Regulatory Amendment 34
to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region

Special Management Zone (SMZ) Framework Amendment to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region

Regulatory Flexibility Act Analysis, and

Regulatory Impact Review

February 2020

South Atlantic Fishery Management Council
4055 Faber Place Drive; Suite 201
North Charleston, SC 29405

Award Number FNA15NMF4410010

Definitions, Abbreviations, and Acronyms Used in the Document

ABC acceptable biological catch

ACL annual catch limit

ACT annual catch target

ALS Accumulated Landings System

AM accountability measure

COUNCIL South Atlantic Fishery Management Council

CS consumer surplus

EEZ exclusive economic zone

EA environmental assessment

EFH essential fish habitat

EFH-HAPC essential fish habitat-habitat areas of particular concern

ESA Endangered Species Act

FMP fishery management plan

FMU fishery management unit

LBS GW pounds gutted weight

LBS WW pounds whole weight

M natural mortality rate

MAGNUSON-STEVENS ACT Magnuson-Stevens Fishery Conservation and Management Act

MARMAP Marine Resources Monitoring Assessment and Prediction Program

MMPA Marine Mammal Protection Act

MRFSS Marine Recreational Fisheries Statistics Survey

MRIP Marine Recreational Information Program

NEPA National Environmental Policy Act

NMFS National Marine Fisheries Service

NOAA National Oceanic and Atmospheric Administration

NOR net operating revenue

PS producer surplus

SECRETARY Secretary of Commerce

SEDAR Southeast Data, Assessment, and Review

SEFSC Southeast Fisheries Science Center

SERO Southeast Regional Office

SMZ special management zone

SOUTH ATLANTIC southeastern united states

SSC Scientific and Statistical Committee

Regulatory Amendment 34 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region

Proposed actions:	Designate Special Management Zones in North Carolina and South Carolina.

Responsible Agencies and Contact Persons

South Atlantic Fishery Management Council
4055 Faber Place, Suite 201
North Charleston, South Carolina 29405
IPT lead: Myra Brouwer
myra.brouwer@safmc.net

843-571-4366
843-769-4520 (fax)
www.safmc.net

National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701
IPT lead: Rick DeVictor
rick.devictor@noaa.gov

727-824-5305
727-824-5308 (fax)
http://sero.nmfs.noaa.gov

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Summary

Why is the South Atlantic Fishery Management Council considering action?

The South Atlantic Fishery Management Council (South Atlantic Council) received requests from the North Carolina Division of Marine Fisheries (NCDMF) and the South Carolina Marine Resources Division (SCMRD) to extend Special Management Zone (SMZ) designation to 30 and four permitted artificial reef sites in the exclusive economic zone (EEZ) off each state, respectively.

The Snapper Grouper Fishery Management Plan (FMP) (SAFMC 1983) established a framework for designating SMZs. The stated intent of a SMZ is to *provide incentive to create artificial reefs and fish attraction devices that will increase biological production and or/create fishing opportunities that would not otherwise exist. The drawback to "investing" in artificial reefs or fish attraction devices is that they are costly and have limited advantages that can be rapidly dissipated by certain types of fishing gear (e.g., traps harvesting black sea bass from artificial reefs). Fishing gear that offers "exceptional advantages" over other gear to the point of eliminating the incentive for artificial reefs and fish attraction devices for users with other types of fishing gear prevent improved fishing opportunities that would not otherwise exist* (SAFMC 1983).

As such, the NCDMF requested that fishing gear other than handline, rod and reel, and spear be prohibited within the proposed SMZs. Further, the state requested that harvest of snapper grouper species with spearfishing gear be limited to the recreational bag limit for those species. The stated rationale for the requested restrictions is to *increase opportunities for anglers by reducing the potential impact restricted gears can have on the relative abundance of snapper and grouper species. By limiting allowable gears to handline, rod and reel, and spearfishing gear, fishery removals will be moderated and allow for greater access by anglers if increasing effort occurs. Additionally, limiting spearfishing gear to the lower recreational limits of snapper grouper species may mitigate some of the biological concerns for the resource that arise when species with complex social life histories are selectively harvested. Numerous snapper and grouper species have reproductive strategies that include complex social structures predicated on large individuals.*

Twenty-eight artificial reef sites in the EEZ off South Carolina have been designated as SMZs. Four additional artificial reef sites were established in recent years and the SCMRD requested the sites be designated as SMZs with the same restrictions on fishing gear as existing SMZs, namely limiting angling activities to handheld hook and line gear and spearfishing gear (excluding powerheads) and limiting harvest of snapper grouper species to the applicable recreational bag limits.

South Carolina was the first of the South Atlantic states to apply SMZ designation to their permitted artificial reef sites. Since its implementation, two amendments to the Snapper Grouper

Fishery Management Plan (insert citations) have designated artificial reefs in the EEZ off South Carolina as SMZs and restricted fishing gear to handheld gear and spear. In addition, in all the South Carolina SMZs, harvest of snapper grouper species is currently restricted to the applicable recreational bag limits. According to the South Carolina state representative on the Council, fishermen in South Carolina are used to the current regulations and so are enforcement officers. Hence, the requested designation as SMZ of the four additional reefs would avoid confusion among users and bring consistency to regulations and enforcement.

DRAFT Purpose and Need

What actions are being proposed in this framework amendment?

Regulatory Amendment 34 proposes the following:

NOTE: Highlighted alternatives have not yet been approved for inclusion by the Council

Action 1. Establish 30 Special Management Zones in the Exclusive Economic Zone off North Carolina

Currently: There are no special management zones in the exclusive economic zone off North Carolina at permitted artificial reef sites.

Alternative 2. Establish 30 special management zones at permitted artificial reef sites in the exclusive economic zone off North Carolina. Within the special management zones, harvest of snapper grouper species would only be allowed with handline, rod and reel, and spear. All harvest would be limited to the applicable recreational bag limit.

Alternative 3. Establish 30 special management zones at permitted artificial reef sites in the exclusive economic zone off North Carolina. Within the special management zones, harvest of snapper grouper species would be allowed with handline, rod and reel, and spear. All harvest by spear would be limited to the applicable recreational bag limit.

Action 2. Establish four Special Management Zones in the Exclusive Economic Zone off South Carolina

Currently: There are 28 special management zones at permitted artificial reef sites in the exclusive economic zone off South Carolina.

Preferred Alternative 2. Establish four additional special management zones at permitted artificial reef sites in the exclusive economic zone off South Carolina. Within the special management zones, harvest of snapper grouper species would only be allowed with handline, rod and reel, and spear. All harvest would be limited to the applicable recreational bag limit.

Alternative 3. Establish four additional special management zones at permitted artificial reef sites in the exclusive economic zone off South Carolina. Within the special management zones, harvest of snapper grouper species would only be allowed with handline, rod and reel, and spear. All harvest by spear would be limited to the applicable recreational bag limit.

Chapter 1. Introduction

1.1 What actions are being proposed in this framework amendment?

This framework amendment proposes the designation of 30 artificial reef sites in the Exclusive Economic Zone (EEZ) off North Carolina and four artificial reef sites in the EEZ off South Carolina as Special Management Zones (SMZ). The proposed action would also prohibit the use of certain gear types in the SMZs and limit harvest to the recreational bag limit by some or all of the gears.

South Atlantic Fishery Management Council

- Responsible for conservation and management of fish stocks in the South Atlantic Region
- Consists of 13 voting members who are appointed by the Secretary of Commerce, 1 representative from each of the 4 South Atlantic states, the Southeast Regional Administrator of NMFS, and 4 non-voting members
- Responsible for developing fishery management plans and amendments under the Magnuson-Stevens Act; recommends actions to NMFS for implementation
- Management area is from 3 to 200 nautical miles off the coasts of North Carolina, South Carolina, Georgia, and east Florida through Key West, except for Mackerel which is from New York to Florida, and Dolphin-Wahoo, which is from Maine to Florida

1.2 Who is proposing the framework amendment?

The South Atlantic Fishery Management Council (South Atlantic Council) develops the framework amendment and submits it to the National Marine Fisheries Service (NMFS). NMFS is an agency of the National Oceanic and Atmospheric Administration. NMFS implements the actions in the framework amendment through the development of regulations. The South Atlantic Council and NMFS are also responsible for making this document available for public comment. The draft environmental assessment is made available to the public during the scoping process, public hearings, and in South Atlantic Council meeting briefing books.

1.3 Where is the project located?

Management of the federal snapper grouper fishery located off the southeastern United States (South Atlantic) in the 3-200 nautical miles U.S. Exclusive Economic Zone (EEZ) is conducted under the Snapper Grouper Fishery Management Plan (FMP) (SAFMC 1983) (**Figure 1.3.1).** There are 55 species managed by the South Atlantic Council under the Snapper Grouper FMP.

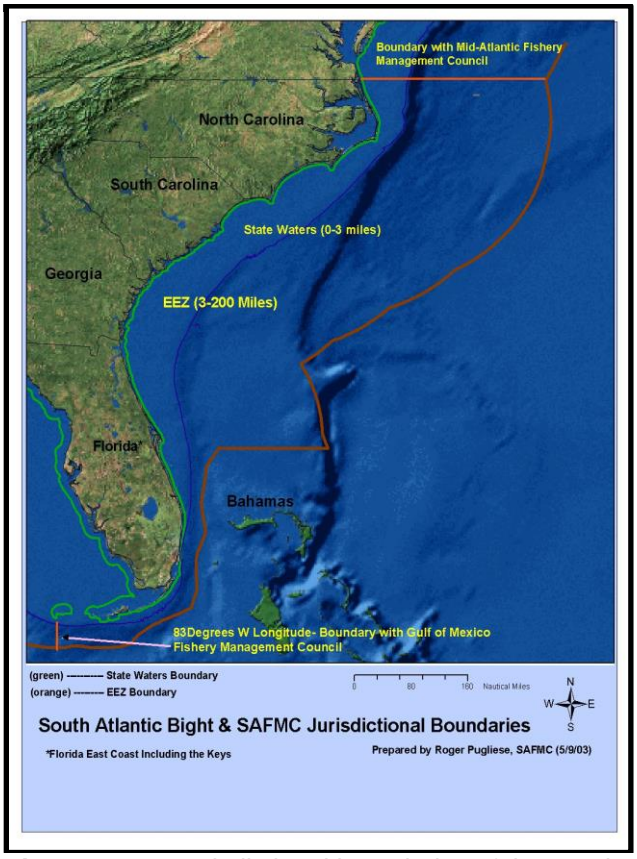

Figure 1.3.1. Jurisdictional boundaries of the South Atlantic Council.

1.4 Why is the South Atlantic Council considering action (Purpose and need statement)

NOTE: Council has not yet approved Purpose and Need

Purpose: Designate artificial reefs sites in the exclusive economic zone off North Carolina and South of Carolina as special management zones and restrict fishing gear use within the areas.

Need: Reduce the adverse effects to snapper grouper species and increase fishing opportunities.

The South Atlantic Council is considering action to prevent overexploitation in the areas and promote habitat conservation through designation as Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (HAPC).

In their letter to the Council, the North Carolina Division of Marine Fisheries included the following reasons for requesting SMZ designation to permitted artificial reefs in the EEZ off North Carolina:

- Easy access to the artificial reefs creates an opportunity for high exploitation.
- Highly efficient fishing gear can remove large quantities of snapper grouper species and disproportionately affect resource users.
- SMZ designation will ensure more equitable access to resource users.
- Restricting harvest by spear to recreational bag limit quantities would protect species that have complex social structures, such as hogfish.
- By limiting allowable gear, derelict gear may become less problematic and potential impacts to threatened and endangered species may be diminished.
- SMZ designation supports North Carolina's mission of reef enhancement for the benefit of many target species, including snappers and groupers.

South Carolina was the first of the South Atlantic states to apply SMZ designation to their permitted artificial reef sites. Since its implementation, two amendments to the Snapper Grouper Fishery Management Plan (insert citations) have designated artificial reefs in the EEZ off South Carolina as SMZs and restricted fishing gear to handheld gear and spear. In addition, in all the South Carolina SMZs, harvest of snapper grouper species is currently restricted to the applicable recreational bag limits. According to the South Carolina state representative on the Council, fishermen in South Carolina are used to the current regulations and so are enforcement officers. Hence, the requested designation as SMZ of the four additional reefs would avoid confusion among users and bring consistency to regulations and enforcement.

Prior to implementation of the Snapper Grouper Fishery Management Plan that established the SMZ designation process for permitted artificial reefs in the EEZ (SAFMC 1983), black sea bass pots were being used on the artificial reefs in South Carolina, to efficiently remove black sea bass from small areas creating inequity among resource users that was not compatible with the purpose of artificial reefs, namely to maximize access for the public to fishing opportunities.

By design, the artificial reefs are small because they are limited by the amount of suitable reef-building material. Such small reefs are very vulnerable to being rapidly "fished out" by efficient gear. Hence, designating allowable fishing gear within the areas, as proposed in this framework amendment, would prevent potential adverse biological effects to snapper grouper species inhabiting the reefs and ensures equitable fishing opportunity among resource users.

1.5 What is the history of management for the Snapper Grouper fishery?

The snapper grouper fishery is highly regulated, and regulations have been in place since the implementation of the Snapper Grouper FMP in 1983. A detailed history of management for species in the snapper grouper fishery management unit is in **Appendix B**.

Chapter 2. Proposed Actions and Alternatives

Note: Highlighted alternatives have not yet been approved by the Council. Wording of actions and alternatives to be updated after March meeting.

2.1 Action 1. Establish 30 Special Management Zones in the Exclusive Economic Zone off North Carolina

Alternative 1 (No Action). There are currently no special management zones in the exclusive economic zone off North Carolina at permitted artificial reef sites. Do not establish new special management zones in the exclusive economic zone off North Carolina at permitted artificial reef sites. The allowable gear for the snapper grouper fishery management plan for the commercial and recreational sectors are handline, rod and reel, spear, bandit gear, powerhead, pot, and longline (the last two are commercial sector only). Do not implement new restrictions on fishing gear used to harvest snapper grouper species on designated artificial reefs in federal waters off North Carolina.

Alternative 2. Establish 30 special management zones at permitted artificial reef sites in the exclusive economic zone off North Carolina. Within the special management zones, harvest of snapper grouper species would only be allowed with handline, rod and reel, and spear. All harvest would be limited to the applicable recreational bag limit.

Alternative 3. Establish 30 special management zones at state permitted artificial reef sites in the exclusive economic zone off North Carolina. Within the special management zones, harvest of snapper grouper species would be allowed with handline, rod and reel, and spear. All harvest by spear would be limited to the applicable recreational bag limit.

Discussion:

The North Carolina Division of Marine Fisheries (NCDMF) requested designation of 30 artificial reef sites in the exclusive economic zone (EEZ) off North Carolina as special management zones (SMZs). The sites were originally created through the Army Corps of Engineers permitting process. NCDMF requested fishing be allowed in the SMZs using handline, rod and reel, and spear. Further, NCDMF requested that harvest of snapper grouper species with spearfishing gear would be limited to the recreational bag limit. NCDMF's rationale for the proposed restrictions is to *increase opportunities for anglers by reducing the potential impact restricted gears can have on the relative abundance of snapper and grouper species. By limiting allowable gears to handline, rod and reel, and spearfishing gear, fishery removals will be moderated and allow for greater access by anglers if increasing effort occurs. Additionally, limiting spearfishing gear to the lower recreational limits of snapper grouper species may mitigate some of the biological concerns for the resource that arise when species with complex social life histories are selectively harvested. Numerous snapper and grouper*

species have reproductive strategies that include complex social structures predicated on large individuals.

Table 2.1.1. North Carolina artificial reefs proposed as special management zones based on permitted locations including centroids and radius (Source: NC DMF August 2019)**.**

Reef Name	Centroid Latitude DDM	Centroid Longitude DDM	Radius (ft)
AR-130	36° 0.296' N	75° 31.957' W	1500
AR-140	35° 56.718' N	75° 31.965' W	1500
AR-145	35° 54.017' N	75° 23.883' W	1500
AR-220	35° 8.117' N	75° 40.633' W	3000
AR-225	35° 6.768' N	75° 39.322' W	1500
AR-230	35° 6.133' N	75° 42.933' W	1500
AR-250	34° 56.900' N	75° 54.860' W	1500
AR-255	34° 55.483' N	75° 57.910' W	1500
AR-285	34° 33.383' N	76° 26.350' W	1500
AR-300	34° 18.517' N	76° 24.133' W	1500
AR-302	34° 10.265' N	76° 13.703' W	1500
AR-305	34° 16.683' N	76° 38.650' W	3000
AR-330	34° 33.634' N	76° 51.267' W	1500
AR-340	34° 34.319' N	76° 58.345' W	1500
AR-345	34° 32.266' N	76° 58.508' W	1500
AR-355	34° 21.318' N	77° 19.877' W	1500
AR-362	34° 15.657' N	77° 30.392' W	1500
AR-366	34° 12.950' N	77° 25.250' W	1500
AR-368	34° 9.514' N	77° 25.782' W	1500
AR-372	34° 6.295' N	77° 44.917' W	1500
AR-376	34° 3.283' N	77° 39.633' W	1500
AR-382	33° 58.581' N	77° 41.172' W	1500
AR-386	33° 57.517' N	77° 33.400' W	1500
AR-400	33° 29.267' N	77° 35.227' W	1500
AR-420	33° 51.050' N	78° 6.710' W	1500
AR-440	33° 49.800' N	78° 13.083' W	1500
AR-445	33° 44.783' N	78° 14.100' W	1500
AR-455	33° 47.033' N	78° 17.883' W	1500
AR-460	33° 50.089' N	78° 22.022' W	1500
AR-465	33° 23.423' N	78° 11.052' W	1500

Source: NCDMF

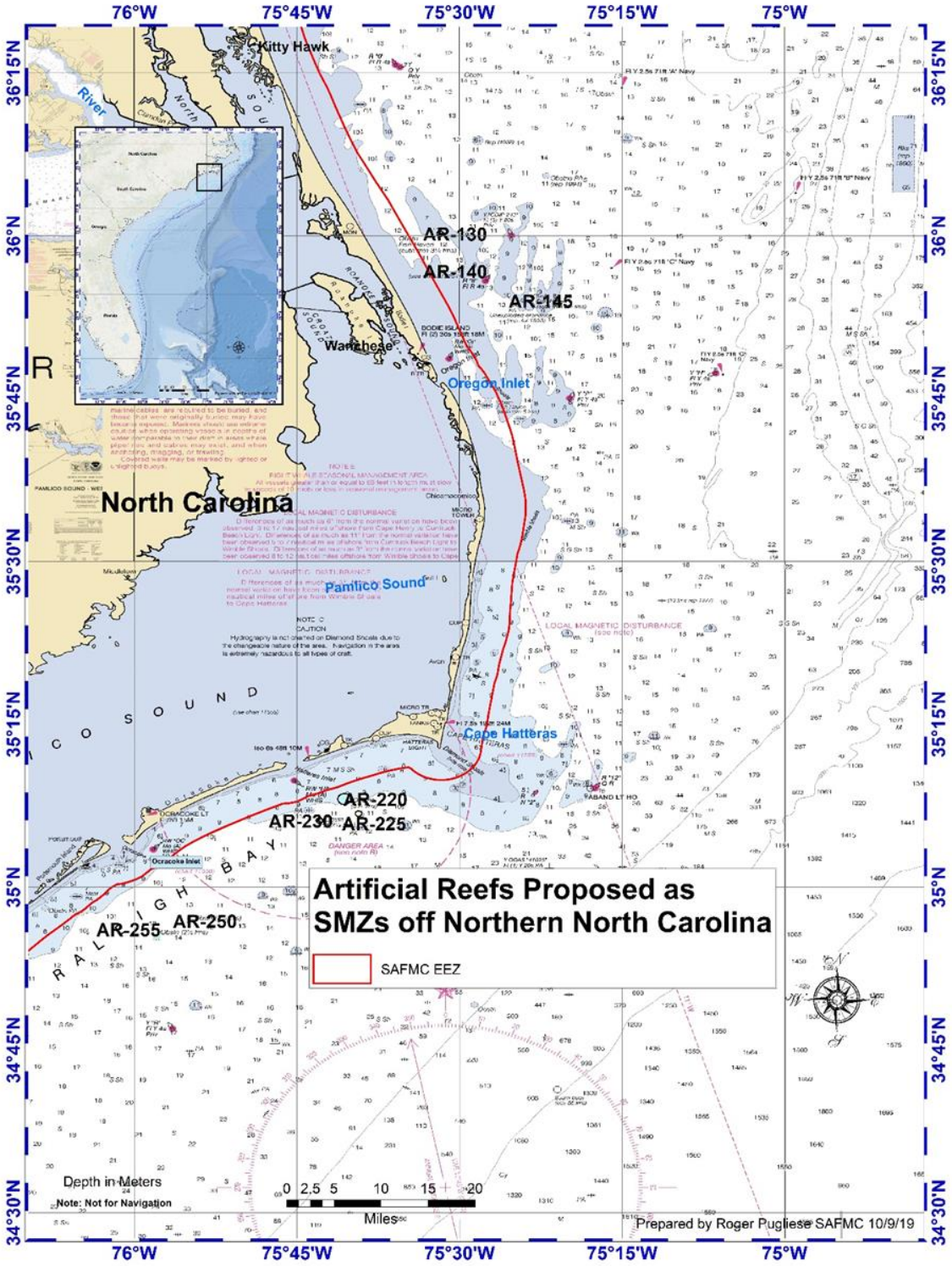

Figure 2.1.1. Proposed Special Management Zones at permitted artificial reefs sites in the exclusive economic zone off northern North Carolina. Maps of individual sites are in **Appendix X**. Source: SAFMC.

