

# **SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL**

## **MPA EXPERT WORKGROUP**



### **Meeting Overview**

**May 16-17, 2012  
Mighty Eighth Air Force Museum  
Pooler, GA**

**Version: 6-1-2012**

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## PURPOSE

This meeting was convened to:

- Review the SAFMC Snapper-Grouper Advisory Panel, Scientific and Statistical Committee, and Law Enforcement Advisory Panel recommendations in regards to CE-BA 3
- Review recommendations from MPA Workshop #1
- Review data availability, assumptions and other considerations for siting MPAs for speckled hind and warsaw grouper
- Discuss potential sites for MPA designation based on available data, including spawning locations
- Summarize recommendations from Expert Workgroup

**MEETING MATERIALS****Expert Workgroup Meeting Materials**

[Workgroup Meeting Agenda](#)

**Briefing Book Materials**

Attachment 1 [April 2012 SSC Report](#)

Attachment 2 [Snapper Grouper AP Report](#) April 2012

Attachment 3a [Law Enforcement AP Recommendations](#) 1998

Attachment 3b [SERMA Final Report](#) 2011

Attachment 3c [Law Enforcement AP Recommendations](#) 2012

**Literature/Articles of Interest (distributed to Workgroup by SAFMC via their web site or email)**

[Babcock and MacCall 2011](#)

[Botsford \*et al.\* 2009](#)

[Coleman \*et al.\* 2011](#)

[Federal Register Notice - 90 Day Finding for Speckled Hind](#)

[Federal Register Notice - 90 Day Finding for Warsaw Grouper](#)

[Field \*et al.\* 2006](#)

[Hare and Walsh 2007](#)

[Hart 2006](#)

[Heyman 2011](#)

[Heyman and Wright 2011](#)

[Lindeman \*et al.\* 2000](#)

[Minority Report - Snapper Grouper Amendment 17B](#)

[SERO Fishery Bulletin 12-033: South Atlantic Regulatory Amendment 11 Final Rule](#)

[SFA ECFS 2012 May 15 MPA Policy](#)

[Ziskin 2008 - Thesis for Speckled Hind](#)

[Ziskin \*et al.\* 2011](#)

## INTRODUCTION

At their March 2012 meeting, the South Atlantic Fishery Management Council (SAFMC or Council) directed staff to hold five Marine Protected Area (MPA) workshops to obtain information useful for the siting of MPAs for speckled hind (SH) and warsaw grouper (WG) based on considerations under development in the Comprehensive Ecosystem Based Amendment 3 (CE-BA 3). In addition, the Council directed staff to convene a group of experts to provide scientific input on using MPAs to end overfishing of SH and WG. Two of the five MPA workshops were held prior to the June 2012 Council meeting, with the remaining three scheduled after the June Council meeting.

The goal of the MPA Workshops is to give the public an opportunity to provide data on locations of SH, WG and essential habitat for these two species. The goal is not to debate the value of MPAs as the correct approach.

Public Workshops were held during the Snapper Grouper Advisory Panel (AP) meeting in North Charleston, SC (April 18, 2012) and during the MPA Expert Workgroup. The Council held the Expert Workgroup meeting from 1:00 pm on Wednesday, May 16, 2012 through 1:00 pm on Thursday, May 17, 2012 at the Mighty Eighth Air Force Museum in Pooler GA. The purpose of the Workgroup was to provide expert recommendations on designation of MPAs to curb bycatch mortality of SH and WG.

The Workgroup was provided with charts of known occurrences (fishery-dependent and fishery-independent) of the two grouper species, and known hard-bottom habitat; publications related to these two species and their habitat; known and suspected spawning locations (see **Meeting Materials**, above); and access to an internet map server containing the habitat and species occurrence data.

The Workgroup selected George Sedberry (Scientist) as Chair and Don DeMaria (Fisherman) as Vice-Chair, responsible for coordination and preparation of this Expert Workgroup Report to be submitted to the Council on or before June 1, 2012.

Participants in the Expert Workgroup included scientists and fishermen (four primarily commercial, one recreational, one primarily charter), and were:

<i>Scientists:</i>	Joey Ballenger	<i>Fishermen:</i>	Jack Cox
	Churchill Grimes		Ralph Delph
	Stacey Harter		Don DeMaria
	Will Heyman		Bobby Freeman
	Chris Koenig		Rusty Hudson
	Ken Lindeman		Mark Marhefka
	George Sedberry		
	Gabe Ziskin		

### **Opening Remarks and Charge**

The charge given to the Workgroup was to provide specific site recommendations where MPAs might help reduce bycatch of SH and WG or where MPAs might enhance spawning and recruitment of these two species.

SAFMC Staff explained to the Workgroup the origin of the idea for additional management measures for SH and WG. Regulatory Amendment 11 was requested by the SAFMC in December 2010 in response to industry input. Industry suggested the harvest prohibition of six deepwater Snapper-Grouper species in depths greater than 240 ft. could be modified to reduce negative economic and social effects without compromising conservation objectives for SH and WG. The SAFMC reviewed options for the Regulatory Amendment and agreed to consider expansion of existing MPAs, or new MPAs, to provide protection for SH and WG in a separate amendment. At the March 2012 meeting, the Council refined the Comprehensive Ecosystem-Based Amendment 3 (CE-BA 3), and included actions to consider expansion or designation of coral Habitat Areas of Particular Concern (HAPCs) and MPAs for SH and WG.

### *SSC Report*

Members of the Scientific and Statistical Committee (SSC) Churchill Grimes and George Sedberry reviewed the [recommendations of the SSC](#) regarding SH and WG, compiled during their April 2012 meeting. The SSC wanted the opinion of the various APs (e.g., [Snapper-Grouper](#), Law Enforcement) and the results of the MPA Workshops before providing its comments; however they issued several recommendations to the SAFMC. The SSC felt that MPAs should follow depth contours and should be designed and chosen to protect ecosystem function, instead of focusing just on SH and WG. Members felt that fishery-dependent and fishery-independent approaches have strong merit for use and should incorporate temporal analysis and weighting of data (determination of how to weight them with regard to their value and actual weighting of datasets). The SSC thought it possible that overfishing for SH and WG is no longer occurring and additional bycatch analysis is needed to confirm this. They felt that a habitat-modeling exercise should be considered that would use habitat covariates from known locations of SH and WG to predict occurrence of the two species. Such an analysis could serve as a decision support tool for the Council. The SSC felt that data are lacking to comment on MPA size and that MPA size is not directly related to a similar amount of biological gain. The MPA approach does not take into consideration any of the Biological Reference Points [BRP: e.g., 30% spawning potential ratio (SPR) overfished definition], but that SH and WG are so rare that traditional BRP methods don't apply. If SH and WG cannot be managed via BRPs, then perhaps MPAs are a good alternative, given that total prohibition does not address bycatch. Although data are lacking the SSC suggested something akin to a rebuilding plan, with projections showing how we will get back to 30% SPR for these species, and where we are in that plan.

The SSC believes that, absent new data to the contrary, the overfishing definition remains. Additional data should be collected, including fishery-independent data collection, increased observer coverage, and Standardized Bycatch Reporting Methodology (SBRM).

The SSC issued a consensus statement, which was read to the Expert Workgroup:

*It is possible that SH and WG are not undergoing overfishing, given all the regulations for associated species and the current analysis from the Regional Office; however, there is not sufficient evidence to indicate overfishing has ended. Additional closed areas could further decrease bycatch mortality beyond current levels. Based on the current info, the SSC cannot determine what benefits an additional closure will provide to the stocks of SH and WG, what amount of area closure is necessary to reduce bycatch mortality, or if additional closed areas are even necessary. Additional monitoring and data needs to be collected in order to be able to conduct an assessment of these species.*

#### *Snapper-Grouper AP Report*

The Snapper-Grouper AP also considered MPAs for the two grouper species at their April 2012 meeting. The AP discussed the importance of clear transit provisions for any future MPAs, although this makes enforcement difficult. The AP moved that a small-scale experimental fishery for SH and WG be conducted and sampled accordingly, but the motion did not pass. The AP passed a motion that the SAFMC work with the state of Florida to prohibit landings of the two species in Florida waters. The AP approved a motion to support the Council's effort to further identify and expand essential fish habitat (EFH) and HAPC for SH and WG as a basis for potential MPA design and development.

The AP approved motions that research be conducted to evaluate existing MPAs and their effects on SH and WG; that vessel monitoring systems (VMS) be required for any vessel harvesting fish in the SAFMC region; and that enforcement of existing MPAs be increased and verified. A separate approved motion requested that the Council include an action in CE-BA 3 that requires an evaluation and enforcement plan for all MPAs implemented and modified through CE-BA 3, and include acknowledgement of the fact that there are not enough data to put together well-planned MPAs; and that MPAs in CE-BA 3 be developed with sunset provisions that require evaluation of effectiveness.

The AP is also concerned with the cumulative effects of regulations and requested an analysis to determine those cumulative effects on the incidental take of SH and WG, and that the Southeast Fishery Science Center (SEFSC) conduct that analysis as soon as possible.

The Workgroup noted that MPAs have been considered by APs in the Gulf and South Atlantic for many years for to address many problems in reef fish management.

#### *Additional Introductory Material*

Recommendations from the SAFMC Law Enforcement AP were reviewed (Attachments 3a-c). In contrast to recommendations by some scientists and fishermen that boundaries follow the depth contours, the LE AP recommends that boundaries be straight lines, generally following lines of latitude and longitude and be right-angle quadrilaterals.

Council staff reviewed an internet map server tool used to incorporate data on bathymetry, habitat and occurrences of SH and WG, and which was used at the first public MPA workshop held in Charleston in April:

<http://www.safmc.net/EcosystemManagement/EcosystemBoundaries/MappingandGISData/tabid/632/Default.aspx>).

