SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

MPA EXPERT WORKGROUP

Meeting II Overview

February 4-6, 2013
Crowne Plaza
North Charleston, SC

Draft: 2-26-13

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PURPOSE

This second meeting of the South Atlantic Fishery Management Council (SAFMC) Marine Protected Area (MPA) Workgroup was convened to follow up on the results of the previous meeting held in May 2012 in Pooler, Georgia. The 2012 meeting generated suggestions for several MPAs to be considered for reducing bycatch of speckled hind and warsaw grouper, and the report from that meeting generated additional interest and suggestions for MPAs to protect these two species of grouper.

The goal of the Workgroup is to support the fishery with minimum impacts to fishermen, while using ecosystem-based management to end overfishing of speckled hind and warsaw grouper. The objectives of the second meeting of the Workgroup, convened in North Charleston SC on 4-6 February 2013, were to:

1) reduce incidental bycatch of speckled hind and warsaw grouper throughout the region, using a suite of MPAs whose cumulative impact will reduce encounters of the two species;
2) recommend a network of MPAs that will protect reef species, especially spawning fish and the two grouper species of concern;
3) improve resiliency of the socioeconomics of the fishery and the ecosystem that supports it;
4) encourage development of clear management plans (to include mapping, characterization, research, monitoring and enforcement) for each proposed site that is ultimately selected by the SAFMC as an MPA
5) develop several alternative MPAs that meet minimum criteria for potential protection of speckled hind and warsaw grouper, and to suggest alternatives off of each southeast Atlantic state, based on expert opinion and best available data;

6) rebuild and maintain stocks of speckled hind, warsaw grouper and associated snapper/grouper species with the eventual goal of allowing year-round fishing outside the MPAs; and
7) summarize recommendations from the Expert Workgroup.

MEETING MATERIALS

Materials Provided for May 2012 Meeting

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 Bulletin12-033: South Atlantic Regulatory Amendment 11 Final Rule
SFA ECFS 2012 May 15 MPA Policy
Ziskin 2008 - Thesis for Speckled Hind
Ziskin *et al*. 2011

Materials Provided for February 2013 Meeting

Expert Workgroup Meeting Materials

Agenda

Briefing Book Materials

MPA Workgroup Report - May 16-17, 2012
Presentation on MPAs and HAPCs for Speckled Hind and Warsaw Grouper *(updated 2/1/13)*
Study on the distribution of Speckled Hind and Warsaw Grouper in the U.S. South Atlantic *(updated 2/1/13)*

MPA Impacts Selection Tool

INTRODUCTION

At their March 2012 meeting, the South Atlantic Fishery Management Council (SAFMC or Council) directed staff to convene a group of experts to provide scientific input on using MPAs to end overfishing of specked hind and warsaw grouper. The first meeting of the Workgroup was held in May 2012, with the report of that group available for the SAFMC June meeting that year. In response to this report, the SAFMC convened a second meeting of the Marine Protected Areas Expert Workgroup to give further consideration to their suggested sites; to incorporate newly-available data from fishermen and researchers, and updated analyses by NOAA Fisheries; and to consider reorientation of existing MPAs and addition or deletion of sites.

The Council held the second Expert Workgroup meeting from 1:00 PM on Monday, February 4 through noon, on Wednesday, February 6, 2013 at the Crowne Plaza Hotel in North Charleston, SC. The goal of the Workgroup was to provide expert recommendations on designation of MPAs to curb bycatch mortality of speckled hind and warsaw grouper.

The Workgroup was provided with updated Geographic Information System (GIS) and other analyses of existing sonar, habitat mapping, distribution, catch, and spawning location data from fishery-dependent and fishery-independent sources. A presentation and report by Dr. Nick Farmer, NOAA Fisheries Southeast Regional Office, provided visual summaries of data that included habitat maps, catch locations for speckled hind, warsaw grouper and associated species, spawning locations of those and other snapper/grouper species and additional historic and recent data (see **Meeting Materials**, above). Following his presentation, Dr. Farmer provided real-time access to databases and GIS maps, and he uploaded and summarized additional data provided by participants at the workshop.

Participants in the second meeting included scientists and fishermen, and were:

Scientists:	Joey Ballenger	*Fishermen:*	Mark Brown
	Churchill Grimes		Jack Cox
	Stacey Harter		Don DeMaria
	Will Heyman		Bobby Freeman
	Chris Koenig		Ben Hartig
	Ken Lindeman		Rusty Hudson
	George Sedberry		

South Atlantic Fishery Management Council Staff: Julie O'Dell
Roger Pugliese
Gregg Waugh

In addition to these participants in the meeting, Workgroup members Mark Marhefka and Ralph Delph were contacted by email to provide their comments.

Opening Remarks and Charge

The meeting opened with a charge given by SAFMC staff to the Workgroup to give further consideration to sites recommended after the first workshop (including reorientation of existing MPAs), and to consider additional possible sites. To those ends, a presentation was given by Dr. Nick Farmer regarding sites where MPAs might help reduce bycatch of speckled hind and warsaw grouper, or where MPAs might enhance spawning and recruitment of these two species and foster ecosystem-based fisheries management in the southeast. The Workgroup was reminded by Council staff of the history of the management of these two grouper species, including the harvest prohibition of six deepwater Snapper-Grouper species in depths greater than 240 ft. The Workgroup was charged with developing alternative MPAs that could provide protection for speckled hind and warsaw grouper that would be more biologically efficient than the 240-ft. closure, with reduced socioeconomic impacts.

Report from Nick Farmer, NOAA Fisheries Southeast Regional Office

The Workgroup was given a detailed PowerPoint and GIS presentation by Dr. Nick Farmer of NOAA Fisheries, Southeast Regional Office (SERO). The presentation included a review of the management history and stock status for speckled hind and warsaw grouper; data on landings and discard trends; observed (i.e., points on maps) and modeled distribution maps for both species; theory and description of spatial closures; impacts of spatial closures on the two species and the fishery for associated species; and the impacts of closures on harvest of associated stocks. The presentation materials included detailed GIS maps of the data, and a matrix table of data, benefits and impacts of proposed MPAs and an MPA Impacts Selection Tool (Appendix 1 to this report).

The available data summarized by Dr. Farmer indicated most encounters of speckled hind and warsaw grouper occurred inshore of 240 ft.; however, statistical tests controlling for sampling and/or fishing effort by depth predicted the odds of encountering speckled hind and warsaw grouper were higher in depths less than 240 ft. Warsaw grouper were associated with speckled hind, misty grouper, vermilion snapper, gray triggerfish, greater amberjack, gag, shallow-water snappers and snowy grouper. Speckled hind were associated with warsaw grouper, red grouper, scamp, red porgy, vermilion snapper, gray triggerfish, greater amberjack, gag, and other porgies and grunts. Point observations of speckled hind and warsaw grouper indicated that the stocks were predominantly distributed on shelf edge hard-bottom habitats from 25-100 fm., with concentrations at certain locations in 30-45 fm. Logistic regression models for probability of detection for speckled hind and warsaw grouper found latitude, habitat type, and sampling gear to be important predictors of the probability of a positive observation. Depth was also a significant predictor for speckled hind.

Nine existing SAFMC MPAs for deepwater snapper/grouper species, two existing *Oculina* Bank MPAs, existing Sanctuary Protection Areas (SPAs) and Ecological Reserves (ERs) in the Florida Keys National Marine Sanctuary (FKNMS), and 29 new MPAs were considered and evaluated during the workshop. The presentation and report by Dr. Farmer served as a starting point for additional discussion and suggestions by the Workgroup, and the databases and GIS used for the presentation were updated as additional observations and data were presented by members of the Workgroup. Stacy Harter (NOAA Fisheries, Southeast Fisheries Science Center) presented some additional recent data on monitoring efforts inside and outside of the existing MPAs.

These observations were made in 2012 during a cruise aboard the NOAA Ship *Pisces*. Following the introductory remarks and presentation, the Workgroup carefully considered the MPAs previously proposed at their May 2012 meeting, and those suggested during the presentation and subsequent discussions, working from northeast (NC) to southwest (FL Keys).

SUMMARY OF WORKGROUP DISCUSSIONS

General Remarks

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 and discussion points are below.

It is important to note that there was not complete agreement among the participants regarding the importance of the recommended areas to speckled hind and warsaw grouper, but the Workgroup did come to consensus on the high priority areas recommended and summarized below. Consensus does not imply complete agreement by all participants.

Members of the Workgroup emphasized that it is important to choose MPAs that are, or have the potential to be, locations where one or both of the groupers of concern occur (Figure 1). Because this effort is aimed at reducing bycatch of these two species, MPAs chosen must necessarily be areas where high bycatch is occurring or catch has historically occurred, to have an impact on bycatch rates by reducing effort and bycatch. This means inclusion in MPAs of areas that are popular and accessible fishing sites that contain suitable speckled hind and warsaw grouper habitat. It is also important for the SAFMC to consider the socioeconomic impact of choosing such heavily-fished areas in any future impact statement.

In addition to reducing bycatch mortality, the sites chosen should also protect documented spawning locations for speckled hind and warsaw grouper, so that spawning and recruitment to fished areas can be enhanced. Because there is a dearth of data on spawning for these two species, the Workgroup considered spawning locations of species that have historically co-occurred with speckled hind or warsaw grouper, since many snapper/grouper species spawn at the same location (Coleman *et al.* 1996; Claro and Lindeman 2006; Sedberry *et al*. 2008; Kobara and Heyman 2010; Heyman and Wright 2011; Coleman *et al.* 2011).

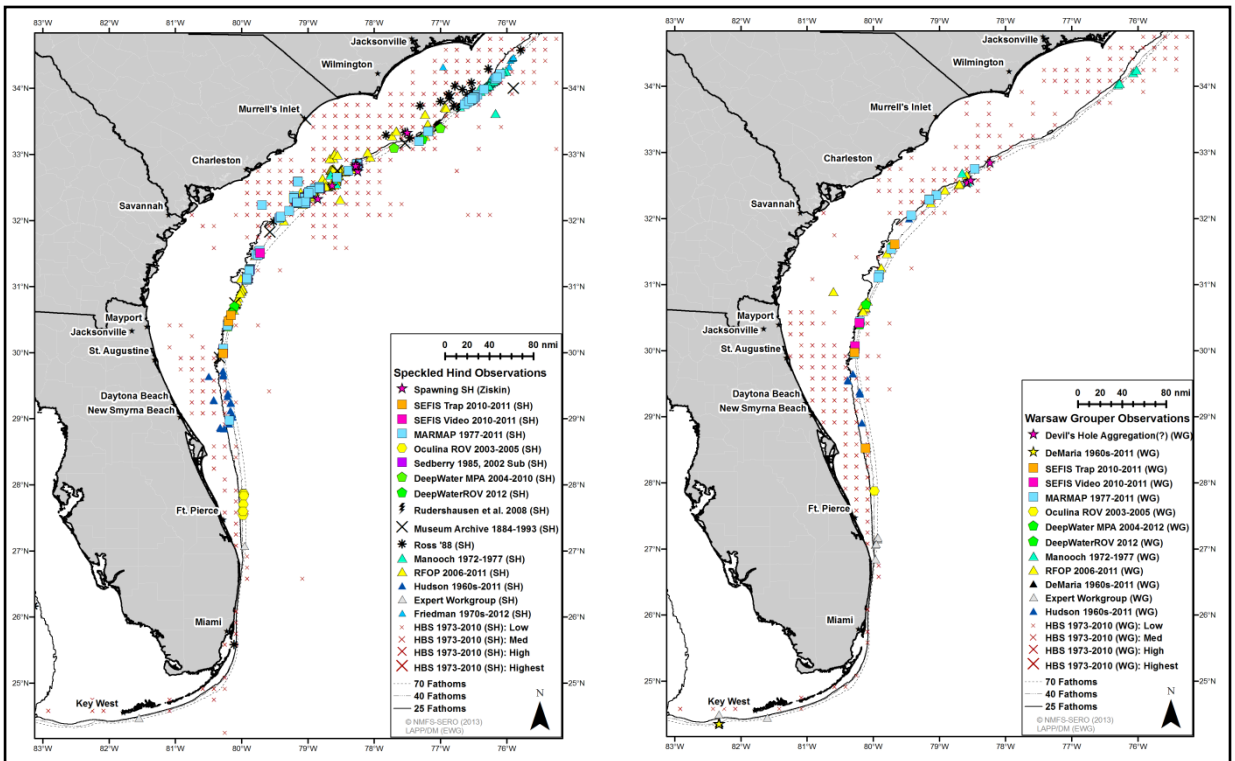

Figure 1. Point location data for speckled hind (left) and warsaw grouper (right) from a variety of historical fishery-dependent and fishery-independent data sources. Point locations were a prime factor in determining MPA locations. × indicates site sampled but speckled hind or warsaw grouper not observed.

The Workgroup also felt it is important to look at all available historical catch data, as directed studies of these species (e.g., Ziskin et al. 2011) began after overfishing was occurring.

The Workgroup created a rather long list of potential sites, and then narrowed that down to a higher-priority list of sites that addressed the concerns of all participants and to aid in the final MPA selection process by SAFMC. As the Workgroup considered the data presented, some additional considerations were added. For example, the Workgroup felt that, in the absence of release-mortality data on speckled hind and warsaw grouper, data from another species of *Epinephelus* or *Hyporthodus* would be more appropriate than data from a species of *Mycteroperca* grouper because species in the former genera are more ecologically and morphologically similar to speckled hind and warsaw grouper. The analysis presented by Dr. Farmer had used release mortality data from gag (*M. microlepis*) and indicated release mortality rates around 50% at 25 fm. (SEDAR-10 2006), but the workgroup agreed that *Mycteroperca* groupers tend to range higher in the water column than other groupers, and barotrauma for gag might be lower than that for speckled hind and warsaw grouper. Release mortality data for red grouper (*E. morio*) were presented, and indicated that speckled hind and warsaw grouper release mortality rates may be greater than 75% at depths beyond 25 fm. (Burns 2009).

The Workgroup reviewed decades of technical data and based their recommendations on the biological and fisheries data provided through research and observations by fishermen.

The Workgroup felt that a system of reserves to protect these two grouper species and their habitats would be a suite of MPAs that have large ecological impacts and long-range economic benefits by improving fisheries outside of the MPAs. The MPAs should be designed to provide a fertile research opportunity to rigorously evaluate if these species aggregate to spawn and where those aggregations are located. These closed areas should have before-after control impact (BACI) studies that determine if the reserves are doing what the SAFMC wants them to do. We recognize the funding constraints but urge that efforts to conduct BACI-type evaluations of several sites where this is most feasible. The proposed network of MPAs must also have support from, and participation of, the fishing community in research, monitoring and enforcement for them to be successful.

As the proposed areas were reviewed, an effort was made to reduce the size of the areas considered so that they encompass only the locations and habitats of the species of concern, yet are large enough to be effective reserves that ensure compliance with the boundaries and enforcement of the regulations, and provide a sufficient buffer against fishing effort redistribution along reserve boundaries. This MPA network is being proposed to replace the 240-ft. closure, using the best available scientific data and the knowledge and experience of fishermen, and should ultimately reduce the area closed from that under the 240-ft. closure to a network of reserves with a smaller footprint, but with greater benefit for speckled hind and warsaw grouper.

The Workgroup suggested that the SAFMC consider a sunset clause for these MPAs. If monitoring, research and stock assessments indicate that the MPAs are not effective in restoring populations of the two groupers then the closures should end or be moved to effective areas. Participants recognized that it might take as long as ten years before differences that can be tested for would accumulate in the MPAs.

The site recommendations are presented below by geographic area, from northeast to southwest, by state. Appendix 2 includes the recommended sites overlaid on Loran-C charts. This does not include all the sites considered, but only those that had particularly strong merits. The areas described below provide a list of alternative MPAs that would be effective. The site recommendations are presented below by geographic area, from northeast to southwest, by state. This does not include all the sites considered, but only those that had particularly strong merits. Some protection would be provided by a subset of the sites recommended by the Workgroup, but maximum protection would be obtained by designating all recommended areas as reserves.

North Carolina

Several shelf-edge reefs and two wrecks were considered off of North Carolina (Figure 2). Occurrences of speckled hind and warsaw grouper were particularly common around Cape Lookout (near Beaufort Inlet), and the Workgroup first considered several shelf-edge reef and wreck sites around Cape Lookout (Figure 3). Some alternatives there included the “Big Rock” area, an important recreational fishing ground off the port of Morehead City, NC, which experimental fishing in the 1970s recorded high catches of speckled hind (Grimes *et al* 1982).

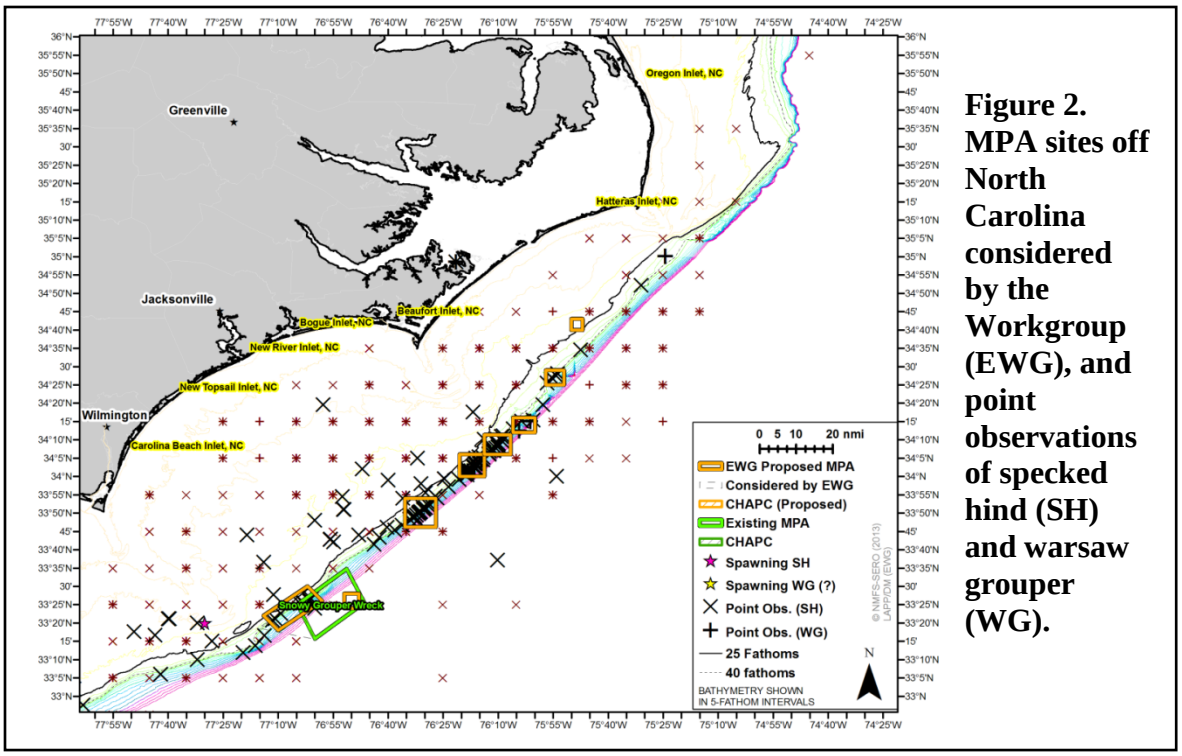

Figure 2. MPA sites off North Carolina considered by the Workgroup (EWG), and point observations of specked hind (SH) and warsaw grouper (WG).

During discussions, the Workgroup also considered the *Malchace* wreck recommended by some members, but the location given for that wreck was in water too shallow for the two grouper species, and was actually the wreck of the *Manuela*. No further consideration of the *Manuela* is recommended, but a small area around the *Malchace* is included in the Workgroup's recommendations.