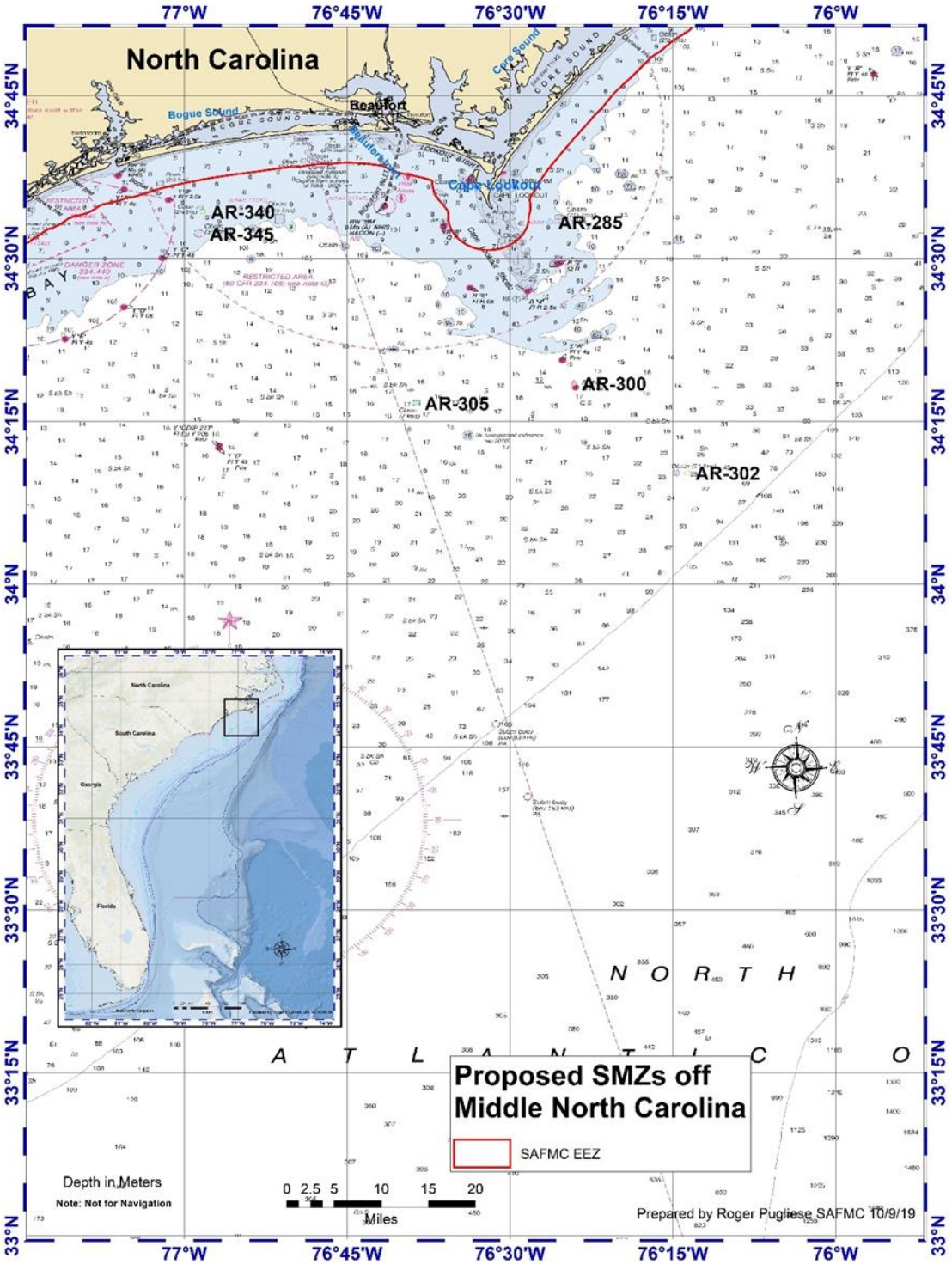

Figure 2.1.2. Proposed Special Management Zones at permitted artificial reefs sites in the exclusive economic zone off central North Carolina. Maps of individual sites are in **Appendix X**.
Source: SAFMC

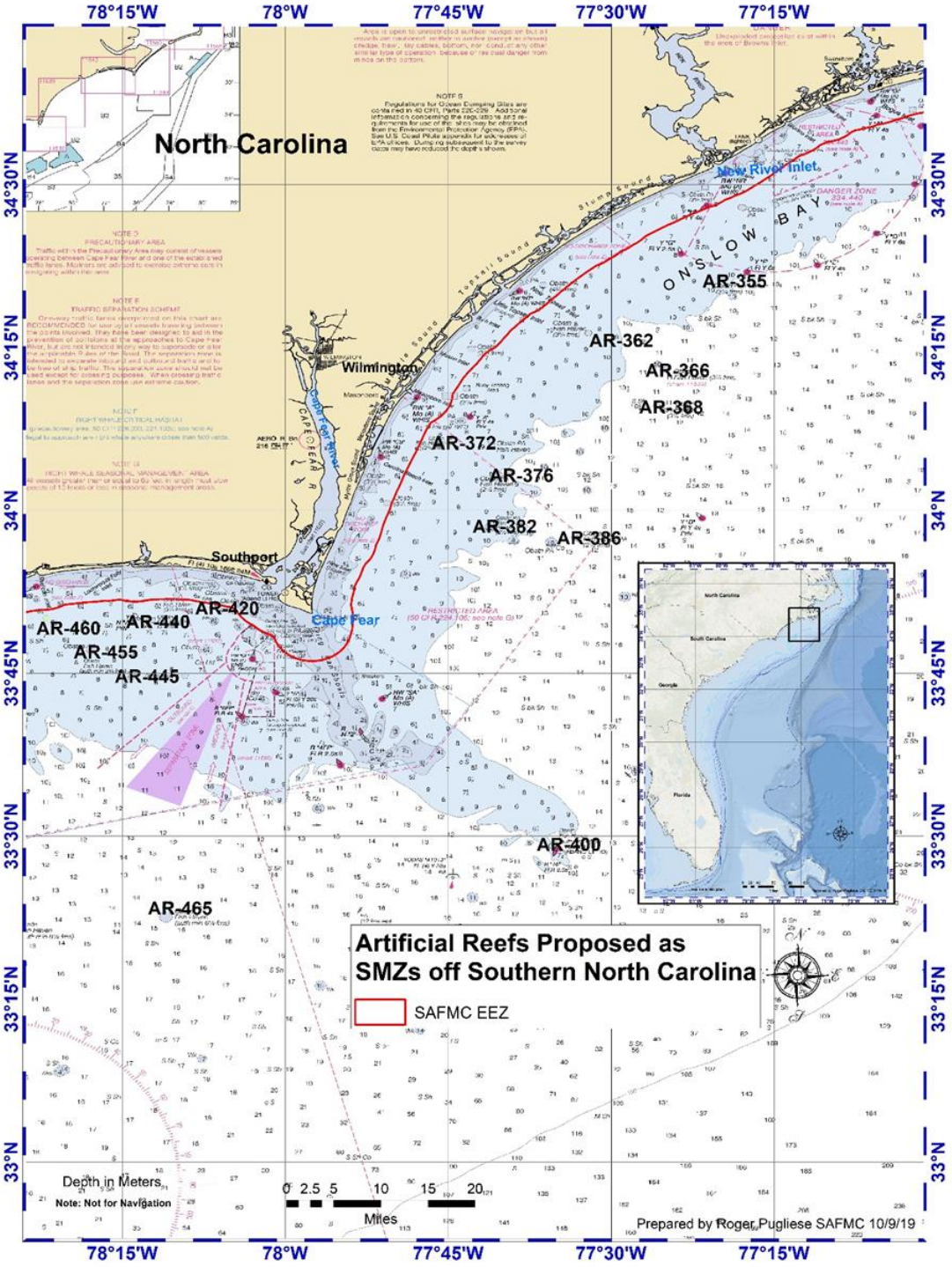

Figure 2.1.3. Proposed Special Management Zones at permitted artificial reefs sites in the exclusive economic zone off southern North Carolina. Maps of individual sites are in **Appendix X**.
Source: SAFMC.

2.1.1 Comparison of Alternatives:

2.2 Action 2. Establish four Special Management Zones in the Exclusive Economic Zone off South Carolina

Alternative 1 (No Action). There are currently 29 special management zones at permitted artificial reef sites in the exclusive economic zone off South Carolina. Do not establish additional special management zones in the exclusive economic zone off South Carolina at permitted artificial reef sites. Allowable gear within the special management zones includes handline, rod and reel, and spear (without powerheads), and all harvest of snapper grouper species is limited to the recreational bag limit. Do not implement new restrictions on fishing gear used to harvest snapper grouper species on designated artificial reefs in federal waters off South Carolina.

Preferred Alternative 2. Establish four additional special management zones at permitted artificial reef sites in the exclusive economic zone off South Carolina. Within the special management zones, harvest of snapper grouper species would only be allowed with handline, rod and reel, and spear. All harvest would be limited to the applicable recreational bag limit.

Alternative 3. Establish four additional special management zones at permitted artificial reef sites in the exclusive economic zone off South Carolina. Within the special management zones, harvest of snapper grouper species would only be allowed with handline, rod and reel, and spear. All harvest by spear would be limited to the applicable recreational bag limit.

Discussion:

Twenty-nine artificial reef sites in the EEZ off South Carolina have been designated as SMZs. Four additional artificial reef sites have been established in recent years, and the South Carolina Marine Resources Division (SCMRD) requested the sites be designated as SMZs with the same restrictions on fishing gear as existing SMZs off South Carolina. SCMRD requested to limit angling activities to handheld hook-and-line gear and spearfishing gear (excluding powerheads). In addition, SCMRD requested that the use of fish traps, longlines, gill nets, and trawls be prohibited, and harvest of snapper grouper species be limited to the federal recreational bag limits.

Table 2.1.2. South Carolina artificial reefs proposed as special management zones based on permitted locations including three with centroids and radius and one with corner coordinates in Degrees Decimal Minutes.

Reef Name	Centroid Latitude DDM	Centroid Longitude DDM	Radius (yards)	Ares (square miles)
PA-07- Pop Nash Reef	33° 34.510' N	78° 51.000' W	200	0.41
PA-28- Lowcountry Anglers Reef	32° 34.300' N	79° 55.100' W	200	0.41
PA-34- CCA-McClellanville Reef	32° 51.800' N	79° 22.500' W	200	0.41

Reef Name	Corner	Latitude	Longitude	Area (square miles)
PA-04 - Ron McManus Memorial Reef	NW	33° 46.400' N	78° 36.200' W	0.33
	SW	33° 45.900' N	78° 36.200' W	
	NE	33° 46.400' N	78° 35.600' W	
	SE	33° 45.900' N	78° 35.600' W	

Source: SCDNR August 2019.

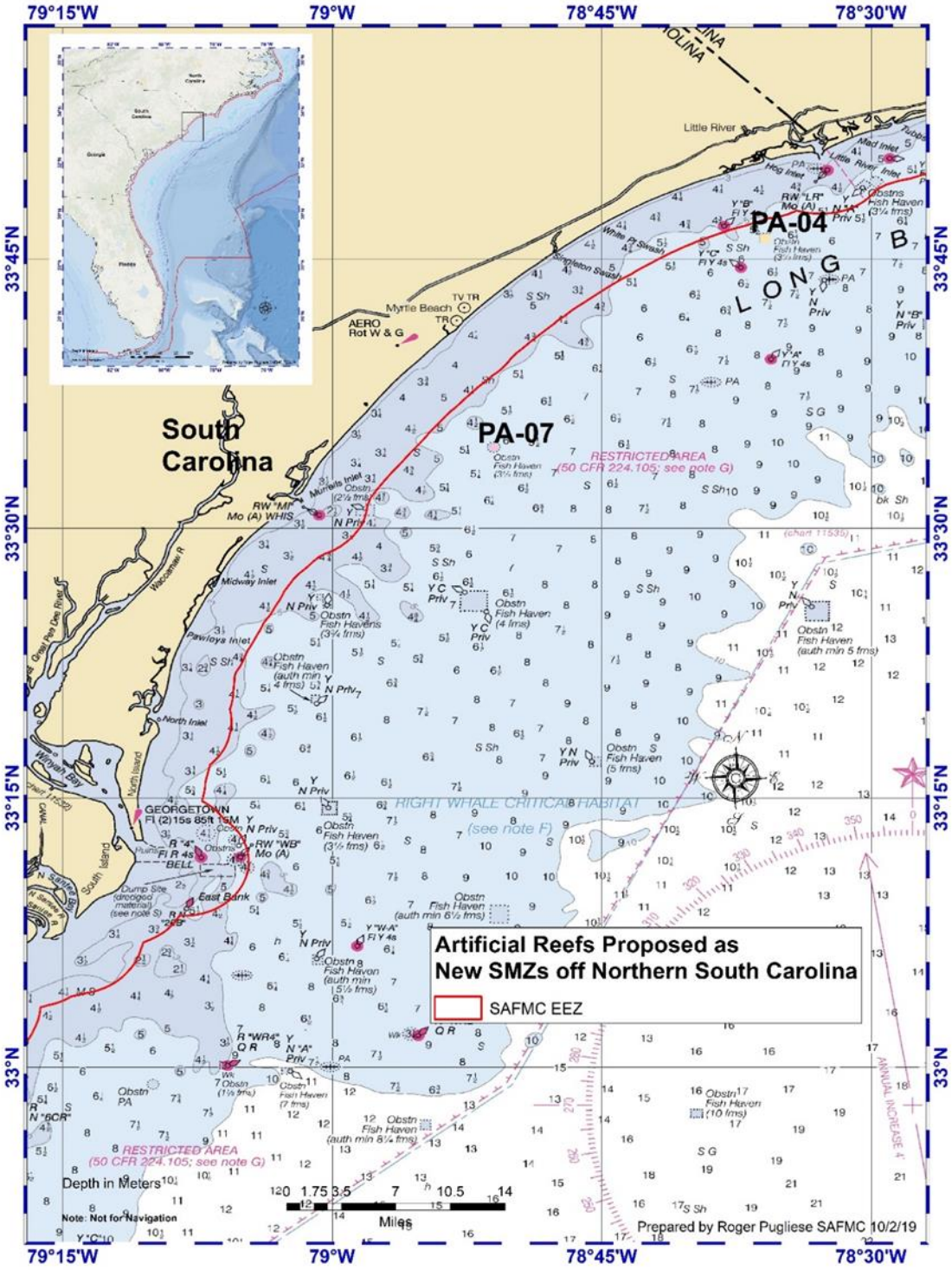

Figure 2.2.1. Proposed Special Management Zones at permitted artificial reefs sites in the exclusive economic zone off northern South Carolina. Maps of individual sites are in **Appendix X**.
Source: SAFMC.

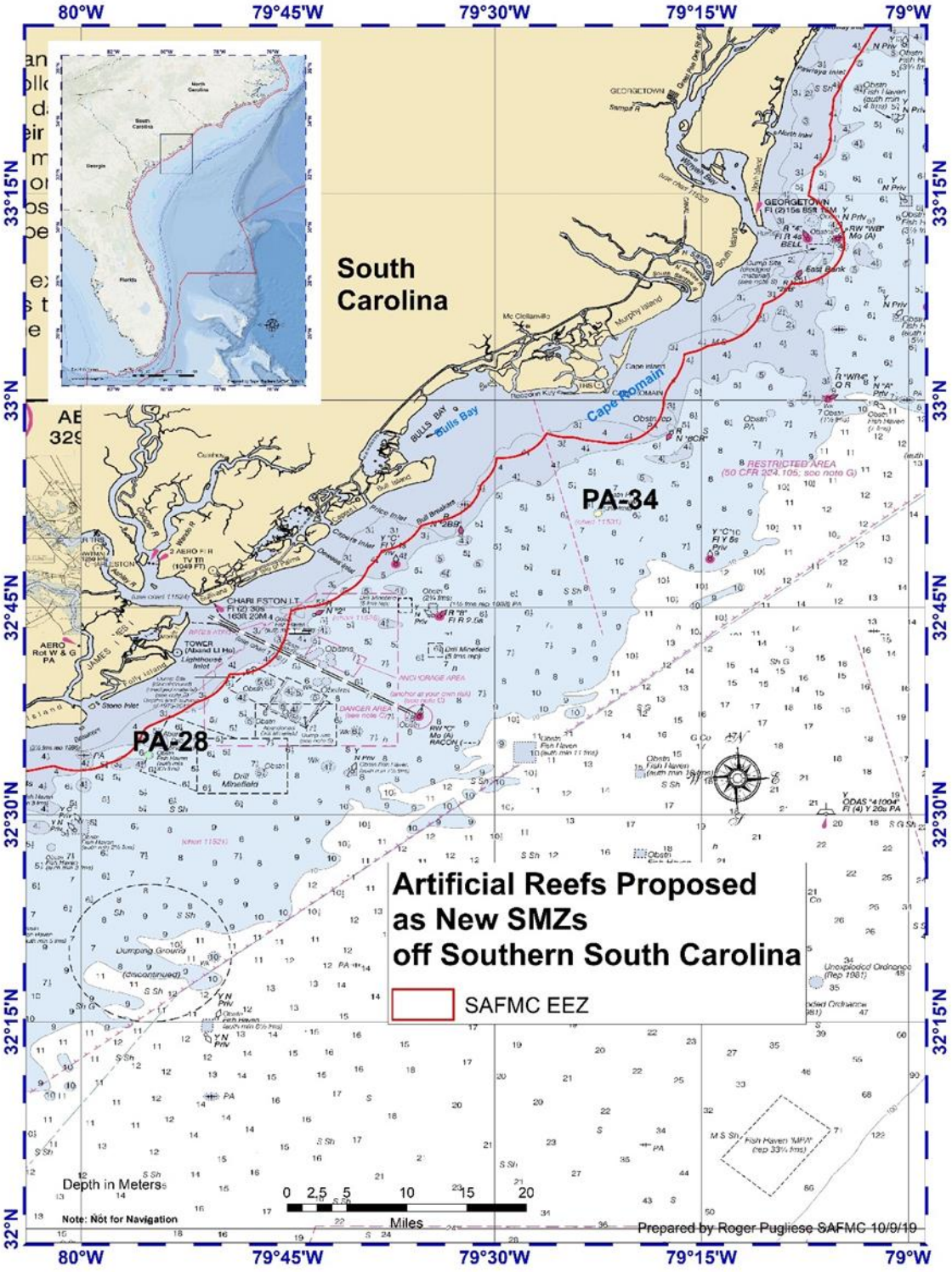

Figure 2.2.2. Proposed Special Management Zones at permitted artificial reefs sites in the exclusive economic zone off southern South Carolina. Maps of individual sites are in **Appendix X**.
Source: SAFMC.

2.1.2 Comparison of Alternatives:

Chapter 3. Affected Environment

This section describes the affected environment in the proposed project area. The affected environment is divided into four major components:

- **Habitat environment** (Section 3.1)
- **Biological and Ecological environment** (Section 3.2)
- **Economic and Social environment** (Sections 3.3)
- **Administrative environment** (Section 3.4)

3.1 Habitat Environment

3.1.1 Inshore/Estuarine Habitat

Many snapper grouper species utilize both pelagic and benthic habitats during several stages of their life histories; larval stages of these species live in the water column and feed on plankton. Most juveniles and adults are demersal (bottom dwellers) and associate with hard structures on the continental shelf that have moderate to high relief (e.g., coral reef systems and artificial reef structures, rocky hard-bottom substrates, ledges and caves, sloping soft-bottom areas, and limestone outcroppings). Juvenile stages of some snapper grouper species also utilize inshore seagrass beds, mangrove estuaries, lagoons, oyster reefs, and embayment systems. In many species, various combinations of these habitats may be utilized during daytime feeding migrations or seasonal shifts in cross-shelf distributions. Additional information on the habitat utilized by species in the Snapper Grouper Complex is included in Volume II of the Fishery Ecosystem Plan[1] (FEP; SAFMC 2009b).

3.1.2 Offshore Habitat

Predominant snapper grouper offshore fishing areas are located in live bottom and shelf-edge habitats where water temperatures range from 11º to 27º C (52º to 81º F) due to the proximity of the Gulf Stream, with lower shelf habitat temperatures varying from 11º to 14º C (52º to 57º F). Water depths range from 16 to 55 meters (54 to 180 ft) or greater for live-bottom habitats, 55 to 110 meters (180 to 360 ft) for the shelf-edge habitat, and from 110 to 183 meters (360 to 600 ft) for lower-shelf habitat areas.

[1] http://safmc.net/ecosystem-management/fishery-ecosystem-plan/

The exact extent and distribution of productive snapper grouper habitat in South Atlantic continental shelf habitats is unknown. Current data suggest from 3% to 30% of the shelf is suitable habitat for these species. These live-bottom habitats may include low relief areas, supporting sparse to moderate growth of sessile (permanently attached) invertebrates, moderate relief reefs from 0.5 to 2 meters (1.6 to 6.6 ft), or high relief ridges at or near the shelf break consisting of outcrops of rock that are heavily encrusted with sessile invertebrates such as sponges and sea fan species. Live-bottom habitat is scattered irregularly over most of the shelf north of Cape Canaveral but is most abundant offshore from northeastern Florida. South of Cape Canaveral the continental shelf narrows from 56 to 16 kilometers (35 to 10 mi) wide off the southeast coast of Florida and the Florida Keys. The lack of a large shelf area, presence of extensive, rugged living fossil coral reefs, and dominance of a tropical Caribbean fauna are distinctive benthic characteristics of this area.

Rock outcroppings occur throughout the continental shelf from Cape Hatteras, North Carolina to Key West, Florida (MacIntyre and Milliman 1970; Miller and Richards 1979; Parker et al. 1983), which are principally composed of limestone and carbonate sandstone (Newton et al. 1971), and exhibit vertical relief ranging from less than 0.5 to over 10 meters (33 ft). Ledge systems formed by rock outcrops and piles of irregularly sized boulders are also common. Parker et al. (1983) estimated that 24% (9,443 km^2) of the area between the 27- and 101-meter (89 and 331 ft) depth contours from Cape Hatteras, North Carolina to Cape Canaveral, Florida is reef habitat. Although the bottom communities found in water depths between 100 and 300 meters (328 and 984 ft) from Cape Hatteras, North Carolina to Key West, Florida is relatively small compared to the whole shelf, this area, based upon landing information of fishers, constitutes prime reef fish habitat and probably significantly contributes to the total amount of reef habitat in this region.

Artificial reef structures are also utilized to attract fish and increase fish harvests; however, research on artificial reefs is limited and opinions differ as to whether or not these structures promote an increase of ecological biomass or merely concentrate fishes by attracting them from nearby, natural un-vegetated areas of little or no relief. There are several notable shipwrecks along the southeast coast in state and federal waters including *Lofthus* (eastern Florida), *SS Copenhagen* (southeast Florida), *Half Moon* (southeast Florida), *Hebe* (Myrtle Beach, South Carolina), *Georgiana* (Charleston, South Carolina), *U.S.S. Monitor* (Cape Hatteras, North Carolina), *Huron* (Nags Head, North Carolina), and *Metropolis* (Corolla, North Carolina).

The distribution of coral and live hard bottom habitat as presented in the Southeast Marine Assessment and Prediction Program (SEAMAP) bottom mapping project is a proxy for the distribution of the species within the snapper grouper complex. The method used to determine hard bottom habitat relied on the identification of reef obligate species including members of the snapper grouper complex. The Florida Fish and Wildlife Research Institute (FWRI), using the best available information on the distribution of hard bottom habitat in the South Atlantic region, prepared ArcView maps for the four-state project. These maps, which consolidate known distribution of coral, hard/live bottom, and artificial reefs as hard bottom, are available on the

South Atlantic Fishery Management Council's (South Atlantic Council) online map services provided by the newly developed SAFMC Habitat and Ecosystem Atlas[2]

Plots of the spatial distribution of offshore species were generated from the Marine Resources Monitoring, Assessment, and Prediction Program (MARMAP) data. The plots serve as point confirmation of the presence of each species within the scope of the sampling program. These plots, in combination with the hard bottom habitat distributions previously mentioned, can be employed as proxies for offshore snapper grouper complex distributions in the South Atlantic region. Maps of the distribution of snapper grouper species by gear type based on MARMAP data can also be generated through the South Atlantic Council's Internet Mapping System at the above address.

3.1.3 Essential Fish Habitat

Essential Fish Habitat (EFH) is defined in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S. C. 1802(10)). Specific categories of EFH identified in the South Atlantic Bight, which are utilized by federally managed fish and invertebrate species, include both estuarine/inshore and marine/offshore areas. Specifically, estuarine/inshore EFH includes: Estuarine emergent and mangrove wetlands, submerged aquatic vegetation, oyster reefs and shell banks, intertidal flats, palustrine emergent and forested systems, aquatic beds, and estuarine water column. Additionally, marine/offshore EFH includes: live/hard bottom habitats, coral and coral reefs, artificial and manmade reefs, *Sargassum* species, and marine water column.

EFH utilized by snapper grouper species in this region includes coral reefs, live/hard bottom, submerged aquatic vegetation, artificial reefs, and medium to high profile outcroppings on and around the shelf break zone from shore to at least 183 meters [600 ft (but to at least 2,000 ft for wreckfish)] where the annual water temperature range is sufficiently warm to maintain adult populations of members of this largely tropical fish complex. EFH includes the spawning area in the water column above the adult habitat and the additional pelagic environment, including *Sargassum*, required for survival of larvae and growth up to and including settlement. In addition, the Gulf Stream is also EFH because it provides a mechanism to disperse snapper grouper larvae.

For specific life stages of estuarine-dependent and near shore snapper grouper species, EFH includes areas inshore of the 30 meter (100-ft) contour, such as attached macroalgae; submerged rooted vascular plants (seagrasses); estuarine emergent vegetated wetlands (saltmarshes, brackish marsh); tidal creeks; estuarine scrub/shrub (mangrove fringe); oyster reefs and shell banks; unconsolidated bottom (soft sediments); artificial reefs; and coral reefs and live/hard bottom habitats.

[2] http://ocean.floridamarine.org/safmc_atlas/.
An introduction to the system is found at: http://www.safmc.net/ecosystem-management/mapping-and-gis-data.