Most recommendations from that workshop related to reorientation of existing MPAs, with some recommendations on incorporating additional habitats. These same recommendations and additional ones were made by the Workgroup, and will be described below.

Following the above plenary introduction, the Workgroup divided into three breakout groups on each day. The only requirement for each breakout was that they include at least one fisherman and a scientist. Breakout groups discussed potential sites for MPA designation based on available data and their expert knowledge. In addition the SAFMC internet map server and printed habitat maps (with grouper occurrences) were available. Members of the Expert Workgroup worked closely with SAFMC staff to make specific recommendations based on their expert experience in research, fishing, NOAA charts, and with the data available in the SAFMC internet map server. Each breakout group designated a rapporteur responsible for summarizing the group's discussions and presenting the group's final recommendations at the conclusion of the meeting. Some Workgroup members participated in more than one breakout group on any one day, and participants developed their recommendations over the two-day period, with daily summaries.

Day 1 breakouts were not focused or organized geographically, but after the discussions following Day 1, it was realized that groups organized by geographic area would be a good way to organize the Day 2 breakouts and the workshop report. The results from both days are presented below by geographic area, from northeast to southwest, with all comments and recommendations included.

## BREAKOUT GROUP REPORTS

Results from the Day 1 breakout groups were reported the following morning and later summarized and submitted by email from each breakout rapporteur to the Workgroup Chair and Vice Chair. The results from Day 2 breakouts were reported later that day and similarly written up and submitted. The following summarizes the discussions that took place during the meeting and what was included in the reports from each breakout rapporteur.

The breakout group notes and discussions were subsequently organized geographically, as is this report. The Northern Region covered habitats off the Carolinas. The Middle Region covered Georgia to Cape Canaveral, Florida. The southern region covered South Florida (from Jupiter Inlet south) and the Florida Keys. There was overlap in the discussions between days and among groups and geographic regions.

As a result of the discussions, different breakout groups recommended new, expanded, or reoriented shelf-edge marine reserves throughout the south Atlantic region for the protection and recovery of SH and WG. The selection of these reserves was based on many considerations, including the following:

- 1) historical catch, bycatch and fishery-independent catch locations (provided by Nick Farmer, NOAA Fisheries Southeast Regional Office);
- 2) published accounts of dominant reef fish catches;
- 3) fishermen's knowledge of historic and current habitat and species locations; and
- 4) scientist's knowledge of habitat.

In addition to specific site recommendations summarized below, the Workgroup also discussed other requirements necessary for the protection of these two species; those general recommendations follow the site recommendations.

Figures for specific sites can be generated using the SAFMC website ([http://ocean.floridamarine.org/safmc\\_managedareas/](http://ocean.floridamarine.org/safmc_managedareas/)), and some are included as website screen captures in this document. Map images have not been provided for all recommended sites, as they were not available when this report was drafted. The SAFMC will make maps available in the near future.

It is important to note that there was not complete agreement among the participants regarding the importance of the recommended areas to SH and WG, and the opinions expressed herein are not those of all participants for all recommendations. In particular, there was disagreement between scientists and fishermen (both groups having several decades of experience) regarding sites off North Carolina.

The site recommendations are presented below by geographic area, from northeast to southwest.

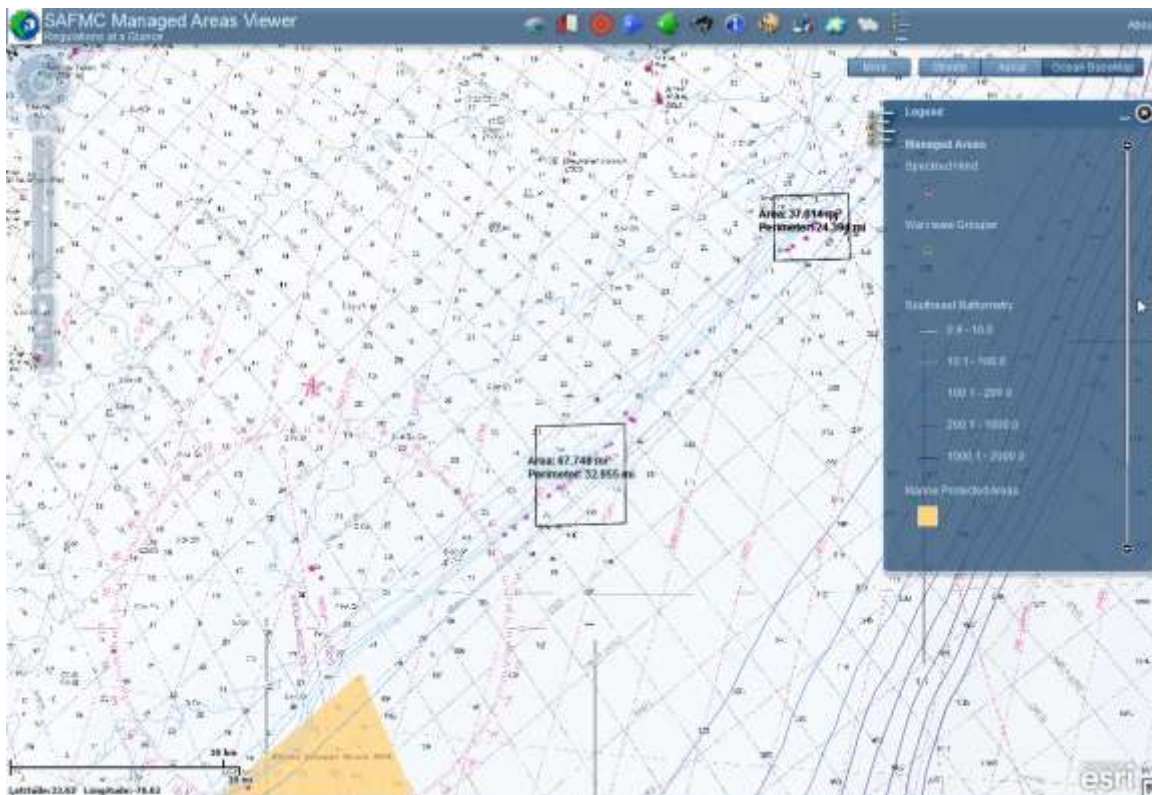


### Northern (Carolinas) Area

The Workgroup looked at areas off Onslow Bay and NC as one group, and areas off SC as another group. There was overlap between groups, and different suggestions, but all are reported.

The "Snowy Edge" southeast of Cape Lookout is recommended as a good site for SH. In the 1970s, SH were among the five most abundant reef fish caught (most abundant grouper), but were severely depleted by the 1980s (Rudershausen *et al.* 2008). Though not common in the northern region since the early 1980s, there does appear to have been a decrease in catch or bycatch of SH and WG in the region over time, and a need for additional protection to reduce bycatch. The Workgroup suggested high-occurrence areas for SH and WG to be included in small MPAs focused on occurrence of the two species (Figure 1).

Two alternative MPA sites for northern SH and WG were offered along the 30-fm depth contour off Beaufort NC, where SH used to be the most abundant grouper, and which coincides with occurrences in the database.



**Figure 1. Shelf-edge reef areas off Onslow Bay NC that include historical catches of SH and WG, and that were suggested as MPAs to reduce bycatch of these species.**

The northern area off Cape Lookout NC (Figure 1; area = 37.5 mi<sup>2</sup>) is one of the deep-water sites reported in Grimes *et al.* (1982) and Rudershausen *et al.* (2008) showing that

SH was the most abundant grouper in the catch and the among the five most abundant species overall in the catch from 1972-1977.

NE corner: 34.19°N / -76.23°W (34°11'24"N / 76°13'48"W)

NW corner: 34.19°N / -76.11°W (34°11'24"N / 76°6'36"W)

SE corner: 34.10°N / -76.23°W (34°6'0"N / 76°13'48"W)

SW corner: 34.10°N / -76.11°W (34°6'0"N / 76°6'36"W)

The southern recommendation off Cape Lookout (Figure 1) is a rectangular shape, oriented N-S, with an area = 67.8 mi<sup>2</sup>. This site was also reported in Grimes *et al.* (1982) and Rudershausen *et al.* (2008) showing the former dominance of SH in the reef fish catch from 1972-1977.

NE corner: 33.90°N / -76.59°W (33°54'0"N / 76°35'24"W)

NW corner: 33.90°N / -76.45°W (33°54'0"N / 76°27'0"W)

SE corner: 33.77°N / -76.59°W (33°45'12"N / 76°35'24"W)

SW corner: 33.77°N / -76.45°W (33°46'12"N / 76°27'0"W)

The Workgroup also suggested expansion of the Snowy Grouper Wreck MPA in an inshore direction (NNW into shallow water) to about the 131-ft isobath, to incorporate depths where SH and WG are more likely to be found. Some NC fishermen indicated there were numbers of SH just inshore of the currently-implemented MPA.