The "Big Rock" site, North Cape Lookout 1, is an area where occurrence of both grouper species is well documented, and which contains a very high probability of containing speckled hind from the habitat and occurrence analyses. Since it is well known by participants that Big Rock is an important headboat and charterboat fishing area, the Workgroup did not include this area in its final list of recommendations to reduce adverse socioeconomic impacts. Rather than close an area that is an important fishing location for locals and tourists, the Workgroup recommended including the *Malchase* Wreck and the "780 Bottom" area, which had not previously been considered by the Workgroup. The 780 Bottom is also considered an important area for speckled hind and warsaw grouper but, because it is farther from port, it is less often fished.

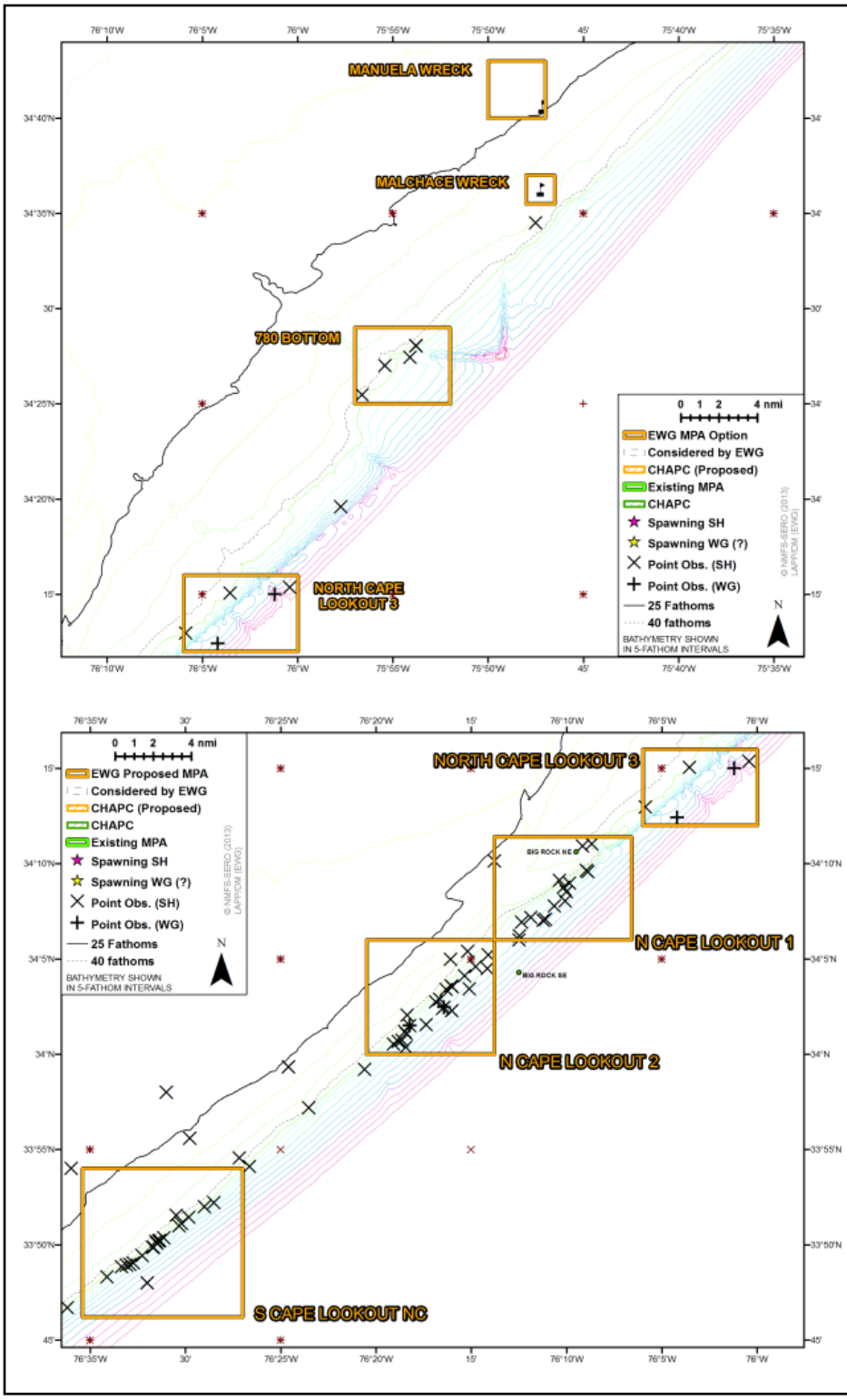

Figure 2. MPA sites considered in the vicinity of Cape Lookout (near Beaufort Inlet) NC, and point observations of speckled hind (SH) or warsaw grouper (WG). North Cape Lookout 1 includes the Big Rock area.

In addition to the 780 Bottom and *Malchace/Manuela* Wrecks, the Workgroup looked at four sites off Cape Lookout (North Cape Lookout 1-3, South Cape Lookout), a new site off Cape Fear (Southern NC, Figure 4) and a reconfiguration of the existing Snowy Grouper Wreck MPA (Figure 4). From all of these eight sites off North Carolina, the Workgroup recommends the following:

1. 780 Bottom (22 sq. mi.);
2. *Malchace* Wreck (2.47 sq. mi.);
3. South Cape Lookout NC (72 sq. mi.); and
4. Southern NC (89 sq. mi.).

These four sites contain at least one of the two grouper species of concern, and spawning of several snapper/grouper species has been documented (South Cape Lookout, Southern NC) or is likely. Some of these sites were included in recommendations made by the first meeting of the Workgroup.

The Workgroup also recommends a reduction of the existing Snowy Grouper Wreck MPA (which contains point observations of speckled hind) from 190 to 18 sq. mi. to concentrate on the area of the Wreck itself. The Snowy Wreck MPA could be reduced to 2 x 2 or even 1 x 1 miles, depending on enforcement needs and at the discretion of the SAFMC. Any of those three proposals would likely have an equal effect on populations of speckled hind and warsaw grouper. The Southern NC site includes the "SW hard bottom" reported by fishermen near the existing Snowy Grouper Wreck MPA (Figure 4).

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.

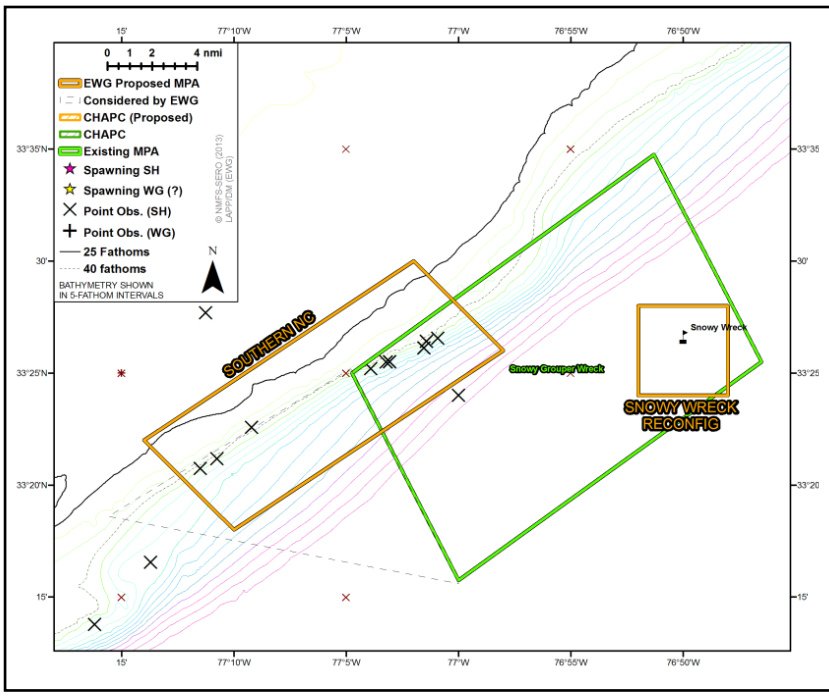

Figure 3. Proposed Southern NC and reconfigured Snowy Grouper Wreck MPAs off NC. These configurations will include additional observation locations of speckled hind (SH) beyond those in the existing Snowy Grouper Wreck MPA, and more efficiently contain the Wreck.

South Carolina

Off South Carolina, the Workgroup considered reconfiguration of existing MPAs, recommendations from the first meeting of the Workgroup, and some new sites based on the analysis presented by Dr. Farmer. The Workgroup considered reconfiguration of the existing Northern SC MPA, additional and different configurations around the Devils Hole/Georgetown Hole considered during the first meeting of the Workgroup, a new Charleston Shelf site, and reconfiguration of the existing Edisto MPA and the Charleston Deep MPA (Figure 5).

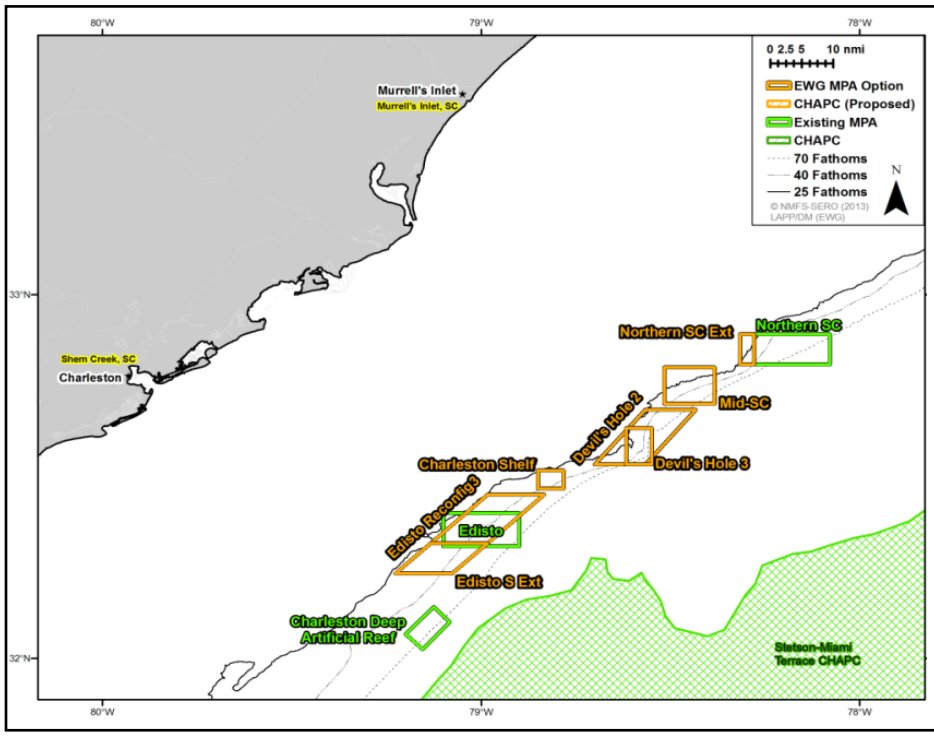

Figure 4. MPA configurations off South Carolina considered by the Workgroup. CHAPC = Coral Habitat Area of Particular Concern.

The Workgroup considered seven new configurations or sites off South Carolina, and made the following recommendations:

1. Edisto Reconfiguration 3 (81 sq. mi.);
2. Devils Hole 3 (27 sq. mi.);
3. Northern SC (existing, 67 sq. mi.); and
4. Northern SC Extension (13 sq. mi.).

The existing and reconfigured Edisto and Northern SC MPAs have documented spawning of speckled hind, and the Devils Hole 3 site has a suspected warsaw grouper spawning location (Figure 6). Marine Resources Monitoring, Assessment and Prediction (MARMAP) data indicate that several reef species spawn in these four sites (e.g., Sedberry *et al*. 2006; Appendix 1).

The cuspate bottom topography of Devils Hole contains steep and rugged bottom preferred by speckled hind and warsaw grouper. Spawning speckled hind have been documented in the Northern SC MPA and the proposed extension. The Devils Hole is an important bottom- and pelagic-fishing area and a shelf-edge habitat where speckled hind

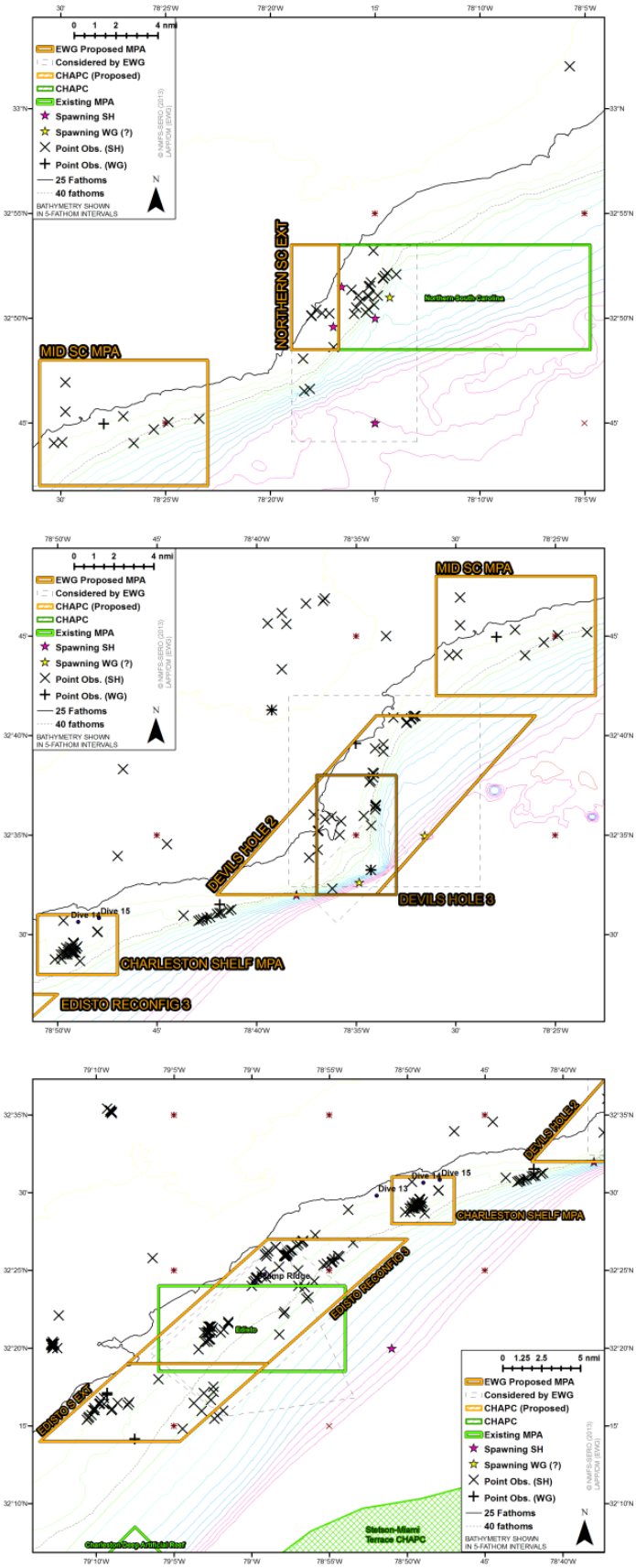

Figure 5. Proposed new or reconfigured MPAs off of South Carolina. These sites contain many observations of speckled hind (SH) and some observations of warsaw grouper (WG). Sites are shown (top to bottom of page) from north to south. Dive numbers refer to 2012 ROV dives conducted by NMFS, where large snapper/grouper aggregations were observed.

have been observed in several locations. It contains more habitat than the proposed extension of the Northern South Carolina MPA.

The Workgroup also recommended rotating the existing Edisto MPA off South Carolina so that it follows the depth contours of the shelf edge, encompasses more of the shelf-edge reef habitat, and has north-south boundaries that are parallel to lines of latitude (enhancing compliance and enforcement). The rotated configuration includes more habitat and reef fish spawning sites than the existing Edisto MPA. The rotated configuration also includes more speckled hind and warsaw grouper capture locations in the fishery-independent database.

Georgia

The Workgroup had previously noted that there are several occurrences of speckled hind at shelf-edge reefs off Georgia, but there are no existing MPAs off Georgia that protect hard-bottom habitat for reef fishes. The additional analyses provided by Dr. Farmer indicated areas for new MPAs off Georgia that would encompass several speckled hind locations and the appropriate habitat to be protected. The Workgroup considered five new sites off Georgia, and a reconfiguration of the existing Georgia MPA (Figure 7). The existing MPA was designed to protect golden tilefish, which are no longer being overfished or undergoing overfishing. The Workgroup felt that continued protection of tilefish grounds in and MPA was needed as insurance against failure of traditional catch limits to keep the golden tilefish populations at sustainable levels.

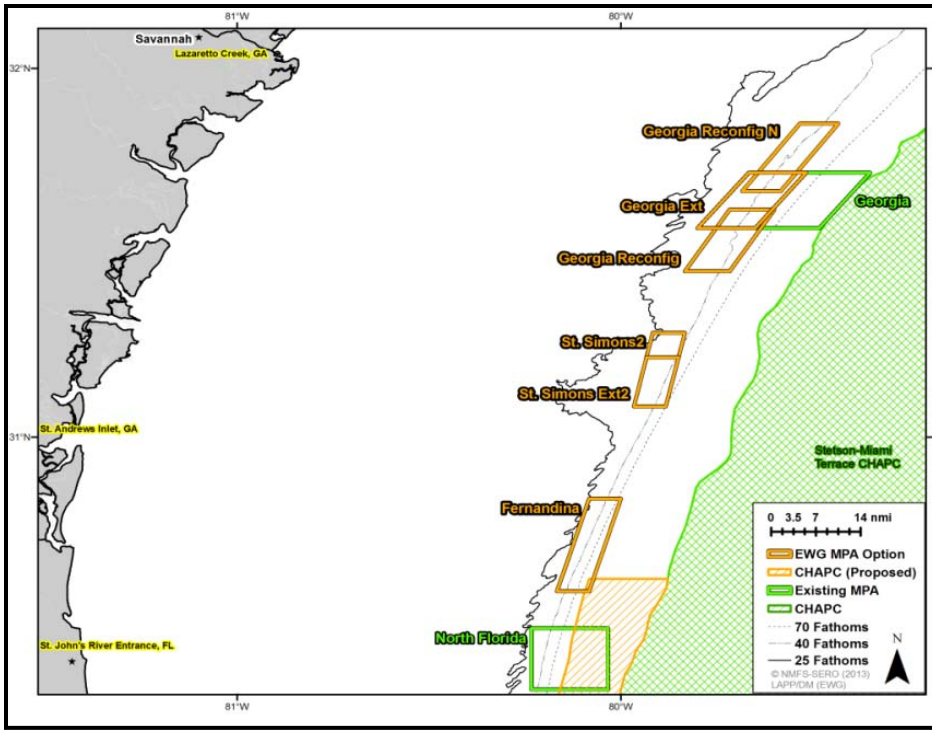

Figure 6. MPA sites proposed off the coast of Georgia. CHAPC = Coral Habitat Area of Particular Concern.

The following sites off Georgia were recommended by the Workgroup:

1. Georgia MPA (existing, 102 sq. mi.);
2. Georgia MPA Reconfiguration (79 sq. mi.);
3. Georgia MPA Reconfiguration N2 (74 sq., mi.); and
4. St. Simons Extension 2 (45 sq. mi.).

The Georgia MPA, as noted above, should be continued to protect golden tilefish that live and spawn there. The extension of that MPA shoreward (an additional 91 sq. mi.) would include many snapper/grouper spawning locations; however, that option was not recommended (Figure 8). Instead, the Workgroup recommended the Georgia MPA Reconfiguration over the extension of the existing MPA, because the southern reconfiguration contains many more snapper/grouper spawning locations than the western extension of the existing MPA (Appendix).