3.1.4 Habitat Areas of Particular Concern

Areas which meet the criteria for Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPCs) for species in the snapper grouper management unit include medium to high profile offshore hard bottoms where spawning normally occurs; localities of known or likely periodic spawning aggregations; near shore hard bottom areas; The Point, The Ten Fathom Ledge, and Big Rock (North Carolina); The Charleston Bump (South Carolina); mangrove habitat; seagrass habitat; oyster/shell habitat; all coastal inlets; all state-designated nursery habitats of particular importance to snapper grouper (e.g., Primary and Secondary Nursery Areas designated in North Carolina); pelagic and benthic *Sargassum*; Hoyt Hills for wreckfish; the Oculina Bank Habitat Area of Particular Concern; all hermatypic coral habitats and reefs; manganese outcroppings on the Blake Plateau; South Atlantic Council-designated Artificial Reef Special Management Zones (SMZs); and deep-water Marine Protected Areas (MPAs). Areas that meet the criteria for EFH-HAPCs include habitats required during each life stage (including egg, larval, postlarval, juvenile, and adult stages).

In addition to protecting habitat from fishing related degradation though fishery management plan regulations, the South Atlantic Council, in cooperation with National Marine Fisheries Service (NMFS), actively comments on non-fishing projects or policies that may impact essential fish habitat. With guidance from the Habitat Advisory Panel, the South Atlantic Council has developed and approved policies on: energy exploration, development, transportation and hydropower re-licensing; beach dredging and filling and large-scale coastal engineering; protection and enhancement of submerged aquatic vegetation; alterations to riverine, estuarine and near shore flows; offshore aquaculture; and marine and estuarine invasive species.

The potential impacts the actions in this amendment may have on EFH, and EFH-HAPCs are discussed in **Chapter 4** of this document.

3.2 Biological and Ecological Environment

The reef environment in the South Atlantic management area affected by actions in this environmental impact statement is defined by two components (**Figure 3.2.1**). Each component will be described in detail in the following sections.

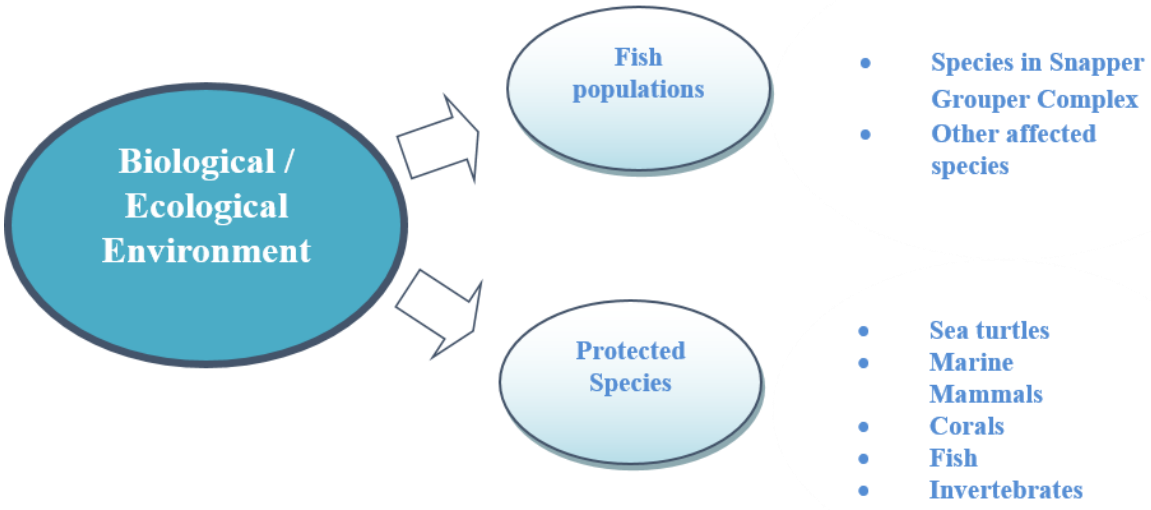

Figure 3.2.1. Two components of the biological environment described in this document.

The waters off the South Atlantic coast are home to a diverse population of fish. The snapper grouper fishery management unit contains 55 species of fish, many of them neither "snappers" nor "groupers." These species live in depths from a few feet (typically as juveniles) to hundreds of feet. As far as north/south distribution, the more temperate species tend to live in the upper reaches of the South Atlantic management area (e.g., black sea bass, red porgy) while the tropical variety's core residence is in the waters off south Florida, Caribbean Islands, and northern South America (e.g., black grouper, mutton snapper). These are reef-dwelling species that live amongst each other. These species rely on the reef environment for protection and food. There are several reef tracts that follow the southeastern coast. The fact that these fish populations congregate dictates the nature of the fishery (multi-species) and further forms the type of management regulations proposed in this document.

3.2.1 Fish Populations Affected by this Amendment

The species directly affected by actions proposed in this amendment are species in the Snapper Grouper Complex.

Life History

Life history information on species that comprise the Snapper Grouper Complex can be found in Volume II (pdf page 606) of the Fishery Ecosystem Plan[3].

Landings

Landings information is presented in **Section 3.3.2.**

Stock Status

For assessed snapper grouper species, additional life history and stock status information may be found in their respective Southeast Data, Assessment, and Review (SEDAR) reports listed below, which are available on the SEDAR Web site http://www.sefsc.noaa.gov/sedar/

Table 3.2.1. Stock status for snapper grouper species addressed in this amendment. Source: 3rd Quarter 2018 Update, Report to Congress https://www.fisheries.noaa.gov/national/population-assessments/fishery-stock-status-updates.

Species		Overfishing?	Overfished?	Last Assessment	Notes
Snowy grouper		No	Yes	SEDAR 36 (2014)	Status determinations from peer reviewed SEDAR assessments, with estimates of all relevant biological reference points. Therefore, stock status is considered "known."
Blueline Tilefish		No	No	SEDAR 50 (2017)	Only able to get status for part of stock South of Hatteras.
Golden Tilefish		Yes	No	SEDAR 25 Update (2016)	
Wreckfish		No	No	Rademeyer and Butterworth (2014)	This assessment was conducted outside of the SEDAR process and was reviewed through the SAFMC peer review process.
Gray Triggerfish		No	UNK	Potts and Brennan (2001)	Gray triggerfish has not undergone a SEDAR assessment but is listed in the Report to Congress as not undergoing overfishing based on assessment information provided

[3] http://safmc.net/ecosystem-management/fishery-ecosystem-plan/

Species		Overfishing?	Overfished?	Last Assessment	Notes
					in Potts and Brennan (2001).
Queen snapper, blackfin snapper, silk snapper, misty grouper, yellowedge grouper, whitebone porgy, jolthead porgy, knobbed porgy, saucereye porgy, scup, bar jack, almaco jack, banded rudderfish, lesser amberjack, white grunt, margate, sailor's choice, Atlantic spadefish, scamp, red hind, rock hind, coney, grasby, yellowfin grouper, yellowmouth grouper		UNK	UNK	N/A	These species have not been assessed and the overfishing limit (OFL) is unknown.

3.2.2 Bycatch and Discards

The snapper grouper fishery is a multi-species fishery, which uses mostly hook-and-line gear although some trips use other gear such as pots/traps and spears. The actions in this amendment are not expected to result in significant changes in bycatch of snapper grouper species. In addition, the South Atlantic Council, the NMFS, and the SEFSC have implemented and plan to implement numerous management measures and reporting requirements that have improved, or are likely to improve, monitoring efforts of discards and discard mortality in the snapper grouper fishery.

3.2.3 Other Species Affected

3.2.4 The Stock Assessment Process

The Southeast Data, Assessment, and Review (SEDAR) process is a cooperative Fishery Management Council initiative to improve the quality and reliability of fishery stock assessments in the South Atlantic, Gulf of Mexico, and U.S. Caribbean. The Caribbean, Gulf of Mexico, and South Atlantic Fishery Management Councils manage SEDAR in coordination with NMFS and the Atlantic and Gulf States Marine Fisheries Commissions. SEDAR seeks improvements in the scientific quality of stock assessments, constituent and stakeholder participation in assessment development, transparency in the assessment process, and a rigorous and independent scientific review of completed stock assessments.

SEDAR is organized around three workshops. First is the Data Workshop, during which fisheries monitoring and life history data are reviewed and compiled. Second is the Assessment Workshop, which may be conducted via a workshop and several webinars, during which assessment models are developed and population parameters are estimated using the information provided from the Data Workshop. Third and final is the Review Workshop, during which independent experts review the input data, assessment methods, and assessment products. The completed assessment, including the reports of all three workshops and all supporting documentation, are then forwarded to the South Atlantic Council's Scientific and Statistical Committee (SSC). The SSC considers whether the assessment represents the best available science and develops fishing level recommendations for South Atlantic Council consideration.

SEDAR workshops are public meetings organized by SEDAR. Workshop participants appointed by the lead South Atlantic Council are drawn from state and federal agencies, non-government organizations, South Atlantic Council members, South Atlantic Council advisors, and the fishing industry with a goal of including a broad range of disciplines and perspectives. All participants are expected to contribute to this scientific process by preparing working papers, contributing data, providing assessment analyses, evaluating and discussing information presented, and completing the workshop report.

3.2.5 Protected Species

NMFS manages marine protected species in the Southeast region under the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). There are 29 ESA-listed species or Distinct Population Segments (DPSs) of marine mammals, sea turtles, fish, and corals managed by NMFS that may occur in the EEZ of the South Atlantic or Gulf of Mexico. There are 91 stocks of marine mammals managed within the Southeast region plus the addition of the stocks such as NARWs, and humpback, sei, fin, minke, and blue whales that regularly or sometimes occur in Southeast region managed waters for a portion of the year (Hayes et al. 2017). All marine mammals in U.S. waters are protected under the MMPA. The MMPA requires that each commercial fishery be classified by the number of marine mammals they seriously injure or kill. NMFS's List of Fisheries (LOF)[4] classifies U.S. commercial fisheries into three categories based on the number of incidental mortality or serious injury they cause to marine mammals.

Five of the marine mammal species (sperm, sei, fin, blue, and NARW) protected by the MMPA, are also listed as endangered under the ESA. In addition to those five marine mammals, six species or DPSs of sea turtles (green (the North Atlantic DPS and the South Atlantic DPS), hawksbill, Kemp's ridley, leatherback, and the Northwest Atlantic DPS of loggerhead); nine species or DPSs of fish (the smalltooth sawfish; five DPSs of Atlantic sturgeon; Nassau grouper; oceanic whitetip shark, and giant manta ray); and seven species of coral (elkhorn coral, staghorn coral, rough cactus coral, pillar coral, lobed star coral, mountainous star coral, and boulder coral) are also protected under the ESA and occur within the action area of the snapper grouper fishery. Portions of designated critical habitat for NARW, the Northwest Atlantic DPS of loggerhead sea turtles, and *Acropora* corals occur within the South Atlantic Council's jurisdiction.

NMFS has conducted specific analyses ("Section 7 consultations") to evaluate the potential effects from the South Atlantic snapper grouper fishery on species and critical habitat protected under the ESA. On December 1, 2016, NMFS completed its most recent biological opinion (2016 Opinion) on the snapper grouper fishery of the South Atlantic Region (NMFS 2016). In the 2016 Opinion, NMFS concluded that the snapper grouper fishery's continued authorization is likely to adversely affect but is not likely to jeopardize the continued existence of the NARW, loggerhead sea turtle Northwest Atlantic DPS, leatherback sea turtle, Kemp's ridley sea turtle, green sea turtle North Atlantic DPS, green sea turtle South Atlantic DPS, hawksbill sea turtle, smalltooth sawfish U.S. DPS, or Nassau grouper. NMFS also concluded that designated critical habitat and other ESA-listed species in the South Atlantic Region were not likely to be adversely affected.

Since publication of the 2016 Opinion, NMFS has published two additional final listing rules. On January 22, 2018, NMFS listed the giant manta ray (*Manta birostris*) as threatened under the ESA, effective February 21, 2018. On January 30, 2018, NMFS listed the oceanic whitetip shark (*Carcharinus longimanus*) as threatened under the ESA, effective March 1, 2018. Giant manta rays and oceanic whitetip sharks are found in the South Atlantic and may be affected by the subject fishery via incidental capture in snapper grouper fishing gear. In a June

[4] http://www.nmfs.noaa.gov/pr/interactions/fisheries/2016_list_of_fisheries_lof.html

11, 2018, memorandum NMFS analyzed and documented ESA Section 7(a)(2) and Section 7(d) determinations for allowing the continued authorization of fishing managed by the Snapper Grouper FMP, during re-initiation of ESA consultation on this fishery, for its effects on the giant manta ray and the oceanic whitetip shark. Based on the analysis, NMFS determined that allowing the proposed action to continue during the re-initiation period will not violate Section 7(a)(2) or 7(d). This Section 7(a)(2) determination is only applicable to the proposed action during the re-initiation period and does not address the agency's long-term obligation to ensure its actions are not likely to jeopardize the continued existence of any listed species or destroy or adversely modify critical habitat.

For summary information on the protected species that may be adversely affected by the snapper grouper fishery and how they are affected refer to **Section 3.2.5** in Vision Blueprint Regulatory Amendment 27. The 2016 Opinion provides additional information on these species, how they are affected by the snapper grouper fishery, and the authorized incidental take levels of these species in the snapper grouper fishery.

3.3 Economic Environment

3.3.1 Economic Description of the Commercial Sector

Economic information pertaining to the commercial snapper grouper fishery is provided in Buck (2018) and Overstreet et al. (2018) and is incorporated herein by reference. Select updates to this information are provided below. The major sources of data summarized in this section are the NMFS Southeast Regional Office (SERO) Permits Information Management System (PIMS) and the SEFSC's Socioeconomic Panel[5] data set. Inflation adjusted values are reported in 2017 dollars.

Permits

Any fishing vessel that harvests and sells any of the snapper grouper species from the South Atlantic EEZ must have a valid South Atlantic commercial snapper grouper permit, which is a limited access permit. As of December 20, 2018, there were 535 valid or renewable South Atlantic Snapper Grouper unlimited permits and 108 valid or renewable 225-lb trip-limited permits. After a permit expires, it can be renewed or transferred up to one year after the date of expiration.

Landings, Value, and Effort

The number of federally permitted commercial vessels that landed South Atlantic snapper grouper species increased from 2013 through 2015 and then decreased to a 5-year low in 2017 (**Table 3.3.1.1**). Landings of snapper grouper species fluctuated during this time. On average (2013 through 2017), vessels that landed snapper grouper species did so on approximately 71% of their South Atlantic trips and snapper grouper species accounted for 68% of their annual all species revenue, including revenue from Gulf of Mexico trips (**Table 3.3.1.1** and **Table 3.3.1.2**). Average all species vessel-level revenue for these vessels fluctuated from 2013 through 2017 (**Table 3.3.1.2**). During this time period, the average annual price per pound of snapper grouper species ranged from $3.13 to $3.44 (2017 dollars). Although not shown in the tables, on average (2013 through 2017), 76 vessels reported landings of snapper grouper species on trips that primarily used dive gear, including powerheads. In addition, approximately 5% of total snapper grouper species landings and ex-vessel revenue, on average (2013 through 2017), were from trips that primarily used dive gear.

Table 3.3.1.1. Number of vessels, number of trips, and landings (lbs gw) by year for South Atlantic snapper grouper species.

[5] This data set is compiled by the SEFSC Social Science Research Group from Federal Logbook System data, supplemented by average prices calculated from the Accumulated Landings System. Because these landings are self-reported, they may diverge slightly from dealer-reported landings presented elsewhere.

Year	# of vessels that caught snapper grouper species (> 0 lbs gw)	# of trips that caught snapper grouper species	snapper grouper species landings (lbs gw)	Other species' landings jointly caught w/ snapper grouper species (lbs gw)	# of South Atlantic trips that only caught other species	Other species' landings on South Atlantic trips w/o snapper grouper species (lbs gw)	All species landings on Gulf trips (lbs gw)
2013	576	10,226	5,500,725	532,669	4,337	1,841,767	923,495
2014	577	12,024	5,624,271	645,576	5,190	2,670,471	1,245,200
2015	580	11,029	5,332,296	505,083	4,484	2,085,362	1,012,701
2016	563	11,507	5,175,852	602,715	4,747	2,230,645	793,431
2017	545	11,246	5,212,159	732,363	4,658	2,095,915	882,923
Average	568	11,206	5,369,061	603,681	4,683	2,184,832	971,550

Source: SEFSC Socioeconomic Panel (Version 7) accessed by the SEFSC Economic Query System (January 2019).
Note: South Atlantic trips refer to trips taken in Council jurisdictional waters and Gulf trips refer to trips taken in Gulf of Mexico Fishery Management Council jurisdictional waters.

Table 3.1.1.2. Number of vessels and ex-vessel revenue by year (2017 dollars) for South Atlantic snapper grouper species.

Year	# of vessels that caught snapper grouper species (> 0 lbs gw)	Dockside revenue from snapper grouper species	Dockside revenue from 'other species' jointly caught w/ snapper grouper species	Dockside revenue from 'other species' caught on South Atlantic trips w/o snapper grouper species	Dockside revenue from 'all species' caught on Gulf trips	Total dockside revenue	Average total dockside revenue per vessel
2013	576	$17,217,942	$1,809,944	$3,452,530	$2,960,777	$25,441,193	$44,169
2014	577	$18,307,792	$2,267,861	$4,131,554	$3,973,477	$28,680,684	$49,707
2015	580	$17,964,032	$1,516,331	$3,297,663	$3,032,317	$25,810,343	$44,501
2016	563	$17,791,494	$1,692,765	$3,561,278	$2,237,209	$25,282,746	$44,907
2017	545	$17,012,736	$1,788,804	$3,566,427	$2,400,678	$24,768,645	$45,447
Average	568	$17,658,799	$1,815,141	$3,601,890	$2,920,892	$25,996,722	$45,746

Source: SEFSC Socioeconomic Panel (Version 7) accessed by the SEFSC Economic Query System (January 2019).
Note: South Atlantic trips refer to trips taken in Council jurisdictional waters and Gulf trips refer to trips taken in Gulf of Mexico Fishery Management Council jurisdictional waters.

Imports

Imports of seafood products compete in the domestic seafood market and have in fact dominated many segments of the seafood market. Imports aid in determining the price for domestic seafood products and tend to set the price in the market segments in which they dominate. Seafood imports have downstream effects on the local fish market. At the harvest level for snapper and grouper species, imports affect the returns to fishermen through the ex-vessel prices they receive for their landings. As substitutes to domestic production of snappers and groupers, imports tend to cushion the adverse economic effects on consumers resulting from a reduction in domestic landings. The following describes the imports of fish products that directly compete with the domestic harvest of snapper and grouper species.

Imports[6] of fresh snapper increased steadily from 23.2 million lbs product weight (pw) in 2013 to 31.2 million lbs pw in 2017. During this time, total revenue from fresh snapper imports ranged from $72 million (2017 dollars[7]) to $92 million. Imports of fresh snappers primarily originated in Mexico or Central America and entered the U.S. through the port of Miami, Florida. Imports of fresh snapper were highest on average (2013 through 2017) during the months of March through July. Imports of frozen snapper ranged from 9.3 million lbs pw to 14.4 million lbs pw during 2013 through 2017. The annual value of these imports ranged from $25 million (2017 dollars) to $39 million, with a peak in 2016. Imports of frozen snapper primarily originated in South America (especially Brazil), Indonesia, Mexico, and Central America. The majority of frozen snapper imports entered the U.S. through the ports of Miami, Florida, New York, New York, and San Juan, Puerto Rico. Imports of frozen snappers tended to be lowest during March through May when fresh snapper imports were high.

Imports of fresh grouper decreased from 10 million lbs pw in 2013 to 8.6 million lbs pw in 2014, then rose steadily to 12.3 million lbs pw in 2017. Total revenue from fresh grouper imports ranged from $37 million (2017 dollars) to $50.7 million during this time period. Imports of fresh grouper primarily originated in Mexico or Central America and entered the U.S. through the ports of Miami and Tampa, Florida. On average (2013 through 2017), monthly imports of fresh grouper were mostly stable with a peak in July. Imports of frozen grouper ranged from 0.8 million lbs pw to 1.8 million lbs pw during 2013 through 2017. The annual value of these imports ranged from $1.5 million (2017 dollars) to $3.8 million, with a peak in 2014. Imports of frozen grouper primarily originated in Mexico and India. The majority of frozen grouper imports entered the U.S. through the ports of Miami and Tampa, Florida. On average (2013 through 2017), monthly imports of frozen groupers were mostly stable with a peak in January.

Business Activity

The commercial harvest and subsequent sales and consumption of fish generates business activity as fishermen expend funds to harvest the fish and consumers spend money on goods and services, such as seafood purchased at a local fish market and served during restaurant visits. These expenditures spur additional business activity in the region(s) where the harvest and

[6] NMFS purchases fisheries trade data from the Foreign Trade Division of the U.S. Census Bureau. Data are available for download at http://www.st.nmfs.noaa.gov/st1/trade/index.html.

[7] Converted to 2017 dollars using the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. Bureau of Economic Analysis.

purchases are made, such as jobs in local fish markets, grocers, restaurants, and fishing supply establishments. In the absence of the availability of a given species for purchase, consumers would spend their money on substitute goods, such as other finfish or seafood products, and services, such as visits to different food service establishments. As a result, the analysis presented below represents a distributional analysis only; that is, it only shows how economic effects may be distributed through regional markets and should not be interpreted to represent the impacts if these species are not available for harvest or purchase.

Estimates of the U.S. average annual business activity associated with the commercial harvest of snapper grouper species in the South Atlantic were derived using the model developed for and applied in NMFS (2017) and are provided in **Table 3.3.1.3**.[8] This business activity is characterized as jobs (full- and part-time), income impacts (wages, salaries, and self-employed income), output impacts (gross business sales), and value-added impacts, which represent the contribution made to the U.S. Gross Domestic Product (GDP). These impacts should not be added together because this would result in double counting. These results are based on average relationships developed through the analysis of many fishing operations that harvest many different species. Separate models to address individual species are not available.

Table 3.1.1.3. Average annual business activity (2013 through 2017) associated with the commercial harvest of snapper grouper species in the South Atlantic. All monetary estimates are in 2017 dollars.*

Species	Average Ex-vessel Value ($ thousands)	Total Jobs	Harvester Jobs	Output (Sales) Impacts ($ thousands)	Income Impacts ($ thousands)	Value Added ($ thousands)
Snappers and Groupers	$17,999	2,361	560	$178,489	$65,548	$92,611

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2017).
*Converted to 2017 dollars using the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. Bureau of Economic Analysis.

3.3.2 Economic Description of the Recreational Sector

The recreational fishing sector of the South Atlantic is comprised of the private and for-hire modes. The private mode includes anglers fishing from shore (all land-based structures) and private/rental boats. The for-hire mode is composed of charter boats and headboats (also called party boats). Charter boats generally carry fewer passengers and charge a fee on an entire vessel basis, whereas headboats carry more passengers and payment is per person. The type of service, from a vessel- or passenger-size perspective, affects the flexibility to search different fishing locations during the course of a trip and target different species since larger concentrations of fish are required to satisfy larger groups of anglers.

Angler Effort

Recreational effort derived from the Marine Recreational Information Program (MRIP) database can be characterized in terms of the number of trips as follows:

[8] A detailed description of the input/output model is provided in NMFS (2011).

- Target effort - The number of individual angler trips, regardless of duration, where the intercepted angler indicated that the species or a species in the species group was targeted as either the first or the second primary target for the trip. The species did not have to be caught.
- Catch effort - The number of individual angler trips, regardless of duration and target intent, where the individual species or a species in the species group was caught. The fish did not have to be kept.
- Total recreational trips - The total estimated number of recreational trips in the South Atlantic, regardless of target intent or catch success.