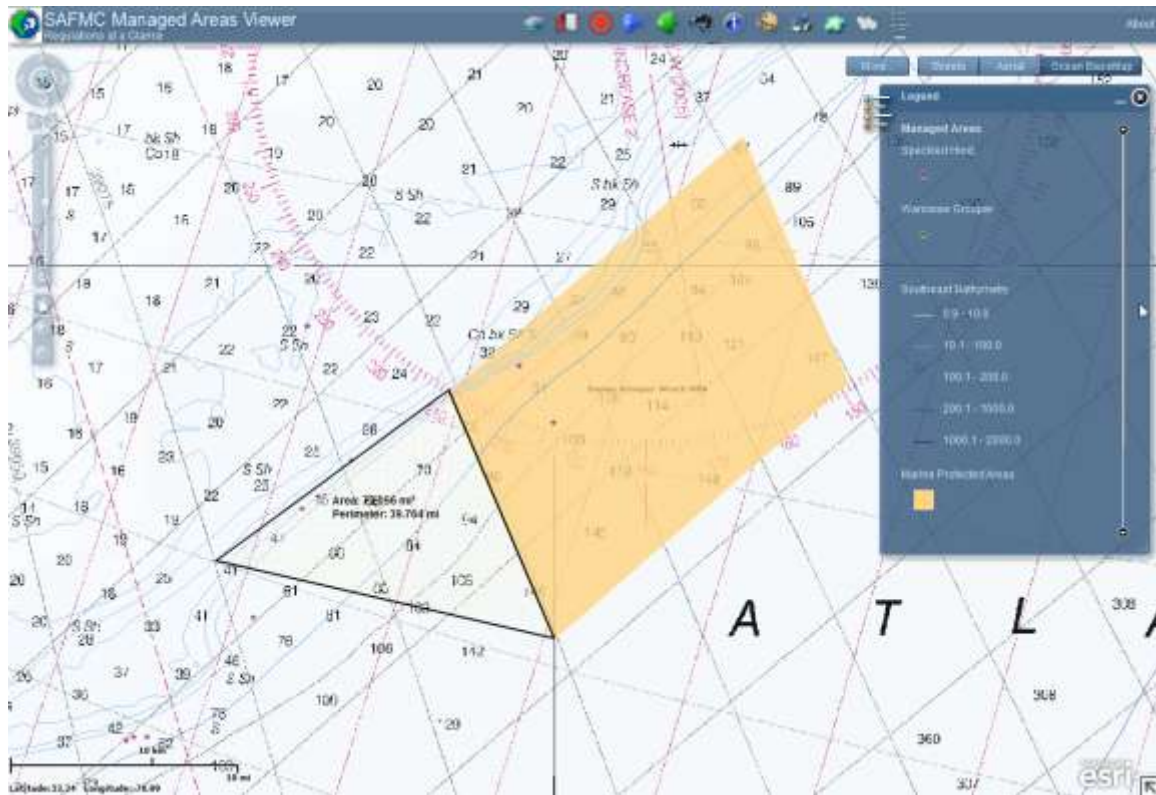
An alternative expansion was proposed to the Snowy Grouper Wreck MPA to add a triangular-shaped area to the southwest end, to include more SH and WG habitat (Figure 2). This triangular extension does not include many SH or WG sites from fishery-independent sampling; however, a fisherman in the Workgroup reported historical catches of both species from 32 years of fishing in this area and also in the extension of the Northern South Carolina MPA shown in Figure 3 (below). The corner coordinates for the extension of the Northern South Carolina MPA (Figure 2) are:

North: 33.42 °N. / 77.08 °W

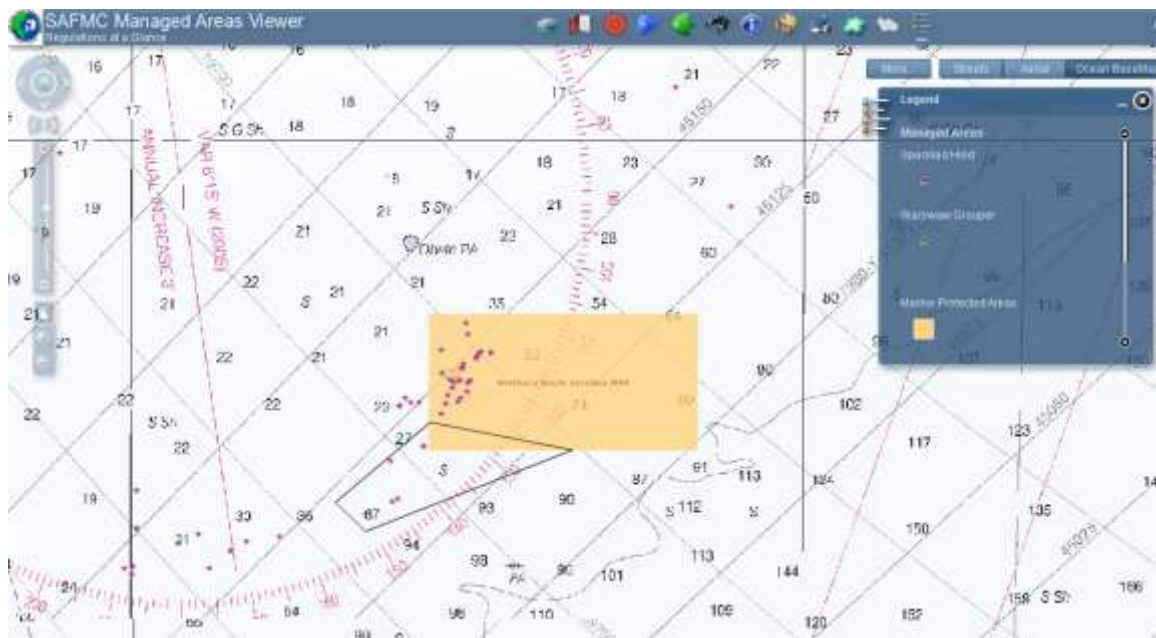
West: 33.31 °N. / 77.26 °W

East: 33.26 °N. / 77.00 °W

The workgroup suggested adding additional artificial reef material to the Snowy Grouper Wreck MPA, as the existing wreck is productive but small, and more material could increase fish production for the entire MPA. Additional general comments regarding wrecks and artificial reefs are summarized later in this report.



**Figure 2. Existing Snowy Grouper Wreck MPA (yellow) and triangular extension suggested to add additional SH and WG habitat.**



**Figure 3. Suggested extension to the Northern South Carolina MPA to include additional SH and WG locations.**

The Workgroup recommended not rotating the Northern South Carolina MPA (Figure 3). Although rotation was suggested by some in the Workgroup because it would increase the amount of protected habitat and include additional locations for SH and WG (and was the original orientation for this MPA suggested to the SAFMC MPA AP), the consensus was that rotating the box would eliminate the existing southeast corner that contains low-relief hard-bottom habitat where snowy grouper and blueline tilefish have been observed. In addition, rotating of the box away from parallel lines of latitude caused concern with enforcement and compliance. Instead of rotating the existing Northern South Carolina MPA, the Workgroup recommended adding an extension to it (Figure 3), and establishing a new small and concise MPA around Georgetown Hole (also known as Devils Hole) off South Carolina. The coordinates for the extension of the Northern SC MPA (Figure 3) are:

NE Corner: 32.81 Degrees N. / -78.17 Degrees W.

NW Corner: 32.83 Degrees N. / -78.28 Degrees W.

SW Corner: 32.77 Degrees N. / -78.35 Degrees W.

SE Corner: 32.76 Degrees N. / -78.33 Degrees W.

The cusped bottom topography of Georgetown Hole contains steep and rugged bottom preferred by SH and WG, as well as known occurrences of these species in fishery-independent sampling (including spawning locations of SH). Two suggestions for coordinates were included (Figures 4, 5) and both include populations of many snapper-grouper species. The coordinates for the first alternative Devil's Hole/Georgetown Hole MPA (Figure 4) are:

NE Corner: 32.57 Degrees N. / -78.54 Degrees W.

NW Corner: 32.60 Degrees N. / -78.57 Degrees W.

SW Corner: 32.54 Degrees N. / -78.63 Degrees W.

SE Corner: 32.51 Degrees N. / -78.60 Degrees W.

The second suggestion is a rectangular shape, oriented N-S, with an area = 101.5 mi<sup>2</sup>.

The Georgetown Hole is an important bottom- and pelagic-fishing area and a shelf-edge habitat where SH were caught. It contains more habitat than the proposed extension of the Northern South Carolina MPA. The coordinates for the second alternative Georgetown Hole MPA (Figure 5) are:

NE corner: 32.70°N / -78.64°W (32°42'0"N / 78°38'24"W)

NW corner: 32.70°N / -78.48°W (32°42'0"N / 78°28'48"W)

SE corner: 32.54°N / -78.64°W (32°32'24"N / 78°38'24"W)

SW corner: 32.54°N / -78.48°W (32°32'24"N / 78°28'48"W)

