack, *Caranx ruber*

**Management / Conservation:** The bar jack forms small to large schools over reefs and juveniles are often found associated with Sargassum. Bar jack is sought after by anglers with light tackle. There is no distinct management for this species. Bar jack is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.29**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.77; High**

### 3.6.7 Lesser amberjack, *Seriola fasciata*

**Management / Conservation:** Lesser amberjack is caught with hook-and-line gear on the bottom. It is primarily a sport fish and is often caught incidentally with greater amberjack. Lesser amberjack is managed with gear restrictions and a recreational retention limit applies; this species is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.57**      **Susceptibility Score: 2.33**  
**Overall Risk Score: 3.47; High**

### 3.6.8 Yellow jack, *Caranx bartholomaei*

**Management / Conservation:** The Yellow jack is often caught by anglers and achieves a large size. Yellow jack juveniles are often associated with Sargassum and adults are found in small groups or solitary around outer reefs. There is no distinct management for this species. Yellow jack is not listed by the IUCN.

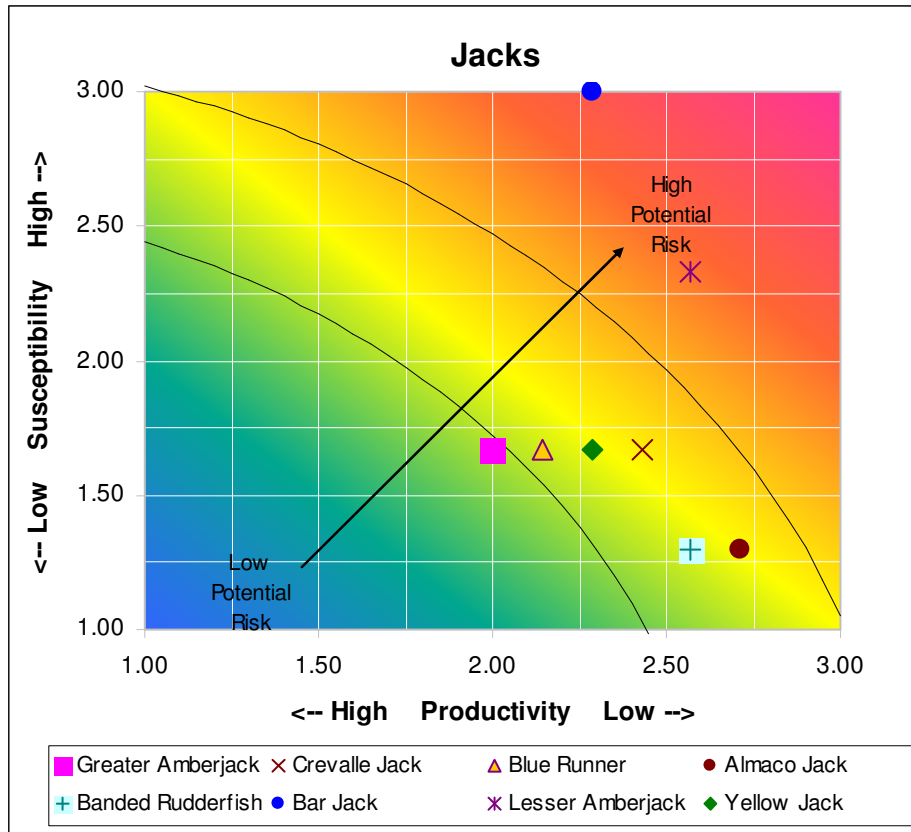
**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.29**      **Susceptibility Score: 1.67**  
**Overall Risk Score: 2.83; Medium**