Estimates of snapper grouper target and catch effort[9] are provided in **Table 3.3.2.1** and **Table 3.3.2.2**, respectively. It is important to note that in 2018, MRIP transitioned from the old Coastal Household Telephone Survey (CHTS) to a new mail-based fishing effort survey (FES). The estimates presented in **Table 3.3.2.1** and **Table 3.3.2.2** are based on the CHTS and have not been calibrated to the FES; however, it is expected that such calibration would result in greater estimates. The majority of snapper grouper target and catch trips in the South Atlantic, as estimated by MRIP, were recorded in Florida and the private/rental mode was the predominant mode of fishing on these trips (**Table 3.3.2.1** and **Table 3.3.2.2**). The number of target trips for snapper grouper species steadily increased in North Carolina from 2013 through 2017 but fluctuated elsewhere during this time period (**Table 3.3.2.1**). Although not shown in the tables, on average (2013-2017), approximately 9% of estimated snapper grouper target trips and 2% of estimated snapper grouper catch trips involved spearfishing. There were no estimated snapper grouper species target or catch trips that used spear gear in South Carolina from 2013 through 2017.

Table 3.3.2.1. South Atlantic recreational snapper grouper target trips, by mode and state, 2013-2017.*

	FL	GA	NC	SC	Total
	Shore Mode				
2013	48,170	0	964	0	49,134
2014	49,279	0	2,124	0	51,403
2015	55,306	580	718	271	56,875
2016	110,476	319	5,424	0	116,219
2017	57,847	726	3,126	78	61,777
Average	64,216	325	2,471	70	67,082
	Charter Mode				
2013	5,302	262	2,840	0	8,404
2014	7,011	989	2,167	4,833	15,000
2015	11,376	0	1,717	3,880	16,973
2016	6,647	756	1,480	1,602	10,485
2017	5,330	1,649	1,398	8,574	16,951
Average	7,133	731	1,920	3,778	13,563

[9] These estimates include all trips that targeted or caught one or more of the species managed under the South Atlantic Snapper Grouper FMP.

	FL	GA	NC	SC	Total
	Private/Rental Mode				
2013	171,309	14,344	9,663	10,227	205,543
2014	209,779	12,781	14,561	24,715	261,836
2015	174,653	2,044	16,627	8,802	202,126
2016	181,394	705	15,057	10,285	207,441
2017	195,063	2,523	22,165	9,914	229,665
Average	186,440	6,479	15,615	12,789	221,322
	All Modes				
2013	224,781	14,605	13,466	10,227	263,079
2014	266,069	13,770	18,852	29,548	328,239
2015	241,335	2,624	19,062	12,953	275,974
2016	298,517	1,780	21,961	11,887	334,145
2017	258,241	4,898	26,689	18,566	308,394
Average	257,789	7,535	20,006	16,636	301,966

Source: MRIP database, SERO, NMFS.
* Headboat data are unavailable.
Note: These estimates are based on the MRIP CHTS. Directed effort estimates that are calibrated to the new MRIP mail-based FES may be greater than what are presented here.

Table 3.3.2.2. South Atlantic recreational snapper grouper catch trips, by mode and state, 2013-2017.

	FL	GA	NC	SC	Total
	Shore Mode				
2013	271,608	13,349	51,762	13,468	350,187
2014	314,778	31,582	55,933	34,707	437,000
2015	287,342	22,188	47,240	39,450	396,220
2016	414,308	11,084	78,075	37,392	540,859
2017	501,377	12,134	80,672	18,072	612,255
Average	357,883	18,067	62,736	28,618	467,304
	Charter Mode				
2013	63,206	3,544	11,314	2,761	80,825
2014	74,007	5,195	17,056	34,173	130,431
2015	108,508	5,285	16,811	34,083	164,687
2016	92,900	3,548	18,074	17,057	131,579
2017	95,420	3,943	17,104	41,520	157,987
Average	86,808	4,303	16,072	25,919	133,102
	Private/Rental Mode				
2013	1,009,108	48,385	245,049	60,146	1,362,688
2014	1,263,643	28,633	196,663	128,598	1,617,537
2015	1,014,496	26,251	246,634	117,281	1,404,662
2016	1,113,273	18,640	261,591	95,026	1,488,530

	FL	GA	NC	SC	Total
2017	1,024,088	30,313	260,454	123,813	1,438,668
Average	1,084,922	30,444	242,078	104,973	1,462,417
	All Modes				
2013	1,343,922	65,278	308,126	76,375	1,793,702
2014	1,652,428	65,410	269,652	197,478	2,184,968
2015	1,410,346	53,724	310,685	190,814	1,965,568
2016	1,620,482	33,272	357,740	149,476	2,160,969
2017	1,620,885	46,390	358,231	183,405	2,208,911
Average	1,529,613	52,815	320,887	159,510	2,062,824

Source: MRIP database, SERO, NMFS.
* Headboat data are unavailable.
Note: These estimates are based on the MRIP CHTS. Directed effort estimates that are calibrated to the new MRIP mail-based FES may be greater than what are presented here.

Similar analysis of recreational angler trips is not possible for the headboat mode because headboat data are not collected at the angler level. Estimates of effort by the headboat mode are provided in terms of angler days, or the total number of standardized full-day angler trips.[10] Headboat effort in the South Atlantic, in terms of angler days, increased substantially in Florida through Georgia from 2013 through 2014, leveled off through 2016, and then dropped sharply in 2017. In North Carolina and South Carolina, there were modest fluctuations in headboat effort during this time period (**Table 3.3.2.3**). Headboat effort was the highest, on average, during the summer months of June through August (**Table 3.3.2.4**).

Table 3.3.2.3. South Atlantic headboat angler days and percent distribution by state (2013-2017).

	Angler Days			Percent Distribution		
	FL/GA*	NC	SC	FL/GA	NC	SC
2013	165,679	20547	40,963	72.93%	9.04%	18.03%
2014	195,890	22691	42,025	75.17%	8.71%	16.13%
2015	194,979	22716	39,702	75.75%	8.83%	15.42%
2016	196,660	21565	42,207	75.51%	8.28%	16.21%
2017	126,126	20170	36,914	68.84%	11.01%	20.15%
Average	175,867	21,538	40,362	74%	9%	17%

*East Florida and Georgia are combined for confidentiality purposes.
Source: NMFS Southeast Region Headboat Survey (SRHS).

Table 3.3.2.4. South Atlantic headboat angler days and percent distribution by month (2013-2017).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Headboat Angler Days											
2013	10,182	10,892	14,541	16,129	20,969	33,079	39,463	33,830	16,335	14,534	6,698	10,537

[10] Headboat trip categories include half-, three-quarter-, full-, and 2-day trips. A full-day trip equals one angler day, a half-day trip equals .5 angler days, etc. Angler days are not standardized to an hourly measure of effort and actual trip durations may vary within each category.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2014	8,748	13,512	19,808	22,570	25,764	39,115	44,066	32,886	15,203	15,235	9,088	14,611
2015	12,661	11,148	21,842	25,128	25,172	36,907	42,558	30,772	15,649	13,375	9,623	12,562
2016	9,818	12,243	23,872	22,217	27,374	37,454	45,744	29,223	17,061	9,202	12,820	13,404
2017	7,693	10,066	13,382	17,448	19,377	27,050	33,356	21,037	6,684	8,928	8,929	9,260
Avg	9,820	11,572	18,689	20,698	23,731	34,721	41,037	29,550	14,186	12,255	9,432	12,075
	Percent Distribution											
2013	4%	5%	6%	7%	9%	15%	17%	15%	7%	6%	3%	5%
2014	3%	5%	8%	9%	10%	15%	17%	13%	6%	6%	3%	6%
2015	5%	4%	8%	10%	10%	14%	17%	12%	6%	5%	4%	5%
2016	4%	5%	9%	9%	11%	14%	18%	11%	7%	4%	5%	5%
2017	4%	5%	7%	10%	11%	15%	18%	11%	4%	5%	5%	5%
Avg	4%	5%	8%	9%	10%	15%	17%	12%	6%	5%	4%	5%

Source: NMFS Southeast Region Headboat Survey (SRHS).

Permits

For-hire vessels are required to have a for-hire snapper grouper permit to fish for or possess snapper grouper species in the South Atlantic EEZ. As of December 20, 2018, there were 1,747 valid for-hire snapper grouper permits. This sector operates as an open access fishery and not all permitted vessels are necessarily active in the fishery. Some vessel owners may have obtained open access permits as insurance for uncertainties in the fisheries in which they currently operate.

Although the for-hire permit application collects information on the primary method of operation, the permit itself does not identify the permitted vessel as either a headboat or a charter vessel and vessels may operate in both capacities. However, only federally permitted headboats are required to submit harvest and effort information to the NMFS Southeast Region Headboat Survey (SRHS). Participation in the SRHS is based on determination by the SEFSC that the vessel primarily operates as a headboat. As of June 11, 2018, 64 South Atlantic headboats were registered in the SRHS (K. Fitzpatrick, NMFS SEFSC, pers. comm.). The majority of these headboats were located in Florida/Georgia (39), followed by North Carolina (14) and South Carolina (11).

There are no specific permitting requirements for recreational anglers to harvest snapper grouper species. Instead, anglers are required to possess either a state recreational fishing permit that authorizes saltwater fishing in general or be registered in the federal National Saltwater Angler Registry system, subject to appropriate exemptions. As a result, it is not possible to identify with available data how many individual anglers would be expected to be affected by this proposed amendment.

Economic Value

Participation, effort, and harvest are indicators of the value of saltwater recreational fishing. However, a more specific indicator of value is the satisfaction that anglers experience over and above their costs of fishing. The monetary value of this satisfaction is referred to as consumer surplus (CS). The value or benefit derived from the recreational experience is dependent on

several quality determinants, which include fish size, catch success rate, and the number of fish kept. These variables help determine the value of a fishing trip and influence total demand for recreational fishing trips.

Direct estimates of the CS for every species potentially affected by this action are not currently available. There are, however, estimates for snapper and grouper species in general. Haab et al. (2012) estimated the CS (willingness to pay (WTP) for one additional fish caught and kept) for snappers and groupers in the Southeastern U.S. using four separate econometric modeling techniques. The finite mixture model, which takes into account variation in the preferences of fishermen, had the best prediction rates of the four models and, as such, was selected for presentation here. The WTP for an additional snapper (excluding red snapper) estimated by this model was $12.47 (2017 dollars).[11] This value may seem low and may be strongly influenced by the pooling effect inherent to the model in which it was estimated. The WTP for an additional red snapper, in comparison, was estimated to be $141.28 (2017 dollars). The WTP for an additional grouper was estimated to be $135.74 (2017 dollars). Another study estimated the value of the consumer surplus for catching and keeping a second grouper on an angler trip at approximately $105 (2017 dollars) and lower thereafter (approximately $70 for a third grouper, $52 for a fourth grouper, and $41 for a fifth grouper) (Carter and Liese 2012). Additionally, this study estimated the value of harvesting a second red snapper at approximately $82 (2017 dollars) and lower thereafter. No estimates were provided for other snapper species.

The foregoing estimates of economic value should not be confused with economic impacts associated with recreational fishing expenditures. Although expenditures for a specific good or service may represent a proxy or lower bound of value (a person would not logically pay more for something than it was worth to them), they do not represent the net value (benefits minus cost), nor the change in value associated with a change in the fishing experience.

With regards to for-hire businesses, economic value can be measured by producer surplus (PS) per passenger trip (the amount of money that a vessel owner earns in excess of the cost of providing the trip). Estimates of the PS per for-hire passenger trip are not available. Instead, net operating revenue (NOR), which is the return used to pay all labor wages, returns to capital, and owner profits, is used as a proxy for PS. For the South Atlantic region, estimated NOR values are $168 (2017 dollars) per charter angler trip and $45 per headboat angler trip (C. Liese, NMFS SEFSC, pers. comm.). Holland et al. (2012) estimated average annual gross revenue for charter vessels and headboats operating in the South Atlantic at $120,297 and $212,680 (2017 dollars), respectively. Estimates of average annual producer surplus or profits are not available.

Business Activity

The desire for recreational fishing generates economic activity as consumers spend their income on various goods and services needed for recreational fishing. This income spurs economic activity in the region where recreational fishing occurs. It should be clearly noted that, in the absence of the opportunity to fish, the income would presumably be spent on other goods and services and these expenditures would similarly generate economic activity in the region

[11] Converted to 2017 dollars using the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. Bureau of Economic Analysis (BEA).

where the expenditure occurs. As such, the analysis below represents a distributional analysis only.

Estimates of the business activity (economic impacts) associated with recreational angling for South Atlantic snapper grouper species were calculated using average trip-level impact coefficients derived from the 2015 Fisheries Economics of the U.S. report (NMFS 2017) and underlying data provided by the National Oceanic and Atmospheric Administration (NOAA) Office of Science and Technology. Economic impact estimates in 2015 dollars were adjusted to 2017 dollars using the annual, not seasonally adjusted GDP implicit price deflator provided by the U.S. Bureau of Economic Analysis.

Business activity (economic impacts) for the recreational sector is characterized in the form of jobs (full- and part-time), income impacts (wages, salaries, and self-employed income), output impacts (gross business sales), and value-added impacts (contribution to the GDP in a state or region). Estimates of the average annual economic impacts (2013-2017) resulting from South Atlantic recreational snapper grouper target trips are provided in **Table 3.3.2.5**. The average impact coefficients, or multipliers, used in the model are invariant to the "type" of effort and can therefore be directly used to measure the impact of other effort measures such as snapper grouper catch trips. To calculate the multipliers from **Table 3.3.2.5**, simply divide the desired impact measure (sales impact, value-added impact, income impact or employment) associated with a given state and mode by the number of target trips for that state and mode.

The estimates provided in **Table 3.3.2.5** only apply at the state-level. Addition of the state-level estimates to produce a regional (or national) total may underestimate the actual amount of total business activity, because state-level impact multipliers do not account for interstate and interregional trading. It is also important to note, that these economic impacts estimates are based on trip expenditures only and do not account for durable expenditures. Durable expenditures cannot be reasonably apportioned to individual species or species groups. As such, the estimates provided in **Table 3.3.2.5** may be considered a lower bound on the economic activity associated with those trips that targeted snapper grouper species.

Estimates of the business activity associated with headboat effort are not available. Headboat vessels are not covered in MRIP, so, in addition to the absence of estimates of target effort, estimation of the appropriate business activity coefficients for headboat effort has not been conducted.

Table 3.3.2.5. Estimated annual average economic impacts (2013-2017) from South Atlantic recreational snapper grouper target trips, by state and mode, using state-level multipliers. All monetary estimates are in 2017 dollars (in thousands).

	NC	SC	GA	FL
	Charter Mode			
Target Trips	1,920	3,778	731	7,133
Value Added Impacts	$677	$1,560	$186	$2,946
Sales Impacts	$1,266	$2,882	$340	$5,326
Income Impacts	$460	$1,015	$127	$1,894
Employment (Jobs)	10	26	3	41

	NC	SC	GA	FL
	Private/Rental Mode			
Target Trips	15,615	12,789	6,479	186,440
Value Added Impacts	$585	$264	$132	$3,926
Sales Impacts	$1,039	$479	$230	$6,680
Income Impacts	$365	$158	$79	$2,257
Employment (Jobs)	10	5	2	60
	Shore			
Target Trips	2,471	70	325	64,216
Value Added Impacts	$158	$4	$8	$1,148
Sales Impacts	$275	$7	$15	$1,893
Income Impacts	$97	$2	$5	$652
Employment (Jobs)	3	0	0	18
	All Modes			
Target Trips	20,006	16,636	7,536	257,788
Value Added Impacts	$1,420	$1,828	$327	$8,020
Sales Impacts	$2,580	$3,369	$585	$13,899
Income Impacts	$922	$1,176	$211	$4,803
Employment (Jobs)	24	32	5	118

Source: effort data from MRIP; economic impact results calculated by NMFS SERO using NMFS (2017) and underlying data provided by the NOAA Office of Science and Technology.

3.4 Social Environment

This framework amendment affects the commercial and recreational management of the snapper grouper fishery in the South Atlantic. This section provides the background for the proposed actions, which are evaluated in **Chapter 4**.

Commercial and recreational permits by state are included to provide information on the geographic distribution of fishing involvement. A description of the commercial dive gear and recreational spearfishing is included in order to provide information on the use of powerheads. Descriptions of the top-ranking communities by the number of commercial snapper grouper permits are included, along with descriptions of the top communities involved in commercial snapper grouper, descriptions of the top-ranking communities by the number of for-hire permits, and descriptions of top recreational fishing communities based on recreational engagement. Community level data are presented in order to meet the requirements of National Standard 8 of the Magnuson-Stevens Act, which requires the consideration of the importance of fishery resources to human communities when changes to fishing regulations are considered. Lastly, social vulnerability data are presented to assess the potential for environmental justice concerns.

3.4.1 Permits by State

Commercial

As described in **Section 3.3.1**, as of December 20, 2018, there were 535 South Atlantic commercial snapper grouper unlimited permits. In the period 2013 through 2017, the number of snapper grouper unlimited permits decreased over time (**Table 3.4.1.1**). The majority of snapper grouper unlimited permits are issued to individuals in Florida (average of 69.6%), followed by North Carolina (19.2%), South Carolina (8.9%), and Georgia (1.2%). Residents of other states (Louisiana, Massachusetts, New Jersey, New York, Texas, and Virginia) also hold snapper grouper unlimited permits, but these states represent a small percentage of the issued permits.

Table 3.4.1.1. Number of South Atlantic commercial snapper grouper unlimited permits, by state, 2013-2017.

State	2013	2014	2015	2016	2017	Average
Florida	416	409	399	391	379	399
Georgia	6	6	7	8	7	7
North Carolina	112	112	108	107	112	110
South Carolina	50	51	50	51	52	51
Other	8	6	7	8	4	7
Total	592	584	571	565	554	573

Source: NMFS, SERO Permits Dataset, 2019.

As described in Section **3.3.1**, as of December 20, 2018, there were 108 South Atlantic commercial snapper grouper 225-lb trip-limited permits. In the period 2013 through 2017, the number of snapper grouper 225-lb trip-limited permits decreased over time (**Table 3.4.1.2**). The majority of snapper grouper 225-lb trip-limited permits are issued to individuals in Florida (average of 89.9%), followed by North Carolina (7.1%), and South Carolina (1.3%). Residents of other states (New Jersey and Virginia) also hold snapper grouper 225-lb trip-limited permits, but these states represent a small percentage of the issued permits.

Table 3.4.1.2. Number of South Atlantic commercial snapper grouper 225-lb trip-limited permits, by state, 2013-2017.

State	2013	2014	2015	2016	2017	Average
Florida	117	113	109	105	100	109
Georgia	0	0	0	0	0	0
North Carolina	8	8	8	8	11	9
South Carolina	2	2	2	1	1	2
Other	2	2	2	2	2	2
Total	129	125	121	116	114	121

Source: NMFS, SERO Permits Dataset, 2019.

Recreational

As of January 28, 2019, there were 1654 South Atlantic for-hire snapper grouper permits. In the period 2013 through 2017, the number of for-hire snapper grouper permits increased over

time (**Table 3.4.1.3**). The majority of for-hire snapper grouper permits are issued to individuals in Florida (average of 60.4%), followed by North Carolina (17.5%), South Carolina (10.1%), and Georgia (2.4%). Residents of other Gulf states (Alabama, Mississippi, Louisiana, and Texas) also hold a sizable amount of for-hire snapper grouper permits (4.1%). Residents of other states and territories (California, Delaware, Idaho, Indiana, Massachusetts, Maryland, Maine, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Puerto Rico, Rhode Island, Tennessee, and Virginia) also hold for-hire snapper grouper permits.

Table 3.4.1.3. Number of South Atlantic for-hire snapper grouper permits, by state, 2013-2017.

State	2013	2014	2015	2016	2017	Average
Florida	1120	1062	1071	1100	1179	1106
Georgia	30	34	45	53	62	45
North Carolina	308	294	308	331	362	321
South Carolina	150	160	188	212	215	185
Gulf (AL, MS, LA, TX)	91	81	73	69	63	75
Other	100	96	94	102	101	99
Total	1799	1727	1779	1867	1982	1831

Source: NMFS, SERO Permits Dataset, 2019.

3.4.2 Gear

Descriptions of commercial dive gear and recreational spearfishing are included in order to provide information, which can be used as a proxy for the use of powerheads. However, commercial dive gear and recreational spearfishing contain forms of gear other than powerheads and do not necessarily include powerheads.

Commercial

Figure 3.4.2.1 shows the proportion of total commercial landings by gear as reported on trips for the South Atlantic from 2013 to 2017. As described in **Section 3.3.1**, on average, 76 vessels reported landings of snapper grouper species on trips that used dive gear and approximately 5% of landings were from trips that primarily used dive gear. Within the category of dive gear, dive trips with explosive devices comprised an average of 1.6% of snapper grouper landings for the years 2013 to 2017 (**Figure 3.4.2.1**). Although not shown in the figure, on average for the years 2013 to 2017, 17 vessels reported landings of snapper grouper species on trips that used dive gear with explosive devices.

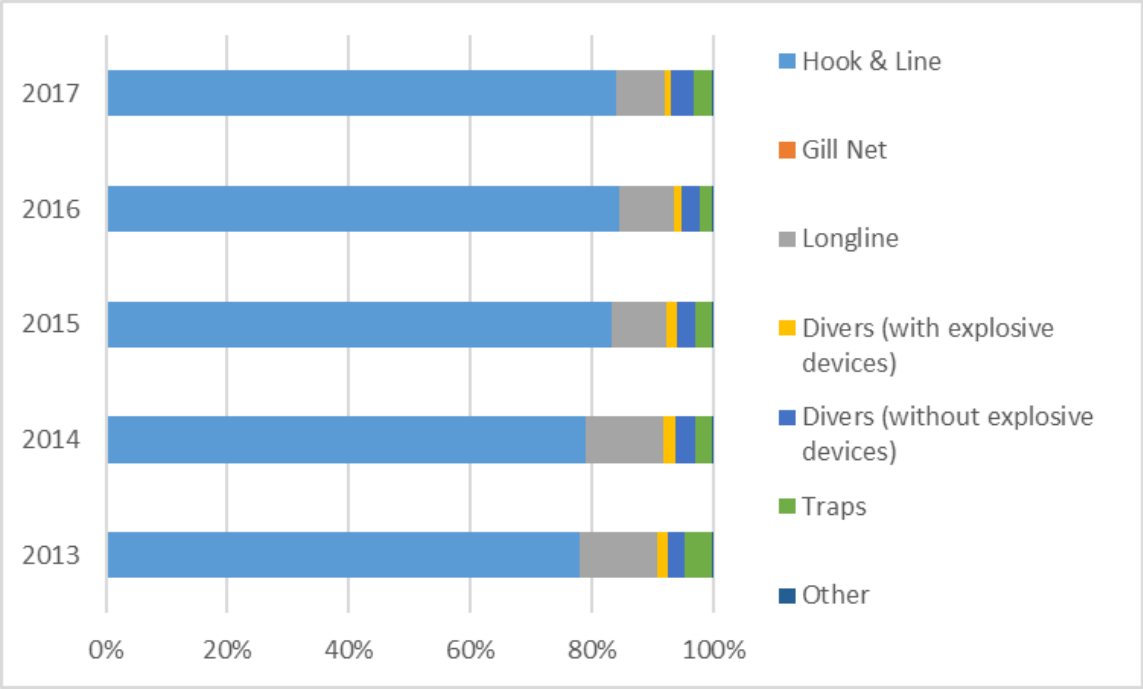

Figure 3.4.2.1. Snapper grouper commercial landings by gear reported on trips for the South Atlantic region, 2013-2017.
Source: SEFSC Socioeconomic Panel (Version 7) accessed by the SEFSC Economic Query system (Feb. 2019).
Note: Hook and line gear includes handlines, bandit (electric and bandit reels), trolling, and buoy gear. Divers with explosive devices includes powerheads and bang-sticks.

Recreational

As described in Section 3.3.2, on average for the years 2013 to 2017, approximately 9% of estimated snapper grouper target trips and 2% of estimated snapper grouper catch trips involved spearfishing.

3.4.3 Fishing Communities

Commercial

South Atlantic commercial snapper grouper unlimited permits are held by individuals with mailing addresses in 156 communities, located in 12 states (SERO Permit Office, January 28, 2019). Communities with the most commercial snapper grouper unlimited permits are located in Florida, South Carolina, and North Carolina (**Table 3.4.3.1**). The community with the most commercial snapper grouper unlimited permits is Key West, Florida (10.1% of commercial snapper grouper unlimited permits).