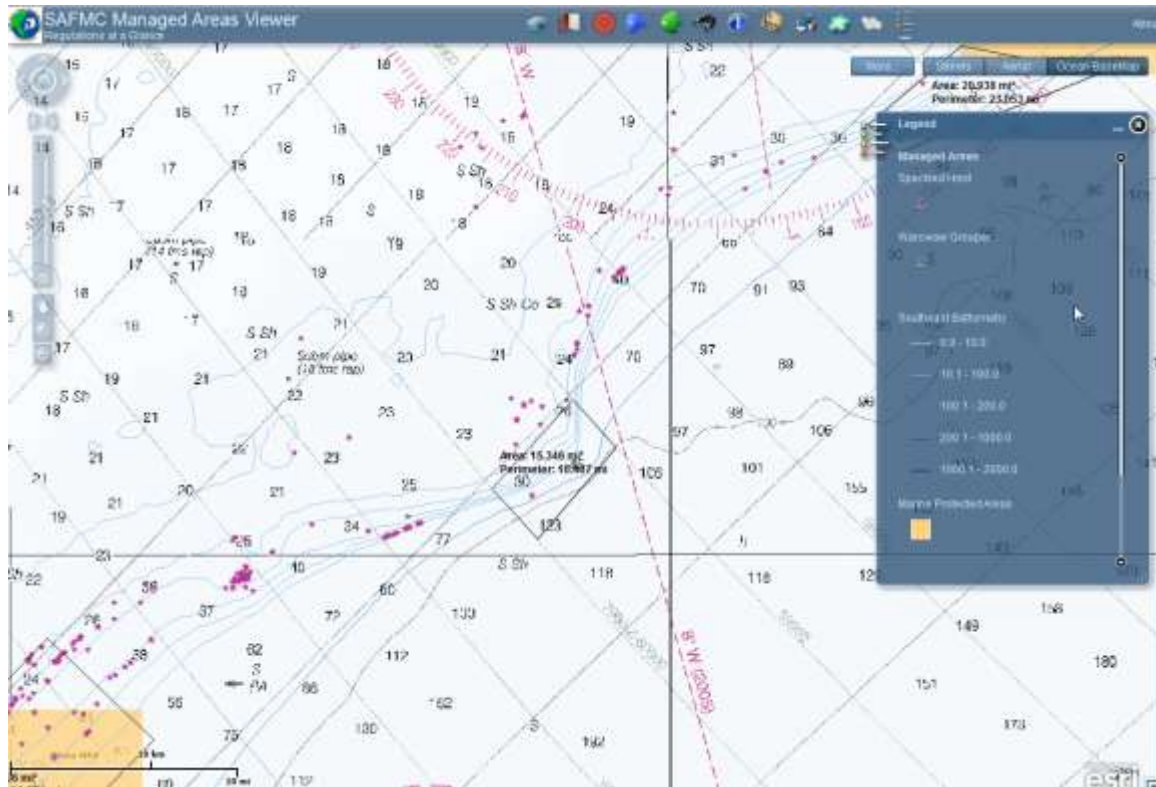


Figure 4. Recommended MPA around the Georgetown Hole (Devils Hole).

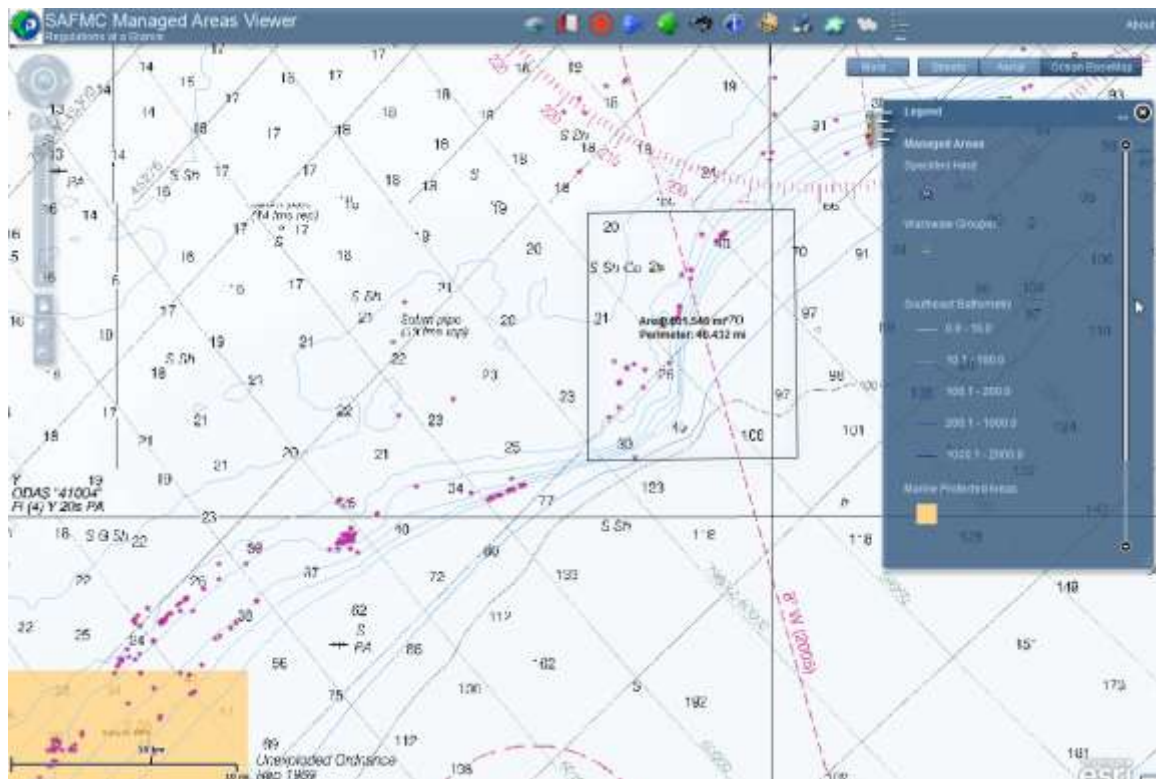


Figure 5. Alternative coordinates for Georgetown Hole (Devils Hole) MPA.

The group also recommended rotating the Edisto MPA off South Carolina so that it follows the depth contours of the shelf edge and encompasses more of the shelf-edge reef habitat. In spite of enforcement and compliance concerns, the rotated configuration is what was originally proposed to the SAFMC for implementation in 2009 because it includes more habitat and reef fish spawning sites. The rotated configuration (77.1 mi<sup>2</sup>) also includes more SH and WG capture locations in the fishery-independent database.

NE corner: 32.45°N / -78.97°W (32°27'0"N / 78°58'12"W)

NW corner: 32.39°N / -78.89°W (32°23'24"N / 78°53'24"W)

SE corner: 32.32°N / -79.11°W (32°19'12"N / 79°6'36"W)

SW corner: 32.26°N / -79.03°W (32°15'36"N / 79°1'48"W)

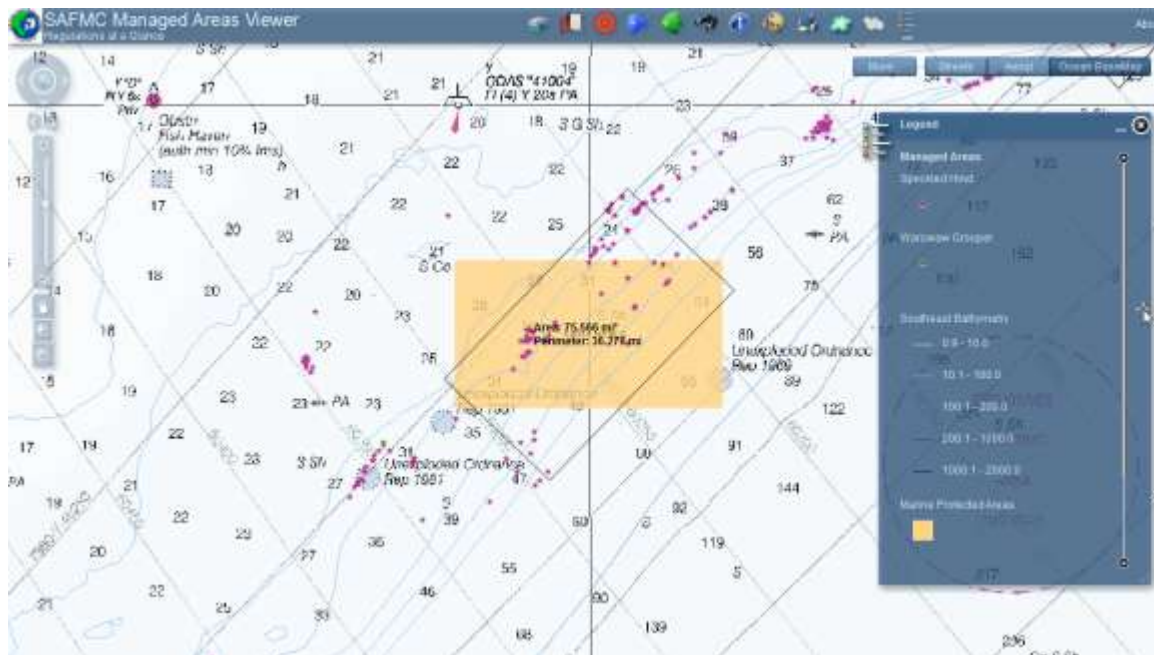
An additional recommendation based on fishermen input shows a reorientation of the Edisto MPA as shown in Figure 6. The coordinates for the reorientation of the Edisto MPA (Figure 6) are:

NE Corner: 32.28 °N / -78.89 °W

NW Corner: 32.45 °N / -78.97 °W

SW Corner: 32.33 °N / -79.11 °W

SE Corner: 32.26 °N / -79.03 °W



**Figure 6. Suggested rotation (black outline) of the existing Edisto MPA (yellow area) to include more shelf-edge reef and SH-WG locations known from fishery-independent sampling.**

### Georgia and North Florida

The Workgroup noted that there are several occurrences of SH at shelf-edge reefs off Georgia, but there are no existing MPAs off Georgia that target hard-bottom reef fishes. The group suggested a new small MPA off Georgia that would encompass several SH