The Workgroup had previously suggested a site off St. Simons Island GA, and further examination of the database indicated refinements and additional locations to improve the potential protection provided by a site in that area (Figure 8). St. Simons Extension 2 contains a large number of speckled hind observation points, many documented snapper/grouper spawning sites, and a continuous shelf-edge reef containing appropriate habitats for both species of grouper.

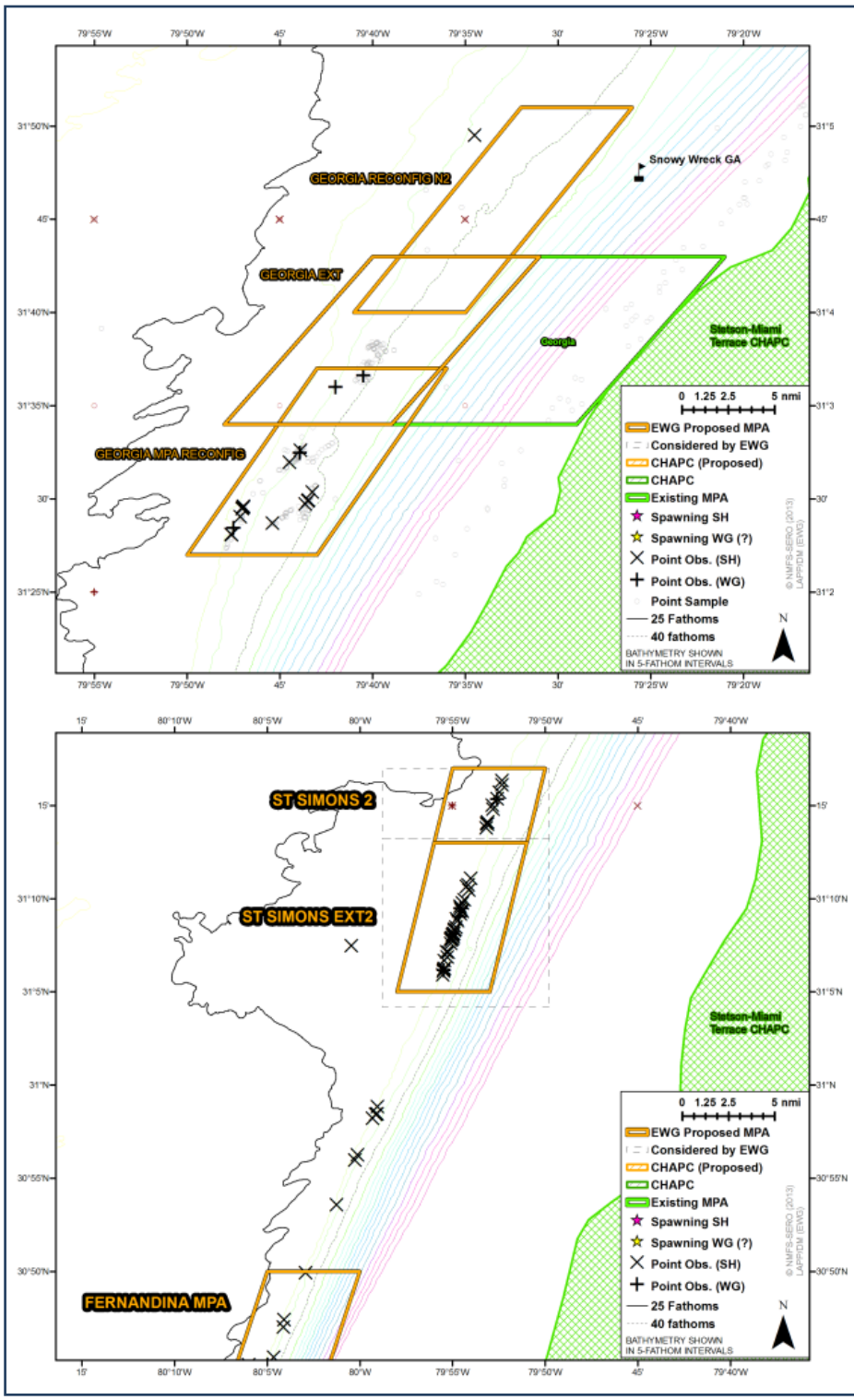

Figure 7. New and reconfigured MPA sites off Georgia. Some of these alternatives contain many observations of speckled hind (SH), along with a few warsaw grouper (WG). CHAPC = Coral Habitat Area of Particular Concern.

Florida

The Workgroup considered several new sites off of Florida, and discontinued consideration of some sites (Figure 9). The existing North Florida MPA was considered effective for protecting a small area of habitat for speckled hind and warsaw grouper. Although the Workgroup had previously recommended moving the North Florida MPA inshore, after further consideration it was felt that the existing orientation also provides some protection to deeper species such as golden tilefish.

Several additional sites off northeast Florida were also considered. Deepwater sites south of Cape Canaveral, in the vicinity of St. Lucie and Push Button Hill considered from the previous meeting, were consolidated. Shallow sites in the Florida Keys that had previously been considered were abandoned. Several shipwreck sites that had previously been considered were

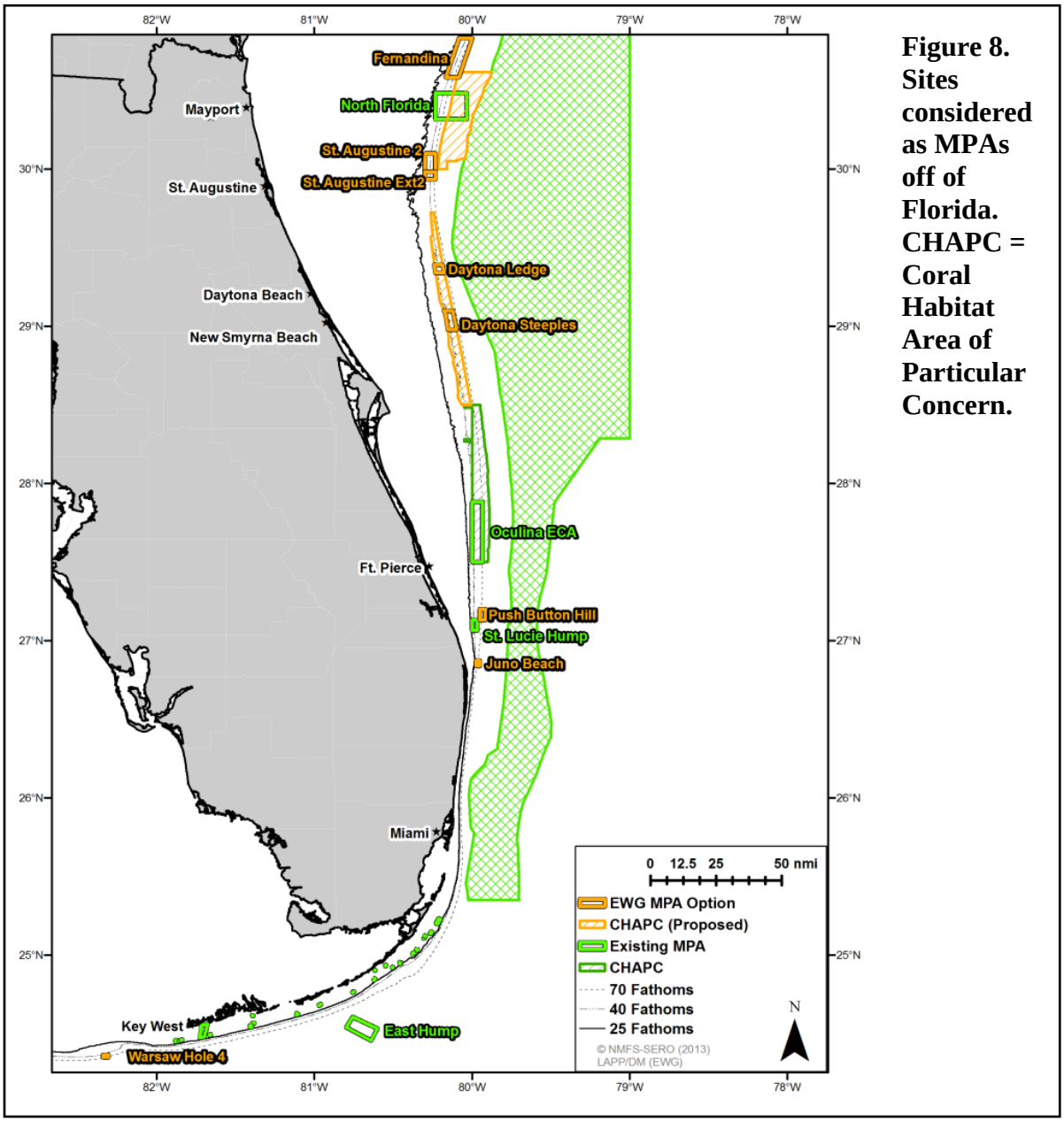

Figure 8. Sites considered as MPAs off of Florida. CHAPC = Coral Habitat Area of Particular Concern.

deemed too small and ephemeral for inclusion into recommendations to the SAFMC.

Because of the diversity of habitats and the extensive coastline of Florida, and the different biogeographic areas represented (north of Cape Canaveral, south of Cape Canaveral, Florida Keys coral reef tract) many sites were suggested off Florida. The following sites off Florida were recommended by the Workgroup for further consideration by the SAFMC:

1. Fernandina (85 sq. mi.);
2. North Florida MPA (existing MPA, 137 sq. mi.);
3. St Augustine 2 (32 sq. mi.);
4. Daytona Ledge (11 sq. mi.);
5. Daytona Steeples (27 sq. mi.);
6. *Oculina* Bank CHAPC (existing CHAPC, 279 sq. mi.);
7. *Oculina* Bank CHAPC Extension (242 sq. mi.);
8. *Oculina* Experimental Closed Area (existing MPA, 108 sq. mi.);
9. Push Button Hill (9 sq. mi.);
10. St. Lucie Hump MPA (existing MPA, 9 sq. mi.);
11. Juno Beach (4 sq. mi.);
12. Warsaw Hole (2 sq. mi.); and
13. Florida Keys National Marine Sanctuary Preservation Areas (SPAs) and Ecological Reserves (ERs) (existing, 247 sq. mi.).

The Fernandina site contains known spawning locations for snapper/grouper species, and several observation sites for speckled hind and warsaw grouper (Figure 10). The existing North Florida MPA, located along the same reef tract to the south of Fernandina, also had locations for both grouper species and many known snapper/grouper spawning locations. The Workgroup also 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 speckled hind, and point locations for warsaw grouper. This area is south of the existing North Florida MPA, and is connected to it and the Fernandina site by a contiguous reef and prevailing (Gulf Stream) currents.

Sites off of Daytona, those within proposed *Oculina* CHAPC, and those within the existing *Oculina* Experimental Closed Areas (ECA) include observations of speckled hind and warsaw grouper, but few documented spawning sites for any snapper/grouper species (only in the *Oculina* ECA). The lack of spawning information is most likely due to lack of MARMAP sampling in the area.

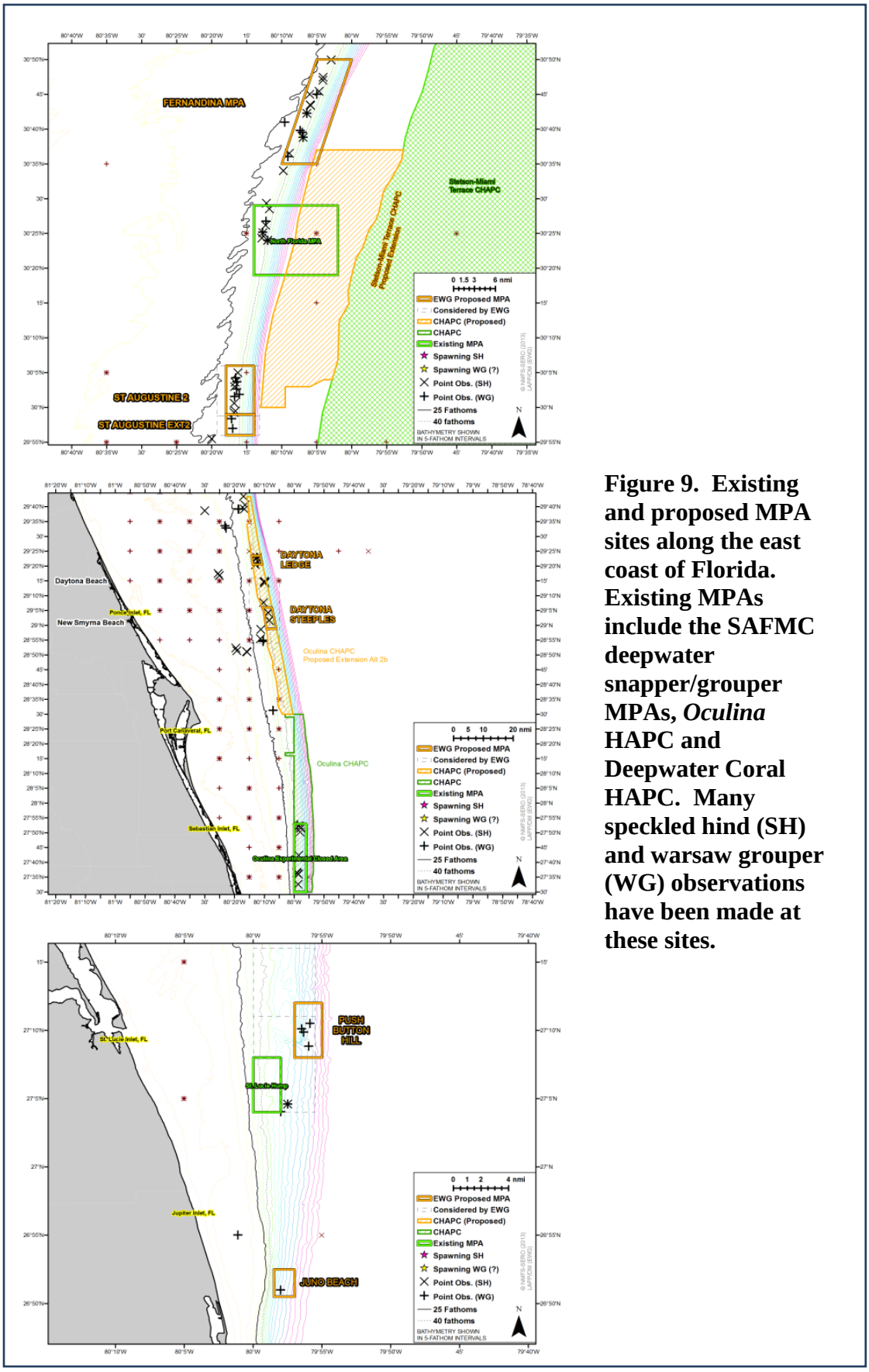

Figure 9. Existing and proposed MPA sites along the east coast of Florida. Existing MPAs include the SAFMC deepwater snapper/grouper MPAs, *Oculina* HAPC and Deepwater Coral HAPC. Many speckled hind (SH) and warsaw grouper (WG) observations have been made at these sites.

The Workgroup discussed the existing *Oculina* Banks Habitat Area of Particular Concern (HAPC) and *Oculina* Banks ECA and some members noted that the frequently high currents in the region due to the proximity of the Gulf Stream, along with the anchoring prohibition, makes these areas just south of Cape Canaveral fairly "protected" even if fishing continued. The Workgroup noted that fishing for wreckfish further offshore on the Blake Plateau takes place in stronger currents without anchoring, and fishing technology is often adapted to changing regulations if fishing is allowed. The pinnacles that occur at the Daytona Steeples, Juno Beach and in the CHAPC are unique habitat that are fragile and in need of protection. For these reasons, the Workgroup proposed that these areas be considered as no-take MPAs by the SAFMC.

The Push Button Hill site is important for a variety of species including warsaw grouper, 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* ECA. Many large warsaw grouper (100-360 lbs.) have been caught at the Push Button Hill reef complex. At least 20 of these larger warsaw grouper were caught between 1986 and 1995, along with dozens of smaller individuals. Smaller animals are still commonly encountered every year in this area. The proposed MPA is designed to protect the core habitat for this species, while leaving the rest of the Hill open to fishing.

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. 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.

The Juno Beach reef 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 speckled hind and warsaw grouper) occur off the Florida Keys as features such as the "Islamorada Hump". Large and small warsaw grouper have been reportedly caught off Juno. 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.

At the first meeting of the Workgroup in May 2012, several wreck sites and shallow reefs in south Florida and in the Florida Keys were recommended because of observations of speckled hand or warsaw grouper, and because the shallow coral banks are important spawning sites for many reef-associated fishes. At the most recent meeting the Workgroup decided to not consider wrecks in the Keys, as most are small and degrading rapidly. Shallow reefs in state waters (e.g.,

Western Dry Rocks) were also dropped from further consideration because they are in state waters and, while thought to be spawning areas for many fishes, have not been documented as being important spawning areas for speckled hind and warsaw grouper.

In the Florida Keys, speckled hind and warsaw grouper are now so rare that the Workgroup concentrated on looking at spawning aggregations for all deepwater reef fishes, as a proxy for potential spawning locations for them (although locations of speckled hind and warsaw grouper encounters are also noted).

Warsaw Hole (Figure 11) 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 where 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 warsaw grouper (occasionally caught), but also 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. A small no-take MPA would adequately

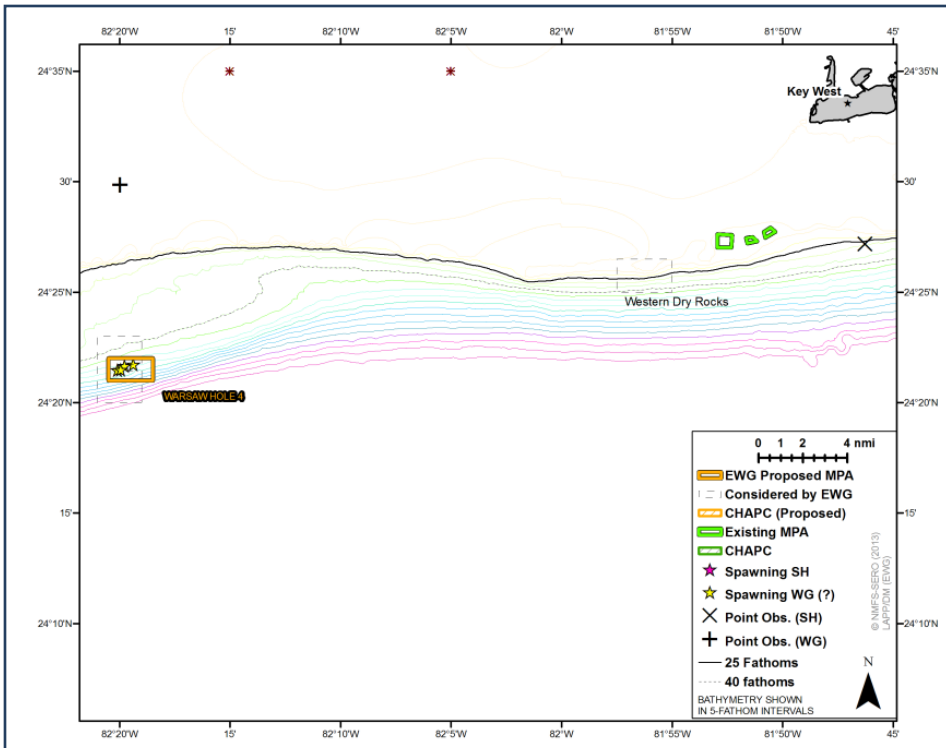

Figure 10. Location of Warsaw Hole in the Florida Keys, where spawning warsaw grouper reportedly occur.

protect this area. In addition, there is a radar station nearby which would make enforcement easier.