South Atlantic commercial snapper grouper 225-lb trip-limited permits are held by individuals with mailing addresses in 53 communities, located in six states (SERO Permit Office, January 28, 2019). Communities with the most commercial snapper grouper 225-lb trip-limited permits are located in Florida and North Carolina (**Table 3.4.3.1**). The community with the most commercial snapper grouper 225-lb trip-limited permits is Key West, Florida (9.3% of commercial snapper grouper 225-lb trip-limited permits).

Table 3.4.3.1. Top ranking communities based on the number of South Atlantic commercial snapper grouper unlimited permits and 225-lb trip-limited permits, in descending order.

State	Community	Unlimited Permits	State	Community	225-lb Trip-Limited Permits
FL	Key West	54	FL	Key West	10
FL	Jacksonville	39	FL	Marathon	9
FL	Miami	19	FL	Summerland Key	9
FL	Marathon	15	FL	Jupiter	6
FL	Key Largo	13	FL	Miami	6
SC	Little River	13	FL	Big Pine Key	5
NC	Southport	11	FL	Key Largo	4
FL	Hialeah	10	FL	Fort Pierce	3
FL	Jupiter	10	FL	Melbourne Beach	3
FL	Tavernier	10	NC	Wilmington	3
SC	Murrells Inlet	10			
FL	Islamorada	8			
FL	Palmetto Bay	8			
FL	Port Orange	8			
FL	St. Augustine	8			
NC	Hampstead	8			
FL	Big Pine Key	7			
FL	Homestead	7			
FL	Summerland Key	7			
NC	Sneads Ferry	7			
NC	Wilmington	7			

Source: NMFS SERO permit office, January 28, 2019.

The descriptions of communities include information about the top communities based on a "regional quotient" (RQ) of commercial landings and value for snapper grouper. The RQ is the proportion of landings and value out of the total landings and value of that species management complex for that region and is a relative measure. These communities would be most likely to experience the effects of the proposed actions that could change the fishery and impact participants, associated businesses, and communities within the region. If a community is identified as a snapper grouper community based on the RQ, this does not necessarily mean that the community would experience significant impacts due to changes in the fishery if a different species or number of species were also important to the local community and economy.

South Atlantic communities with commercial landings of snapper grouper are located in Florida, Georgia, North Carolina, and South Carolina (SERO Community ALS, 2016). About 13% of snapper grouper is landed in the top community of Murrells Inlet, South Carolina,

representing about 14% of the South Atlantic-wide ex-vessels value (**Figure 3.4.3.1**). About 12% of snapper grouper is landed in the second ranked community of Key West, Florida, representing about 11% of the ex-vessel value. Additionally, several other Florida Keys communities (Marathon, Key Largo, and Islamorada) are included in the top communities and these communities collectively represent about 15% of landings and 14% of value.

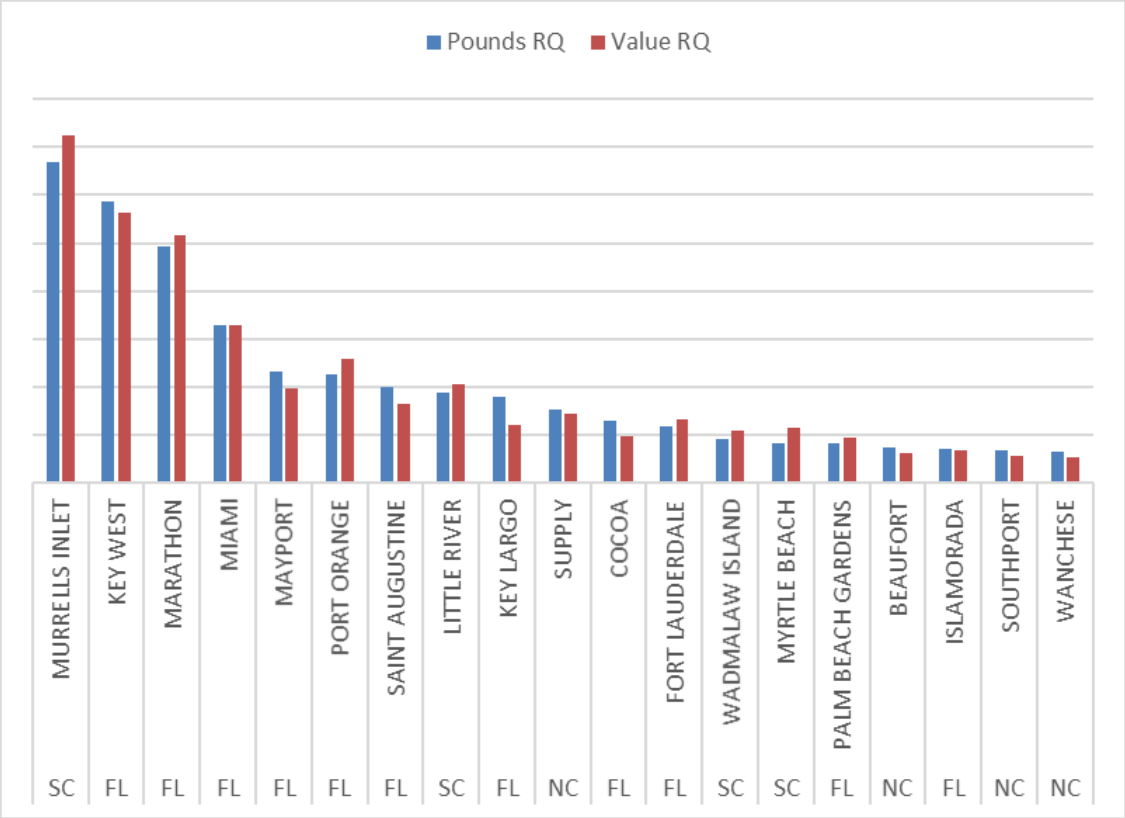

Figure 3.4.3.1. Top South Atlantic communities ranked by pounds and value regional of quotient (RQ) of snapper grouper. The actual RQ values (y-axis) are omitted from the figure to maintain confidentiality. Source: SERO, Community ALS 2016.

Recreational

South Atlantic for-hire snapper grouper permits are held by those with mailing addresses in 452 communities, located in 24 states (SERO permit office, January 28, 2019). Communities with the most for-hire snapper grouper permits are located in communities in Florida, followed by North Carolina, and South Carolina (**Table 3.4.3.2**). The community with most South Atlantic for-hire snapper grouper permits is Key West, Florida (7.8% of for-hire snapper grouper permits, **Table 3.4.3.2**).

Table 3.4.3.2. Top ranking communities based on the number of South Atlantic for-hire snapper grouper permits, in descending order.

State	Community	Permits
FL	Key West	129
FL	Marathon	57
FL	Islamorada	46

State	Community	Permits
FL	St. Augustine	27
FL	Jacksonville	26
FL	Port Orange	25
FL	Naples	24
FL	Tavernier	24
NC	Hatteras	23
SC	Charleston	23
FL	Merritt Island	22
NC	Wilmington	21
FL	Ft. Lauderdale	20
FL	Jupiter	19
FL	Key Largo	19
NC	Manteo	19
SC	Hilton Head	19
FL	Miami	17
FL	Summerland Key	17

Source: NMFS SERO permit office, January 28, 2019.

Landings for the recreational sector are not available by species at the community level; therefore, it is not possible with available information to identify communities as dependent on recreational fishing for specific species. Because limited data are available concerning how recreational fishing communities are engaged and reliant on specific species, indices were created using secondary data from permit and infrastructure information for the southeast recreational fishing sector at the community level (Jacob et al. 2013; Jepson and Colburn 2013). Recreational fishing engagement is represented by the number of recreational permits and vessels designated as "recreational" by homeport and owners address. Fishing reliance includes the same variables as fishing engagement, divided by population. Factor scores of both engagement and reliance were plotted. Communities were analyzed in ranked order by recreational fishing engagement.

Figure 3.4.3.2 identifies the top 20 recreational communities located in the South Atlantic that are the most engaged and reliant on recreational fishing, in general. All included communities demonstrate high levels of recreational engagement. Five communities (Marathon, Florida; Islamorada, Florida; Hatteras, North Carolina; Manteo, North Carolina; and Atlantic Beach, North Carolina) demonstrate high levels of recreational reliance.

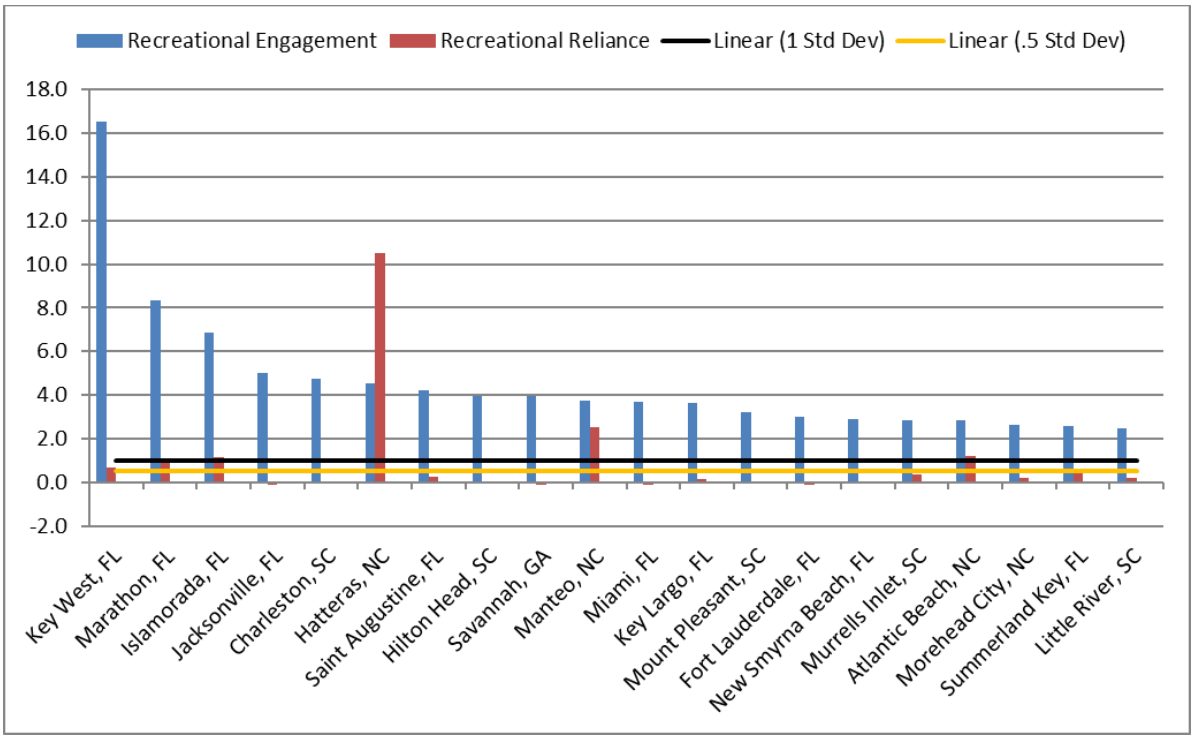

Figure 3.4.3.2. Top 20 recreational fishing communities' engagement and reliance.
Source: SERO, Community Social Vulnerability Indicators Database 2018 (American Community Survey 2012-2016).

Additional detailed information about fishing communities contained in this description can be found on the SERO Community Snapshots website.[12]

3.4.4 Environmental Justice

Executive Order 12898 requires federal agencies conduct their programs, policies, and activities in a manner to ensure individuals or populations are not excluded from participation in, or denied the benefits of, or subjected to discrimination because of their race, color, or national origin. In addition, and specifically with respect to subsistence consumption of fish and wildlife, federal agencies are required to collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. The main focus of Executive Order 12898 is to consider "the disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories…" This executive order is generally referred to as environmental justice (EJ).

Commercial and recreational anglers and associated industries could be impacted by the proposed actions. However, information on the race and income status for groups at the different participation levels is not available. Although information is available concerning communities' overall status with regard to minorities and poverty (e.g., census data), such information is not available specific to fishermen, their households, and those involved in the industries and

[12] http://sero.nmfs.noaa.gov/sustainable_fisheries/social/community_snapshot/

activities, themselves. To help assess whether any environmental justice concerns arise from the actions in this amendment, a suite of indices were created to examine the social vulnerability of coastal communities. The three indices are poverty, population composition, and personal disruptions. The variables included in each of these indices have been identified through the literature as being important components that contribute to a community's vulnerability. Indicators such as increased poverty rates for different groups, more single female-headed households and households with children under the age of five, disruptions such as higher separation rates, higher crime rates, and unemployment all are signs of populations experiencing vulnerabilities. Again, for those communities that exceed the threshold it would be expected that they would exhibit vulnerabilities to sudden changes or social disruption that might accrue from regulatory change.

Figure 3.4.4.1 and **Figure 3.4.4.2** provide the social vulnerability of the top commercial and recreational communities. Several South Atlantic communities exceed the threshold of 0.5 standard deviation for at least one of the social vulnerability indices: Cocoa, Fort Lauderdale, Fort Pierce, Hialeah, Homestead, Marathon, and Miami, Florida; Savannah, Georgia; Beaufort, Morehead City, and Sneads Ferry, North Carolina; and Myrtle Beach, South Carolina. The communities of Cocoa, Fort Pierce, Hialeah, Homestead, and Miami, Florida and Savannah, Georgia exceed the threshold for all three social vulnerability indices. These communities have substantial vulnerabilities and may be susceptible to further effects from any regulatory changes depending upon the direction and extent of that change.

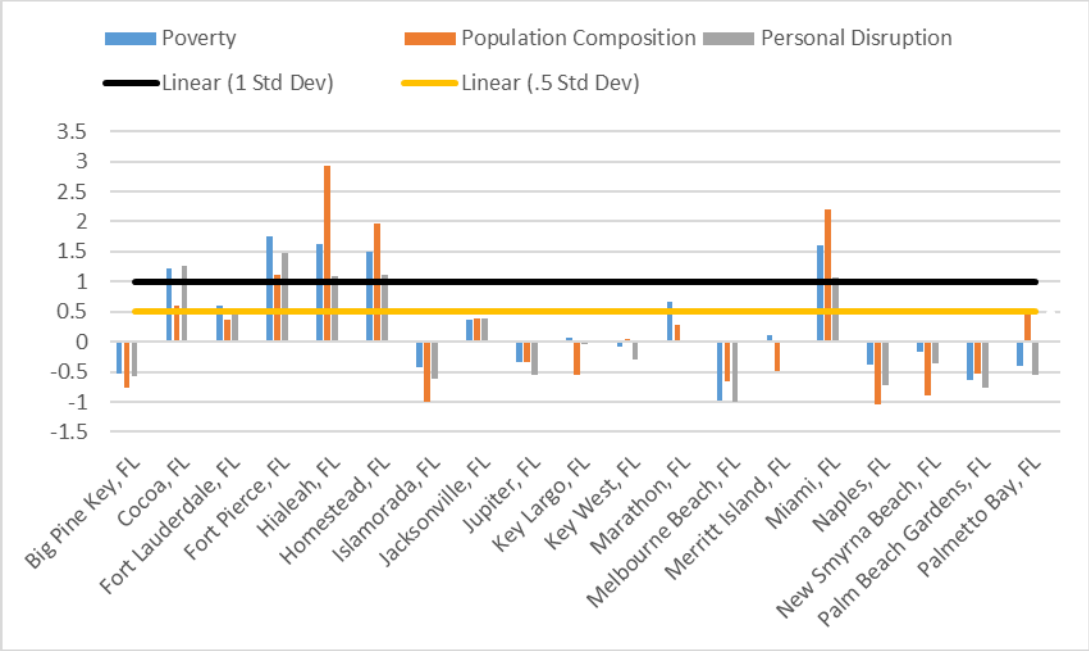

Figure 3.4.4.1. Social vulnerability indices for top commercial and recreational communities.
Source: SERO, Community Social Vulnerability Indicators Database 2018 (American Community Survey 2012-2016).

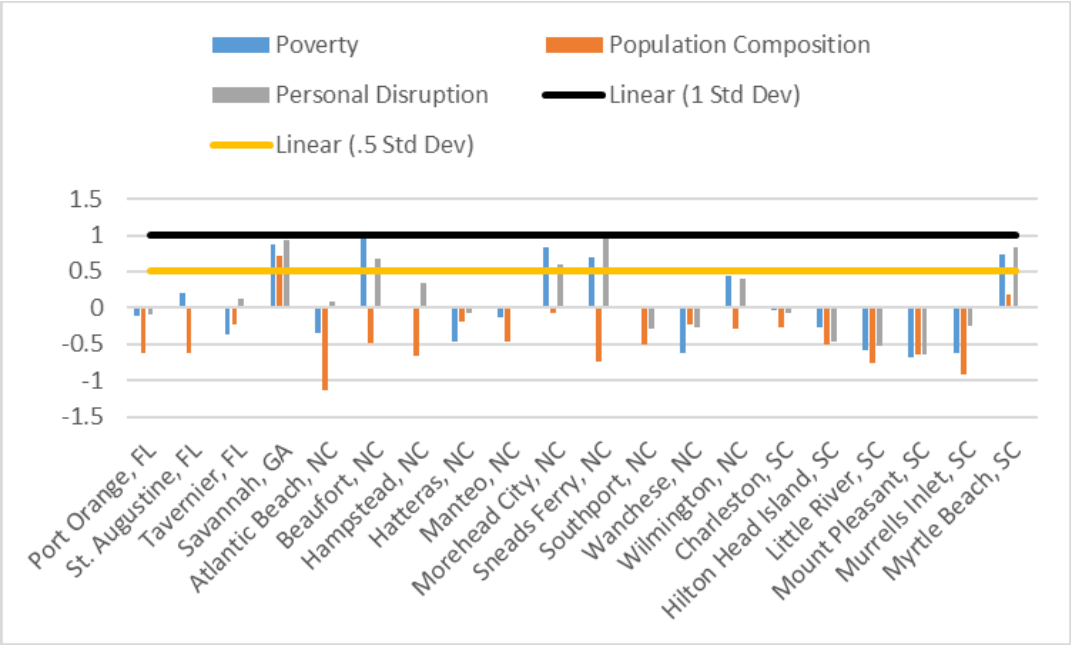

Figure 3.4.4.2. Social vulnerability indices for top commercial and recreational communities continued. Source: SERO, Community Social Vulnerability Indicators Database 2018 (American Community Survey 2012-2016).

People in these communities may be affected by fishing regulations in two ways: participation and employment. Although these communities may have the greatest potential for EJ concerns, data are not available on the race and income status for those involved in the local fishing industry (employment), or for their dependence on snapper grouper species (participation). However, the implementation of the proposed actions of this amendment would not discriminate against any group based on their race, ethnicity, or income status because the proposed actions would be applied to all participants in the fishery. Thus, the actions of this amendment are not expected to result in adverse or disproportionate environmental or public health impacts to EJ populations. Although no EJ issues have been identified, the absence of potential EJ concerns cannot be assumed.

3.5 Administrative Environment

3.5.1 Federal Fishery Management

Federal fishery management is conducted under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (16 U.S.C. 1801 et seq.), originally enacted in 1976 as the Fishery Conservation and Management Act. The Magnuson-Stevens Act claims sovereign rights and exclusive fishery management authority over most fishery resources within the EEZ, an area extending 200 nm from the seaward boundary of each of the coastal states, and authority over U.S. anadromous species and continental shelf resources that occur beyond the U.S. EEZ.

Responsibility for federal fishery management decision-making is divided between the U.S. Secretary of Commerce (Secretary) and eight regional fishery management councils that represent the expertise and interests of constituent states. Regional councils are responsible for preparing, monitoring, and revising management plans for fisheries needing management within their jurisdiction. The Secretary is responsible for collecting and providing the data necessary for the councils to prepare fishery management plans and for promulgating regulations to implement proposed plans and amendments after ensuring that management measures are consistent with the Magnuson-Stevens Act and with other applicable laws. In most cases, the Secretary has delegated this authority to NMFS.

The South Atlantic Council is responsible for conservation and management of fishery resources in federal waters of the U.S. South Atlantic. These waters extend from 3 to 200 mi offshore from the seaward boundary of North Carolina, South Carolina, Georgia, and east Florida to Key West. The South Atlantic Council has thirteen voting members: one from NMFS; one each from the state fishery agencies of North Carolina, South Carolina, Georgia, and Florida; and eight public members appointed by the Secretary. On the South Atlantic Council, there are two public members from each of the four South Atlantic States. Non-voting members include representatives of the U.S. Fish and Wildlife Service, U.S. Coast Guard, State Department, and Atlantic States Marine Fisheries Commission (ASMFC). The South Atlantic Council has adopted procedures whereby the non-voting members serving on the South Atlantic Council Committees have full voting rights at the Committee level but not at the full South Atlantic Council level. The South Atlantic Council also established two voting seats for the Mid-Atlantic Council on the South Atlantic Mackerel Committee. South Atlantic Council members serve three-year terms and are recommended by state governors and appointed by the Secretary from lists of nominees submitted by state governors. Appointed members may serve a maximum of three consecutive terms.

Public interests also are involved in the fishery management process through participation on Advisory Panels and through council meetings, which, with few exceptions for discussing personnel and legal matters, are open to the public. The South Atlantic Council uses its Scientific and Statistical Committee (SSC) to review the data and science being used in assessments and fishery management plans/amendments. In addition, the regulatory process is in accordance with the Administrative Procedure Act, in the form of "notice and comment" rulemaking.

3.5.2 State Fishery Management

The state governments of North Carolina, South Carolina, Georgia, and Florida have the authority to manage fisheries that occur in waters extending three nautical miles from their respective shorelines. North Carolina's marine fisheries are managed by the Marine Fisheries Division of the North Carolina Department of Environmental Quality. The Marine Resources Division of the South Carolina Department of Natural Resources regulates South Carolina's marine fisheries. Georgia's marine fisheries are managed by the Coastal Resources Division of the Department of Natural Resources. The Marine Fisheries Division of the Florida Fish and Wildlife Conservation Commission is responsible for managing Florida's marine fisheries. Each state fishery management agency has a designated seat on the South Atlantic Council. The purpose of state representation at the South Atlantic Council level is to ensure state participation in federal fishery management decision-making and to promote the development of compatible regulations in state and federal waters.

The South Atlantic States are also involved through ASMFC in management of marine fisheries. This commission was created to coordinate state regulations and develop management plans for interstate fisheries. It has significant authority, through the Atlantic Striped Bass Conservation Act and the Atlantic Coastal Fisheries Cooperative Management Act, to compel adoption of consistent state regulations to conserve coastal species. The ASFMC is also represented at the South Atlantic Council level, but does not have voting authority at the South Atlantic Council level.

NMFS's State-Federal Fisheries Division is responsible for building cooperative partnerships to strengthen marine fisheries management and conservation at the state, inter-regional, and national levels. This division implements and oversees the distribution of grants for two national (Inter-jurisdictional Fisheries Act and Anadromous Fish Conservation Act) and two regional (Atlantic Coastal Fisheries Cooperative Management Act and Atlantic Striped Bass Conservation Act) programs. Additionally, it works with the ASMFC to develop and implement cooperative State-Federal fisheries regulations.

3.5.3 Enforcement

Both the NMFS Office for Law Enforcement (NOAA/OLE) and the United States Coast Guard (USCG) have the authority and the responsibility to enforce South Atlantic Council regulations. NOAA/OLE agents, who specialize in living marine resource violations, provide fisheries expertise and investigative support for the overall fisheries mission. The USCG is a multi-mission agency, which provides at sea patrol services for the fisheries mission.

Neither NOAA/OLE nor the USCG can provide a continuous law enforcement presence in all areas due to the limited resources of NOAA/OLE and the priority tasking of the USCG. To supplement at sea and dockside inspections of fishing vessels, NOAA entered into Cooperative Enforcement Agreements with all but one of the states in the Southeast Region (North Carolina), which granted authority to state officers to enforce the laws for which NOAA/OLE has jurisdiction. In recent years, the level of involvement by the states has increased through Joint Enforcement Agreements, whereby states conduct patrols that focus on federal priorities and, in some circumstances, prosecute resultant violators through the state when a state violation has occurred.