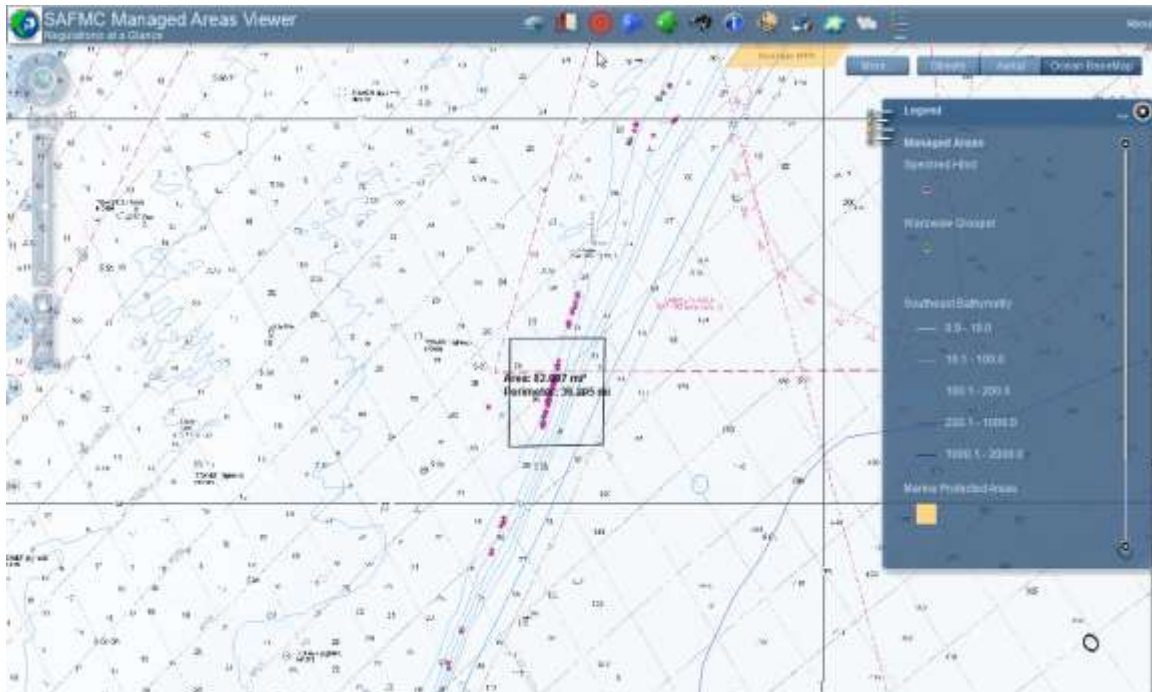
locations and the appropriate habitat (as noted by narrow depth contours). The Workgroup suggested a site off St. Simons Island GA of rectangular shape, oriented N-S, with an area = 82.1 mi<sup>2</sup>. Selection of this site was based on the historical catch data (Figure 7).

NE corner: 31.22°N / -79.98°W (31°13'12"N / 79°58'48"W)

NW corner: 31.22°N / -79.83°W (31°13'12"N / 79°49'48"W)

SE corner: 31.07°N / -79.98°W (31°4'12"N / 79°58'48"W)

SW corner: 31.07°N / -79.83°W (31°4'12"N / 79°49'48"W)



**Figure 7. Proposed MPA for SH and WG off Georgia.**

The MPA Workgroup also suggested moving the North Florida MPA inshore so that it includes more of the shelf-edge reef habitat. This MPA, designated in 2009, is currently oriented along deeper isobaths so that it could encompass (golden) tilefish habitat. Because this species is no longer overfished or undergoing overfishing, the MPA is no longer needed to recover it, and tilefish habitat does not need to be included. Moving the box inshore will protect more shelf-edge habitat where SH and WG occur.

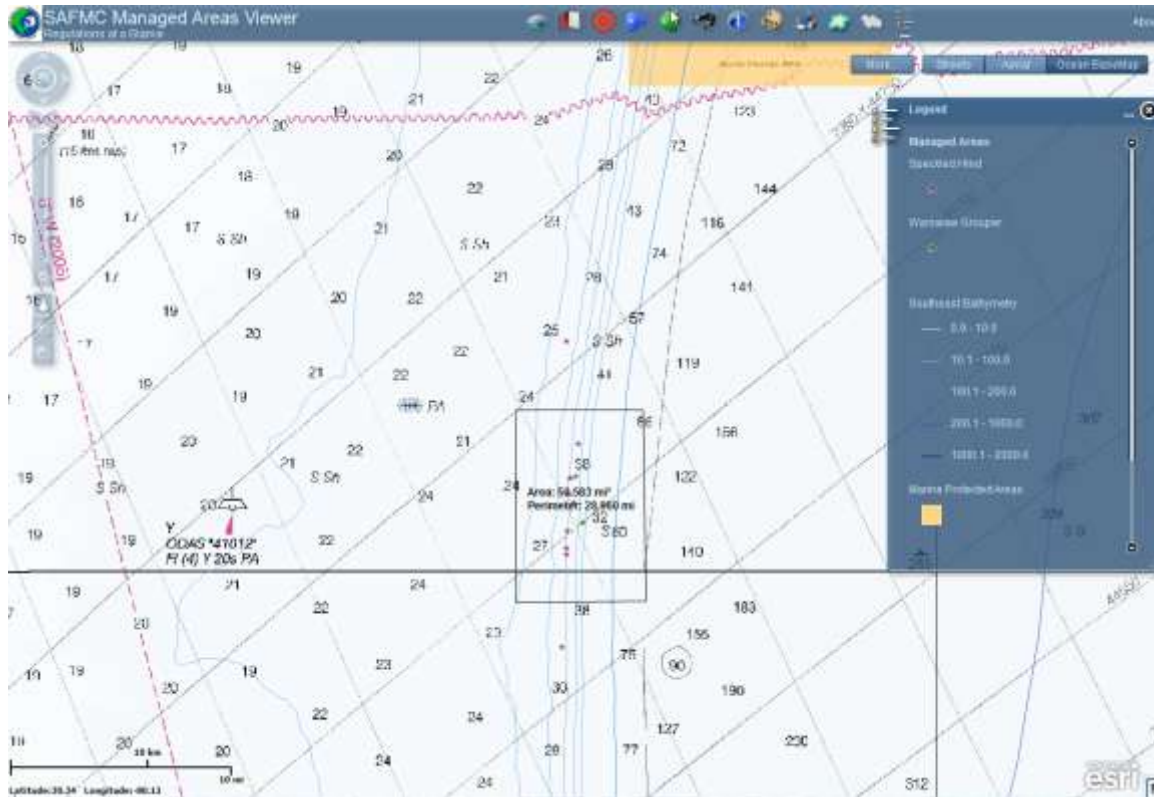
The Workgroup looked at a shelf-edge reef off St. Augustine FL, in an area that had previously been considered and rejected by the SAFMC during development of the MPAs implemented in 2009. The area includes habitat, locations and spawning sites for SH, and locations of WG. This area is south of the existing (and proposed reoriented) North Florida MPA, and is connected to it by a contiguous reef and prevailing (Gulf Stream) currents. Specific coordinates were suggested (Figure 8) for a rectangular shape, oriented N-S, with an area = 50.6 mi<sup>2</sup>. Selection of this site was based on the historical catch data.

NE corner: 30.10°N / -80.32°W (30°6'0"N / 80°19'12"W)

NW corner: 30.10°N / -80.22°W (30°6'0"N / 80°13'12"W)

SE corner: 29.98°N / -80.32°W (29°58'48"N / 80°19'12"W)

SW corner: 29.98°N / -80.22°W (29°58'48"N / 80°13'12"W)



**Figure 8. Proposed MPA site off St. Augustine FL that includes locations for SH and WG.**

The Workgroup generally felt that the existing *Oculina* Banks Habitat Area of Particular Concern and *Oculina* Banks Experimental Closed Area, coupled with the generally high currents in the region due to the proximity of the Gulf Stream makes these areas just south of Cape Canaveral fairly “protected” even though bottom hook-and-line fishing (including bandit reel) is allowed. Without being able to anchor in the closed area it is extremely difficult to successfully prosecute snapper-grouper fisheries in this region, thus affording “natural protections”. It should be noted that fishermen are successful at fishing for wreckfish under the Gulf Stream and that fishing methods and technology are constantly improving.

### South Florida and Florida Keys

As it was recognized by fishermen and scientists alike during the meeting, many species of groupers and snapper tend to spawn in the same areas (Lindeman *et al.* 2000; Heyman and Wright 2011; Coleman *et al.* 2011); therefore, we broadened our scope to discuss important spawning areas for a variety of other members of the snapper-grouper complex in south Florida. MPAs that protect multi-species fish spawning aggregations, in relatively small areas, were seen as highly beneficial for management of many important stocks. In addition, some members of the snapper/grouper complex make migrations



from the northern area of the south Atlantic region to the South Florida area to spawn. Research at the South Carolina Department of Natural Resources (SCDNR) has documented these migratory patterns for gag and greater amberjack.

*Summary List of Sites in South Florida (listed in order of priority for protection)*

1. Western Dry Rocks
2. Warsaw Hole
3. Push Button Hill
4. Juno Pinnacles
5. St. Lucie Humps (already included in an MPA)
6. Various wrecks

The southern section breakouts concentrated on water off southern Florida, from Jupiter Inlet south and west to the Dry Tortugas. Summaries are presented below, from north to south.

*Push Button Hill (Figure 9)*

1) This site is important for a variety of species including WG, vermilion snapper, red porgy, gag, snowy grouper and greater amberjack. Speckled hind are relatively rare at this site compared to other locations in this general area between the *Oculina* banks to the north and the Florida Keys. Push Button Hill is the next major deep-water reef complex moving south from the “*Oculina* Experimental Closed Area”. Coordinates for the area are as follows:

SE corner: 27.15°N 79.94°W (27° 8.83' N / 79° 56.12' W) in 412-310 ft.

SW corner: 27.17°N 79.94°W (27° 10.10' N / 79° 56.65' W) marking the inshore edge of the formation (~200 ft.)

NE corner: 27.17°N 79.94°W (27° 10.49' N / 79° 56.53' W) in 300-400 ft.

A) “East-West Face” (TD43057.1/61964.1 to TD43067.0/61964.5): Most of the largest WG (100-360 lbs.) from the Push Button Hill reef complex have been caught on this face and most of these near the southeast corner. At least 20 of these larger WG were caught between 1986 and 1995, along with about 80 smaller individuals. Smaller animals are still commonly encountered every year in this area. There is a steep drop off in this area with a depth of 412 ft. shoaling rapidly to 300 ft. with a more gradual slope to 275 ft.