OVERALL SUMMARY AND ADDITIONAL RECOMMENDATIONS

The recommendations given above have come out of two meetings of the Marine Protected Areas Workgroup, and an in-depth geographic analysis of fishery-dependent and fishery-independent data on fishery species, and available habitat mapping data. The detailed rationale for selection of these sites is not presented above, but the analyses found in NOAA Fisheries Service (2013) and in Appendix 1 for this report provide that information. In addition to the specific sites investigated by the Workgroup as potential sites for MPAs, the group made some general observations regarding speckled hind and warsaw grouper that were summarized in the report submitted in June 2012 (SAFMC 2012), and additional suggestions were made at the meeting in February 2013. In particular the Workgroup emphasized the need for management plans for any new MPAs that include clear objectives and plans for research, monitoring, enforcement and outreach to ensure compliance with MPA regulations so that the MPA can meet its stated objectives. Research and monitoring is also needed to guide adaptive management.

The Workgroup recommends that the SAFMC consider a networked set of closed areas for significant protection and recovery of speckled hind and warsaw grouper populations, according to the best available scientific information. These recommended sites are connected as network by the continuity of reef structure (e.g., Harris *et al*. in press); by the migration of some key species (e.g., McGovern *et al*. 2005); and by the circulation in the South Atlantic Bight (Figure 12) that provides both general connectivity among deep reefs from the Florida Keys to the Carolinas, as well as local retention of water masses (Hare and Walsh 2007; Lesher 2008). Accordingly, the relatively small reserves proposed herein form a connected network of refugia for spawning and recruitment of the species targeted for protection, and other economically-valuable reef fishes.

As recommended previously, a rigorous experimental approach should be taken to determine the efficacy of the selected reserves, to include before-and-after-designation studies. Important variables in such an experimental approach should include "spillover" as a direct and immediate benefit to fishermen. As stated in the first Workgroup report, we also recommend a further refinement of the analyses by Dr. Farmer we used to identify prime locations for MPAs by adding modeled ocean circulation variables to the habitat model. Such an improvement could insure that the proposed MPA sites do in fact provide a connected MPA network, and allow any necessary adjustments needed to assure connectivity. Dr. Farmer has provided some of the circulation analyses (Figure 12), but additional analysis and modeling of circulation is needed.

The Workgroup emphasized that the SAFMC use an adaptive approach to managing the MPA network based on the results of ongoing research and monitoring. As has been recently been confirmed in the region, properly designed marine reserves that include the best-quality habitat where reef fishes are historically abundant and targeted in fisheries, can work to restore fish populations and enhance fisheries outside of the reserves (Jeffrey *et al*. 2012). At noted in that

study, well-designed pre- and post-designations studies and follow-up monitoring are needed to evaluate the effectiveness of such reserves for reef fishes (Jeffrey *et al.* 2012).

The Workgroup emphasized that if studies show that the desired effect is not occurring, the reserve network design should be re-evaluated. Review and sunset provisions in establishing the MPAs would assure that those that are not meeting goals can be considered for modification or removal from the network. Research, monitoring, evaluation and enforcement is needed to help meet those management goals and to determine the effectiveness of the MPAs. Because of the uncertainties surrounding the selection of these areas, and the long generation time for these fishes, the Council should schedule a re-evaluation of the reserves 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 speckled hind and warsaw grouper populations, as well as in the protection of spawning populations of other snapper/grouper species.

Additional MPA Siting Criteria

In siting MPAs in general, the Council should target areas with multi-species spawning aggregations. In their discussions, the Workgroup considered known spawning locations available in the MARMAP database and from fishermen's knowledge, and the sites chosen are spawning sites for multiple species. The Workgroup recognizes that Dry Rocks reef near Key West is an important spawning location for many reef fishes, and should be included for special protection to prevent fishing on spawning aggregations. This protection is best provided by the Florida Keys National Marine Sanctuary. Inclusion of important spawning locations for species that co-occur with speckled hind and warsaw grouper is especially important because these two species 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 (Coleman *et al.* 1996; Claro and Lindeman 2003; Paz and Sedberry 2008; Heyman and Wright 2011; Heyman 2011), these special areas should be protected to enhance spawning success and contribute to the ecosystem-based management of the southeast region.

Figure 11. Tracks from satellite-tracked drifters deployed from 2005-2008 on reef fish spawning locations, at spawning times, based on Sedberry et al. (2006). The tracks show connectivity among proposed MPAs and retention of water masses in the region.

Fishermen on the Workgroup noted that sites such as Devils Hole (Georgetown Hole), Charleston Shelf and Edisto South sites are important fishing areas and the SAFMC should consider the socioeconomic impacts of closures of multiple areas of the shelf-edge reef off each state. It was also noted by the Workgroup that important fishing sites like these are also sites where bycatch is likely to be high and therefore these sites would be effective in restoring populations of these groupers if fishing did not occur. The SAFMC should consider the socioeconomic impacts of any closures, as sites most likely to provide maximum biological benefits as closures can also have short-term effects on fishery landings.

During the first meeting of the Workgroup, several locations of wrecks (in addition to the existing Snowy Grouper Wreck MPA) were considered, particularly in south Florida. Recommendations for use of wreck came mainly from fishermen/divers who have observed the two grouper species on these wrecks. During second meeting, fishermen recommended a wreck off North Carolina to be used instead of the popular fishing ground, "Big Rock". The Workgroup is divided on the issue of wrecks, with many opposed to their use, and some agreeing to their use only as a last resort. The feeling of many members is that use of wrecks and other artificial structure as MPAs is unsound biologically and as policy. Wrecks have a short-term history and a short-term future. Fish accumulate on them because they are high-relief structure, but there is no evidence that those fish can serve as a source to enhance fish populations; in fact, wrecks may serve as a sink where fish are drawn away from natural productive habitats. Reef fish species co-evolved with the habitats and species complexes on natural reefs, and cannot be expected to be as productive on artificial structure. Spawning migrations and behaviors have developed over thousands of years, and are unlikely to adapt to artificial habitats that may not be in migratory pathways. The Workgroup recommends that natural reefs, with their long evolutionary history of supporting and producing fish populations, should be preferred as marine reserves. Using wrecks should be the SAFMC's lowest priority when considering MPAs for ecosystem-based management.

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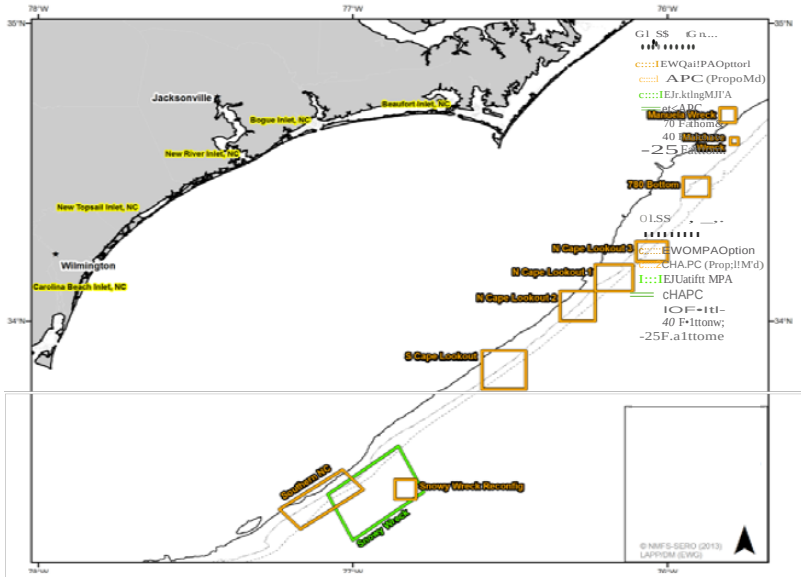
APPENDIX 1.

MPA Selection Tool spreadsheet used, along with other materials, for making MPA recommendations.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N Cape Lookout 3
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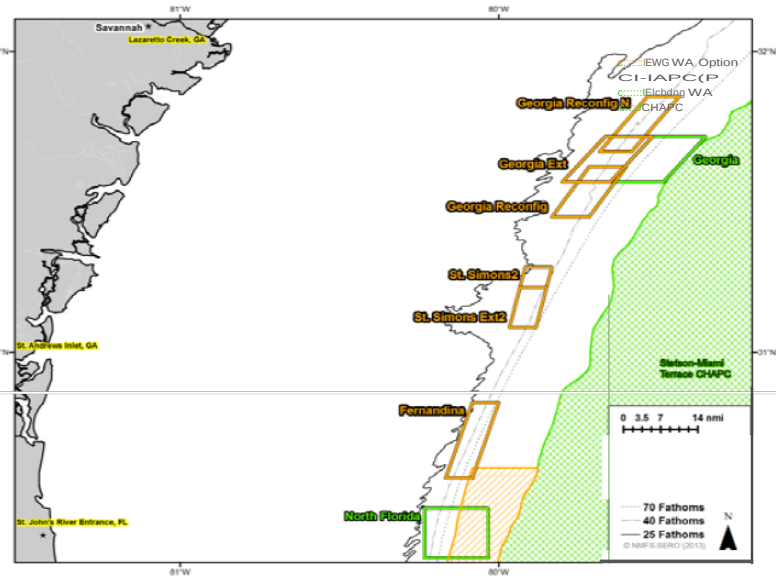
LAPP/DM (EWG)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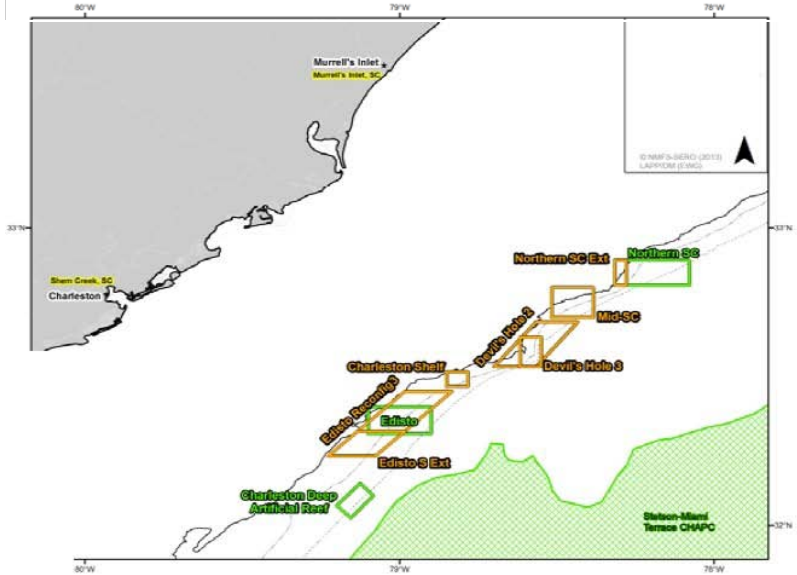
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Charleston Deep Artificial Reef
Stetson-Miami Terrace CHAPC
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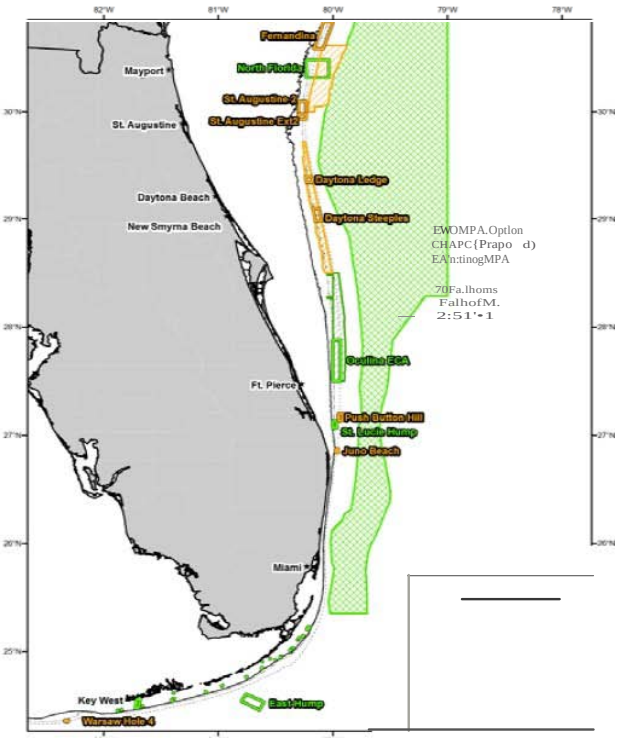
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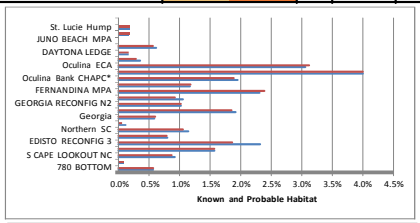
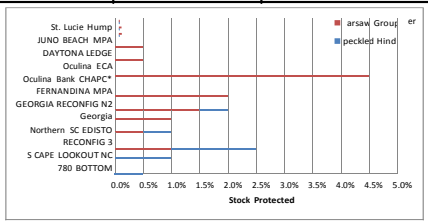
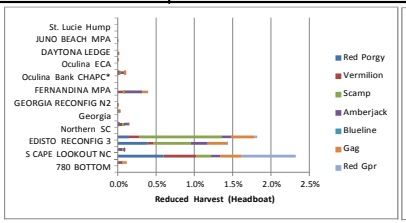
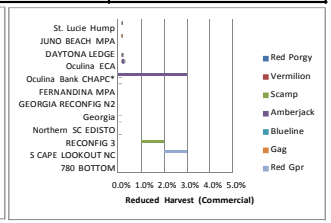
Daytona Beach
New Smyrna Beach
Ft. Pierce
Oculina ECA
Push Button Hill
St. Lucie Hump
Juno Beach
Miami
Key West
East Hump
Warsaw Hole 4

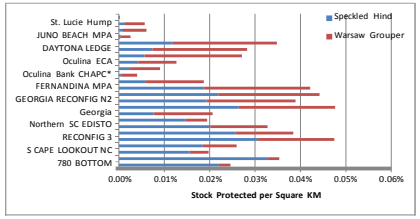
NAME	STATUS	TOTAL AREA (mi2)	TOTAL AREA (mi2)	STATE	SPAWNING	SPECKLED HIND HABITAT Known	SPECKLED HIND HABITAT SUITABILITY Known & Probable	SPECKLED HIND HABITAT % Stock	WARSAW GROUPER HABITAT Known	WARSAW GROUPER HABITAT SUITABILITY Known & Probable	WARSAW GROUPER HABITAT % Stock	Harvest Reductions: Headboat Red Porgy	Harvest Reductions: Headboat Vermilion	Harvest Reductions: Headboat Scamp	Harvest Reductions: Headboat Amberjack	Harvest Reductions: Headboat Blueline	Harvest Reductions: Headboat Gag	Harvest Reductions: Headboat Red Gpr	Harvest Reductions: Commercial Red Porgy	Harvest Reductions: Commercial Vermilion	Harvest Reductions: Commercial Scamp	Harvest Reductions: Commercial Amberjack	Harvest Reductions: Commercial Blueline	Harvest Reductions: Commercial Gag	Harvest Reductions: Commercial Red Gpr	%Stock per unit area Speckled Hind	%Stock per unit area Warsaw Grouper
780 BOTTOM	Proposed	22.0	22.0	NC	Likely	0.0%	0.6%	0.5%	0.0%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.02%	0.00%
MALCHACE WRECK	Proposed	2.5	2.5	NC	Maybe	0.0%	0.1%	0.1%	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.03%	0.00% S
CAPE LOOKOUT NC	Proposed	72.4	58.9	NC	S-G	1.8%	0.9%	1.1%	0.0%	0.9%	0.3%	0.6%	0.4%	0.2%	0.1%	0.0%	0.3%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.02%	0.00%
SOUTHERN NC	Proposed	88.7	75.1	NC	S-G	0.7%	1.6%	1.6%	0.0%	1.6%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.3%	0.7%	0.1%	0.2%	0.2%	1.2%	0.02%	0.01%
EDISTO RECONFIG 3	Proposed	80.6	80.4	SC	SH	17.9%	2.3%	2.5%	2.4%	1.9%	1.4%	0.4%	0.1%	0.5%	0.2%	0.0%	0.3%	0.0%	0.5%	0.6%	0.9%	0.3%	0.2%	0.3%	0.2%	0.03%	0.02%
DEVILS HOLE 3	Proposed	26.8	22.9	SC	WG?	2.5%	0.8%	0.7%	0.2%	0.8%	0.3%	0.1%	0.1%	1.1%	0.1%	0.0%	0.3%	0.0%	0.7%	0.8%	0.8%	0.2%	0.0%	0.5%	0.5%	0.03%	0.01%
Northern SC	Existing	66.9	66.3	SC	SH	3.2%	1.1%	1.3%	2.5%	1.1%	0.8%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02%	0.01%
NORTHERN SC EXT	Proposed	12.5	4.8	SC	SH	2.3%	0.1%	0.2%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.2%	0.1%	0.3%	0.1%	0.1%	0.1%	0.1%	0.01%	0.00%
Georgia	Existing	101.5	59.8	GA	Tile?	0.0%	0.6%	0.8%	0.0%	0.6%	1.3%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01%	0.01%
GEORGIA MPA RECONFIG	Proposed	79.0	79.0	GA	S-G	4.9%	1.9%	2.1%	11.2%	1.9%	1.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.3%	0.3%	0.1%	0.1%	0.1%	0.2%	0.03%	0.02%
GEORGIA RECONFIG N2	Proposed	74.3	74.3	GA	Maybe	0.0%	1.0%	1.4%	0.0%	1.0%	1.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.2%	0.0%	0.0%	0.0%	0.1%	0.02%	0.02%
ST SIMONS EXT2	Proposed	45.3	45.3	GA	S-G	5.3%	1.1%	1.0%	1.2%	0.9%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.5%	0.5%	0.2%	0.2%	0.2%	0.2%	0.02%	0.02%
FERNANDINA MPA	Proposed	85.4	79.6	NEFL	S-G	1.1%	2.3%	1.6%	5.1%	2.4%	2.0%	0.0%	0.1%	0.0%	0.2%	0.0%	0.1%	0.0%	0.2%	0.3%	0.1%	0.1%	0.1%	0.0%	0.0%	0.02%	0.02%
North Florida	Existing	137.0	58.8	NEFL	S-G	1.6%	1.2%	0.8%	4.5%	1.2%	1.7%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01%	0.01%
Oculina Bank CHAPC*	Existing	925.1	279.3	NEFL	S-G	0.0%	2.0%	0.5%	-2.0%	1.9%	3.2%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00%	0.00%
OCULINA BANK CHAPC EXT*	Proposed	687.4	242.4	NEFL	S-G	1.4%	4.0%	1.7%	0.5%	4.0%	4.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	3.6%	0.0%	0.1%	0.0%	0.00%	0.01%
Oculina ECA	Existing	107.8	107.8	NEFL	S-G	3.8%	3.1%	0.5%	2.6%	3.1%	0.9%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00%	0.01%
DAYTONA STEEPLES	Proposed	26.6	26.6	NEFL	S-G	1.5%	0.4%	0.2%	0.0%	0.3%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.01%	0.02%
DAYTONA LEDGE	Proposed	11.0	11.0	NEFL	S-G	1.3%	0.2%	0.1%	1.3%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.01%	0.02%
ST AUGUSTINE 2	Proposed	32.1	32.1	NEFL	S-G	1.9%	0.6%	0.4%	2.1%	0.6%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.1%	0.1%	0.0%	0.0%	0.01%	0.02%
JUNO BEACH MPA	Proposed	3.5	3.5	SEFL	S-G	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.00%	0.00%
PUSH BUTTON HILL	Proposed	9.4	9.4	SEFL	S-G	0.0%	0.2%	0.0%	0.8%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.00%	0.01%
St. Lucie Hump	Existing	9.4	9.4	SEFL	S-G	0.0%	0.2%	0.0%	0.0%	0.2%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00%	0.00%
WARSAW HOLE 4	Proposed	2.4	2.4	SEFL	WG?	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.00%	0.00%
FKNMS SPAs & Ers	Proposed	246.7	246.7	SEFL	WG?																						