The NOAA Office of General Counsel Penalty Policy and Penalty Schedule is available online at http://www.gc.noaa.gov/enforce-office3.html.

Chapter 4. Environmental Effects and Comparison of Alternatives

Note: Preliminary effects analyses all three proposed alternatives. Note that additional alternatives have not yet been approved by the Council.

4.1 Action 1. Establish 30 Special Management Zones in the Exclusive Economic Zone off North Carolina

Alternatives*

1 (No Action). Do not designate new SMZs in the EEZ off North Carolina at permitted artificial reef sites.

2. Establish 30 SMZs at permitted artificial reef sites in the EEZ off North Carolina. Within SMZs, allow harvest of snapper grouper species only with handline, rod and reel, and spear. Limit all harvest to the applicable recreational bag limit.

3. Establish 30 SMZs at permitted artificial reef sites in the EEZ off North Carolina. Within SMZs, allow harvest of snapper grouper species only with handline, rod and reel, and spear. Limit all harvest with spear to the applicable recreational bag limit.

*See Chapter 2 for detailed language of alternatives. Preferred indicated in bold.

4.1.1 Biological Effects

Thirty of North Carolina's 68 artificial reefs are in the exclusive economic zone (EEZ) and none have been designated as Special Management Zones (SMZ) under the federal Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP). According to the North Carolina Division of Marine Fisheries (NCDMF), the use of "highly efficient" gear, including black sea bass pots, sink nets, and bandit gear, is not in line with the intended use of designated artificial reefs. These types of fishing gear can potentially remove large numbers of aggregated snapper and grouper species from small areas such as artificial reefs possibly leading to localized depletion and impacting the health of stocks. Therefore, **Alternative 2** and **Alternative 3** are expected to impart biological benefits to snapper grouper stocks relative to **Alternative 1 (No Action)** since they would prohibit use of fishing gear with a high potential to adversely affect resident communities of snapper grouper species. Of these, **Alternative 2** is more restrictive than **Alternative 3**; hence, it would impart the greatest biological benefits of the alternatives considered.

Spearfishing is considered a highly selective means of harvest. As such, the potential exists for anglers to disproportionately remove large individuals from an area. Among fish species that change sex (e.g., grouper and hogfish), this practice can lead to alterations in sex ratio and social structure, possibly affecting the reproductive potential of a population. Hence, limiting harvest of snapper grouper species with spear to the appropriate recreational bag limit, as proposed under **Alternative 3**, ensures that such disproportionate removal is less likely, thus imparting biological benefits to snapper grouper species relative to **Alternative 1 (No Action)**. As a highly selective type of gear, spearfishing can also result in less bycatch, thus imparting some biological benefits to the resource.

Artificial reefs were designated Essential Fish Habitat (EFH) in the South Atlantic in the Comprehensive Essential Fish Habitat Amendment (SAFMC 1998). Therefore, Special Management Zones around artificial reefs constitute EFH. Special Management Zones are also considered EFH-Habitat Areas of Particular Concern (HAPC) (SAFMC date?). The protection of these habitats from gear impacts and excessive harvest by highly efficient gear types, as proposed under **Alternative 2** and **Alternative 3**, promotes conservation and enhances protection of EFH and EFH-HAPCs in the EEZ off North Carolina.

Expected Effects to Protected Species

The proposed restriction on types of fishing gear that can be used in artificial reef sites may also provide benefits to species listed and protected under the Endangered Species Act (ESA). The NCDMF request maintains that, *as part of the federal permitting process for reef construction, the National Oceanic and Atmospheric Administration Protected Resources Division (NOAA PRD) provides consultation on potential impacts to ESA listed species in North Carolina. NOAA PRD has raised derelict fishing gear as a point of particular concern for many species, highlighting the possibility of entanglement or entrapment. In recent consultations, the Division has been asked to detail its plans for mitigating these impacts presented by artificial reefs. By limiting allowable gears at artificial reef sites, dereliction of gear may become less likely and less frequent, therefore minimizing possible impacts to ESA listed species. The proposed restrictions support the Division's mission of reef enhancement for the benefit of many target species, including snapper and grouper.*

4.1.2 Economic Effects

Alternative 1 (No Action) would maintain the ability to harvest commercial quantities of snapper grouper species in the potential SMZ sites using all legal commercial gear. In the short-term, under this alternative, commercial vessels would have the opportunity to generate the highest landings and thus the highest commercial fishing revenues from these sites among the alternatives considered. There may be long-term costs imposed if harvesting commercial quantities of snapper grouper species leads to localized depletion of these species. These economic effects would be represented by lower commercial landings and thus lower revenue generated from these sites as well as decreased recreational landings from the artificial reef sites, which would lead to reduced overall consumer surplus (CS) that would be generated from the sites.

Alternative 2 would limit harvest to recreational bag limits on the artificial reef sites as well as limit the gear that could be used to handline, rod and reel, and spear. This may lead to reduced commercial revenue generated from the sites or could potentially result in increased trip costs if vessels have to travel further to areas where other commercial gear could be used for snapper grouper species or these species could be harvested in commercial quantities. If snapper grouper species are locally available for harvest in higher quantities due to the limitation on gear and harvest restrictions, then recreational landings from the site may increase leading to higher overall CS generated from the sites.

Alternative 3 would have similar economic effects as **Alternative 2** but is less restrictive for the commercial sector. **Alternative 3** would limit snapper grouper species harvested by spear to

recreational bag limits on the artificial reef sites as well as limit the gear that could be used to handline, rod and reel, and spear. This may lead to reduced commercial revenue generated from the sites or may result in increased trip costs if vessels need to travel further to areas where other commercial gear could be used for snapper grouper species or these species could be harvested in commercial quantities. If snapper grouper species are available for harvest in higher quantities due to the limitation on gear and restricting harvest to recreational quantities for fish harvested with spear gear, then recreational landings from the site may increase leading to higher overall CS generated from the sites.

In terms of potential costs for the commercial sector and potential benefits for the recreational sector, **Alternative 2** would be the most restrictive and thus have the highest potential costs for the commercial sector and highest potential benefits for the recreational sector followed by **Alternative 3**, and **Alternative 1 (No Action)**.

4.1.3 Social Effects

In general, the benefits to fishermen and coastal communities of establishing SMZs would be associated with the biological benefits that result from restricting harvest in the designated areas. If there is improvement in a stock over time, as anticipated, this could benefit fishermen due to the expected spillover effect of restricted areas or fewer regulations associated with improvements in stock abundance. Additionally, improved stock health that fishermen observe firsthand would also improve buy-in for restricted areas. However, in most cases there would be expected negative effects on fishermen and fishing communities if access to fishing grounds is restricted. For commercial fishermen and for-hire businesses that use the fishing grounds, this could negatively affect business profits. For private recreational anglers, restricted access could negatively affect fishing opportunities and trip satisfaction.

Prohibiting use of highly efficient gear such as pots, sink nets, and bandit gear, as proposed in **Alternative 2** and **Alternative 3** would result in negative short-term social effects to fishing communities that participate in the snapper grouper fishery and utilize gear that would be restricted under this action. Those fishermen would need to adjust their businesses to compensate for the decrease in access. Effects on the commercial sector are expected to be greatest as all harvest of snapper grouper species (**Alternative 2**) or harvest by with spear (**Alternative 3**) would be limited to the applicable recreational bag limit. Alternatively, if prohibiting highly efficient gear prevents localized depletion and allows larger fish to survive, it would improve the sustainability of species in the snapper grouper fishery and result in direct long-term social benefits to fishing communities in the form of increased access for all sectors and components of the snapper grouper fishery. Ultimately, the social effects of establishing SMZs in North Carolina would be associated with any biological benefits and subsequent changes in access to the resource. **Alternative 2** is more restrictive than **Alternative 3**; thus, it would result in greatest short-term negative social effects and the greatest long-term positive social effects to coastal communities.

Designating an area as an SMZ, would require compliance and enforcement to be effective. If these are lacking, the SMZ may not generate the expected biological benefits, which would negatively affect fishermen and communities. **Alternative 2** would limit all harvest to the applicable recreational bag limits, which would provide more consistency in regulations than

Alternative 3. Consistency in would be expected to reduce confusion among commercial and recreational fishermen and aid in compliance and enforcement efforts resulting in indirect positive social effects.

4.1.4 Administrative Effects

Alternative 1 (No Action) would not change the administrative environment from its current condition. **Alternatives 2** and **3** would likely have adverse administrative effects if law enforcement conducted at-sea enforcement of the regulations at the proposed SMZs. The adverse administrative effects of **Alternative 3** would likely be greater than **Alternative 2** since **Alternative 2** would limit all harvest to the recreational bag limit, not just harvest by one gear type.

4.2 Action 2. Establish four Special Management Zones in the Exclusive Economic Zone off South Carolina

Alternatives*

1 (No Action). Do not designate additional SMZs in the EEZ off South Carolina at permitted artificial reef sites.

2. Establish four additional SMZs at permitted artificial reef sites in the EEZ off South Carolina. Within the SMZs, allow harvest of snapper grouper species only with handline, rod and reel, and spear. Limit all harvest to the applicable recreational bag limit.

3. Establish four additional SMZs at permitted artificial reef sites in the EEZ off South Carolina. Within the SMZs, allow harvest of snapper grouper species only with handline, rod and reel, and spear. Limit all harvest with spear to the applicable recreational bag limit.

*See Chapter 2 for detailed language of alternatives. Preferred indicated in bold.

4.2.1 Biological Effects

In the SMZs off South Carolina, allowable gear to fish for snapper grouper species is limited to handheld hook and line gear and spearfishing gear (excluding powerheads). The use of fish traps, longlines, gill nets, and trawls is prohibited. In addition, within the SMZs harvest and possession by recreational and commercial fishermen is limited to recreational bag limits. **Preferred Alternative 2** and **Alternative 3** are expected to impart biological benefits to snapper grouper stocks relative to **Alternative 1 (No Action)** since they would prohibit use of fishing gear with a high potential to adversely affect resident communities of snapper grouper species. Of these, **Preferred Alternative 2** is more restrictive than **Alternative 3**; hence, it would impart the greatest biological benefits of the alternatives considered.

Spearfishing is considered a highly selective means of harvest. As such, the potential exists for anglers to disproportionately remove large individuals from an area. Among fish species that change sex (e.g., grouper and hogfish), this practice can lead to alterations in sex ratio and social structure, possibly affecting the reproductive potential of a population. Hence, limiting harvest of snapper grouper species with spear to the appropriate recreational bag limit, as proposed under **Alternative 3**, ensures that such disproportionate removal is less likely, thus imparting biological benefits to snapper grouper species relative to **Alternative 1 (No Action)**. As a highly selective type of gear, spearfishing can also result in less bycatch, thus imparting some biological benefits to the resource.

Because **Preferred Alternative 2** is more restrictive in terms of gear use, it is expected to impart the greatest biological benefits to snapper grouper communities among the alternatives considered. As mentioned previously (Action 1), the concurrent designation of these areas as EFH and EFH-HAPC under **Preferred Alternative 2** and **Alternative 3** would similarly impart biological benefits relative to **Alternative 1 (No Action)**.

Expected Effects to Protected Species

To be completed

4.2.2 Economic Effects

Alternative 1 (No Action) would maintain the ability to harvest commercial quantities of snapper grouper species in the potential SMZ sites using all legal commercial gear. In the short-term, under this alternative, commercial vessels would have to the opportunity to generate the highest landings and thus the highest commercial fishing revenues from these sites among the alternatives considered. There may be long-term costs imposed if harvesting commercial quantities of snapper grouper species leads to localized depletion of these species. These economic effects would be represented by lower commercial landings and thus lower revenue generated from these sites as well as decreased recreational landings from the artificial reef sites, which would lead to reduced overall consumer surplus (CS) that would be generated from the sites.

Preferred Alternative 2 would limit harvest to recreational bag limits on the artificial reef sites as well as limit the gear that could be used to handline, rod and reel, and spear. This may lead to reduced commercial revenue generated from the sites or could potentially result in increased trip costs if vessels have to travel further to areas where other commercial gear could be used for snapper grouper species or these species could be harvested in commercial quantities. If snapper grouper species are locally available for harvest in higher quantities due to the limitation on gear and harvest restrictions, then recreational landings from the site may increase leading to higher overall CS generated from the sites.

Alternative 3 would have similar economic effects as **Preferred Alternative 2** but is less restrictive for the commercial sector. **Alternative 3** would limit snapper grouper species harvested by spear to recreational bag limits on the artificial reef sites as well as limit the gear that could be used to handline, rod and reel, and spear. This may lead to reduced commercial revenue generated from the sites or could potentially result in increased trip costs if vessels have to travel further to areas where other commercial gears could be used for snapper grouper species or these species could be harvested in commercial quantities. If snapper grouper species are available for harvest in higher quantities due to the limitation on gear and restricting harvest to recreational quantities for fish harvested with spear, then recreational landings from the site may increase leading to higher overall CS generated from the sites.

In terms of potential costs for the commercial sector and potential benefits for the recreational sector, **Preferred Alternative 2** would be the most restrictive and thus have the highest potential costs for the commercial sector and highest potential benefits for the recreational sector followed by **Alternative 3**, and **Alternative 1 (No Action)**.

4.2.3 Social Effects

In general, the benefits to fishermen and coastal communities of establishing SMZs would be associated with the biological benefits that result from restricting harvest in the designated areas. If there is improvement in a stock over time, as anticipated, this could benefit fishermen due to the expected spillover effect of restricted areas or fewer regulations associated with improvements in stock abundance. Additionally, improved stock health that fishermen observe firsthand would also improve buy-in for restricted areas. However, in most cases there would be expected negative effects on fishermen and fishing communities if access to fishing grounds is restricted. For commercial fishermen and for-hire businesses that use the fishing grounds, this

could negatively affect business profits. For private recreational anglers, restricted access could negatively affect fishing opportunities and trip satisfaction.

Prohibiting use of highly efficient gear such as pots, sink nets, and bandit gear, as proposed in **Preferred Alternative 2** and **Alternative 3** would result in negative short-term social effects to fishing communities that participate in the snapper grouper fishery and utilize gear that would be restricted under this action. Those fishermen would need to adjust their businesses to compensate for the decrease in access. Effects on the commercial sector are expected to be greatest as all harvest of snapper grouper species (**Preferred Alternative 2**) or harvest by with spear (**Alternative 3**) would be limited to the applicable recreational bag limit. Alternatively, if prohibiting highly efficient gear prevents localized depletion and allows larger fish to survive, it would improve the sustainability of species in the snapper grouper fishery and result in direct long-term social benefits to fishing communities in the form of increased access for all sectors and components of the snapper grouper fishery. Ultimately, the social effects of establishing SMZs in South Carolina would be associated with any biological benefits and subsequent changes in access to the resource. **Preferred Alternative 2** is more restrictive than **Alternative 3**; thus, it would result in greatest short-term negative social effects and the greatest long-term positive social effects to coastal communities.

Designating an area as an SMZ, and prohibiting fishing for snapper grouper species, would require compliance and enforcement to be effective. If these are lacking, the SMZ may not generate the expected biological benefits, which would negatively affect fishermen and communities. **Preferred Alternative 2** would limit all harvest to the applicable recreational bag limits, which would provide more consistency in regulations than **Alternative 3**. Additionally, **Preferred Alternative 2** matches regulations in previously established SMZs in South Carolina. Consistency in would be expected to reduce confusion among commercial and recreational fishermen and aid in compliance and enforcement efforts resulting in indirect positive social effects.

4.2.4 Administrative Effects

Alternative 1 (No Action) would not change the administrative environment from its current condition. **Preferred Alternative 2** and **Alternative 3** would likely have adverse administrative effects if law enforcement conducted at-sea enforcement of the regulations at the proposed SMZs. The adverse administrative effects of **Alternative 3** would likely be greater than **Preferred Alternative 2** since **Preferred Alternative 2** would limit all harvest to the recreational bag limit, not just harvest by one gear type.

Chapter 5. South Atlantic Council's Rationale for the Preferred Alternatives

5.1 Action 1.

5.1.1 Snapper Grouper Advisory Panel (AP) Comments and Recommendations

5.1.2 Law Enforcement AP Comments and Recommendations

5.1.3 Scientific and Statistical Committee (SSC) Comments and Recommendations

*Alternatives***

5.1.4 Public Comments and Recommendations

5.1.5 South Atlantic Council's Rationale

5.1.6 How is this Action Addressing the Vision Blueprint for the Snapper Grouper Fishery?

Chapter 6. Cumulative Effects

6.1 Affected Area

The immediate impact area would be the federal 200-mile limit of the Atlantic off the coasts of North Carolina, South Carolina, Georgia, and east Florida to Key West, which is also the South Atlantic Fishery Management Council's (South Atlantic Council) area of jurisdiction. In light of the available information, the extent of the boundaries would depend upon the degree of fish immigration/emigration and larval transport, whichever has the greatest geographical range. The ranges of affected species are described in **Chapter 3**. For the actions found in Vision Blueprint Regulatory Amendment 26 (Regulatory Amendment 26) to the Fishery Management Plan (FMP) for the Snapper Grouper fishery of the South Atlantic Region (Snapper Grouper FMP), the cumulative effects analysis includes an analysis of data from 2014 through the present.

6.2 Past, Present, and Reasonably Foreseeable Actions Impacting the Affected Area

Fishery managers implemented the first significant regulations pertaining to snapper grouper species in 1983 through the Snapper Grouper FMP (Snapper Grouper FMP; SAFMC 1983). Listed below are other past, present, and reasonably foreseeable actions occurring in the South Atlantic Region. These actions, when added to the proposed management measures, may result in cumulative effects on the biophysical and socio-economic environment. The complete history of management of the snapper grouper fishery can be found in **Appendix C (History of Management)**.

Past Actions

The Blueline Tilefish Emergency Rule implemented temporary measures to reduce overfishing of blueline tilefish while permanent measures were being developed in Amendment 32 to the Snapper Grouper FMP (Amendment 32). The temporary rule removed the blueline tilefish portion from the Deep-water Complex annual catch limit (ACL), and established separate commercial and recreational ACLs and accountability measures (AMs). The emergency rule published on April 17, 2014 (79 FR 21636). Those measures were extended through a temporary rule on October 14, 2014 (79 FR 61262, October 10, 2014), and were effective through April 18, 2015, while Amendment 32 and the associated rulemaking were being developed.

The Generic Dealer Reporting Amendment, which became effective on August 7, 2014, established one dealer permit for the Gulf of Mexico and South Atlantic regions and increased the reporting frequency requirements for species managed by the South Atlantic Council and Gulf of Mexico Fishery Management Council. This amendment was expected to improve

fisheries data collection, through more timely and accurate dealer reporting, and streamline the dealer permit system.

Regulatory Amendment 21 to the Snapper Grouper FMP, which became effective on November 6, 2014, modified the definition of the overfished threshold for red snapper, blueline tilefish, gag, black grouper, yellowtail snapper, vermilion snapper, red porgy, and greater amberjack.

Amendment 32 to the Snapper Grouper FMP, which became effective on March 30, 2015, implemented measures to end overfishing of blueline tilefish. The amendment removed blueline tilefish from the Deep-water Complex, specified AMs, recreational ACLs, and a commercial trip limit, and adjusted the recreational bag limit. The amendment also specified ACLs and revised the AMs for the recreational section of the Deep-water Complex (yellowedge grouper, silk snapper, misty grouper, queen snapper, sand tilefish, and blackfin snapper).

Amendment 29 to the Snapper Grouper FMP, which became effective on July 1, 2015, updated the South Atlantic Council's acceptable biological catch (ABC) control rule to incorporate methodology for determining the ABC of "Only Reliable Catch Stocks," adjusted ABCs for the affected unassessed species, specified ACLs for seven species based on the updated ABCs, and modified management measures for gray triggerfish.

Regulatory Amendment 20 to the Snapper Grouper FMP, which became effective on August 20, 2015, adjusted the recreational and commercial ACLs for snowy grouper, as well as adjusted the rebuilding strategy, modified the commercial trip limit and the recreational bag limit, and modified the recreational fishing season.

Amendment 33 to the Snapper Grouper FMP (also included with Amendment 7 to the FMP for the Dolphin and Wahoo Fishery of the Atlantic), which became effective on December 28, 2015, in part, was implemented to allow recreational fishermen to bring dolphin and wahoo fillets from The Commonwealth of The Bahamas (The Bahamas) into the U.S. exclusive economic zone (EEZ), and update regulations allowing recreational fishermen to bring snapper grouper fillets from the Bahamas into the U.S. EEZ.

Amendment 34 to the Snapper Grouper FMP (included in the Generic AM and Dolphin Allocation Amendment), in part, modified AMs for snapper grouper species to make them more consistent with AMs already implemented for other species and other FMPs. The regulations became effective on February 22, 2016.

Amendment 35 to the Snapper Grouper FMP, which became effective on June 22, 2016, was implemented to remove four species from the FMP (black snapper, dog snapper, mahogany snapper, and schoolmaster), and clarified regulations implementing the golden tilefish longline endorsement.

Regulatory Amendment 25 to the Snapper Grouper FMP, in part, revised the commercial and recreational ACLs for blueline tilefish and implemented a recreational season. The regulations for blueline tilefish became effective on July 13, 2016.

Amendment 36 to the Snapper Grouper FMP, which became effective on July 31, 2017, was implemented to establish new Spawning Special Management Zones to protect spawning areas for snapper grouper species.

Amendment 41 to the Snapper Grouper FMP, which became effective on February 10, 2018, modified management of mutton snapper in the South Atlantic to respond to a recent stock assessment and protect mutton snapper during the spawning season. Actions in the amendment include the modification of management benchmarks and allowable fishing levels. The amendment also designated the "spawning months" (during which stricter regulations may apply), modified the minimum size limit, recreational bag limit, and commercial trip limit.

Golden Tilefish Interim Measures to the Snapper Grouper FMP which became effective on January 2, 2018, was implemented to reduce the golden tilefish total ACLs for 2018 while the South Atlantic Council develops management measures to end overfishing on a permanent basis through Regulatory Amendment 28. These interim measures were effective for 180 days after the date of publication of the final temporary rule through July 1, 2018. The temporary rule was extended for an additional 186 days through a temporary rule extension, and was effective through January 3, 2019.

Abbreviated Framework 1 to the Snapper Grouper FMP, which became effective on August 27, 2018, was implemented to address overfishing of red grouper, and reduced the commercial and recreational ACLs for red grouper in the South Atlantic EEZ.

Regulatory Amendment 28 to the Snapper Grouper FMP, considers actions that would end overfishing of golden tilefish by reducing the total ACL. The proposed rule published on September 27, 2018, and the comment period ended on October 12, 2018. The final rule published on December 4, 2018, and became effective on January 4, 2019.

Present Actions

The Vision Blueprint Commercial Regulatory Amendment 27 (Regulatory Amendment 27) for the Snapper Grouper FMP considers actions to modify commercial regulations for blueline tilefish, snowy grouper, greater amberjack, red porgy, vermilion snapper, almaco jack, Other Jacks Complex (lesser amberjack, almaco jack, and banded rudderfish), queen snapper, silk snapper, blackfin snapper, and gray triggerfish. Actions include modifying fishing seasons, trip limits, and minimum size limits. The amendment was approved for Secretarial review at the September-October 2018 South Atlantic Council meeting.

Reasonably Foreseeable Future Actions

The South Atlantic Council has moved to end overfishing through the revised ABC and ACL for red grouper that was implemented via Abbreviated Framework Amendment 1 (effective August 18, 2018) but has not yet revised the red grouper rebuilding plan. At the March 2018 meeting, the South Atlantic Council directed staff to develop Regulatory Amendment 30 to the Snapper Grouper FMP to revise the current rebuilding plan before the next red grouper assessment is completed (currently scheduled as a standard assessment in 2021) to meet the statutory deadline of September 17, 2019. At the June 2018 meeting, the Snapper Grouper Committee moved actions from the Vision Blueprint amendments addressing modification to the

spawning season closure for red grouper to Regulatory Amendment 30, and also requested that an additional action be added to establish a commercial trip limit. The abbreviated framework amendment was reviewed and public comment was received at the September-October 2018 meeting. Final approval for Secretarial review is expected to be held at the June 2019 South Atlantic Council meeting.