B) “South-North Face” (TD43065.1/61964.1 to TD43070.2/61960.4): There is a steep drop off along the southern portion of this area becoming more gradual to the north. Warsaw grouper can be caught along this area in 290-330 feet but are usually single encounters.

C) “East-West Ledge”: This site is the first of two small ridges located on top of the reef complex in 264 ft. of water. Ben Hartig caught at least 25 WG from this location. They were usually smaller on top of the ridges, with most in the 30 - 60 lb. range. It is a good gag spot as well. Greater amberjack are also commonly caught here during the spawning season.

D) “Unnamed Ridge”: The second small ridge system on top of the reef system. This spot has similar productivity and species complex as the “East-West Ledge” and is only about 300 yards northeast of that location.

Push Button Hill is an important reef fish spawning ground for multiple species. Banded rudderfish show up in large numbers in late March and usually exit the area by the end of May. Rudderfish normally spawn at shallower depths (120-200 ft.) but when conditions deteriorate in those depths due to north swells and a cessation or reversal of the local Gulf Stream flow, they will move to the deeper reef habitats until conditions improve on the inshore areas. That was the case (5/23/12) at site "D" on Push Button Hill, where 190 pounds of running ripe rudderfish were caught. Most were males and there was only one female that was full of hydrated eggs. The male-dominated catch is not uncommon when fish are in the act of spawning where the ovaries take up the majority of the body cavity making feeding difficult. This spawning event occurred near the new moon and is at the end of the spawning season.

Vermilion snapper abundance increases (especially for the larger sizes) on the southeastern portion of Push Button Hill from July - October. We do not know where these fish come from but they are in spawning condition during this time period. Their abundance declines markedly after October.

*Juno Pinnacles.* (Figure 9)

This complex runs primarily north-south between the 200 ft. depth contour to the west and 400 ft. depth contour to the east. This is the last (heading from north to south) of the deep-water reef complexes (hard bottom, ledges, pinnacles) in this depth range which extend intermittently from the "*Oculina* Bank". The next deep-water reef complexes (in the depth range for SH and WG) occur off the Florida Keys as features such as the "*Islamorada Hump*".

A) "South Rock": At the southern end of the pinnacle system, several WG were caught here.

B) "High Peak": This feature is approximately ¼ mile north of South Rock. Misty grouper have been caught on top of this peak. High Peak is the most important pinnacle within this reef complex. At least 40 WG have been caught from this location, including 10 on one trip in the fall in the late 1980s. The largest WG captured at this spot was 260 lbs. Other species caught include vermilion snapper, greater amberjack, snowy grouper, almaco jack and red porgy. Misty grouper (three) have been caught on the deeper part of this reef.

C) "Warsaw Occurrence": One WG of approximately 35 lbs. caught on this spot.

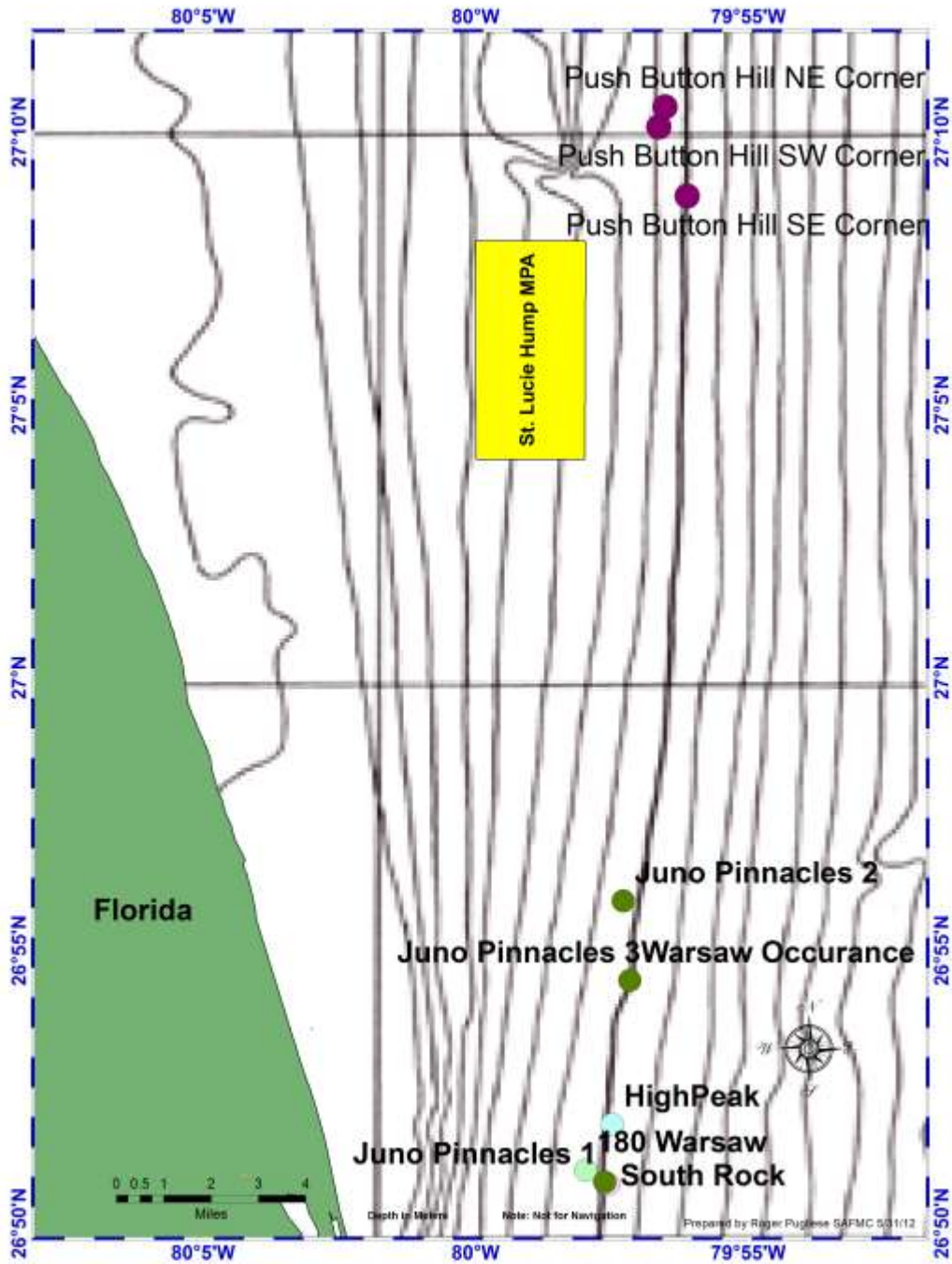
D) SH have been relatively rare in this pinnacle system. There is one spot (coordinates unknown) where four were caught on one drop with a 5-hook rig. There were also some 2-4-lb. red snapper on the same location.

*St. Lucie Humps* (already included in an MPA):

A) "43023.0/61984.3". Two WG were caught on this spot in the 50-lb. range. Other species include gag, greater amberjack, vermilion snapper, black sea bass, almaco jack and small (1-2 lb.) red snapper.

B). "43026.9/61980.5": Three WG were landed from this location as well as all the species listed in (A) above. Juvenile SH have been caught at this location on multiple

trips. Speckled hind are usually caught one to a drop on the tops of several peaks in the southern portion of the MPA. All SH caught were juveniles.



**Figure 9. Species Occurrence and possible sites for protection in South Florida.**

*Western Dry Rocks Area*

In the Florida Keys, SH and WG are now so rare that the Workgroup concentrated on looking at spawning aggregations for all deeper reef fishes, as a proxy for potential spawning locations for SH and WG (although locations of those species are also noted). One of these important spawning locations is the Western Dry Rocks. Located about one nautical mile (NM) southwest of Key West in 110 ft. of water (just offshore of 10-fm depth contour on NOAA charts), Western Dry Rocks is a popular dive spot and well-known and greatly exploited mutton snapper spawning aggregation site. The center of the spawning area is located at 24°25.80'N and 81°56.88'W. The mutton snapper fishery there is still active (Figure 10). While many fishermen would like to see a reduced bag limit for mutton snapper, some would like to see this site become a no-take MPA. This area is within Florida State waters (three miles on the Atlantic side) and within the Florida Keys National Marine Sanctuary (FKNMS; boundary is at 300 ft. depth contour). Overlapping jurisdictions will complicate an MPA-designation process, but not make it impossible. Coordinated discussions should begin as soon as this report is released.



**Figure 10. Vessels fishing on mutton snapper spawning aggregation at Western Dry Rocks, May 2011.**

Western Dry Rocks (Figure 110 also includes aggregations of permit, gag, scamp, black grouper and red snapper. An annual spawning aggregation of permit can be found during the months of March and April (24°25.98'N, 81°55.93'W). Aggregations of permit occur slightly (< 1 NM) to the west of the mutton snapper aggregation during the months of March and April (24°25.98'N, 81°55.93'W) and are thought to be spawning aggregations. Black grouper form small aggregations around the same area as the permit, and speared black grouper have appeared to be in spawning condition; however spawning

of black grouper has not been observed at this site. It is not known if the aggregations of scamp, gag, or red snapper that also occur at Western Dry Rocks represent spawning aggregations. Indeed, it has not been documented that those species aggregate to spawn anywhere in the lower Keys. Gray snapper also aggregate and are believed to spawn in the same area where black grouper and spawning permit have been observed. Hammerhead and other sharks are commonly seen there.

Also westward of Western Dry Rocks is a paleo-shoreline ridge that runs west from Western Dry Rocks at about 50 fm, with three humps that rise up from that ridge. The site has two paleo-shorelines that break at this point. In 240-250 ft. there are scamp while black grouper and gag are found at 220 ft. Small SH and WG have been seen here.