		Jacks							
		Greater Amberjack	Crevalle Jack	Blue Runner	Almaco Jack	Banded Rudderfish	Bar Jack	Lesser Amberjack	Yellow Jack
<b>Productivity</b>	Age at maturity	low	med	unk	unk	unk	unk	unk	unk
	Size at maturity	high	high	low	high	unk	low	unk	low
	Maximum age	med	med	med	unk	unk	unk	unk	unk
	Maximum size	high	high	med	high	med	med	med	med
	Fecundity	low	unk	unk	unk	unk	unk	unk	unk
	Reproductive strategy	low	low	low	low	low	low	low	low
	Trophic level	high	high	high	high	high	high	high	high
<b>Total Productivity Score</b>		2.00	2.43	2.14	2.71	2.57	2.29	2.57	2.29
<b>Susceptibility</b>	Availability	high	high	high	med	med	high	high	high
	Encounterability	low	low	low	low	low	high	high	low
	Selectivity	high	high	high	high	high	high	high	high
	Post Capture Mortality	high	high	high	med	med	high	med	high
<b>Total Susceptibility Score</b>		1.67	1.67	1.67	1.30	1.30	3.00	2.33	1.67
<b>Overall Risk Score</b>		2.60	2.95	2.71	3.01	2.88	3.77	3.47	2.83
<b>Risk Ranking</b>		Low	Med	Med	Med	Med	High	High	Med
<b>Overfishing</b>		no	unk	unk	unk	unk	unk	unk	unk
<b>Overfished (Depleted)</b>		no	unk	unk	unk	unk	unk	unk	unk

unk = unknown attribute values are treated with precaution and assigned high risk; stock status unknown

low, med, high = risk score for attribute value



### 3.7 Grunts

#### 3.7.1 White grunt, *Haemulon plumieri*

**Management / Conservation:** The white grunt forms large schools, it is a recreational gamefish of minor commercial importance, and is also collected for aquaria. This species inhabits nearshore sponge and coral reef habitats. It is primarily caught by hook-and-line; management measures include gear restrictions and a recreational retention limit. White grunt is not listed by the IUCN.

**Overfishing:** No  
**Overfished:** Unknown

**Productivity Score:** 1.86      **Susceptibility Score:** 3.00  
**Overall Risk Score:** 3.53; **High**

#### 3.7.2 Porkfish, *Anisotremus virginicus*

**Management / Conservation:** Porkfish is a minor commercial species considered a good game fish, and is collected for aquaria. Porkfish is nocturnal and often travel in large schools. There is no distinct management for this species. Porkfish is not listed by the IUCN.

**Overfishing:** Unknown  
**Overfished:** Unknown

**Productivity Score:** 2.57      **Susceptibility Score:** 3.00  
**Overall Risk Score:** 3.95; **High**

### 3.7.3 Margate, *Haemulon album*

**Management / Conservation:** Margate is a schooling species caught in both commercial and recreational fisheries and is a popular food fish in some areas. In the SA EEZ management measures include gear restrictions and a recreational retention limit. Margate is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 1.86**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.53; High**

### 3.7.4 Black margate, *Anisotremus surinamensis*

**Management / Conservation:** Black margate is a shallow water species caught in commercial and recreational fisheries and retained for aquaria. Caught mainly with hook-and-line, a recreational retention limit applies. Black margate is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.57**      **Susceptibility Score: 2.33**  
**Overall Risk Score: 3.47; High**

### 3.7.5 Tomtate, *Haemulon aurolineatum*

**Management / Conservation:** The tomtate sometimes forms large schools and is primarily caught by hook-and-line. Management measures include gear restrictions and a recreational retention limit; fish must be landed with head and fins intact. Tomtate is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 1.57**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.39; High**

### 3.7.6 Bluestriped grunt, *Haemulon sciurus*

**Management / Conservation:** Bluestriped grunts form small groups as adults and juveniles are abundant in shallow turtle grass. This species is of minor commercial fisheries importance, but is valued for aquaria collection. Bluestriped grunt is managed through gear restrictions and a recreational retention limit. Bluestriped grunt is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 1.43**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.32; High**

### 3.7.7 French grunt, *Haemulon flavolineatum*

**Management / Conservation:** French grunt occurs in large schools over rocky and coral reefs. It is caught in commercial and recreational fisheries for food, bait and aquaria. Management measures include gear restrictions and a recreational retention limit; fish must be landed with head and fins intact. French grunt is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 1.71**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.46; High**

### 3.7.8 Spanish grunt, *Haemulon macrostomum*

**Management / Conservation:** Unlike many other grunt species, spanish grunt does not form schools. Spanish grunt is of minor commercial importance and is collected for aquaria; there is no distinct management for this species. Spanish grunt is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.57**      **Susceptibility Score: 2.33**  
**Overall Risk Score: 3.47; High**