At the March 2018 meeting, the South Atlantic Council directed staff to continue to develop Regulatory Amendment 29 to the Snapper Grouper FMP to address the use of best fishing practices and powerhead regulations in a framework amendment to expedite development (these actions were previously included in Amendment 46). The framework amendment was approved for scoping at the June 2018 meeting, and scoping hearings were conducted on August 7 and 8, 2018, via webinar meeting. The framework amendment is expected to continue being developed in 2019.

At their June 2018 meeting, the South Atlantic Council reviewed Amendment 45 to the Snapper Grouper FMP (included in the Comprehensive ABC Control Rule Amendment) Options Paper and comments, and approved the document for scoping in late 2018. The amendment would modify the ABC control rule, specify an approach for determining the acceptable risk of overfishing and the probability of rebuilding success for overfished stocks, allow phase-in of ABC changes, and allow carry-over of unharvested catch. The South Atlantic Council reviewed actions and alternatives and provided guidance at their December 2018 meeting, and is expected to continue developing the amendment in 2019.

Regulatory Amendment 31 to the Snapper Grouper FMP (included with the Dolphin Wahoo Regulatory Amendment 2 in the Recreational Accountability Measures Amendment) considers actions to modify the in-season closures for the recreational sector. The South Atlantic Council reviewed actions and alternatives in the generic regulatory amendment and provided guidance at the December 2018 meeting, and is expected to continue developing the amendment in 2019.

At the March 2018 meeting, the South Atlantic Council directed staff to conduct scoping webinars for Amendment 42 to the Snapper Grouper FMP for proposed modifications to regulations for vessels with South Atlantic snapper grouper commercial or for-hire permits to allow the use of three additional sea turtle release gear types. The amendment also proposes changes to the snapper grouper framework procedure to facilitate modifying protected resources' release gear and handling requirements in the future. Scoping hearings were conducted in April 2018, scoping comments and an overview of the decision document were presented at the June 2018 meeting. The South Atlantic Council approved the amendment for public hearings at the December 2018 South Atlantic Council meeting, and final approval for Secretarial review is expected to be held at the March 2019 South Atlantic Council meeting.

Expected Impacts from Past, Present, and Future Actions

In recent years, participants in the recreational sector of the snapper grouper fishery and associated businesses have experienced some negative economic and social impacts due to changes in ACLs and early closures during the fishing years. Factors such as distance to fishing grounds, weather, and water temperature affect availability of species to the recreational fleets in different parts of the South Atlantic Council's jurisdiction.

The intent of Regulatory Amendment 26 is to address recreational stakeholder input to increase predictability for the deep-water component of the recreational snapper grouper fishery, minimize regulatory discards, and improve regulatory compliance and consistency. Actions 1 through 3 were proposed to establish a Deep-water Species Aggregate, including specifying the recreational season and bag limit for these species. Since modifying the species composition of recreational aggregates does not alter the current harvest or use of the resource there are also no anticipated direct or indirect economic or social effects on private recreational and for-hire participants, associated industries, or communities. The South Atlantic Council reasoned that creating an aggregate comprised of deep-water species with similar habitat requirements and life histories would facilitate implementing regulations for them. Grouping these species together was intended to allow the South Atlantic Council more flexibility to apply management approaches that would balance access to resource users and promote predictability, and optimize access to this group of species for recreational anglers throughout the South Atlantic Region. However, fishermen's access to these species from different areas of the South Atlantic region is heavily influenced by factors such as distance to fishing grounds and weather. Consequently, management measures such as a recreational season (considered in **Action 2**) are difficult to implement with the same level of success region-wide. Hence, the South Atlantic Council chose to make no changes for Actions 1-3.

Action 4 was proposed to reduce discard mortality and thus impart biological benefits for the affected species (queen snapper, silk snapper, and blackfin snapper). Snapper grouper species that inhabit deep-water are typically associated with high discard mortality. To curb potential discard losses, the South Atlantic Council is considering Action 4 to eliminate minimum size limit requirements for queen snapper, silk snapper, and blackfin snapper. However, removing the minimum size limit would likely have minimal effect on current recreational trips because these species are not commonly caught. Action 5 proposes to modify the minimum size limit for gray triggerfish in federal waters off the east coast of Florida. The reduction in the minimum size limit for gray triggerfish responds to stakeholders concerns regarding increasing discards of gray triggerfish in south Florida where the average size of gray triggerfish is smaller than in northeast Florida and is also intended to bring regulatory consistency. Action 6 proposes to limit harvest within the 20-fish aggregate to 10 fish of any one species to simplify regulations, and could be biologically beneficial to the well-being of the stocks.

When combined with the impacts of past, present, and future actions affecting the snapper grouper fishery, specifically for the species in Regulatory Amendment 26, minor cumulative impacts are likely to accrue. For example, there could be beneficial cumulative effects from the actions in this framework amendment, in addition to future proposed actions to reduce overfishing of snapper grouper species, require the use of descending devices, and reducing bycatch. Also, there may be cumulative socio-economic effects by promoting access to the fishery which would improve recreational fishing opportunities and benefits to associated businesses and communities; however, the actions in this framework amendment are not expected to result in significant cumulative adverse biological or socio-economic effects to the snapper grouper fishery when combined with the impacts of past, present, and future actions (see **Chapter 4**).

6.3 Consideration of Climate Change and Other Non-Fishery Related Issues

Climate Change

Global climate changes could have significant effects on South Atlantic fisheries, though the extent of these effects on the snapper grouper fishery is not known at this time. The Environmental Protection Agency's climate change webpage (https://www.epa.gov/climate-indicators/marine-species-distribution), and NOAA's Office of Science and Technology climate webpage (https://www.st.nmfs.noaa.gov/ecosystems/climate/index), provides background information on climate change, including indicators which measure or anticipate effects on oceans, weather and climate, ecosystems, health and society, and greenhouse gases. The United Nations Intergovernmental Panel on Climate Change's Fifth Assessment Report also provides a compilation of scientific information on climate change (November 2, 2014). Those findings are summarized below.

Ocean acidification, or a decrease in surface ocean pH due to absorption of anthropogenic carbon dioxide emissions, affects the chemistry and temperature of the water. Increased thermal stratification alters ocean circulation patterns, and causes a loss of sea ice, sea level rise, increased wave height and frequency, reduced upwelling, and changes in precipitation and wind patterns. Changes in coastal and marine ecosystems can influence organism metabolism and alter ecological processes such as productivity, species interactions, migration, range and distribution, larval and juvenile survival, prey availability, and susceptibility to predators. The "center of biomass," a geographical representation of each species' weight distribution, is being used to identify the shifting of fish populations. Warming sea temperature trends in the southeast have been documented, and animals must migrate to cooler waters, if possible, if water temperatures exceed survivable ranges (Needham et al. 2012). Harvesting and habitat changes also cause geographic population shifts. Changes in water temperatures may also affect the distribution of native and exotic species, allowing invasive species to establish communities in areas they may not have been able to survive previously. The combination of warmer water and expansion of salt marshes inland with sea-level rise may increase productivity of estuarine-dependent species in the short term. However, in the long term, this increased productivity may be temporary because of loss of fishery habitats due to wetland loss (Kennedy et al. 2002). The numerous changes to the marine ecosystem may cause an increased risk of disease in marina biota. An increase in the occurrence and intensity of toxic algae blooms will negatively influence the productivity of keystone animals, such as corals, and critical coastal ecosystems such as wetlands, estuaries, and coral reefs (Kennedy et al. 2002; IPCC 2014).

Climate change may impact snapper grouper species in the future, but the level of impacts cannot be quantified at this time, nor is the time frame known in which these impacts will occur. In the near term, it is unlikely that the management measures contained in Regulatory Amendment 26 would compound or exacerbate the ongoing effects of climate change on snapper grouper species.

Weather Variables

Hurricane season is from June 1 to November 30, and accounts for 97% of all tropical activity affecting the Atlantic basin. These storms, although unpredictable in their annual

occurrence, can devastate areas when they occur. Although these effects may be temporary, those fishing-related businesses whose profitability is marginal may go out of business if a hurricane strikes.

Deepwater-Horizon Oil Spill

On April 20, 2010, an explosion occurred on the Deepwater Horizon MC252 oil rig, resulting in the release of an estimated 4.9 million barrels of oil into the Gulf of Mexico (Gulf). In addition, 1.84 million gallons of Corexit 9500A dispersant were applied as part of the effort to constrain the spill. The cumulative effects from the oil spill and response may not be known for several years. The oil spill affected more than one-third of the Gulf area from western Louisiana east to the panhandle of Florida and south to the Campeche Bank in Mexico. The impacts of the Deepwater Horizon MC252 oil spill on the physical environment are expected to be significant and may be long-term. Oil is dispersed on the surface, and because of the heavy use of dispersants, oil is also documented as being suspended within the water column, some even deeper than the location of the broken well head. Floating and suspended oil washed onto shore in several areas of the Gulf, as well as non-floating tar balls. Whereas suspended and floating oil degrades over time, tar balls are more persistent in the environment and can be transported hundreds of miles. Oil on the surface of the water could restrict the normal process of atmospheric oxygen mixing into and replenishing oxygen concentrations in the water column. In addition, microbes in the water that break down oil and dispersant also consume oxygen; this could lead to further oxygen depletion. Zooplankton that feed on algae could also be negatively impacted, thus allowing more of the hypoxia-fueling algae to grow.

The highest concern is that the oil spill may have impacted spawning success of species that spawn in the summer months, either by reducing spawning activity or by reducing survival of the eggs and larvae. Effects on the physical environment, such as low oxygen, could lead to impacts on the ability of larvae and post-larvae to survive, even if they never encounter oil. In addition, effects of oil exposure may create sub-lethal effects on the eggs, larva, and early life stages. The stressors could potentially be additive, and each stressor may increase the susceptibility to the harmful effects of the other. The oil from the spill site was not detected in the South Atlantic Region, and does not likely pose a threat to the South Atlantic species addressed in this amendment. However, the effects of the oil spill on fish species would be taken into consideration in future Southeast Data Assessment and Review assessments. Indirect and inter-related effects on the biological and ecological environment of the fisheries in concert with the Deepwater Horizon MC252 oil spill are not well understood. Changes in the population size structure could result from shifting fishing effort to specific geographic segments of populations, combined with any anthropogenically induced natural mortality that may occur from the impacts of the oil spill. The impacts on the food web from phytoplankton, to zooplankton, to mollusks, to top predators may be significant in the future.

6.4 Overall Impacts Expected from Past, Present, and Future Actions

The proposed actions are intended to address recreational stakeholder input to increase predictability for the deep-water component of the recreational snapper grouper fishery,

minimize regulatory discards, and improve regulatory compliance and consistency. The actions are expected to improve management of the recreational component of the snapper grouper fishery to achieve optimum yield, while minimizing, to the extent practicable, adverse socio-economic effects for recreational fishermen in the South Atlantic Region. The proposed management actions are summarized in **Chapter 2** of this document. Detailed discussions of the magnitude and significance of the impacts of the alternatives on the human environment appear in **Chapter 4** of this document. None of the impacts of the actions in this amendment, in combination with past, present, and future actions have been determined to be significant. Although several other management actions, in addition to this amendment, are expected to affect snapper grouper species, any additive effects, beneficial and adverse, are not expected to result in a significant level of cumulative impacts.

The proposed actions would not adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places as these are not in the South Atlantic EEZ. These actions are not likely to result in direct, indirect, or cumulative effects to unique areas, such as significant scientific, cultural, or historical resources, park land, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas as the proposed action is not expected to substantially increase fishing effort or the spatial and/or temporal distribution of current fishing effort within the South Atlantic region. The U.S. Monitor, Gray's Reef, and Florida Keys National Marine Sanctuaries are within the boundaries of the South Atlantic EEZ. The proposed actions are not likely to cause loss or destruction of these national marine sanctuaries because the actions are not expected to result in appreciable changes to current fishing practices. Additionally, the proposed actions are not likely to change the way in which the snapper grouper fishery is prosecuted; therefore, the actions are not expected to result in adverse impacts on health or human safety beyond the status quo.

6.5 Monitoring and Mitigation

Fishery-independent and fishery-dependent data comprise a significant portion of information used in stock assessments. Fishery-independent data are being collected through the Southeast Fishery Information Survey and the Marine Resources Monitoring Assessment and Prediction Program. The effects of the proposed actions are, and would continue to be, monitored through collection of recreational landings data by all the four states in the South Atlantic Region (Florida, Georgia, South Carolina, and North Carolina). The National Marine Fisheries Service would continue to monitor and collect information on snapper grouper species for stock assessments and stock assessment updates, life history studies, economic and social analyses, and other scientific observations. The proposed actions relate to the harvest of indigenous species in the Atlantic, and the activities/regulations being altered do not introduce non-indigenous species, and are not reasonably expected to facilitate the spread of such species through depressing the populations of native species. Additionally, these alternatives do not propose any activity, such as increased ballast water discharge from foreign vessels, which is associated with the introduction or spread on non-indigenous species.

Chapter 7. List of Interdisciplinary Plan Team (IPT) Members

Name	Agency/Division	Title
Brian Cheuvront	SAFMC	Deputy Executive Director for Management
Myra Brouwer	SAFMC	IPT Lead/Fishery Biologist
Chip Collier	SAFMC	Fishery Scientist/Data Analyst
Scott Crosson	SEFSC	Economist
Rick DeVictor	SERO/SF	South Atlantic Branch Chief
Mike Errigo	SAFMC	Data analyst
Frank Helies	SERO/SF	IPT Lead/Fishery Biologist
Tony Lamberte	SERO/SF	Economist
Mike Larkin	SERO/SF	Data Analyst
Jennifer Lee	SERO/PR	Biologist
Christina Package-Ward	SERO/SF	Social Scientist
Nikhil Mehta	NMFS/SER	NEPA
Scott Sandorf	SERO/SF	Technical Writer and Editor
Kate Siegfried	SEFSC	Biologist
Monica Smit-Brunello	NOAA GC	General Counsel
TBD	SERO/OLE	
Christina Wiegand	SAFMC	Social Scientist

NOAA=National Oceanic and Atmospheric Administration, NMFS = National Marine Fisheries Service, SERO = Southeast Regional Office, SF = Sustainable Fisheries Division, PR = Protected Resources Division, HC = Habitat Conservation Division, SEFSC=Southeast Fisheries Science Center, GC = General Counsel

Chapter 8. Agencies and Persons Consulted

Responsible Agency

South Atlantic
South Atlantic Fishery Management Council
4055 Faber Place Drive, Suite 201
Charleston, South Carolina 29405
(843) 571-4366 (TEL)
Toll Free: 866-SAFMC-10
(843) 769-4520 (FAX)
safmc@safmc.net

NMFS, Southeast Region
263 13th Avenue South
St. Petersburg, Florida 33701
(727) 824-5301 (TEL)
(727) 824-5320 (FAX)

Environmental Assessment:

List of Agencies, Organizations, and Persons Consulted
SAFMC Law Enforcement Advisory Panel
SAFMC Snapper Grouper Advisory Panel
SAFMC Scientific and Statistical Committee
North Carolina Coastal Zone Management Program
South Carolina Coastal Zone Management Program
Georgia Coastal Zone Management Program
Florida Coastal Zone Management Program
Florida Fish and Wildlife Conservation Commission
Georgia Department of Natural Resources
South Carolina Department of Natural Resources
North Carolina Division of Marine Fisheries
North Carolina Sea Grant
South Carolina Sea Grant
Georgia Sea Grant
Florida Sea Grant
Atlantic States Marine Fisheries Commission
Gulf and South Atlantic Fisheries Development Foundation
Gulf of Mexico Fishery Management Council
National Marine Fisheries Service
- Washington Office
- Office of Ecology and Conservation
- Southeast Regional Office
- Southeast Fisheries Science Center

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Appendix A. Considered But Rejected Alternatives

Appendix B. Glossary

Allowable Biological Catch (ABC): Maximum amount of fish stock than can be harvested without adversely affecting recruitment of other components of the stock. The ABC level is typically higher than the total allowable catch, leaving a buffer between the two.

ALS: Accumulative Landings System. NMFS database which contains commercial landings reported by dealers.

Biomass: Amount or mass of some organism, such as fish.

B_{MSY}: Biomass of population achieved in long-term by fishing at F_{MSY}.

Bycatch: Fish harvested in a fishery, but not sold or kept for personal use. Bycatch includes economic discards and regulatory discards, but not fish released alive under a recreational catch and release fishery management program.

Caribbean Fishery Management Council (CFMC): One of eight regional councils mandated in the Magnuson-Stevens Fishery Conservation and Management Act to develop management plans for fisheries in federal waters. The CFMC develops fishery management plans for fisheries off the coast of the U.S. Virgin Islands and the Commonwealth of Puerto Rico.

Catch Per Unit Effort (CPUE): The amount of fish captured with an amount of effort. CPUE can be expressed as weight of fish captured per fishing trip, per hour spent at sea, or through other standardized measures.

Charter Boat: A fishing boat available for hire by recreational anglers, normally by a group of anglers for a short time period.

Cohort: Fish born in a given year. (See year class.)

Control Date: Date established for defining the pool of potential participants in a given management program. Control dates can establish a range of years during which a potential participant must have been active in a fishery to qualify for a quota share.

Constant Catch Rebuilding Strategy: A rebuilding strategy where the allowable biological catch of an overfished species is held constant until stock biomass reaches B_{MSY} at the end of the rebuilding period.

Constant F Rebuilding Strategy: A rebuilding strategy where the fishing mortality of an overfished species is held constant until stock biomass reached BMSY at the end of the rebuilding period.

Directed Fishery: Fishing directed at a certain species or species group.
Discards: Fish captured, but released at sea.

Discard Mortality Rate: The % of total fish discarded that do not survive being captured and released at sea.

Derby: Fishery in which the TAC is fixed and participants in the fishery do not have individual quotas. The fishery is closed once the TAC is reached, and participants attempt to maximize their harvests as quickly as possible. Derby fisheries can result in capital stuffing and a race for fish.

Effort: The amount of time and fishing power (i.e., gear size, boat size, horsepower) used to harvest fish.

Exclusive Economic Zone (EEZ): Zone extending from the shoreline out to 200 nautical miles in which the country owning the shoreline has the exclusive right to conduct certain activities such as fishing. In the United States, the EEZ is split into state waters (typically from the shoreline out to 3 nautical miles) and federal waters (typically from 3 to 200 nautical miles).

Exploitation Rate: Amount of fish harvested from a stock relative to the size of the stock, often expressed as a percentage.

F: Fishing mortality.

Fecundity: A measurement of the egg-producing ability of fish at certain sizes and ages.

Fishery Dependent Data: Fishery data collected and reported by fishermen and dealers.

Fishery Independent Data: Fishery data collected and reported by scientists who catch the fish themselves.

Fishery Management Plan: Management plan for fisheries operating in the federal produced by regional fishery management councils and submitted to the Secretary of Commerce for approval.

Fishing Effort: Usually refers to the amount of fishing. May refer to the number of fishing vessels, amount of fishing gear (nets, traps, hooks), or total amount of time vessels and gear are actively engaged in fishing.

Fishing Mortality: A measurement of the rate at which fish are removed from a population by fishing. Fishing mortality can be reported as either annual or instantaneous. Annual mortality is the percentage of fish dying in one year. Instantaneous is that percentage of fish dying at any one time.

Fishing Power: Measure of the relative ability of a fishing vessel, its gear, and its crew to catch fishes, in reference to some standard vessel, given both vessels are under identical conditions.

$F_{30\%SPR}$: Fishing mortality that will produce a static SPR = 30%.

$F_{45\%SPR}$: Fishing mortality that will produce a static SPR = 45%.

F_{OY}: Fishing mortality that will produce OY under equilibrium conditions and a corresponding biomass of B_{OY}. Usually expressed as the yield at 85% of F_{MSY}, yield at 75% of F_{MSY}, or yield at 65% of F_{MSY}.

F_{MSY}: Fishing mortality that if applied constantly, would achieve MSY under equilibrium conditions and a corresponding biomass of B_{MSY}.

Fork Length (FL): The length of a fish as measured from the tip of its snout to the fork in its tail.

Framework: An established procedure within a fishery management plan that has been approved and implemented by NMFS, which allows specific management measures to be modified via framework amendment.

Gear restrictions: Limits placed on the type, amount, number, or techniques allowed for a given type of fishing gear.

Growth Overfishing: When fishing pressure on small fish prevents the fishery from producing the maximum poundage. Condition in which the total weight of the harvest from a fishery is improved when fishing effort is reduced, due to an increase in the average weight of fishes.

Gulf of Mexico Fishery Management Council (GFMC): One of eight regional councils mandated in the Magnuson-Stevens Fishery Conservation and Management Act to develop management plans for fisheries in federal waters. The GFMC develops fishery management plans for fisheries off the coast of Texas, Louisiana, Mississippi, Alabama, and the west coast of Florida.

Headboat: A fishing boat that charges individual fees per recreational angler onboard.

Highgrading: Form of selective sorting of fishes in which higher value, more marketable fishes are retained, and less marketable fishes, which could legally be retained are discarded.

Individual Fishing Quota (IFQ): Fishery management tool that allocates a certain portion of the TAC to individual vessels, fishermen, or other eligible recipients.

Longline: Fishing method using a horizontal mainline to which weights and baited hooks are attached at regular intervals. Gear is either fished on the bottom or in the water column.

Magnuson-Stevens Fishery Conservation and Management Act: Federal legislation responsible for establishing the fishery management councils and the mandatory and discretionary guidelines for federal fishery management plans.

Marine Recreational Information Program (MRIP): Survey operated by NMFS in cooperation with states that collects marine recreational data.

Maximum Fishing Mortality Threshold (MFMT): The rate of fishing mortality above which a stock's capacity to produce MSY would be jeopardized.

Maximum Sustainable Yield (MSY): The largest long-term average catch that can be taken continuously (sustained) from a stock or stock complex under average environmental conditions.

Minimum Stock Size Threshold (MSST): The biomass level below which a stock would be considered overfished.

Modified F Rebuilding Strategy: A rebuilding strategy where fishing mortality is changed as stock biomass increases during the rebuilding period.

Multispecies fishery: Fishery in which more than one species is caught at the same time and location with a particular gear type.

National Marine Fisheries Service (NMFS): Federal agency within NOAA responsible for overseeing fisheries science and regulation.

National Oceanic and Atmospheric Administration: Agency within the Department of Commerce responsible for ocean and coastal management.

Natural Mortality (M): A measurement of the rate at which fish are removed from a population by natural causes. Natural mortality can be reported as either annual or instantaneous. Annual mortality is the percentage of fish dying in one year. Instantaneous is that percentage of fish dying at any one time.

Optimum Yield (OY): The amount of catch that will provide the greatest overall benefit to the nation, particularly with respect to food production and recreational opportunities and taking into account the protection of marine ecosystems.

Overfished: A stock or stock complex is considered overfished when stock biomass falls below the minimum stock size threshold (MSST) (e.g., current biomass < MSST = overfished).

Overfishing: Overfishing occurs when a stock or stock complex is subjected to a rate of fishing mortality that exceeds the maximum fishing mortality threshold (e.g., current fishing mortality rate > MFMT = overfishing).

Quota: % or annual amount of fish that can be harvested.

Recruitment (R): Number or percentage of fish that survives from hatching to a specific size or age.

Recruitment Overfishing: The rate of fishing above which the recruitment to the exploitable stock becomes significantly reduced. This is characterized by a greatly reduced spawning stock, a decreasing proportion of older fish in the catch, and generally very low recruitment year after year.