SCORES, BY STATE						SPECKLED HIND HABITAT SUITABILITY			WARSAW GROUPER HABITAT SUITABILITY			POTENTIAL REDUCED LANDINGS														
NAME	STATUS	AREA (mi2)	25-100 fathoms AREA (mi2)	STATE	SPAWNING?	YES	YES & MAYBE	Prob	YES	YES & MAYBE	Prob	Red Porgy Com	Red Porgy Hbt	Vermilion Com	Vermilion Hbt	Scamp Com	Scamp Hbt	Amberjack Com	Amberjack Hbt	Blueline Com	Blueline Hbt	Gag Com	Gag Hbt	Red Gpr Com	Red Gpr Hbt	EWG RECOMMENDED
NORTH CAROLINA																										
780 BOTTOM	*Proposed*	56.9	22.0	NC	Likely	0.0%	0.6%	0.5%	0.0%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1
MANUELA WRECK	*Proposed*	25.5	0.2	NC	No	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0
MALCHACE WRECK	*Proposed*	6.4	2.5	NC	Maybe	0.0%	0.1%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1
N CAPE LOOKOUT 2	*Proposed*	114.8	37.9	NC	S-G	2.6%	0.7%	0.8%	2.4%	0.7%	0.2%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.2%	0.0%	0
N CAPE LOOKOUT NC	*Proposed*	110.9	39.2	NC	S-G	2.3%	1.0%	0.9%	0.0%	1.0%	0.1%	0.1%	0.2%	0.1%	0.5%	0.0%	0.0%	0.0%	0.0%	0.1%	0.7%	0.0%	0.2%	0.2%	0.5%	0
NORTH CAPE LOOKOUT 3	*Proposed*	68.4	20.5	NC	S-G	0.7%	0.2%	0.3%	0.4%	0.2%	0.1%	0.0%	0.7%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.9%	0
S CAPE LOOKOUT NC	*Proposed*	187.5	58.9	NC	S-G	1.8%	0.9%	1.1%	0.0%	0.9%	0.3%	0.0%	0.6%	0.0%	0.4%	0.0%	0.2%	0.0%	0.1%	0.0%	0.0%	0.0%	0.3%	0.0%	0.7%	1
SOUTHERN NC	*Proposed*	229.9	75.1	NC	S-G	0.7%	1.6%	1.6%	0.0%	1.6%	0.7%	0.4%	0.0%	0.3%	0.0%	0.7%	0.0%	0.1%	0.0%	0.2%	0.0%	0.2%	0.0%	1.2%	0.0%	1
			158.5			**2.5%**	**3.1%**	**3.3%**	**0.0%**	**3.1%**	**1.0%**	**0.5%**	**0.6%**	**0.3%**	**0.5%**	**0.7%**	**0.2%**	**0.1%**	**0.1%**	**0.2%**	**0.0%**	**0.2%**	**0.3%**	**1.2%**	**0.7%**	**4**
SOUTH CAROLINA																										**RECOMMENDED**
Charleston Deep	Existing	66.0	25.5	SC	No	0.0%	0.0%	0.3%	0.0%	0.0%	0.4%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
CHARLESTON SHELF MPA	*Proposed*	34.8	13.4	SC	S-G	3.6%	0.4%	0.5%	0.0%	0.3%	0.2%	0.1%	0.0%	0.2%	0.0%	0.2%	0.0%	0.1%	0.0%	0.1%	0.0%	0.1%	0.0%	0.1%	0.0%	0
DEVILS HOLE 2	*Proposed*	208.3	69.1	SC	WG?	5.5%	1.4%	1.6%	1.7%	1.3%	1.1%	0.6%	0.4%	0.5%	0.4%	0.9%	2.8%	0.2%	0.3%	0.3%	0.0%	0.3%	0.8%	0.4%	0.1%	0
Edisto	Existing	191.4	71.6	SC	SH	8.1%	1.6%	1.8%	1.2%	1.4%	1.2%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
EDISTO RECONFIG 3	*Proposed*	208.7	80.4	SC	SH	17.9%	2.3%	2.5%	2.4%	1.9%	1.4%	0.5%	0.4%	0.6%	0.1%	0.9%	0.5%	0.3%	0.2%	0.2%	0.0%	0.3%	0.3%	0.2%	0.0%	1
EDISTO S EXT	*Proposed*	130.6	50.3	SC	SH	9.8%	0.9%	1.3%	8.8%	0.7%	1.0%	0.3%	0.0%	0.3%	0.0%	0.6%	0.1%	0.2%	0.0%	0.1%	0.0%	0.2%	0.0%	0.1%	0.0%	0
DEVILS HOLE 3	*Proposed*	69.4	22.9	SC	WG?	2.5%	0.8%	0.7%	0.2%	0.8%	0.3%	0.7%	0.1%	0.8%	0.1%	0.8%	1.1%	0.2%	0.1%	0.0%	0.0%	0.5%	0.3%	0.5%	0.0%	1
MID SC MPA	*Proposed*	138.7	33.7	SC	S-G	2.7%	0.7%	0.9%	0.1%	0.6%	0.4%	0.4%	0.0%	0.3%	0.0%	0.6%	0.5%	0.1%	0.1%	0.1%	0.0%	0.2%	0.1%	0.2%	0.0%	0
Northern SC	Existing	173.2	66.3	SC	SH	3.2%	1.1%	1.3%	2.5%	1.1%	0.8%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
NORTHERN SC EXT	*Proposed*	32.5	4.8	SC	SH	2.3%	0.1%	0.2%	0.0%	0.1%	0.1%	0.2%	0.0%	0.1%	0.0%	0.3%	0.0%	0.1%	0.1%	0.1%	0.0%	0.1%	0.0%	0.1%	0.0%	1
			174.3			**25.9%**	**4.4%**	**4.7%**	**5.1%**	**3.8%**	**2.6%**	**1.4%**	**0.6%**	**1.5%**	**0.2%**	**2.0%**	**1.6%**	**0.6%**	**0.4%**	**0.3%**	**0.0%**	**0.9%**	**0.6%**	**0.8%**	**0.0%**	**4**
GEORGIA																										**RECOMMENDED**
Georgia	Existing	262.9	59.8	GA	Tile?	0.0%	0.6%	0.8%	0.0%	0.6%	1.3%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
GEORGIA MPA RECONFIG	*Proposed*	204.7	79.0	GA	S-G	4.9%	1.9%	2.1%	11.2%	1.9%	1.7%	0.2%	0.0%	0.3%	0.0%	0.3%	0.0%	0.1%	0.0%	0.1%	0.0%	0.1%	0.0%	0.2%	0.0%	1
GEORGIA EXT	*Proposed*	236.6	91.3	GA	Maybe	0.0%	1.4%	2.0%	1.1%	1.5%	1.9%	0.6%	0.0%	0.6%	0.0%	0.6%	0.0%	0.1%	0.0%	0.0%	0.0%	0.3%	0.0%	0.5%	0.0%	0
GEORGIA RECONFIG N2	*Proposed*	192.5	74.3	GA	Maybe	0.0%	1.0%	1.4%	0.0%	1.0%	1.5%	0.1%	0.0%	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	1
ST SIMONS 2	*Proposed*	58.6	21.4	GA	S-G	3.3%	0.2%	0.3%	0.5%	0.1%	0.4%	0.2%	0.0%	0.3%	0.0%	0.3%	0.0%	0.1%	0.0%	0.1%	0.0%	0.1%	0.0%	0.1%	0.0%	0
ST SIMONS EXT2	*Proposed*	117.4	45.3	GA	S-G	5.3%	1.1%	1.0%	1.2%	0.9%	1.0%	0.3%	0.0%	0.5%	0.0%	0.5%	0.0%	0.2%	0.0%	0.2%	0.0%	0.2%	0.0%	0.2%	0.0%	1
			258.5			**10.1%**	**4.6%**	**5.3%**	**12.4%**	**4.4%**	**5.5%**	**0.7%**	**0.0%**	**0.9%**	**0.0%**	**1.0%**	**0.0%**	**0.3%**	**0.0%**	**0.3%**	**0.0%**	**0.3%**	**0.0%**	**0.4%**	**0.0%**	**4**
NORTHEAST FLORIDA																										**RECOMMENDED**
FERNANDINA MPA	*Proposed*	221.1	79.6	NEFL	S-G	1.1%	2.3%	1.6%	5.1%	2.4%	2.0%	0.2%	0.0%	0.3%	0.1%	0.1%	0.0%	0.1%	0.2%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	1
North Florida	Existing	354.9	58.8	NEFL	S-G	1.6%	1.2%	0.8%	4.5%	1.2%	1.7%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Oculina Bank CHAPC (excluding ECA)	Existing	753.7	279.3	NEFL	S-G	0.0%	2.0%	0.5%	-2.0%	1.9%	3.2%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
OCULINA BANK CHAPC EXTENSION (excluding DAYTONA STEEPLES and DAYTONA LEDGE)	*Proposed*	627.7	242.4	NEFL	S-G	1.4%	4.0%	1.7%	0.5%	4.0%	4.5%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	3.6%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	1
Oculina ECA	Existing	279.2	107.8	NEFL	S-G	3.8%	3.1%	0.5%	2.6%	3.1%	0.9%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
DAYTONA STEEPLES	*Proposed*	68.9	26.6	NEFL	S-G	1.5%	0.4%	0.2%	0.0%	0.3%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1
DAYTONA LEDGE	*Proposed*	28.4	11.0	NEFL	S-G	1.3%	0.2%	0.1%	1.3%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1
ST AUGUSTINE 2	*Proposed*	83.1	32.1	NEFL	S-G	1.9%	0.6%	0.4%	2.1%	0.6%	0.7%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	1
ST AUGUSTINE EXT2	*Proposed*	35.6	13.8	NEFL	S-G	0.0%	0.1%	0.1%	0.2%	0.1%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0
			837.5			**12.6%**	**13.6%**	**5.7%**	**14.1%**	**13.6%**	**14.0%**	**0.3%**	**0.0%**	**0.4%**	**0.1%**	**0.3%**	**0.0%**	**3.9%**	**0.3%**	**0.2%**	**0.0%**	**0.2%**	**0.1%**	**0.0%**	**0.0%**	**8**
SOUTHEAST FLORIDA																										**RECOMMENDED**
FKNMS SPAs & Ers	*Proposed*	246.7	246.7	SEFL	WG?																					1
JUNO BEACH MPA	*Proposed*	9.2	3.5	SEFL	S-G	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1
PUSH BUTTON HILL	*Proposed*	24.4	9.4	SEFL	S-G	0.0%	0.2%	0.0%	0.8%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1
St. Lucie Hump	Existing	24.4	9.4	SEFL	S-G	0.0%	0.2%	0.0%	0.0%	0.2%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
WARSAW HOLE 4	*Proposed*	6.2	2.4	SEFL	WG?	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1
			271.5			**0.0%**	**0.4%**	**0.0%**	**1.4%**	**0.4%**	**0.1%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**5**

RANKINGS, BY STATE					SPECKLED HIND HABITAT SUITABILITY			WARSAW GROUPER HABITAT SUITABILITY			POTENTIAL REDUCED LANDINGS														
NAME	STATUS	AREA (mi2)	AREA (mi2)	STATE	YES	YES & MAYBE	Prob	YES	YES & MAYBE	Prob	Red Porgy Com	Red Porgy Hbt	Vermilion Com	Vermilion Hbt	Scamp Com	Scamp Hbt	Amberjack Com	Amberjack Hbt	Blueline Com	Blueline Hbt	Gag Com	Gag Hbt	Red Gpr Com	Red Gpr Hbt	SELECTED
NORTH CAROLINA																									
780 BOTTOM	*Proposed*	3	4	NC	6	5	5	3	5	6	8	7	7	8	8	8	6	7	6	3	8	7	8	6	
MANUELA WRECK	*Proposed*	2	1	NC	6	8	8	3	8	8	7	6	6	7	6	7	8	6	7	3	5	6	5	5	
MALCHACE WRECK	*Proposed*	1	2	NC	6	7	7	3	7	7	5	7	4	4	7	4	7	7	8	3	6	4	7	6	
N CAPE LOOKOUT 2	*Proposed*	6	5	NC	1	4	4	1	4	3	3	5	3	6	3	6	2	5	3	3	2	5	2	4	
N CAPE LOOKOUT NC	*Proposed*	5	6	NC	2	2	3	3	2	4	2	3	2	1	2	3	3	2	2	1	3	2	3	3	
NORTH CAPE LOOKOUT 3	*Proposed*	4	3	NC	5	6	6	2	6	5	6	1	5	3	5	5	4	4	4	2	7	3	6	1	
S CAPE LOOKOUT NC	*Proposed*	7	7	NC	3	3	2	3	3	2	4	2	8	2	4	1	5	1	5	3	4	1	4	2	
SOUTHERN NC	*Proposed*	8	8	NC	4	1	1	3	1	1	1	4	1	5	1	2	1	3	1	3	1	7	1	6	
SOUTH CAROLINA																									**SELECTED**
Charleston Deep	Existing	3	4	SC	10	10	9	8	10	7															
CHARLESTON SHELF MPA	*Proposed*	2	2	SC	5	8	8	8	8	9	7	7	6	7	7	7	7	7	5	1	7	7	5	5	
DEVILS HOLE 2	*Proposed*	9	8	SC	4	3	3	4	3	3	2	2	3	1	2	1	2	1	1	1	3	1	2	1	
Edisto	Existing	8	9	SC	3	2	2	5	2	2															
EDISTO RECONFIG 3	*Proposed*	10	10	SC	1	1	1	3	1	1	3	1	2	3	1	3	1	2	2	1	2	3	3	3	
EDISTO S EXT	*Proposed*	5	6	SC	2	5	5	1	6	4	5	4	5	6	5	5	3	6	3	1	4	5	7	6	
DEVILS HOLE 3	*Proposed*	4	3	SC	8	6	7	6	5	8	1	3	1	2	3	2	4	3	7	1	1	2	1	2	
MID SC MPA	*Proposed*	6	5	SC	7	7	6	7	7	6	4	6	4	4	4	4	5	4	4	1	5	4	4	4	
Northern SC	Existing	7	7	SC	6	4	4	2	4	5															
NORTHERN SC EXT	*Proposed*	1	1	SC	9	9	10	8	9	10	6	5	7	5	6	6	6	5	6	1	6	6	6	6	
GEORGIA																									**SELECTED**
Georgia	Existing	6	3	GA	4	5	5	5	5	4															
GEORGIA MPA RECONFIG	*Proposed*	4	5	GA	2	1	1	1	1	2	3	1	3	1	3	1	4	1	3	1	3	1	2	1	
GEORGIA EXT	*Proposed*	5	6	GA	4	2	2	3	2	1	1	3	1	3	1	3	2	3	4	1	1	3	1	1	
GEORGIA RECONFIG N2	*Proposed*	3	4	GA	4	4	3	5	3	3	5	2	5	2	5	2	5	2	5	1	5	2	5	1	
ST SIMONS 2	*Proposed*	1	1	GA	3	6	6	4	6	6	4	3	4	3	4	3	3	3	2	1	4	3	4	1	
ST SIMONS EXT2	*Proposed*	2	2	GA	1	3	4	2	4	5	2	3	2	3	2	3	1	3	1	1	2	3	3	1	
NORTHEAST FLORIDA																									**SELECTED**
FERNANDINA MPA	*Proposed*	5	6	NEFL	7	3	2	1	3	3	1	2	1	1	2	1	2	1	1	1	2	1	1	1	
North Florida	Existing	7	5	NEFL	3	5	3	2	5	4															
Oculina Bank CHAPC (excluding ECA)	Existing	9	9	NEFL	9	4	4	9	4	2															
OCULINA BANK CHAPC EXTENSION (excluding DAYTONA STEEPLES and DAYTONA LEDGE)	*Proposed*	8	8	NEFL	5	1	1	6	1	1	4	1	4	2	1	2	1	2	4	1	1	2	3	2	
Oculina ECA	Existing	6	7	NEFL	1	2	5	3	2	5															
DAYTONA STEEPLES	*Proposed*	3	3	NEFL	4	7	7	8	7	7	5	2	5	3	5	4	3	4	5	1	5	4	5	2	
DAYTONA LEDGE	*Proposed*	1	1	NEFL	6	8	9	5	8	9	6	2	6	4	6	3	6	3	6	1	6	3	6	2	
ST AUGUSTINE 2	*Proposed*	4	4	NEFL	2	6	6	4	6	6	2	2	2	5	3	4	5	4	2	1	3	5	2	2	
ST AUGUSTINE EXT2	*Proposed*	2	2	NEFL	8	9	8	7	9	8	3	2	3	5	4	4	4	4	3	1	4	5	4	2	
SOUTHEAST FLORIDA																									**SELECTED**
FKNMS SPAs & Ers	*Proposed*																								
JUNO BEACH MPA	*Proposed*	2	2	SEFL	1	3	3	4	3	3	1	1	3	1	2	1	2	1	1	1	2	1	1	1	
PUSH BUTTON HILL	*Proposed*	3	3	SEFL	1	2	2	1	2	1	2	1	1	2	2	1	1	1	2	1	1	2	1	1	
St. Lucie Hump	Existing	4	4	SEFL	1	1	1	3	1	2															
WARSAW HOLE 4	*Proposed*	1	1	SEFL	1	3	4	2	3	4	3	1	2	2	1	1	3	1	3	1	3	2	1	1	