### 3.7.9 Cottonwick grunt, *Haemulon melanurum*

**Management / Conservation:** Cottonwick grunt is a schooling species of minor commercial importance and is collected for aquaria; there is no distinct management for this species. Cottonwick grunt is not listed by the IUCN. Not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.29**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.77; High**

### 3.7.10 Sailors Choice, *Haemulon parra*

**Management / Conservation:** Sailors choice grunt is typically found in shallow open water in schools; they are of minor commercial fisheries importance and retained for aquaria. There are no distinct management measures for this species. Sailors choice is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.57**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.95; High**

### 3.7.11 Smallmouth grunt, *Haemulon chrysargyreum*

**Management / Conservation:** Smallmouth grunt is commonly found in schools and is caught in commercial and recreational fisheries for food, bait and aquaria. There are no distinct management measures for this species. Smallmouth grunt is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

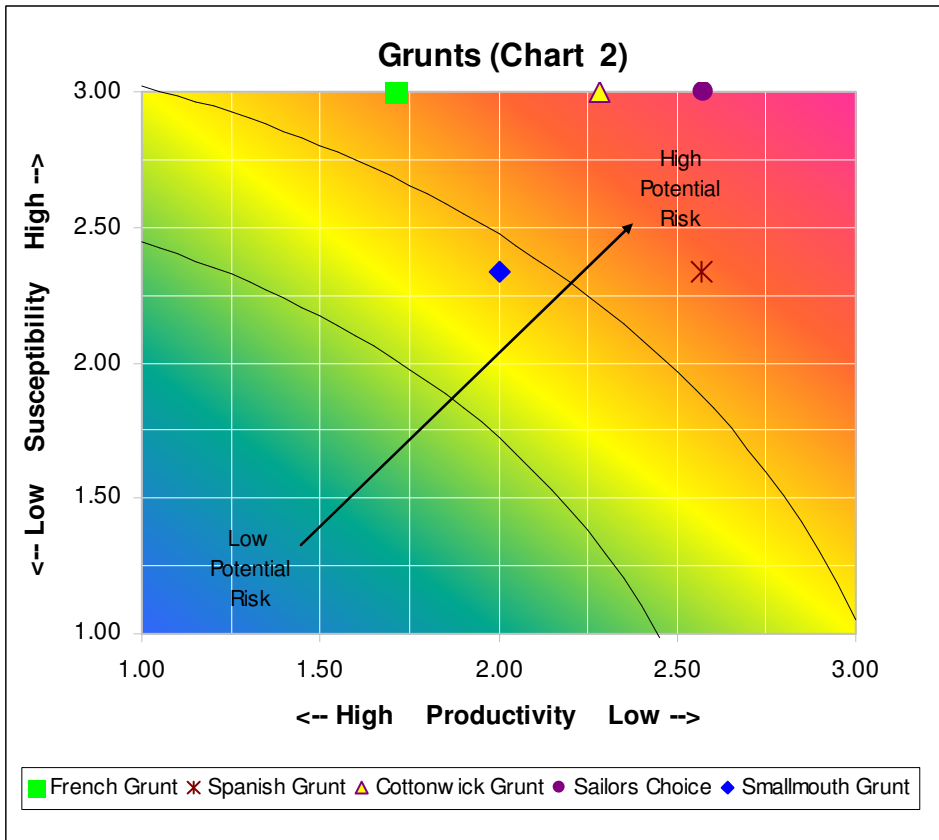
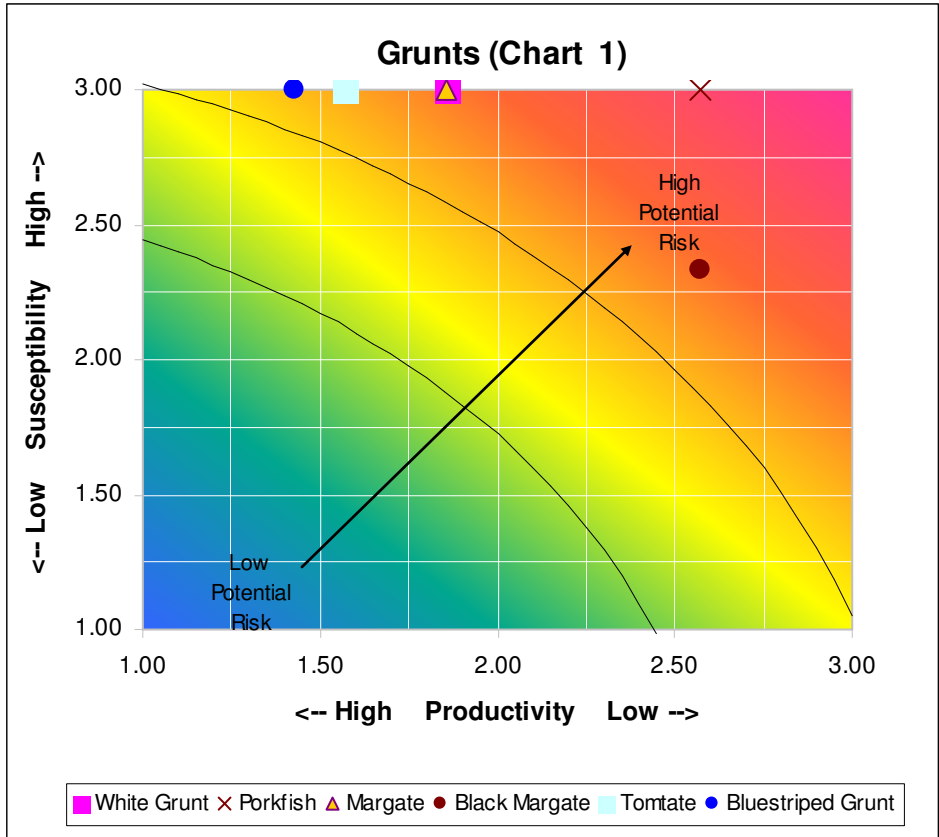
**Productivity Score: 2.00**      **Susceptibility Score: 2.33**  
**Overall Risk Score: 3.07; Medium**