At the high point of the hump on the western end of the 300-yd. ridge (24°29.85'N, 82°19.99'W), concentrations of WG, red snapper, greater amberjack, dog snapper and other reef fishes have been observed.

Rileys Hump, the western extreme of the Florida reef tract near the Dry Tortugas, has long been known as an important mutton snapper spawning aggregation site. Experienced fishermen have identified Rileys Hump and other areas west of Key West as spawning sites for gray, cubera, yellowtail and dog snappers and for black grouper also (Lindeman *et al.* 2000).

It is apparent that other reef-fish spawning sites exist in the Florida Keys; however, Western Dry Rocks is a very important one according to fishermen in the Workgroup. The site may be one of the more important spawning sites in the Florida reef tract, and could be important for SH and WG also. The entire Dry Rocks area described could be protected within a polygon as small as 1 by 2 NM. A buffer zone outside of this box would be desirable.

#### *Warsaw Hole*

This feature consists of a 50-fm hump, southwest of Cosgrove Shoal Light (about 10 miles west-southwest of Key West and south of the Marquesas Keys). The east side of the feature is a backbone ridge. On the east side of the hump, depth drops steeply from 240 to 400 ft. Warsaw grouper have been seen aggregating there in March, and one female has been caught with obvious roe. The area southeast and southwest of Cosgrove Shoal is thought to be a spawning area for red snapper (Lindeman *et al.* 2000).

Warsaw Hole is an area of critical concern. Not only does it have WG (occasionally caught), but almaco jack, greater amberjack (all winter long), groupers (including black and scamp), snappers [silk (yelloweye), blackfin, red, vermilion], and other reef fishes. Warsaw grouper definitely aggregate there, as accounts from the old time conch fishermen clearly indicate there must have been an aggregation based on the numbers they caught. Warsaw Hole may also be a spawning aggregation site for greater amberjack.

The Workgroup recommends establishing a new MPA around Warsaw Hole (Figure 11), an important spawning location for many reef fishes. This is a small area and a 2 x 3 NM no-take MPA would adequately protect this area. In addition, there is a radar station nearby which would make enforcement easier.

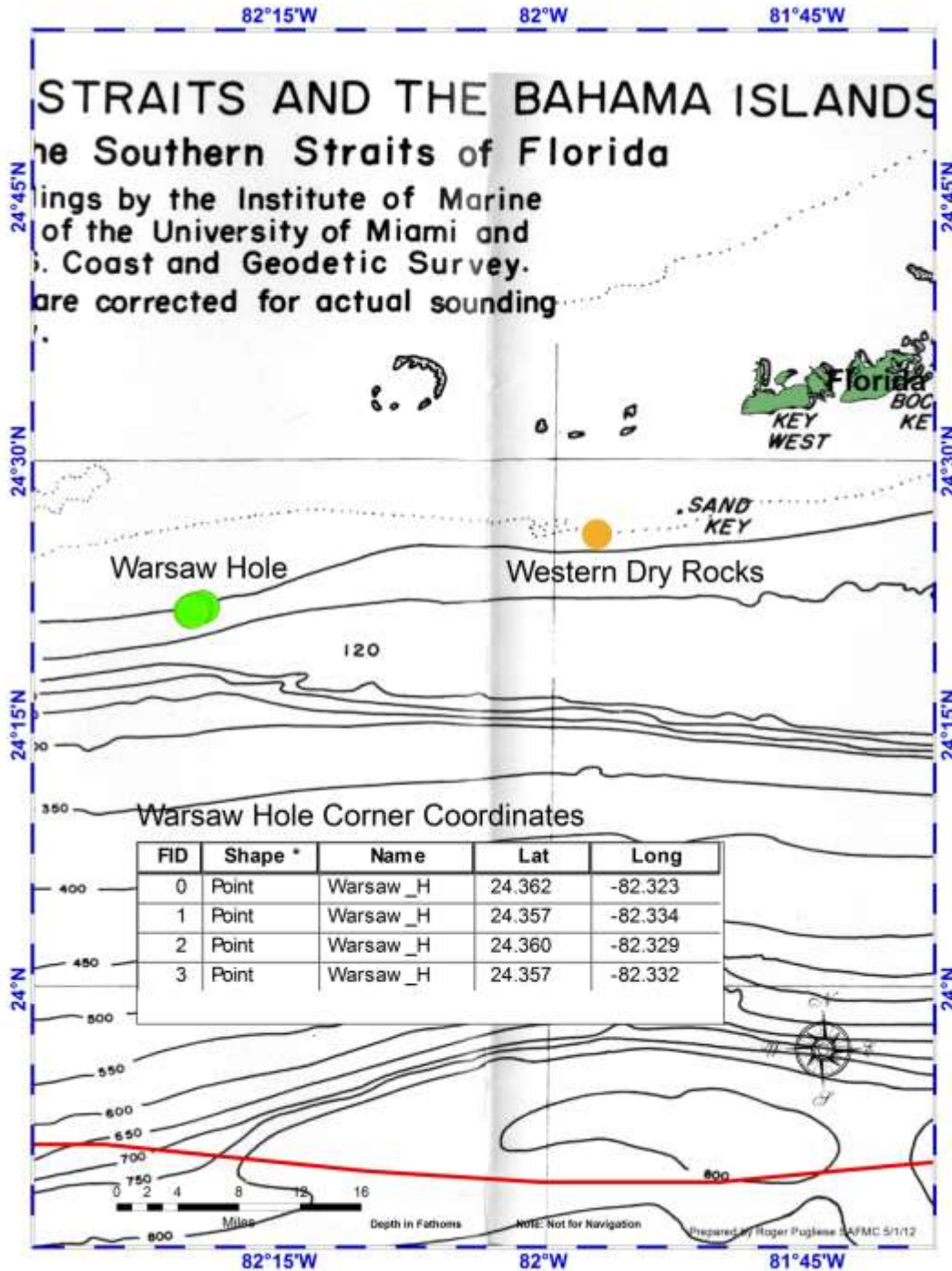


Figure 11. Western Dry Rocks and Proposed Warsaw Hole MPA site.

Just inshore of Warsaw Hole at 220 to 240 ft. there is an area of paleo-shoreline that spreads to the west for more than 80 miles, then turns north to form Pulley Ridge in the Gulf of Mexico. Speckled hind have been caught in that depth range along this reef.

#### *Important Wrecks off Florida (East Coast)*

Limited data have been collected from spearfishing and other diver observations on several wrecks off the Florida coast. This information indicates that wrecks might be an important habitat for these SH and WG. Additional discussion of wrecks and artificial reefs is found later in the report. The following reports the data on hand.

#### "Chinaman's Wreck"

Several WG have been speared at this wreck, which sits in 210 ft. of water off Daytona FL. By some accounts this wreck held a lot of WG in the past, and several were speared in a single dive in 1977.

#### "180"

This spot (TD14343.3/62008.1) has a WWII airplane wreck in 180 ft. of water. In the past, WG congregated here during cold water upwelling during June and July, and one fisherman caught about 10 on two trips. Almaco jacks spawn here during late May-July. Banded rudderfish spawn here during April-May.

#### "Vitrick"

This site, off Molasses Reef in the Upper Keys, is also locally called "the motorcycle wreck". The ship sunk after being torpedoed in WW2. It presently rests with the shallowest part in 120 ft. of water and the deep end in 300 ft. It is known to harbor cubera snapper spawning aggregations and spawning occurs in July and August. In the 1960s, it was not uncommon to see cuberas up to 100 lbs. with many in the 80-90 lb. range. Like most of the wrecks at this depth, there are juvenile SH present, and these wrecks may act as nursery areas for SH.

#### "Moffett", "Kenrick" (TD43588.4/13943.2), "Wilkes Barre" and "Lake City" wrecks

All of these wrecks in the Florida Keys held WG at one point in the past. Occasionally, someone catches one today, but it is rare. One workshop participant did spear a WG on the "Kendrick" along with a large speckled hind. There is also video of a large speckled hind in a lost fish trap at this site. The "Wilkes Barre" (24°28.466'N/81°33.000'W) contained many small speckled hind years ago.

All of the above wrecks held WG at one time. It should be noted that these sites have been established as "fish havens" or artificial reefs for recreational fishermen. If they are set aside as MPAs, mitigation through additional reef creation may be needed.

## DAY 1 PUBLIC COMMENT SUMMARY

A public comment period was included, which ran from 5:00 to 5:30 PM on Day 1, and the Council staff have detailed notes. Briefly, fishermen spoke of catching and releasing more of these two grouper species than ever. The public expressed concern that decisions will be made in the absence of data. Comments emphasized that spawning fish should be protected, but that spawning needs to be documented before any closure. Questions were raised regarding the effectiveness of existing MPAs for these or any species, and the opinion expressed that without any data from existing MPAs to support their usefulness, the SAFMC should not go forward with more MPAs.

## OVERALL SUMMARY: ACTIONS AND ADDITIONAL RECOMMENDATIONS

In addition to the specific sites investigated by the Workgroup as potential sites for MPAs, the group made some general observations regarding SH and WG that should be used in developing management plans for these two species. There is need for additional research, monitoring, enforcement and compliance of existing MPAs and any new ones.