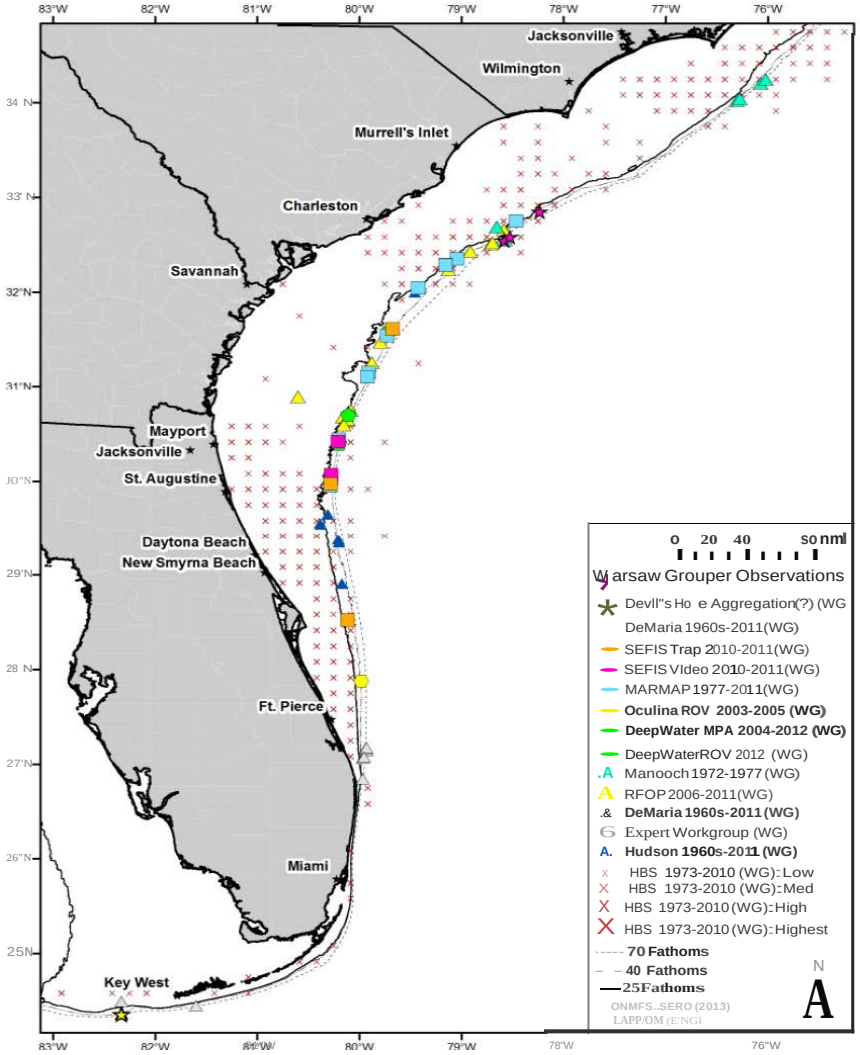
	25-100 fathoms	SPECKLED HIND HABITAT SUITABILITY			WARSAW GROUPER HABITAT SUITABILITY			POTENTIAL REE UCED LANDINGS																TOTAL HITS
								Red Porgy		Vermilion		Scamp		Amberjack		Blueline		Gag		Red Gpr				
	AREA (mi2)	YES	YES & MAYBE	Prob	YES	YES & MAYBE	Prob	Com	Hbt	Com	Hbt	Com	Hbt	Com	Hbt	Com	Hbt	Com	Hbt	Com	Hbt			
STATUS QUO	925	17%	9%	6%	10%	9%	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			9
EWG RECOMMENDATIONS	1700	51%	26%	19%	33%	25%	23%	3%	1%	3%	1%	4%	2%	5%	1%	1%	0%	2%	1%	2%	1%			25
EWG RECOMMENDATIONS (CHAPC SCALAR)	1700	51%	23%	18%	34%	22%	19%	3%	1%	3%	1%	4%	2%	3%	1%	1%	0%	2%	1%	2%	1%			25

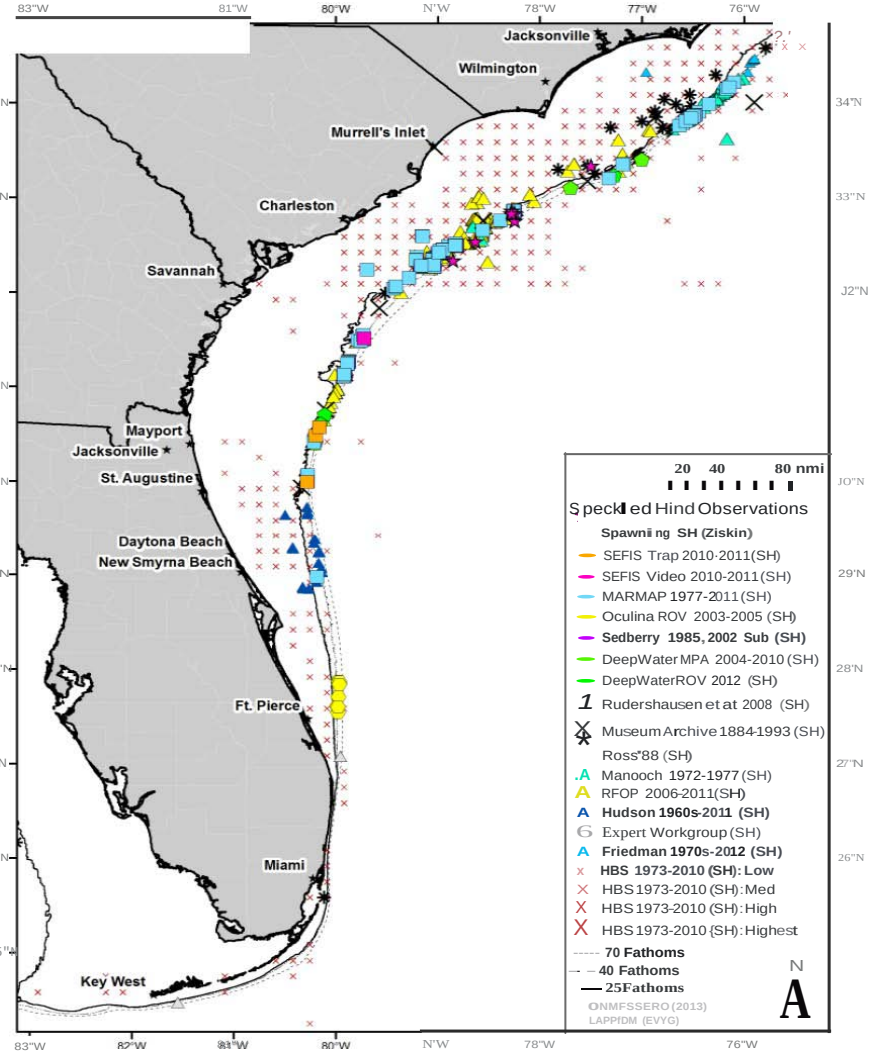
CHAPC SCALAR: 50% effective at excluding fishing pressure due to no-anchoring restriction

MPA Efficiency as determined by dividing through by unit area.

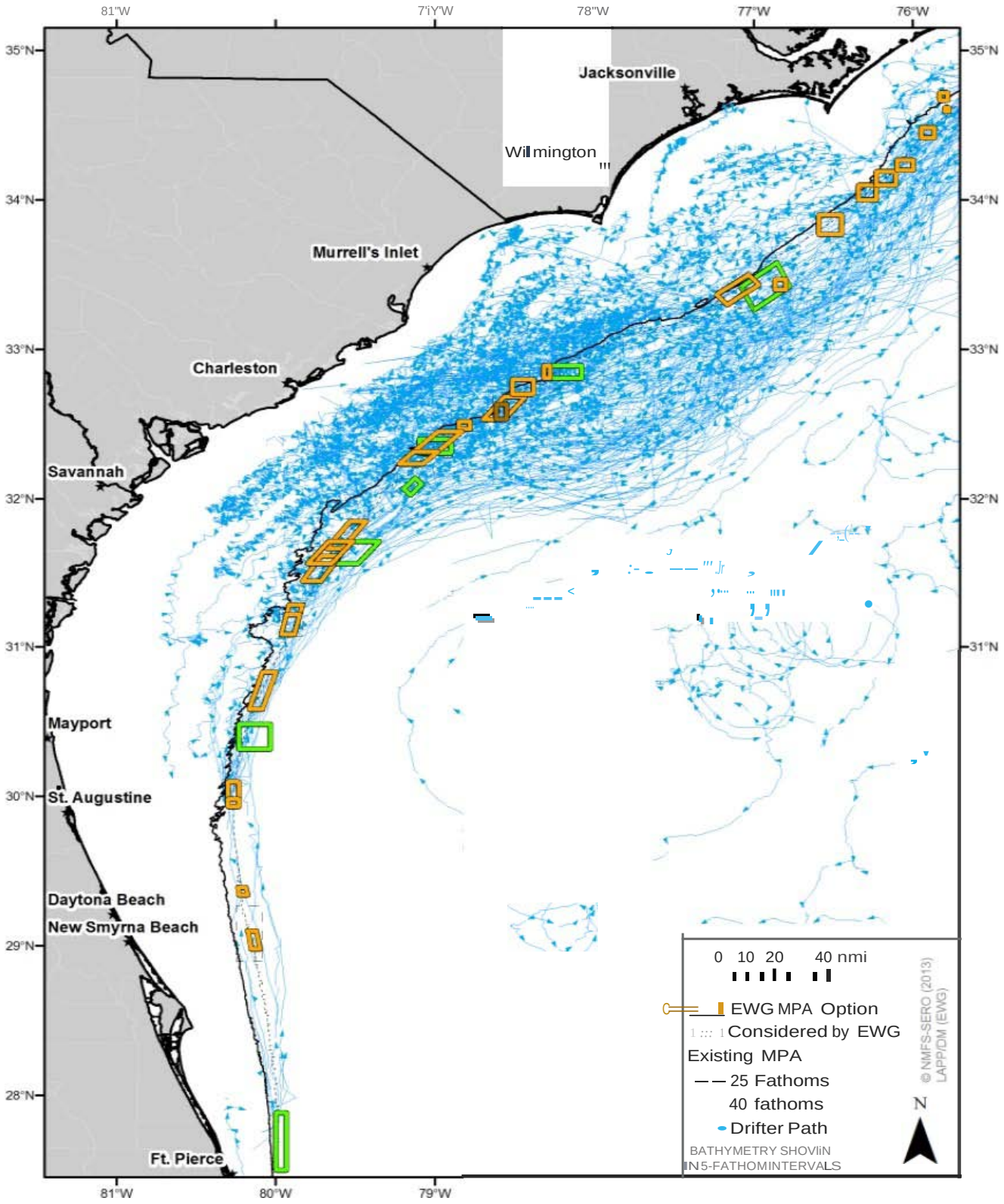
RANKINGS, BY STATE			HABITAT SUITABILITY			HABITAT SUITABILITY			
NAME	STATUS	STATE	YES	YES & MAYBE	Prob	YES	YES & MAYBE	Prob	
NORTH CAROLINA									**SELECTED**
780 BOTTOM	*Proposed*	NC	6	2	4	3	2	6	
MANUELA WRECK	*Proposed*	NC	6	8	8	3	8	8	
MALCHACE WRECK	*Proposed*	NC *N*	6	1	1	3	1	7	
CAPE LOOKOUT 2	*Proposed*	NC *N*	1	5	3	1	5	3	
CAPE LOOKOUT NC	*Proposed*	NC	2	3	2	3	3	5	
NORTH CAPE LOOKOUT 3	*Proposed*	NC	3	7	7	2	7	4	
S CAPE LOOKOUT NC	*Proposed*	NC	4	6	6	3	6	2	
SOUTHERN NC	*Proposed*	NC	5	4	5	3	4	1	
SOUTH CAROLINA									**SELECTED**
Charleston Deep	Existing	SC	10	10	10	8	10	6	
CHARLESTON SHELF MPA	*Proposed*	SC	2	2	2	8	3	4	
DEVILS HOLE 2	*Proposed*	SC Edisto	8	7	8	4	5	5	
	Existing	SC *EDISTO*	5	5	6	5	4	2	
RECONFIG 3	*Proposed*	SC	3	3	3	3	2	3	
EDISTO S EXT	*Proposed*	SC	4	8	7	1	8	1	
DEVILS HOLE 3	*Proposed*	SC *MID*	6	1	4	6	1	7	
SC MPA	*Proposed*	SC	7	6	5	7	6	8	
Northern SC	Existing	SC	9	9	9	2	7	9	
NORTHERN SC EXT	*Proposed*	SC	1	4	1	8	9	10	
GEORGIA									**SELECTED**
Georgia	Existing	GA	4	5	6	5	5	2	
GEORGIA MPA RECONFIG	*Proposed*	GA	3	1	1	1	1	4	
GEORGIA EXT	*Proposed*	GA	4	3	3	4	3	3	
GEORGIA RECONFIG N2	*Proposed*	GA	4	4	4	5	4	5	
ST SIMONS 2	*Proposed*	GA *ST*	1	6	5	3	6	6	
SIMONS EXT2	*Proposed*	GA	2	2	2	2	2	1	
NORTHEAST FLORIDA									**SELECTED**
FERNANDINA MPA	*Proposed*	NEFL	6	1	1	4	1	3	
North Florida	Existing	NEFL	5	3	2	2	3	1	
Oculina Bank CHAPC (excluding ECA)	Existing	NEFL	9	8	9	9	9	8	
OCULINA BANK CHAPC EXTENSION (excluding DAYTONA STEEPLES and DAYTONA LEDGE)	*Proposed*	NEFL	7	5	6	7	5	7	
Oculina ECA	Existing	NEFL	4	2	8	5	2	9	
DAYTONA STEEPLES	*Proposed*	NEFL	3	7	7	8	7	5	
DAYTONA LEDGE	*Proposed*	NEFL	1	6	5	1	6	6	
ST AUGUSTINE 2	*Proposed*	NEFL *ST*	2	4	3	3	4	4	
AUGUSTINE EXT2	*Proposed*	NEFL	8	9	4	6	8	2	
SOUTHEAST FLORIDA									**SELECTED**
FKNMS SPAs & Ers	*Proposed*	SEFL							
JUNO BEACH MPA	*Proposed*	SEFL	1	3	3	4	3	3	
PUSH BUTTON HILL	*Proposed*	SEFL	1	2	2	2	2	1	
St. Lucie Hump	Existing	SEFL	1	1	1	3	1	2	
WARSAW HOLE 4	*Proposed*	SEFL	1	3	4	1	3	4	

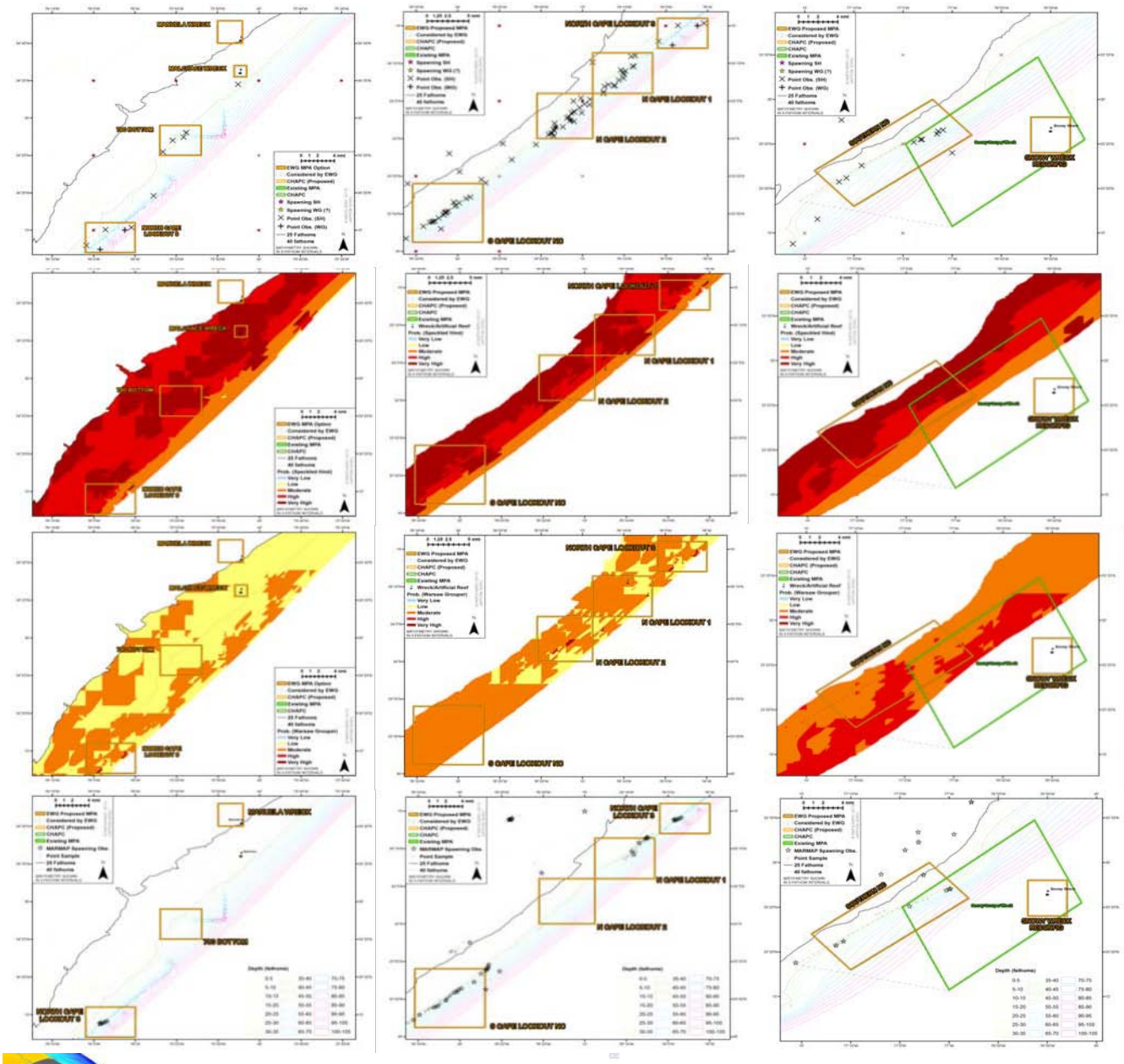
MPA NAME	STATE	AREA_KM	AREA_MI
DAYTONA LEDGE	FL	28.37	10.96
DAYTONA STEEPLES	FL	68.88	26.59
East Hump	FL	162.77	62.85
FERNANDINA MPA	FL	221.12	85.37
FKNMS SPAs & Ers	FL	638.98	246.71
JUNO BEACH MPA	FL	9.17	3.54
North Florida	FL	354.89	137.02
Oculina ECA	FL	279.19	107.80
PUSH BUTTON HILL	FL	24.39	9.42
ST AUGUSTINE 2	FL	83.10	32.08
ST AUGUSTINE EXT2	FL	35.64	13.76
St. Lucie Hump	FL	24.41	9.42
WARSAW HOLE 4	FL	6.24	2.41
Georgia	GA	262.87	101.50
GEORGIA EXT	GA	236.56	91.34
GEORGIA MPA RECONFIG	GA	204.66	79.02
GEORGIA RECONFIG N2	GA	192.53	74.34
ST SIMONS 2	GA	58.64	22.64
ST SIMONS EXT2	GA	117.41	45.33
780 BOTTOM	NC	56.90	21.97
MALCHACE WRECK	NC	6.39	2.47
MANUELA WRECK	NC	25.54	9.86
N CAPE LOOKOUT 2	NC	114.81	44.33
N CAPE LOOKOUT NC	NC	110.94	42.83
NORTH CAPE LOOKOUT 3	NC	68.43	26.42
S CAPE LOOKOUT NC	NC	187.50	72.39
Snowy Grouper Wreck	NC	491.90	189.93
SNOWY WRECK RECONFIG	NC	45.98	17.75
SOUTHERN NC	NC	229.85	88.75
Charleston Deep	SC	66.01	25.49
CHARLESTON SHELF MPA	SC	34.75	13.42
DEVILS HOLE 2	SC	208.28	80.42
DEVILS HOLE 3	SC	69.45	26.81
Edisto	SC	191.38	73.89
EDISTO RECONFIG 3	SC	208.72	80.59
EDISTO S EXT	SC	130.58	50.42
MID SC MPA	SC	138.66	53.54
Northern SC	SC	173.19	66.87
NORTHERN SC EXT	SC	32.47	12.54

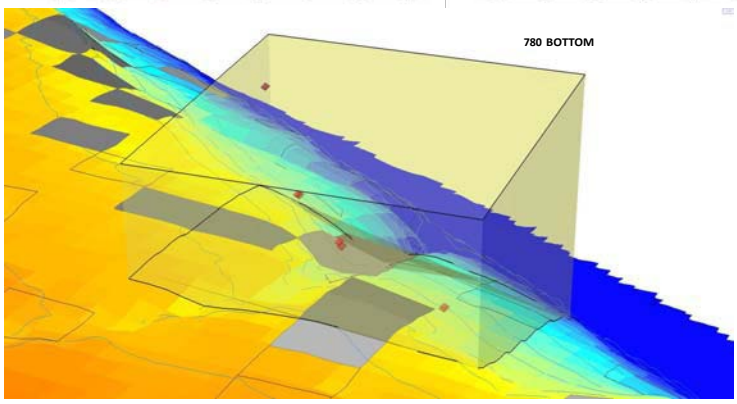

Jacksonville
Wilmington
Murrell's Inlet
Charleston
Savannah
Mayport
Jacksonville
St. Augustine
Daytona Beach
New Smyrna Beach
Ft. Pierce
Miami
Key West
0 20 40 80 nmi
Warsaw Grouper Observations
Devil"s Hole Aggregation(?) (WG
DeMaria 1960s-2011(WG)
SEFIS Trap 2010-2011(WG)
SEFIS Video 2010-2011(WG)
MARMAP 1977-2011(WG)
Oculina ROV 2003-2005 (WG)
DeepWater MPA 2004-2012 (WG)
DeepWaterROV 2012 (WG)
Manooch 1972-1977 (WG)
RFOP 2006-2011(WG)
DeMaria 1960s-2011 (WG)
Expert Workgroup (WG)
Hudson 1960s-2011 (WG)
HBS 1973-2010 (WG): Low
HBS 1973-2010 (WG): Med
HBS 1973-2010 (WG): High
HBS 1973-2010 (WG): Highest
70 Fathoms
40 Fathoms
25 Fathoms
ONMFS SERO (2013)
LAPP/OM (ENG)
N