		Grunts										
		White Grunt	Porkfish	Margate	Black Margate	Tomtate	Bluestriped Grunt	French Grunt	Spanish Grunt	Cottonwick Grunt	Sailors Choice	Smallmouth Grunt
Productivity	Age at maturity	low	unk	low	unk	unk	low	low	unk	unk	unk	unk
	Size at maturity	low	unk	high	unk	low	low	low	unk	low	unk	low
	Maximum age	high	unk	unk	unk	low	med	unk	unk	unk	unk	unk
	Maximum size	med	med	med	med	med	med	med	med	med	med	med
	Fecundity	med	unk	low	unk	low	low	low	unk	unk	unk	low
	Reproductive strategy	low	low	low	low	low	low	low	low	low	low	low
	Trophic level	high	high	med	high	med	med	high	high	high	high	med
Total Productivity Score		1.86	2.57	1.86	2.57	1.57	1.43	1.71	2.57	2.29	2.57	2.00
Susceptibility	Availability	high	high	high	high	high	high	high	high	high	high	high
	Encounterability	high	high	high	high	high	high	high	high	high	high	high
	Selectivity	high	high	high	high	high	high	high	high	high	high	high
	Post Capture Mortality	high	high	high	high	high	high	high	high	high	high	med
Total Susceptibility Score		3.00	3.00	3.00	2.33	3.00	3.00	3.00	2.33	3.00	3.00	2.33
Overall Risk Score		3.53	3.95	3.53	3.47	3.39	3.32	3.46	3.47	3.77	3.95	3.07
Risk Ranking		High	High	High	High	High	High	High	High	High	High	Med
Overfishing		no	unk	unk	unk	unk	unk	unk	unk	unk	unk	unk
Overfished (Depleted)		unk	unk	unk	unk	unk	unk	unk	unk	unk	unk	unk

unk = unknown attribute values are treated with precaution and assigned high risk; stock status unknown

low, med, high = risk score for attribute value





## 3.8 Porgies

### 3.8.1 Red porgy, *Pagrus pagrus*

**Management / Conservation:** Red porgy is a schooling species that has long been an important commercial fish and popular game fish. Red porgy is currently managed with size limits, gear restrictions recreational and commercial retention limits and seasonal restrictions. Red porgy is listed as Endangered by the IUCN.