### **Additional Research, Monitoring and Data Needs**

The Workgroup participant's specific recommendations for marine reserves described above are an initial step in establishing a complete set of closed areas for significant protection and recovery of SH and WG populations. Because little is known about their ecology (e.g., spawning locations and juvenile habitat), experimental studies should be done that are designed to elucidate ecological relationships and life cycle patterns that will allow further protection for their populations (e.g., deep-water reserves encompassing spawning aggregation sites). Such studies should include tagging with acoustic tags and satellite-tracked pop-up tags. Tagged fish can be relocated during the spawning season by either tracking with autonomous underwater vehicles (AUVs) or through programming the satellite tags to release from the fish during the spawning season. Alternatively, or in addition, fishery acoustic surveys (active and passive acoustics) and remotely operated vehicles (ROVs) equipped with video cameras can be used to characterize spawning activity at the deep water spawning sites identified in this report. It is critical to determine where spawning sites are located so that they can be afforded extended protection.

Research to locate spawning grounds should concentrate on shelf-edge reefs. It is known in the south Atlantic region that considerable spawning takes place on the shelf edge (Sedberry *et al.* 2003; Sedberry *et al.* 2006) and it is known from studies in the Madison Swanson Reserve in the NE Gulf (Koenig and Coleman 2011) that red snapper, gag, and scamp spawn at aggregations in close proximity but temporally out of phase. Red grouper, vermilion snapper, red porgy, gray triggerfish and other species also spawn on shelf-edge habitat.



As recommended above, a rigorous experimental approach should be taken to determine the efficacy of the selected reserves such as a BACI (Before-After-Control-Impact) design. In this case, it is suggested that the restricted temporal design of Underwood (1994) be taken. Such an approach will allow broad inference for the establishment of other shelf-edge reserves, not only for SH and WG, but for the many other economically important species spawning on the shelf edge. Important variables in such an experimental approach should include "spillover" as a direct and immediate benefit to fishermen.

The Workgroup participants felt that there is not enough information available on habitat preferences for the two grouper species, for any life history stage. Although adults appear to be associated with steep slopes and walls with high (40 ft.) relief, we do not know much more about their particular habitat preferences. We do know that neither species is commonly seen inshore of 150 ft. (at least at sizes to be caught on hook-and-line or in traps), or on lower relief areas. It was felt that high-relief habitats were the areas that held the highest concentrations of SH. As noted previously by the Workgroup and the SSC, such areas could be determined from existing sonar surveys and habitat modeling, but additional habitat mapping is needed.

Habitat mapping is at the foundation of future studies on the efficacy of selected reserves. High-resolution interpreted habitat maps should be completed in and around the recommended shelf-edge reserves, and then expanded to include intervening areas of the shelf edge. This was done in and around Madison Swanson and Steamboat Lumps Reserves in the northeastern Gulf of Mexico and proved to be extremely important in within-reserve site selection (e.g., see Wall *et al.* 2011 and Coleman *et al.* 2011). The more complete our understanding of the ecology of these two species, the better we will be able to bring about recovery to a productive state.

Many government and private research vessels are now equipped with high-resolution sonars. The U.S. Geological Survey (USGS), NOAA, the U.S. Navy and other agencies should make a concerted effort to pool data and map high-relief habitats that are important to these two groupers. There may be additional data available from these and other ships of opportunity to map the entire shelf-edge and upper-slope reef. If not, USGS and NOAA should initiate a directed effort to do so.

In addition to the seafloor mapping data (bathymetry, backscatter, sub-bottom profiles, etc.), other important habitat features that co-vary with species occurrence/abundance such as ocean circulation and temperature should be determined and used in a habitat modeling framework to predict where the species might occur, to refine reserve siting effectiveness. The Council should encourage the development of such habitat models as an analytical approach that would provide the Council with a powerful decision-support tool for use during deliberations on reserves to protect and recover these species (e.g., site selection, size selection, etc), throughout the south Atlantic region.

Charts, maps and other visuals presented to the Workgroup and to the public need to have more quantitative data presented. The occurrence data (presence/absence) are useful, but counts of fish associated with each data point would be more useful. A temporal analysis of spatial trends in counts would also be useful for developing management plans and for documenting declines and increases in grouper populations. We don't know enough about the ecology of these two species, so we need to get all we can out of existing data. The fishery-independent dataset contains counts and catch-per-unit-effort (CPUE) data that should be made available. Actual abundance and CPUE data would be more useful than presence/absence in evaluating SH and WG areas.

The Workgroup analysis of existing observations clearly show that wrecks (ships, planes) and other man-made habitats are important for these two species. The role of artificial reefs as a possible management or population restoration tool needs further study. If shown to have a positive effect, then additional material could be added to the Snowy Wreck MPA and South Carolina Artificial Reef MPA to support unfished populations of SH and WG. Juvenile WG have been observed on shallower artificial reefs (90 ft.) off South Carolina (B. Martore, SCDNR, pers. comm.). Juvenile (30 mm) SH have been caught in artificial habitat traps off Charleston SC (32°02.2'N, 79°26.0'W, GMBL 3266, Grice Marine Lab collections), and artificial structure might be useful for juvenile stages of both species in shelf waters. Artificial reefs are under-sampled and under-reported in the databases used by the Workgroup, and those data need to be compiled and reported.

Any MPA designation for SH and WG needs to be re-evaluated in 10 years to see if it is meeting management goals. Research, monitoring, evaluation and enforcement is needed to help meet those management goals and to determine the effectiveness of the MPAs. As an intermediate step, research and monitoring data should be compiled and evaluated five years after designation, to evaluate the effectiveness of research, monitoring and enforcement in reaching MPA goals. Research and monitoring programs should then be modified if they are not adequate for evaluating the MPSs. Because of the uncertainties surrounding the selection of reserves, and the long generation time for these fishes, the Council should schedule a re-evaluation of the reserves themselves 10 years after their establishment, as was done with the *Oculina* research reserve. Mapping, research and monitoring should be done by appropriate agencies within this 10-year period and reported to the Council. It is important to evaluate the efficacy of the reserves relative to their contribution to the recovery of SH and WG populations, as well as in the protection of spawning populations of shallow-water groupers and snappers.

### **Compliance/Enforcement Enhancement and Monitoring**

The Council should establish the use of VMS for the commercial and for-hire reef fish fishery, as was done in the Gulf of Mexico in 2007. This should also be extended to the recreational sector. VMS will encourage compliance among fishermen and facilitate surveillance and enforcement for the U.S. Coast Guard (USCG). In April 2012, the Snapper Grouper AP recommended a similar measure. Other measures for ensuring compliance and USCG surveillance should also be put into place, such as deploying vessel listening devices (VLDs) such as DSG acoustic monitoring devices

<http://www.loggerheadinstruments.com/> ) deployed with an acoustic release devices for easy deployment and recovery. These VLDs would be capable of detecting and archiving specific boat sounds (enabling identification of individual boats) within selected ranges of the deployment sites. VLDs should be used after the within-reserve habitat significant to SH and WG is located and mapped to ensure their efficient use.

The USCG should periodically report detailed surveillance efforts and enforcement issues to the Council. Enforcement is an extremely important issue for the success of the marine reserve approach to fishery management. For the Council to make informed decisions, it must have accurate information on the efficacy of the reserve, and accurate information can only be obtained in the absence of poaching.

Review of the experience in the *Oculina* bank and Madison-Swanson protected areas showed continuing problems with lack of research to evaluate the MPA, and lack of enforcement to stop poaching. In the SE U.S., we still cannot answer basic questions about MPA effectiveness without monitoring and enforcement. Additional funding is badly needed to support research and enforcement. We must monitor and evaluate these MPAs and their usefulness in meeting their management and scientific goals. Enforcement agencies need to take resource protection seriously; they need to be presented with monitoring data to show how effective MPAs can be.

The Workgroup discussed the type of MPA needed. While consistency with existing SAFMC Deepwater MPAs is important for helping compliance and enforcement (e.g., allow pelagic trolling in current and future sites), there are new data since the Deepwater MPAs were designated in 2009 that show how pelagic predators are important in providing food subsidies to bottom-dwelling groupers. In addition, allowing pelagic fishing makes enforcement harder. Enforcement is still a problem and anything that can be done to simplify it will make MPAs function better.

Although some scientists prefer that MPA boundaries follow depth contours, straight-line boundaries are easier to enforce. Enforcement is key to successful MPAs.

### **Additional MPA Siting Criteria**

In siting MPAs in general, the Council should target areas with multi-species spawning aggregations. This is especially important for species that are presently (and/or historically) rare. As many different reef species use the same spawning locations because their configuration, bathymetry and hydrography enhance spawning success (e.g., Paz and Sedberry 2008; Kobara and Heyman 2010; Heyman 2011), these special areas should be protected to enhance spawning success.

**Additional Remarks**

The workgroup noted that small SH are bright yellow in color, and may be particularly vulnerable to predation by introduced Pacific lionfish. Ongoing studies of the diet of lionfish should be on the lookout for juvenile SH and WG. There are DNA profiles available for both groupers to assist in identification.

The Council should consider the adoption of less data-intensive stock assessment and management methods such as the density ratio method (McGilliard *et al.* 2011; Babcock and MacCall 2011) for determining status and managing fisheries for SH and WG. This method uses the ratio of abundance inside to outside an MPA as a measure of stock depletion from harvest, and can be used to estimate biological reference points for determining stock status and manage fisheries.

Some species of the snapper/grouper complex make extensive migrations from the northern area of the South Atlantic to the South Florida area to spawn. SCDNR has documented these migratory patterns for gag and greater amberjack. Other species make similar spawning migrations as well, as is evidenced by their seasonal occurrence at specific locations (e.g., banded rudderfish). More data are needed regarding spawning and other migrations, and these movements need to be documented for all reef fishes so that boundaries for place-based management can be evaluated.

Establishing MPAs for the south Atlantic region, as suggested by the Workgroup, is an ambitious undertaking that may require additional meetings of the MPA Expert Workgroup before final decisions can be made. These meetings should be joint meetings with the Snapper-Grouper AP, the Law Enforcement AP and the SSC.

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