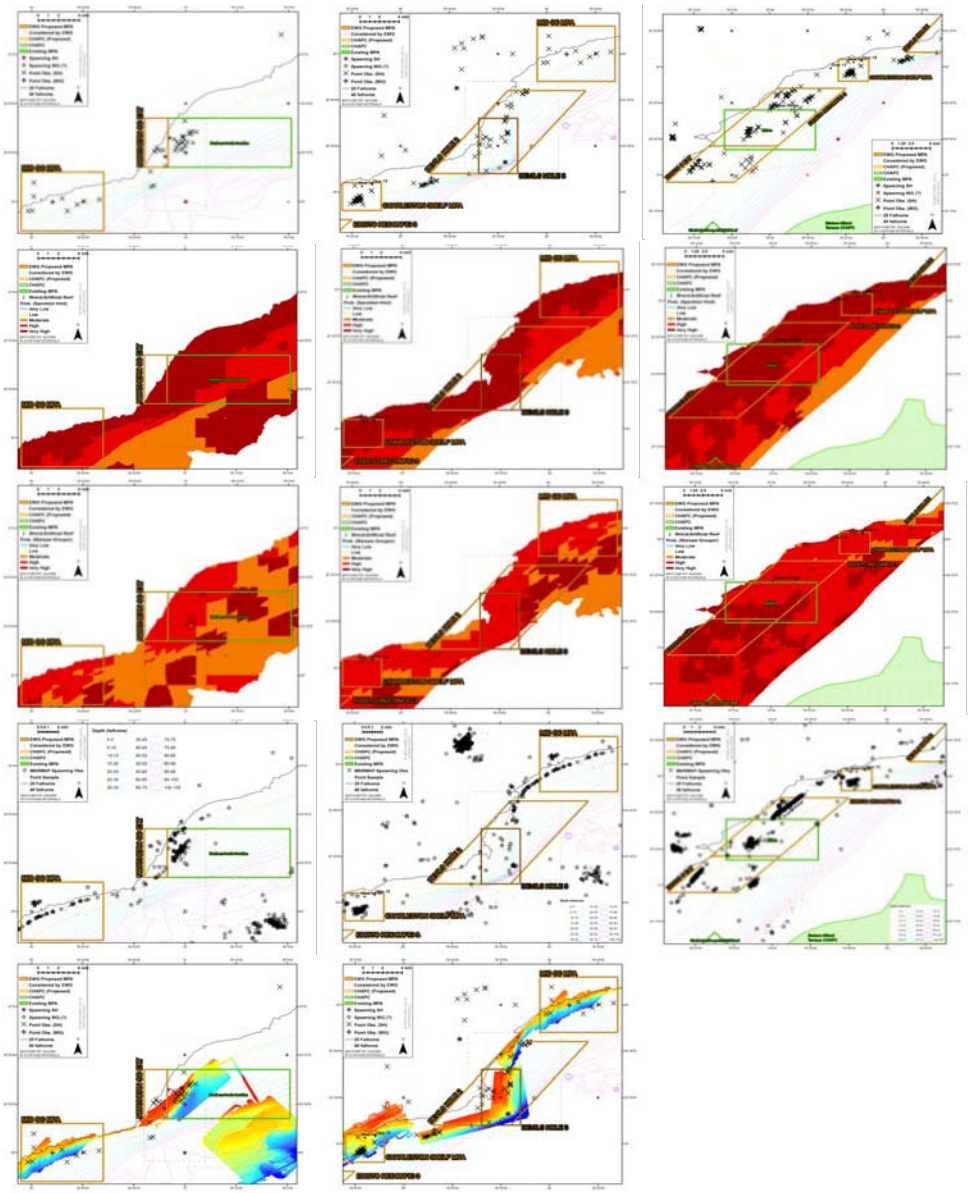

Jacksonville
Wilmington
Murrell's Inlet
Charleston
Savannah
Mayport
Jacksonville
St. Augustine
Daytona Beach
New Smyrna Beach
Ft. Pierce
Miami
Key West
20 40 80 nmi
Speckled Hind Observations
Spawning SH (Ziskin)
SEFIS Trap 2010-2011(SH)
SEFIS Video 2010-2011(SH)
MARMAP 1977-2011 (SH)
Oculina ROV 2003-2005 (SH)
Sedberry 1985, 2002 Sub (SH)
DeepWater MPA 2004-2010 (SH)
DeepWaterROV 2012 (SH)
Rudershausen et at 2008 (SH)
Museum Archive 1884-1993 (SH)
Ross*88 (SH)
Manooch 1972-1977 (SH)
RFOP 2006-2011(SH)
Hudson 1960s-2011 (SH)
Expert Workgroup (SH)
Friedman 1970s-2012 (SH)
HBS 1973-2010 (SH): Low
HBS 1973-2010 (SH): Med
HBS 1973-2010 (SH): High
HBS 1973-2010 (SH): Highest
70 Fathoms
40 Fathoms
25 Fathoms
ONMFSSERO (2013)
LAPP/DM (EVYG)
N

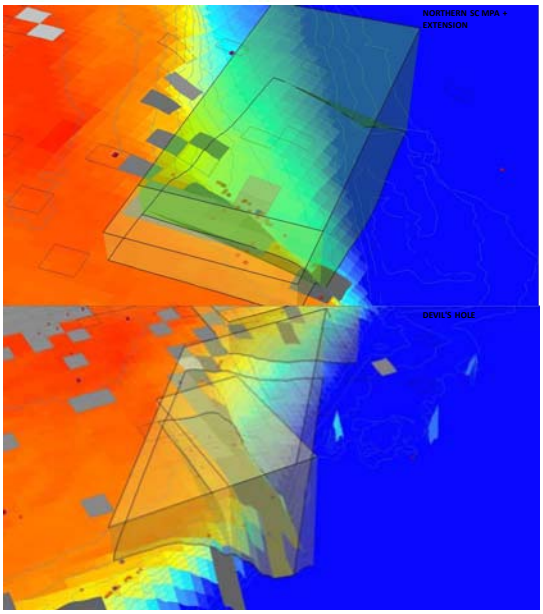
MPA	HABITAT			STOCKS PROTECTED																COMMENTS
				speckled hind	warsaw grouper	red snapper	snowy grouper	tilefish	blueline tilefish	vermilion snapper	gray triggerfish	hogfish	black sea bass	gag	red grouper	graysby	scamp	red porgy	tomtate	
Snowy Wreck		X	X	X			X					X		X	X	X		X		spawning aggregations of snowy grouper (?)
Northern SC		X		X			X			X	X			X				X		
Edisto		X		X			X		X	X			X				X	X		may be larval source/sink due to Charleston Gyre
Charleston Deep			X																	artificial reef never implemented
Georgia			X					X												east of popular fishing ground
North Florida		X	X	X			X	X		X		X					X	X	X	popular fishing grounds to north and south
Oculina ECA	X			X	X		X													protect coral from shrimp trawling
St. Lucie Hump		X		X	X	X	X						X					X		
East Hump		X	X		X		X	X												

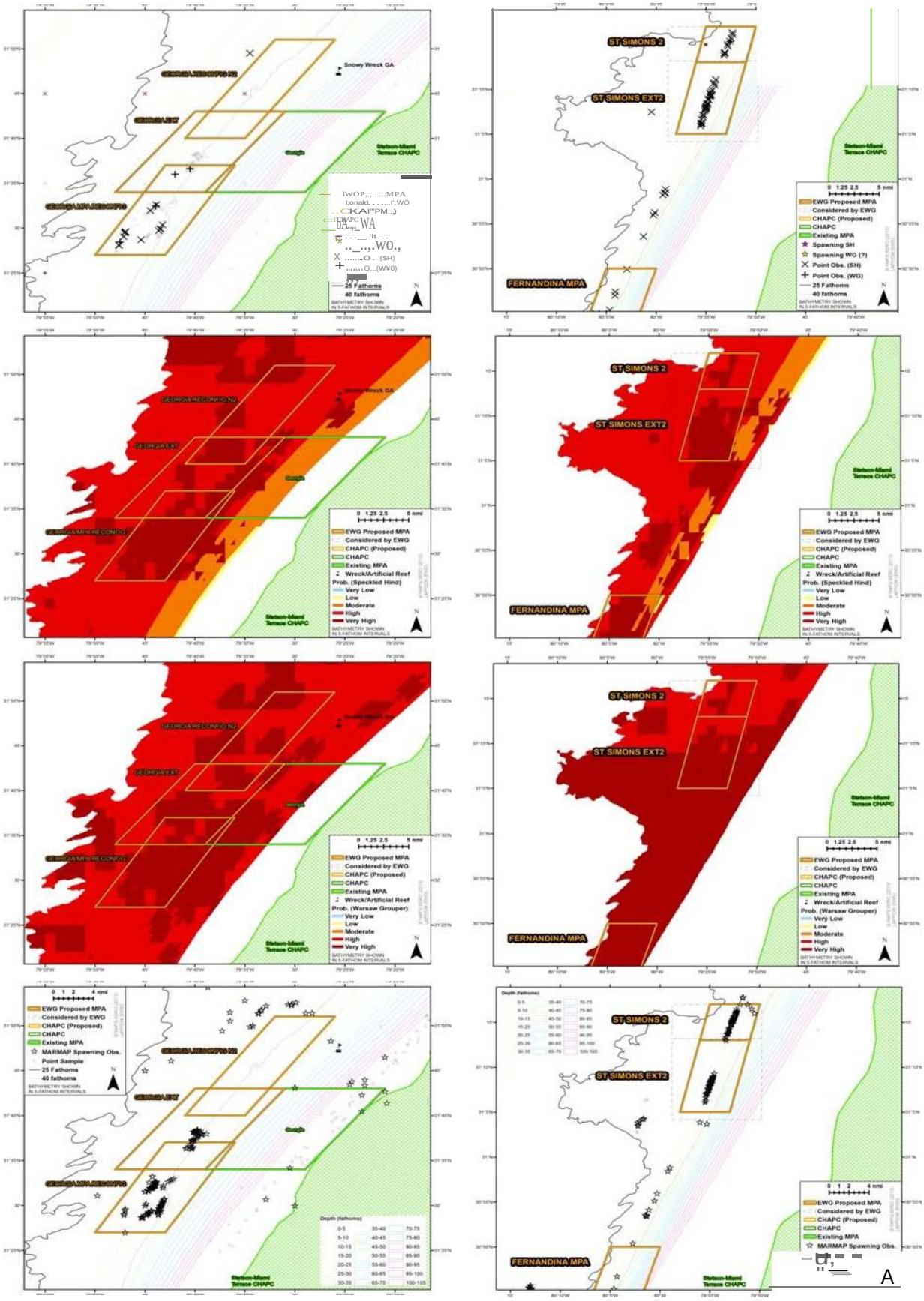

81°W
7'iY'W
78"W
77°W
76°W
35°N
34°N
33°N
32°N
31°N
30°N
29°N
28°N
Jacksonville
Wil mington
Murrell's Inlet
Charleston
Savannah
Mayport
St. Augustine
Daytona Beach
New Smyrna Beach
Ft. Pierce
81°W
80°W
79°W
0 10 20 40 nmi
EWG MPA Option
Considered by EWG
Existing MPA
25 Fathoms
40 fathoms
Drifter Path
BATHYMETRY SHOVliN
IN 5-FATHOMINTERVALS
© NMFS-SERO (2013)
LAPP/DM (EWG)
N

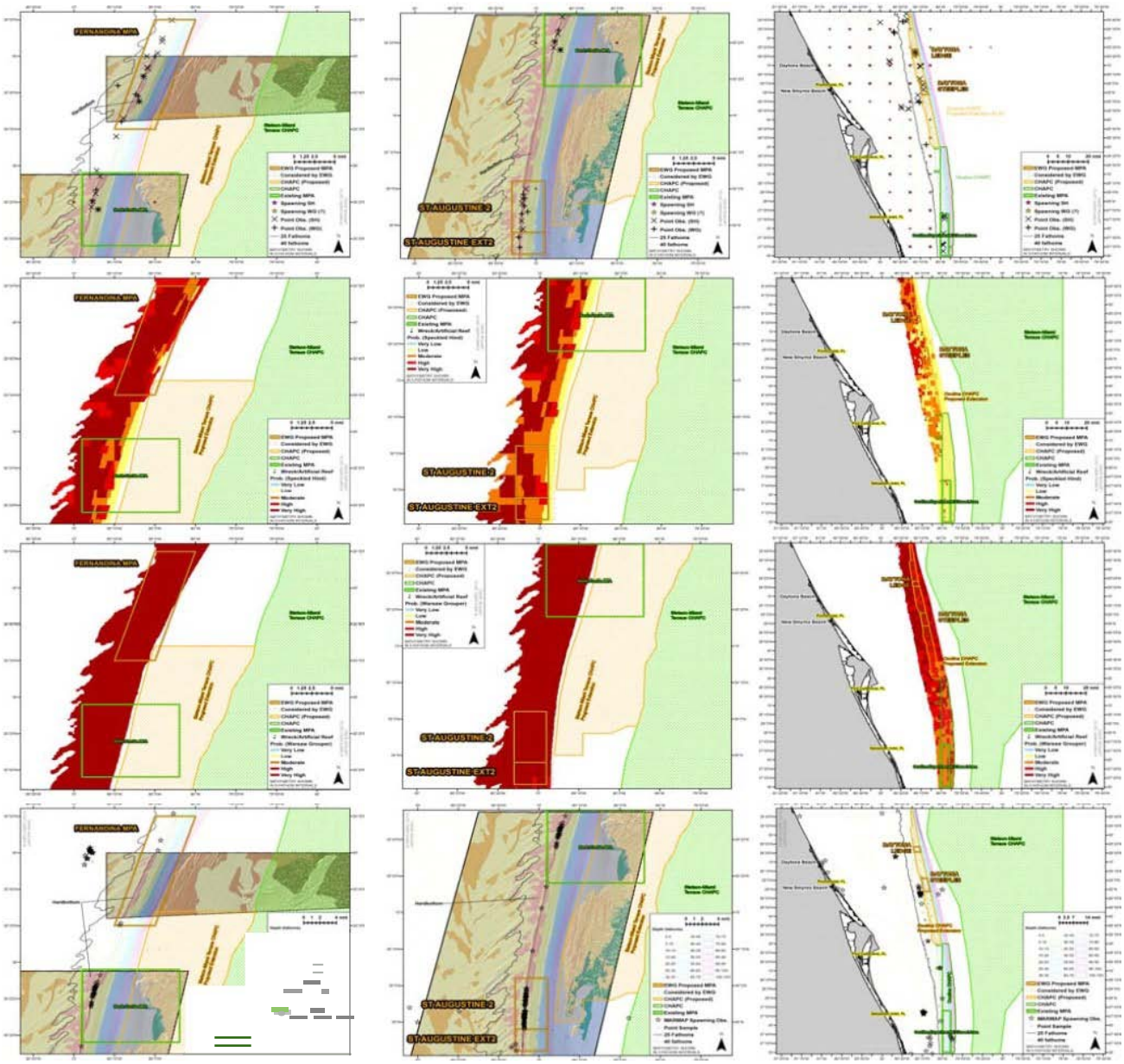


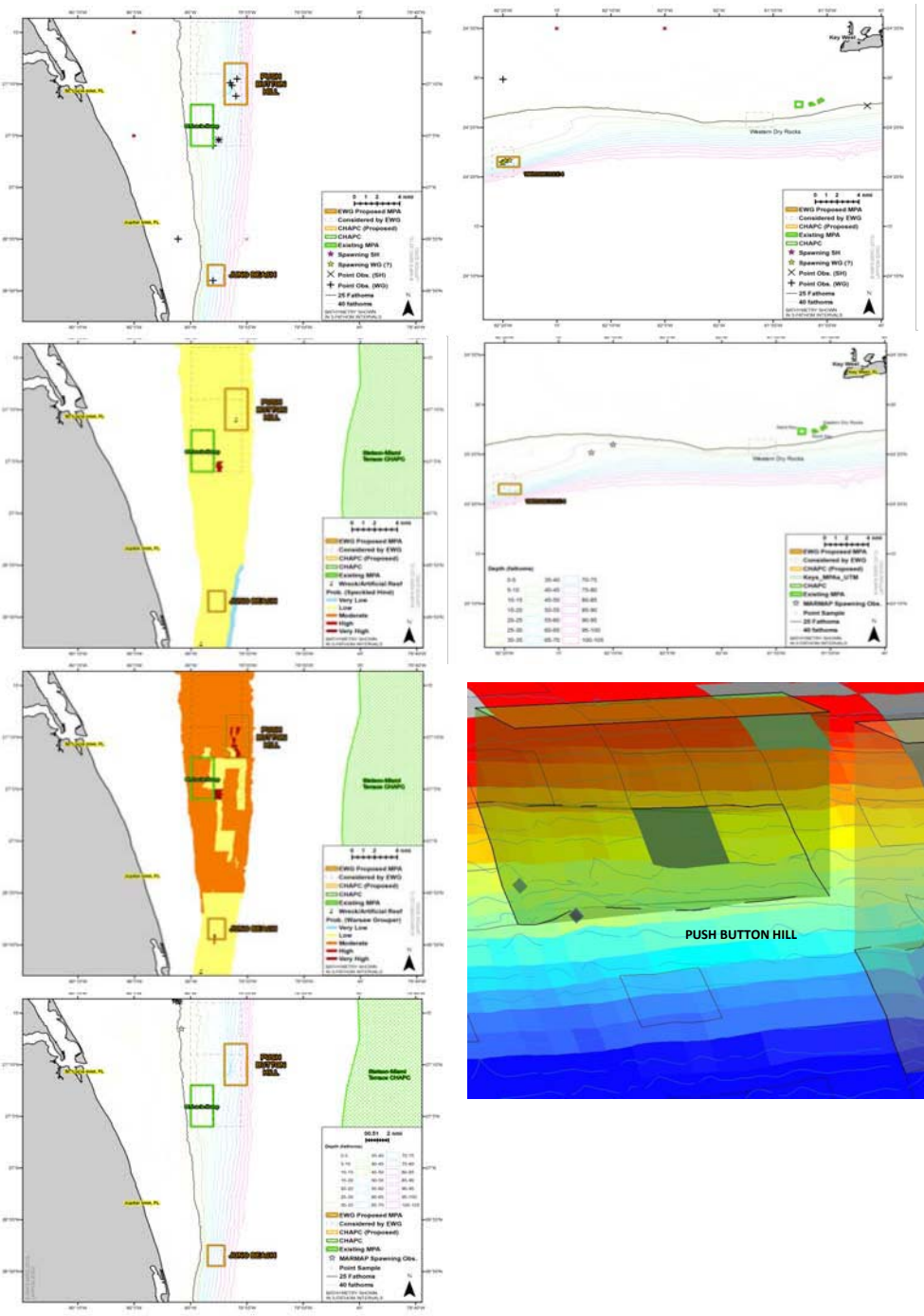

780 BOTTOM

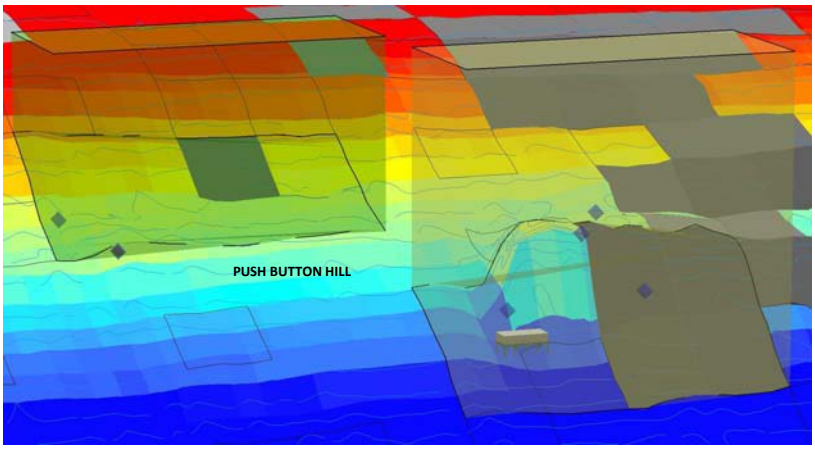



NORTHERN SC MPA + EXTENSION
DEVIL'S HOLE


Snowy Wreck GA
Stetson-Miami Terrace CHAPC
ST SIMONS 2
ST SIMONS EXT2
FERNANDINA MPA
0 1.25 2.5 5 nmi
EWG Proposed MPA
Considered by EWG
CHAPC (Proposed)
CHAPC
Existing MPA
Spawning SH
Spawning WG (?)
Point Obs. (SH)
Point Obs. (WG)
25 Fathoms
40 fathoms
BATHYMETRY SHOWN IN 5-FATHOM INTERVALS
Wreck/Artificial Reef Prob. (Speckled Hind)
Very Low
Low
Moderate
High
Very High
Wreck/Artificial Reef Prob. (Warsaw Grouper)
MARMAP Spawning Obs.
Point Sample
Depth (fathoms)
A