**Overfishing:** No  
**Overfished:** Yes

**Productivity Score:** 1.57      **Susceptibility Score:** 3.00  
**Overall Risk Score:** 3.39; **High**

### 3.8.2 Grass porgy, *Calamus arctifrons*

**Management / Conservation:** Grass porgy juveniles form aggregations. This species is caught in the commercial fishery, occasionally as a bait fish; there are no distinct management measures for this species. Grass porgy is not listed by the IUCN.

**Overfishing:** Unknown  
**Overfished:** Unknown

**Productivity Score:** 2.43      **Susceptibility Score:** 3.00  
**Overall Risk Score:** 3.86; **High**

### 3.8.3 Jolthead porgy, *Calamus bajonado*

**Management / Conservation:** Jolthead porgy is a solitary protogynous species of greater recreational than commercial importance. The species is managed through gear restrictions and a recreational retention limit. Jolthead porgy is not listed by the IUCN.

**Overfishing:** Unknown  
**Overfished:** Unknown

**Productivity Score:** 1.71      **Susceptibility Score:** 3.00  
**Overall Risk Score:** 3.46; **High**

### 3.8.4 Saucereye porgy, *Calamus calamus*

**Management / Conservation:** Saucereye porgy is a minor commercial species managed through gear restrictions and a recreational retention limit. Saucereye porgy is not listed by the IUCN.

**Overfishing:** Unknown  
**Overfished:** Unknown

**Productivity Score:** 2.57      **Susceptibility Score:** 3.00  
**Overall Risk Score:** 3.95; **High**

### 3.8.5 Whitebone porgy, *Calamus leucosteus*

**Management / Conservation:** Whitebone porgy is a protogynous species retained in both commercial and recreational fisheries. The species is managed through gear restrictions and a recreational retention limit. Whitebone porgy is not listed by the IUCN.

**Overfishing:** Unknown  
**Overfished:** Unknown

**Productivity Score:** 2.43      **Susceptibility Score:** 3.00  
**Overall Risk Score:** 3.86; **High**

### 3.8.6 Knobbed porgy, *Calamus nodosus*

**Management / Conservation:** The knobbed porgy is a protogynous species of minor commercial species also retained in recreational fisheries; a recreational retention limit applies. Knobbed porgy is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.14**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.69; High**

### 3.8.7 Longspine porgy, *Stenotomus caprinus*

**Management / Conservation:** Longspine porgy is a minor commercial species with no species-specific management measures. Longspine porgy is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.14**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.69; High**

### 3.8.8 Sheepshead, *Archosargus probatocephalus*

**Management / Conservation:** Sheepshead is significantly more important as a recreational species than a commercial species, though its importance as a food fish varies with region. Sheepshead is managed through gear restrictions and a recreational retention limit. Sheepshead is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 2.00**      **Susceptibility Score: 2.33**  
**Overall Risk Score: 3.07; Medium**

### 3.8.9 Scup, *Stenotomus chrysops*

**Management / Conservation:** Scup supports commercial fisheries in the northeastern coast of the US and is a significant recreational species in the southeast. Scup is a schooling species managed through gear restrictions and a recreational retention limit. Scup is not listed by the IUCN.