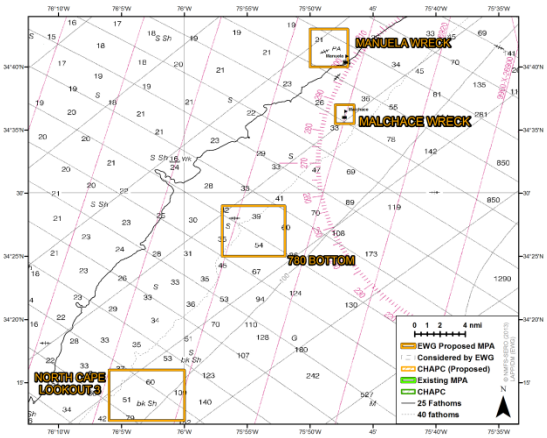

FERNANDINA MPA
ST AUGUSTINE 2
ST AUGUSTINE EXT2
DAYTONA LIGHT
DAYTONA HYDRILLA

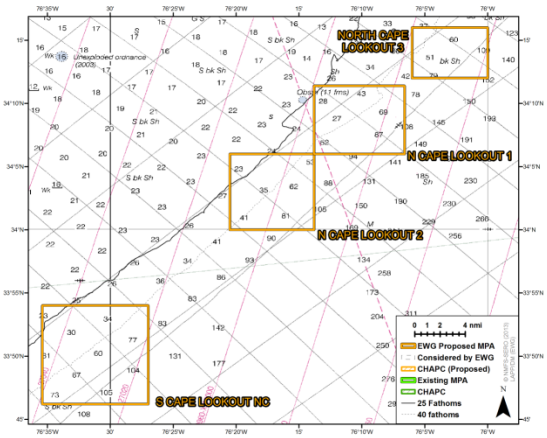

PUSH BUTTON HILL
Western Dry Rocks
EWG Proposed MPA
Considered by EWG
CHAPC (Proposed)
CHAPC
Existing MPA
Spawning SH
Spawning WG (?)
Point Obs. (SH)
Point Obs. (WG)
25 Fathoms
40 fathoms
Wreck/Artificial Reef
Prob. (Speckled Hind)
Prob. (Warsaw Grouper)
Very Low
Low
Moderate
High
Very High
MARMAP Spawning Obs.
Point Sample

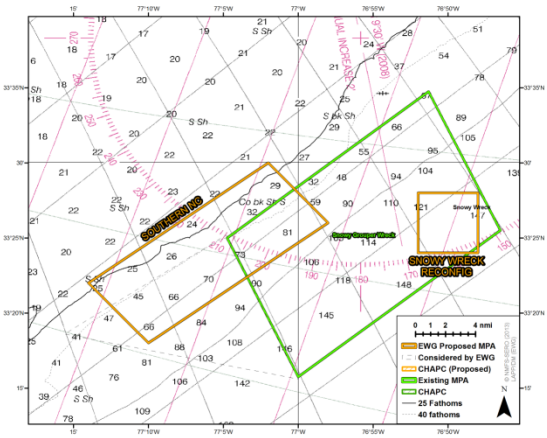

PUSH BUTTON HILL

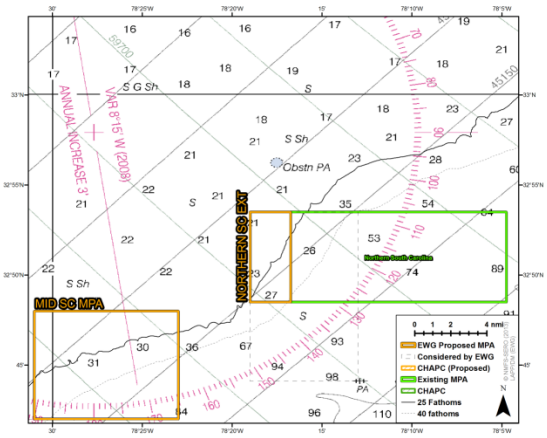
APPENDIX 2

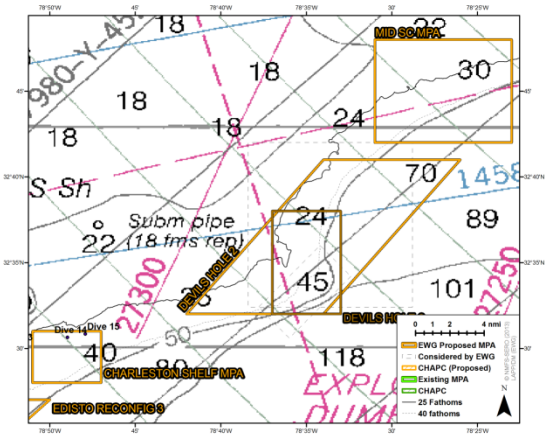
Recommended MPA overlaid with Loran-C lines.

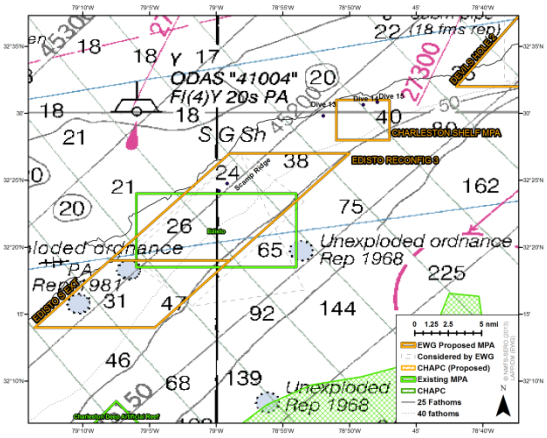

MANUELA WRECK
MALCHACE WRECK
760 BOTTOM
NORTH CAPE LOOKOUT 3
EWG Proposed MPA
Considered by EWG
CHAPC (Proposed)
Existing MPA
CHAPC
25 Fathoms
40 fathoms

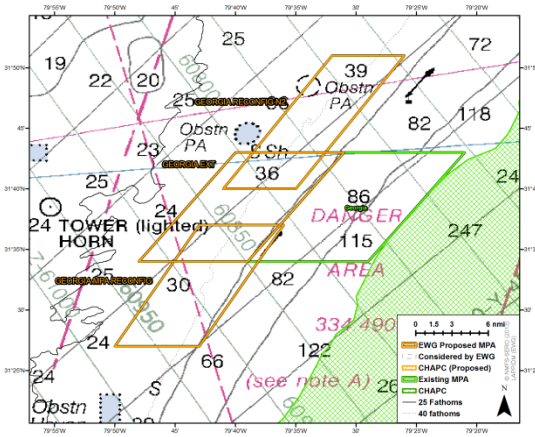

NORTH CAPE LOOKOUT 3
N CAPE LOOKOUT 1
N CAPE LOOKOUT 2
S CAPE LOOKOUT NC
EWG Proposed MPA
Considered by EWG
CHAPC (Proposed)
Existing MPA
CHAPC
25 Fathoms
40 fathoms

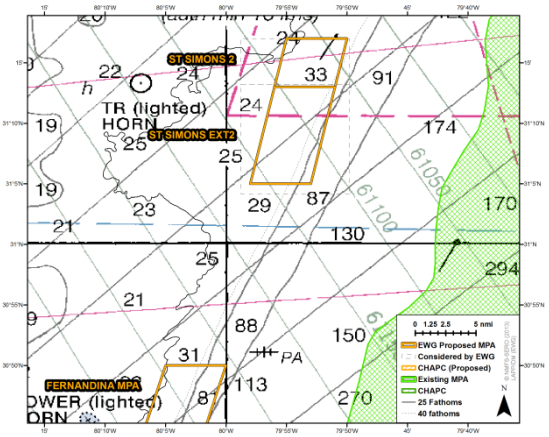

COURTENAY NC
SNOWY WRECK RECONFIG
EWG Proposed MPA
Considered by EWG
CHAPC (Proposed)
Existing MPA
CHAPC
25 Fathoms
40 fathoms

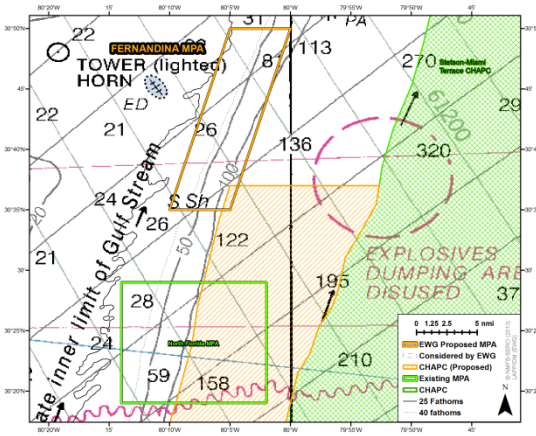

MID SC MPA
NORTHERN SC EXT
EWG Proposed MPA
Considered by EWG
CHAPC (Proposed)
Existing MPA
CHAPC
25 Fathoms
40 fathoms

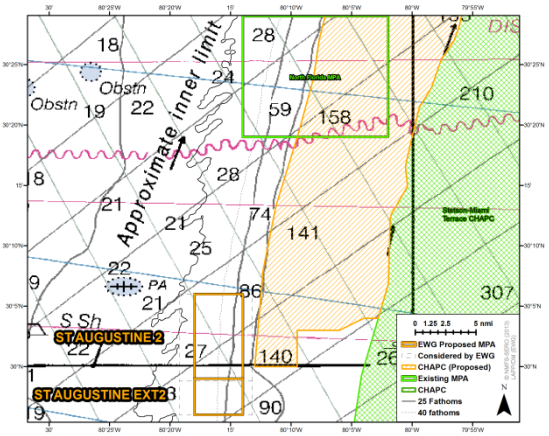

MID SC MPA
DEVILS HOLE 2
DEVILS HOLE
CHARLESTON SHELF MPA
EDISTO RECONFIG 3
EWG Proposed MPA
Considered by EWG
CHAPC (Proposed)
Existing MPA
CHAPC
25 Fathoms
40 fathoms

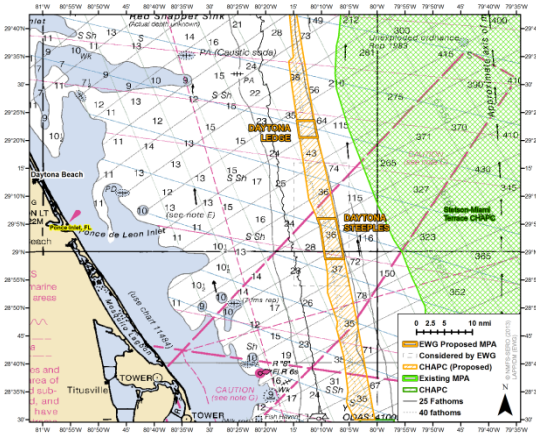

ODAS "41004"
Fl(4)Y 20s PA
DEVILS HOLE 2
CHARLESTON SHELF MPA
EDISTO RECONFIG 3
Unexploded ordnance
Rep 1968
Unexploded
Rep 1968
EWG Proposed MPA
Considered by EWG
CHAPC (Proposed)
Existing MPA
CHAPC
25 Fathoms
40 fathoms

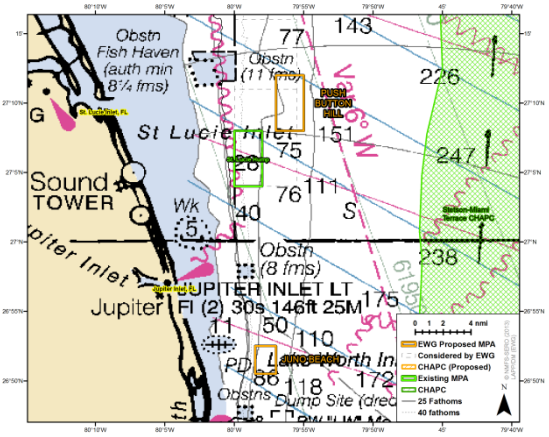

GEORGIA RECONTG
GEORGIA EXT
GEORGIA RECONTG
TOWER (lighted)
HORN
DANGER
AREA
(see note A)
EWG Proposed MPA
Considered by EWG
CHAPC (Proposed)
Existing MPA
CHAPC
25 Fathoms
40 fathoms

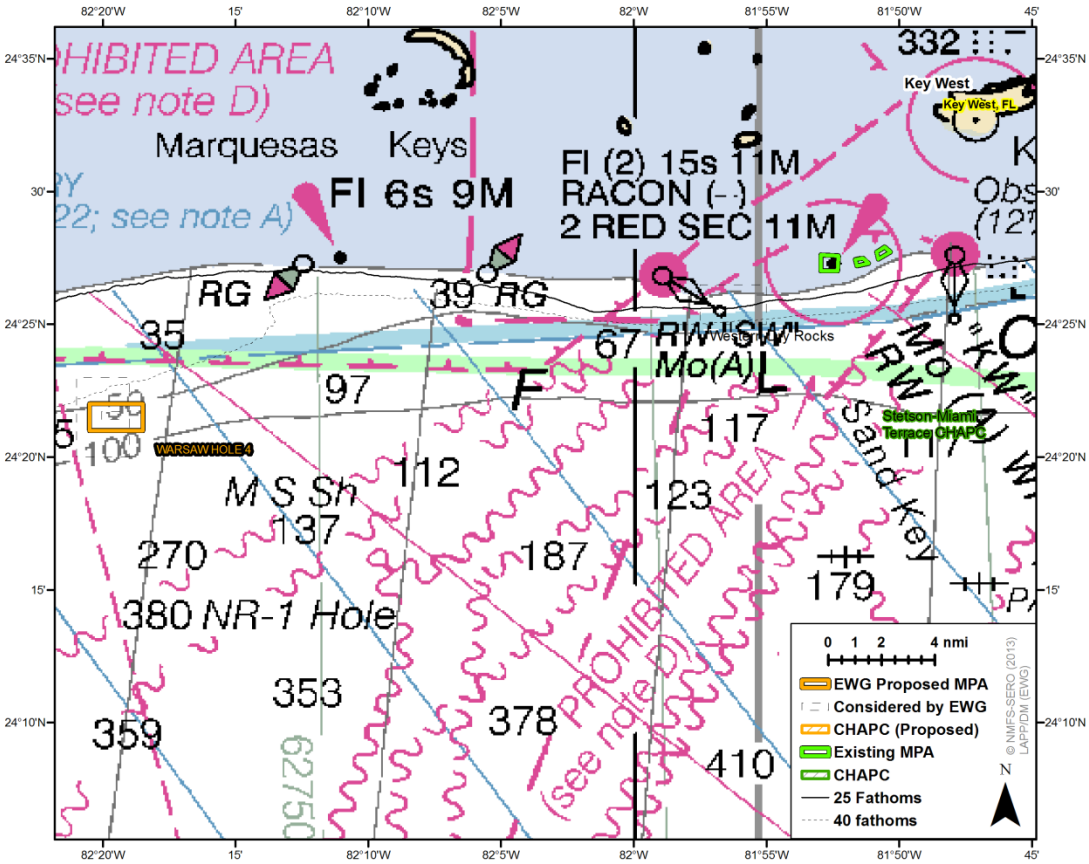

ST SIMONS 2
ST SIMONS EXT2
TR (lighted)
HORN
FERNANDINA MPA
EWG Proposed MPA
Considered by EWG
CHAPC (Proposed)
Existing MPA
CHAPC
25 Fathoms
40 fathoms


FERNANDINA MPA
TOWER (lighted)
HORN
Approximate inner limit of Gulf Stream
EXPLOSIVES
DUMPING ARE
DISUSED
EWG Proposed MPA
Considered by EWG
CHAPC (Proposed)
Existing MPA
CHAPC
25 Fathoms
40 fathoms


Approximate inner limit
ST AUGUSTINE 2
ST AUGUSTINE EXT2
EWG Proposed MPA
Considered by EWG
CHAPC (Proposed)
Existing MPA
CHAPC
25 Fathoms
40 fathoms


DAYTONA
LEDGE
DAYTONA
SWEEPLIKE
Daytona Beach
Ponce de Leon Inlet
Titusville
TOWER
EWG Proposed MPA
Considered by EWG
CHAPC (Proposed)
Existing MPA
CHAPC
25 Fathoms
40 fathoms


Obstn
Fish Haven
(auth min
8¼ fms)
St Lucie Inlet
Sound
TOWER
Jupiter Inlet
JUPITER INLET LT
Jupiter Fl (2) 30s 146ft 25M
EWG Proposed MPA
Considered by EWG
CHAPC (Proposed)
Existing MPA
CHAPC
25 Fathoms
40 fathoms


82°20'W
15'
82°10'W
82°5'W
82°W
81°55'W
81°50'W
45'
24°35'N
30'
24°25'N
24°20'N
15'
24°10'N
HIBITED AREA
see note D)
Marquesas Keys
Fl 6s 9M
Fl (2) 15s 11M
RACON (- -)
2 RED SEC 11M
332
Key West
Key West, FL
RG
39 RG
35
67 RW "SW"
Mo(A)
97
117
112
123
M S Sh
137
270
187
179
380 NR-1 Hole
353
359
378
410
WARSAW HOLE 4
Stetson-Miami Terrace CHAPC
Sand Key
PROHIBITED AREA
(see note D)
0 1 2 4 nmi
EWG Proposed MPA
Considered by EWG
CHAPC (Proposed)
Existing MPA
CHAPC
25 Fathoms
40 fathoms
N
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LAPP/DM (EWG)