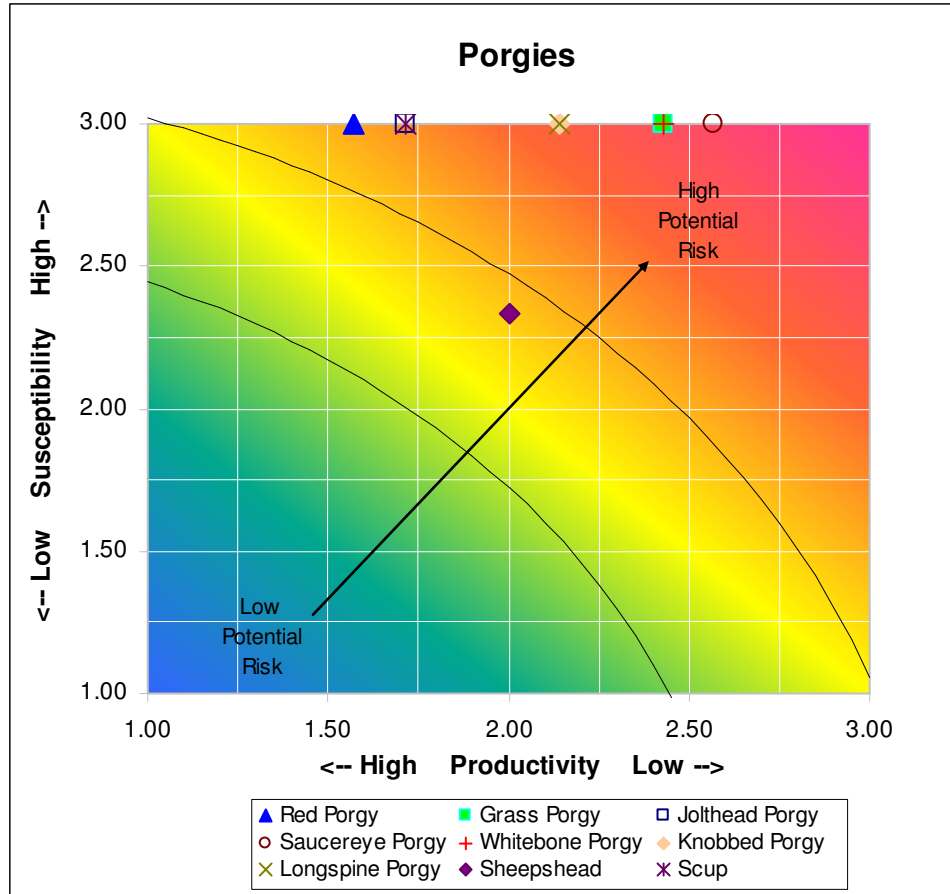
**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 1.71**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.46; High**

		Porgies								
		Red Porgy	Grass Porgy	Jolthead Porgy	Saucereye Porgy	Whitebone Porgy	Knobbed Porgy	Longspine Porgy	Sheepshead	Scup
<b>Productivity</b>	Age at maturity	low	unk	low	unk	unk	med	unk	low	low
	Size at maturity	low	unk	low	unk	unk	med	unk	unk	low
	Maximum age	med	unk	med	unk	med	med	low	med	med
	Maximum size	med	low	med	med	med	med	med	med	med
	Fecundity	low	unk	unk	unk	unk	unk	unk	med	med
	Reproductive strategy	low	low	low	low	low	low	low	low	low
	Trophic level	high	high	med	med	high	unk	med	high	high
<b>Total Productivity Score</b>		1.57	2.43	1.71	2.57	2.43	2.14	2.14	2.00	1.71
<b>Susceptibility</b>	Availability	high	high	high	high	high	high	high	2	high
	Encounterability	high	high	high	high	high	high	high	high	high
	Selectivity	high	high	high	high	high	high	high	high	high
	Post Capture Mortality	high	high	high	high	high	high	high	high	high
<b>Total Susceptibility Score</b>		3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.33	3.00
<b>Overall Risk Score</b>		3.39	3.86	3.46	3.95	3.86	3.69	3.69	3.07	3.46
<b>Risk Ranking</b>		High	High	High	High	High	High	High	Med	High
<b>Overfishing</b>		no	unk	unk	unk	unk	unk	unk	unk	unk
<b>Overfished (Depleted)</b>		yes	unk	unk	unk	unk	unk	unk	unk	unk

unk = unknown attribute values are treated with precaution and assigned high risk; stock status unknown

low, med, high = risk score for attribute value



### 3.9 Sea Basses

#### 3.9.1 Black sea bass, *Centropristis striata*

**Management / Conservation:** Black sea bass is an important commercial and sportfish taken in pots and traps, dredges, pound nets, and on hand lines. Black sea bass is a protogynous hermaphrodite managed through gear restrictions, size limits, commercial trip limits and quotas and recreational retention limits. Black sea bass is not listed by the IUCN.

**Overfishing: Yes**  
**Overfished: Yes**

**Productivity Score: 1.57**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.39; High**

#### 3.9.2 Bank sea bass, *Centropristis ocyurus*

**Management / Conservation:** Bank sea bass is a protogynous hermaphrodite found offshore in deep water and is managed with a recreational retention limit; fish must be landed with heads and fins intact. Bank sea bass is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

**Productivity Score: 1.86**      **Susceptibility Score: 3.00**  
**Overall Risk Score: 3.53; High**

### 3.9.3 Rock sea bass, *Centropristis philadelphica*

**Management / Conservation:** Rock sea bass is a protogynous hermaphrodite managed through gear restrictions and a recreational retention limit. Rock sea bass is not listed by the IUCN.

**Overfishing: Unknown**  
**Overfished: Unknown**

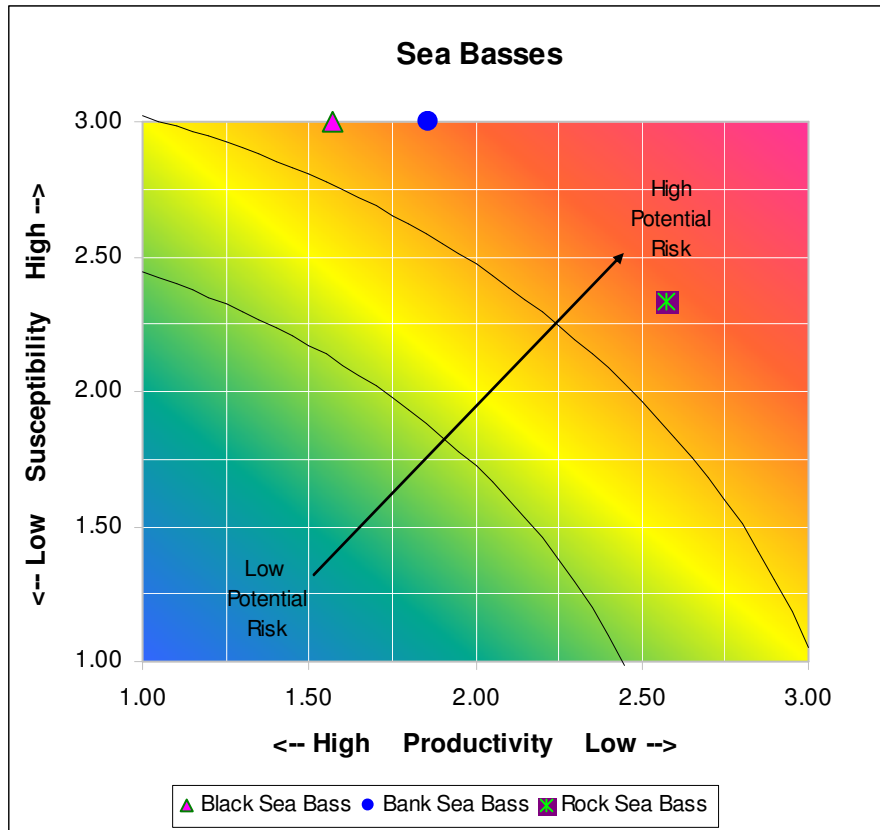
**Productivity Score: 2.57**      **Susceptibility Score: 2.33**  
**Overall Risk Score: 3.47; High**

		Sea Basses		
		Black Sea Bass	Bank Sea Bass	Rock Sea Bass
Productivity	Age at maturity	low	low	unk
	Size at maturity	low	unk	unk
	Maximum age	med	low	unk
	Maximum size	med	med	med
	Fecundity	low	med	unk
	Reproductive strategy	low	low	low
	Trophic level	high	unk	unk
	<b>Total Productivity Score</b>	1.57	1.86	2.57
Susceptibility	Availability	high	high	high
	Encounterability	high	high	high
	Selectivity	high	high	high
	Post Capture Mortality	high	high	med
<b>Total Susceptibility Score</b>	3.00	3.00	2.33	
<b>Overall Risk Score</b>	3.39	3.53	3.47	
<b>Risk Ranking</b>	High	High	High	
<b>Overfishing</b>	yes	unk	unk	
<b>Overfished (Depleted)</b>	yes	unk	unk	

unk = unknown attribute values are treated with precaution and assigned high risk; stock status unknown

low, med, high = risk score for attribute value

**RED** = overfished and overfishing is occurring



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