Scientific and Statistical Committee (SSC): Fishery management advisory body composed of federal, state, and academic scientists, which provides scientific advice to a fishery management council.

Selectivity: The ability of a type of gear to catch a certain size or species of fish.

South Atlantic Fisheries Management Council (SAFMC): One of eight regional councils mandated in the Magnuson-Stevens Fishery Conservation and Management Act to develop management plans for fisheries in federal waters. The SAFMC develops fishery management plans for fisheries off North Carolina, South Carolina, Georgia, and the east coast of Florida.

Spawning Potential Ratio (Transitional SPR): Formerly used in overfished definition. The number of eggs that could be produced by an average recruit in a fished stock divided by the number of eggs that could be produced by an average recruit in an unfished stock. SPR can also be expressed as the spawning stock biomass per recruit (SSBR) of a fished stock divided by the SSBR of the stock before it was fished.

% Spawning Per Recruit (Static SPR): Formerly used in overfishing determination. The maximum spawning per recruit produced in a fished stock divided by the maximum spawning per recruit, which occurs under the conditions of no fishing. Commonly abbreviated as %SPR.

Spawning Stock Biomass (SSB): The total weight of those fish in a stock which are old enough to spawn.

Spawning Stock Biomass Per Recruit (SSBR): The spawning stock biomass divided by the number of recruits to the stock or how much spawning biomass an average recruit would be expected to produce.

Total Allowable Catch (TAC): The total amount of fish to be taken annually from a stock or stock complex. This may be a portion of the Allowable Biological Catch (ABC) that takes into consideration factors such as bycatch.

Total Length (TL): The length of a fish as measured from the tip of the snout to the tip of the tail.

Appendix C. Regulatory Impact Review

Appendix D. Regulatory Flexibility Analysis

Appendix E. Other Applicable Laws

1.1 Administrative Procedure Act (APA)

All federal rulemaking is governed under the provisions of the APA (5 U.S.C. Subchapter II), which establishes a "notice and comment" procedure to enable public participation in the rulemaking process. Among other things under the APA, the National Marine Fisheries Service (NMFS) is required to publish notification of proposed rules in the *Federal Register* and to solicit, consider and respond to public comment on those rules before they are finalized. The APA also establishes a 30-day wait period from the time a final rule is published until it takes effect, with some exceptions. Vision Blueprint Recreational Regulatory Amendment 26 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Regulatory Amendment 26) complies with the provisions of the APA through the South Atlantic Fishery Management Council's (Council) extensive use of public meetings, requests for comments and consideration of comments. The proposed rule associated with this amendment will have a request for public comments, which complies with the APA, and upon publication of the final rule, unless the rule falls within an APA exception, there will be a 30-day wait period before the regulations are effective.

1.2 Information Quality Act (IQA)

The IQA (Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-443)) which took effect October 1, 2002, directed the Office of Management and Budget (OMB) to issue government-wide guidelines that "provide policy and procedural guidelines to federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information disseminated by federal agencies." OMB directed each federal agency to issue its own guidelines, establish administrative mechanisms allowing affected persons to seek and obtain correction of information that does not comply with OMB guidelines, and report periodically to OMB on the number and nature of complaints. The NOAA Section 515 Information Quality Guidelines require a series of actions for each new information product subject to the IQA. Regulatory Amendment 26 uses the best available information and made a broad presentation thereof. The information contained in this document was developed using best available scientific information. Therefore, this document is in compliance with the IQA.

1.3 Coastal Zone Management Act (CZMA)

Section 307(c)(1) of the federal CZMA of 1972 requires that all federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. While it is the goal of the Council to have management measures that complement those of the states, federal and state administrative procedures vary and regulatory changes are unlikely to be fully instituted at the same time. The Council believes the actions in this amendment are consistent to the maximum extent practicable with the Coastal

Zone Management Plans of Florida, Georgia, South Carolina, and North Carolina. Pursuant to Section 307 of the CZMA, this determination will be submitted to the responsible state agencies who administer the approved Coastal Zone Management Programs in the States of Florida, South Carolina, Georgia, and North Carolina.

1.4 Endangered Species Act (ESA)

The ESA of 1973 (16 U.S.C. Section 1531 et seq.) requires that federal agencies must ensure actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or the habitat designated as critical to their survival and recovery. The ESA requires NMFS to consult with the appropriate administrative agency (itself for most marine species, and the U.S. Fish and Wildlife Service for all remaining species) when proposing an action that may affect threatened or endangered species or adversely modify critical habitat. Consultations are necessary to determine the potential impacts of the proposed action. They are concluded informally when proposed actions may affect but are "not likely to adversely affect" threatened or endangered species or designated critical habitat. Formal consultations, resulting in a biological opinion, are required when proposed actions may affect and are "likely to adversely affect" threatened or endangered species or adversely modify designated critical habitat.

On December 1, 2016, NMFS completed its most recent formal consultation on the snapper grouper fishery of the South Atlantic Region. In the resulting biological opinion (2016 Opinion), NMFS concluded that the snapper grouper fishery's continued authorization is not likely to jeopardize the continued existence of the NARW, loggerhead sea turtle Northwest Atlantic DPSs, leatherback sea turtle, Kemp's ridley sea turtle, green sea turtle North Atlantic DPS, green sea turtle South Atlantic DPS, hawksbill sea turtle, smalltooth sawfish U.S. DPS, or Nassau grouper.

Additionally, since publication of the 2016 Opinion, NMFS has published two additional final listing rules. On January 22, 2018, NMFS listed the giant manta ray (*Manta birostris*) as threatened under the ESA, effective February 21, 2018. On January 30, 2018, NMFS listed the oceanic whitetip shark (*Carcharinus longimanus*) as threatened under the ESA, effective March 1, 2018. In a June 11, 2018, memo NMFS documented ESA Section 7(a)(2) and Section 7(d) determinations for allowing the continued authorization of fishing managed by the Snapper Grouper FMP, during reinitiation of ESA consultation on this fishery, for its effects on the giant manta ray and the oceanic whitetip shark. Based on the analysis, NMFS determined that allowing the proposed action to continue during the reinitiation period will not violate Section 7(a)(2) or 7(d). This Section 7(a)(2) determination is only applicable to the proposed action during the reinitiation period and does not address the agency's long-term obligation to ensure its actions are not likely to jeopardize the continued existence of any listed species or destroy or adversely modify critical habitat.

NMFS concluded that the proposed action is not likely to adversely affect designated critical habitat or other ESA-listed species in the South Atlantic Region. Refer to **Section 3.2.5 (Protected Species**) for summary information on species, or DPSs of species, protected by federal law that may occur in the EEZ of the South Atlantic Region, or the analyses ("Section 7

consultations") conducted by NMFS to evaluate the potential adverse effects from the South Atlantic snapper grouper fishery on species and critical habitat protected under the ESA.

1.5 Executive Order 12612: Federalism

E.O. 12612 requires agencies to be guided by the fundamental federalism principles when formulating and implementing policies that have federalism implications. The purpose of the Order is to guarantee the division of governmental responsibilities between the federal government and the states, as intended by the framers of the Constitution. No federalism issues have been identified relative to the actions proposed in this document and associated regulations. Therefore, preparation of a Federalism assessment under E.O. 12612 is not necessary.

1.6 Executive Order 12866: Regulatory Planning and Review

E.O. 12866, signed in 1993, requires federal agencies to assess the costs and benefits of their proposed regulations, including distributional impacts, and to select alternatives that maximize net benefits to society. To comply with E.O. 12866, NMFS prepares a Regulatory Impact Review (RIR) for all fishery regulatory actions that implement a new fishery management plan (FMP) or that significantly amend an existing plan. RIRs provide a comprehensive analysis of the costs and benefits to society associated with proposed regulatory actions, the problems and policy objectives prompting the regulatory proposals, and the major alternatives that could be used to solve the problems. The reviews also serve as the basis for the agency's determinations as to whether proposed regulations are a "significant regulatory action" under the criteria provided in E.O. 12866 and whether proposed regulations will have a significant economic impact on a substantial number of small entities in compliance with the Regulatory Flexibility Act. A regulation is significant if it is likely to result in an annual effect on the economy of at least $100,000,000 or if it has other major economic effects.

A regulation is significant if it: 1) has an annual effect on the economy of $100 million or more or adversely affects in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments and communities; 2) creates a serious inconsistency or otherwise interferes with an action taken or planned by another agency; 3) materially alters the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or 4) raises novel legal or policy issues arising out of legal mandates,the President's priorities, or the principles set forth in this Executive Order.

This amendment includes the RIR as **Appendix E**.

1.7 Executive Order 12898: Environmental Justice

E.O. 12898 requires that "to the greatest extent practicable and permitted by law…each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations in the United States and its territories and possessions.…"

The alternatives being considered in this document are not expected to result in any disproportionate adverse human health or environmental effects to minority populations or low-income populations of Florida, North Carolina, South Carolina, or Georgia, rather the impacts would be spread across all participants in the snapper grouper fishery regardless of race or income. A detailed description of the communities impacted by the actions contained in this document and potential socioeconomic impacts of those actions are contained in **Chapters 3** and **4** of this document

1.8 Executive Order 12962: Recreational Fisheries

E.O. 12962 requires federal agencies, in cooperation with states and tribes, to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities through a variety of methods. Additionally, the Order establishes a seven-member National Recreational Fisheries Coordination Council responsible for, among other things, ensuring that social and economic values of healthy aquatic systems that support recreational fisheries are considered by federal agencies in the course of their actions, sharing the latest resource information and management technologies, and reducing duplicative and cost-inefficient programs among federal agencies involved in conserving or managing recreational fisheries. The National Recreational Fisheries Coordination Council also is responsible for developing, in cooperation with federal agencies, states and tribes, a Recreational Fishery Resource Conservation Plan - to include a five-year agenda. Finally, the Order requires NMFS and the U.S. Fish and Wildlife Service to develop a joint agency policy for administering the ESA.

The alternatives considered in this document are consistent with the directives of E.O. 12962.

1.9 Executive Order 13089: Coral Reef Protection

E.O. 13089, signed by President William Clinton on June 11, 1998, recognizes the ecological, social, and economic values provided by the Nation's coral reefs and ensures that federal agencies are protecting these ecosystems. More specifically, the Order requires federal agencies to identify actions that may harm U.S. coral reef ecosystems, to utilize their program and authorities to protect and enhance the conditions of such ecosystems, and to ensure that their actions do not degrade the condition of the coral reef ecosystem.

The alternatives considered in this document are consistent with the directives of E.O. 13089.

1.10 Executive Order 13158: Marine Protected Areas (MPAs)

E.O. 13158 was signed on May 26, 2000, to strengthen the protection of U.S. ocean and coastal resources through the use of Marine Protected Areas. The E.O. defined MPAs as "any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein." It directs federal agencies to work closely with state, local and non- governmental

partners to create a comprehensive network of MPAs "representing diverse U.S. marine ecosystems, and the Nation's natural and cultural resources."

The alternatives considered in this document are consistent with the directives of E.O. 13158.

1.11 Marine Mammal Protection Act (MMPA)

The MMPA established a moratorium, with certain exceptions, on the taking of marine mammals in U.S. waters and by U.S. citizens on the high seas. It also prohibits the importing of marine mammals and marine mammal products into the United States. Under the MMPA, the Secretary of Commerce (authority delegated to NMFS) is responsible for the conservation and management of cetaceans and pinnipeds (other than walruses). The Secretary of the Interior is responsible for walruses, sea otters, polar bears, manatees, and dugongs. Part of the responsibility that NMFS has under the MMPA involves monitoring populations of marine mammals to make sure that they stay at optimum levels. If a population falls below its optimum level, it is designated as "depleted." A conservation plan is then developed to guide research and management actions to restore the population to healthy levels.

In 1994, Congress amended the MMPA, to govern the taking of marine mammals incidental to commercial fishing operations. This amendment required the preparation of stock assessments for all marine mammal stocks in waters under U.S. jurisdiction; development and implementation of take-reduction plans for stocks that may be reduced or are being maintained below their optimum sustainable population levels due to interactions with commercial fisheries; and studies of pinniped-fishery interactions. The MMPA requires a commercial fishery to be placed in one of three categories, based on the relative frequency of incidental serious injuries and mortalities of marine mammals. Category I designates fisheries with frequent serious injuries and mortalities incidental to commercial fishing; Category II designates fisheries with occasional serious injuries and mortalities; and Category III designates fisheries with a remote likelihood or no known serious injuries or mortalities.

Under the MMPA, to legally fish in a Category I and/or II fishery, a fisherman must take certain steps. For example, owners of vessels or gear engaging in a Category I or II fishery, are required to obtain a marine mammal authorization by registering with the Marine Mammal Authorization Program (50 CFR 229.4). They are also required to accommodate an observer if requested (50 CFR 229.7(c)) and they must comply with any applicable take reduction plans. The commercial hook-and-line components of the South Atlantic snapper grouper fishery (i.e., bottom longline, bandit gear, and handline), which targets snapper grouper species are listed as part of a Category III fishery in the final List of Fisheries (LOF) for 2017 and 2018 (82 FR 3655, January 12, 2017; and 83 FR 5349, February 7, 2018, respectively) because there have been no documented interactions between these gear and marine mammals. The black sea bass pot component of the South Atlantic snapper grouper fishery is part of the Atlantic mixed species trap/pot fishery, a Category II fishery, in the final List of Fisheries (LOF) for 2017 and 2018 (82 FR 3655, January 12, 2017; and 83 FR 5349, February 7, 2018, respectively). The Atlantic mixed species trap/pot fishery designation was created in 2003 (68 FR 41725, July 15, 2003), by combining several separately listed trap/pot fisheries into a single group. This group was designated Category II as a precaution because of known interactions between marine mammals

and gear similar to those included in this group. Prior to this consolidation, the black sea bass pot fishery in the South Atlantic was a part of the "U.S. Mid-Atlantic and Southeast U.S. Atlantic Black Sea Bass Trap/Pot" fishery (Category III). There has never been a documented interaction between marine mammals and black sea bass trap/pot gear in the South Atlantic. The actions in this EA are not expected to negatively impact the provisions of the MMPA.

1.12 National Environmental Policy Act (NEPA)

This document has been written and organized in a manner that meets NEPA requirements, and thus is a consolidated NEPA document, including an EA, as described in NOAA Administrative Order (NAO) 216- 6A, Section 7.

Purpose and Need for Action

The purpose and need for this action are described in **Chapter 1**.

Alternatives

The alternatives for this action are described in **Chapter 2**.

Affected Environment

The affected environment is described in **Chapter 3**.

Impacts of the Alternatives

The impacts of the alternatives on the environment are described in **Chapter 4**.

1.13 National Marine Sanctuaries Act (NMSA)

Under the NMSA (also known as Title III of the Marine Protection, Research and Sanctuaries Act of 1972), as amended, the U.S. Secretary of Commerce is authorized to designate National Marine Sanctuaries to protect distinctive natural and cultural resources whose protection and beneficial use requires comprehensive planning and management. The National Marine Sanctuary Program is administered by the Sanctuaries and Reserves Division of NOAA. The NMSA provides authority for comprehensive and coordinated conservation and management of these marine areas. The National Marine Sanctuary Program currently comprises 13 sanctuaries around the country, including sites in American Samoa and Hawaii. These sites include significant coral reef and kelp forest habitats, and breeding and feeding grounds of whales, sea lions, sharks, and sea turtles. The three sanctuaries in the South Atlantic exclusive economic zone are the USS Monitor, Gray's Reef, and Florida Keys National Marine Sanctuaries.

The alternatives considered in this document are not expected to have any adverse impacts on the resources managed by the National Marine Sanctuaries.

1.14 Paperwork Reduction Act (PRA)

The purpose of the PRA is to minimize the burden on the public. The PRA is intended to ensure that the information collected under the proposed action is needed and is collected in an efficient manner (44 U.S.C. 3501 (1)). The authority to manage information collection and record keeping requirements is vested with the Director of the Office of Management and Budget (OMB). This authority encompasses establishment of guidelines and policies, approval of information collection requests, and reduction of paperwork burdens and duplications. The PRA requires NMFS to obtain approval from the OMB before requesting most types of fishery information from the public. Actions in this document are not expected to affect PRA.

1.15 Regulatory Flexibility Act (RFA)

The RFA of 1980 (5 U.S.C. 601 et seq.) requires federal agencies to assess the impacts of regulatory actions implemented through notice and comment rulemaking procedures on small businesses, small organizations, and small governmental entities, with the goal of minimizing adverse impacts of burdensome regulations and record-keeping requirements on those entities. Under the RFA, NMFS must determine whether a proposed fishery regulation would have a significant economic impact on a substantial number of small entities. If not, a certification to this effect must be prepared and submitted to the Chief Counsel for Advocacy of the Small Business Administration. Alternatively, if a regulation is determined to significantly impact a substantial number of small entities, the RFA requires the agency to prepare an initial and final Regulatory Flexibility Analysis to accompany the proposed and final rule, respectively. These analyses, which describe the type and number of small businesses, affected, the nature and size of the impacts, and alternatives that minimize these impacts while accomplishing stated objectives, must be published in the *Federal Register* in full or in summary for public comment and submitted to the chief counsel for advocacy of the Small Business Administration. Changes to the RFA in June 1996 enable small entities to seek court review of an agency's compliance with the RFA's provisions.

As NMFS has determined whether a proposed fishery regulation would have a significant economic impact on a substantial number of small entities, a certification to this effect will be prepared and submitted to the Chief Counsel for Advocacy of the Small Business Administration.

This amendment includes the RFA as **Appendix F**.

1.16 Small Business Act (SBA)

Enacted in 1953, the SBA requires that agencies assist and protect small-business interests to the extent possible to preserve free competitive enterprise. The objectives of the SBA are to foster business ownership by individuals who are both socially and economically disadvantaged; and to promote the competitive viability of such firms by providing business development assistance including, but not limited to, management and technical assistance, access to capital and other forms of financial assistance, business training, and counseling, and access to sole source and limited competition federal contract opportunities, to help firms achieve competitive viability. Because most businesses associated with fishing are considered small businesses, NMFS, in

implementing regulations, must make an assessment of how those regulations will affect small businesses.

1.17 Public Law 99-659: Vessel Safety

Public Law 99-659 amended the Magnuson-Stevens Fishery Conservation and Management Act to require that a FMP or FMP amendment must consider, and may provide for, temporary adjustments (after consultation with the U.S. Coast Guard and persons utilizing the fishery) regarding access to a fishery for vessels that would be otherwise prevented from participating in the fishery because of safety concerns related to weather or to other ocean conditions. No vessel would be forced to participate in South Atlantic fisheries under adverse weather or ocean conditions as a result of the imposition of management regulations proposed in this amendment. No concerns have been raised by South Atlantic fishermen or by the U.S. Coast Guard that the proposed management measures directly or indirectly pose a hazard to crew or vessel safety under adverse weather or ocean conditions

Appendix F. Essential Fish Habitat and Ecosystem-based Management

South Atlantic Fishery Management Council Habitat Conservation, Ecosystem Coordination and Collaboration

The South Atlantic Fishery Management Council (Council), using the Essential Fish Habitat (EFH) Plan as the cornerstone, adopted a strategy to facilitate the move to an ecosystem-based approach to fisheries management in the region. This approach required a greater understanding of the South Atlantic ecosystem and the complex relationships among humans, marine life, and the environment including essential fish habitat. To accomplish this, a process was undertaken to facilitate the evolution of the Habitat Plan into a Fishery Ecosystem Plan (FEP), thereby providing a more comprehensive understanding of the biological, social, and economic impacts of management necessary to initiate the transition from single species management to ecosystem-based management in the region.

Moving to Ecosystem-Based Management

The Council adopted broad goals for Ecosystem-Based Management to include maintaining or improving ecosystem structure and function; maintaining or improving economic, social, and cultural benefits from resources; and maintaining or improving biological, economic, and cultural diversity. Development of a regional FEP (SAFMC 2009b) provided an opportunity to expand the scope of the original Council Habitat Plan and compile and review available habitat, biological, social, and economic fishery and resource information for fisheries in the South Atlantic ecosystem. The Council views habitat conservation as the core of the move to EBM in the region. Therefore, development of the FEP was a natural next step in the evolution and expands and significantly updates the SAFMC Habitat Plan (SAFMC 1998a) incorporating comprehensive details of all managed species (SAFMC, South Atlantic States, ASMFC, and NOAA Fisheries Highly Migratory Species and Protected Species) including their biology, food web dynamics, and economic and social characteristics of the fisheries and habitats essential to their survival. The FEP therefore serves as a source document and presents more complete and detailed information describing the South Atlantic ecosystem and the impact of fisheries on the environment. This FEP updated information on designated EFH and EFH-Habitat Areas of Particular Concern; expanded descriptions of biology and status of managed species; presented information that will support ecosystem considerations for managed species; and described the social and economic characteristics of the fisheries in the region. In addition, it expanded the discussion and description of existing research programs and needs to identify biological, social, and economic research needed to fully address ecosystem-based management in the region. It is anticipated that the FEP will provide a greater degree of guidance by fishery, habitat, or major ecosystem consideration of bycatch reduction, prey-predator interactions, maintaining biodiversity, and spatial management needs. This FEP serves as a living source document of biological, economic, and social information for all Fishery Management Plans (FMP). Future Environmental Assessments and Environmental Impact Statements associated with subsequent amendments to Council FMPs will draw from or cite by reference the FEP.

The Fishery Ecosystem Plan for the South Atlantic Region encompasses the following volume structure:
FEP Volume I - Introduction and Overview of FEP for the South Atlantic Region
FEP Volume II - South Atlantic Habitats and Species
FEP Volume III - South Atlantic Human and Institutional Environment
FEP Volume IV - Threats to South Atlantic Ecosystem and Recommendations
FEP Volume V - South Atlantic Research Programs and Data Needs
FEP Volume VI - References and Appendices

Comprehensive Ecosystem-Based Amendment (CE-BA) 1 (SAFMC 2009b) is supported by this FEP and updated EFH and EFH-HAPC information and addressed the Final EFH Rule (e.g., GIS presented for all EFH and EFH-HAPCs). Management actions implemented in CE-BA 1 established deep-water Coral HAPCs to protect what is thought to be the largest continuous distribution (>23,000 square miles) of pristine, deep-water coral ecosystems in the world.

The Fishery Ecosystem Plan, slated to be revised every 5 years, will again be the vehicle to update and refine information supporting designation and future review of EFH and EFH-HAPCs for managed species. Planning for the update is being conducted in cooperation with the Habitat Advisory Panel during the fall and winter of 2013 with initiation during 2014.

Ecosystem Approach to Deep-water Ecosystem Management

The Council manages coral, coral reefs and live/hard bottom habitat, including deep-water corals, through the Fishery Management Plan for Coral, Coral Reefs and Live/Hard Bottom Habitat of the South Atlantic Region (Coral FMP). Mechanisms exist in the FMP, as amended, to further protect deep-water coral and live/hard bottom habitats. The SAFMC's Habitat and Environmental Protection Advisory Panel and Coral Advisory Panel have supported proactive efforts to identify and protect deep-water coral ecosystems in the South Atlantic region. Management actions in Comprehensive Ecosystem-Based Amendment (CE-BA 1) (SAFMC 2009b) established deep-water coral HAPCs (C- HAPCs) to protect what is thought to be the largest continuous distribution (>23,000 square miles) of pristine deep-water coral ecosystems in the world. In addition, CE-BA 1 established areas within the CHAPC, which provide for traditional fishing in limited areas, which do not impact deep-water coral habitat. CE-BA 1, supported by the FEP, also addressed non-regulatory updates for existing EFH and EFH- HAPC information and addressed the spatial requirements of the Final EFH Rule (i.e., GIS presented for all EFH and EFH-HAPCs). Actions in this amendment included modifications in the management of the following: octocorals; special management zones (SMZs) off the coast of South Carolina; and sea turtle release gear requirements for snapper grouper fishermen. The amendment also designated essential fish habitat (EFH) and EFH-Habitat Areas of Particular Concern (EFH-HAPCs).

CE-BA 2 established annual catch limits (ACL) for octocorals in the South Atlantic as well as modifying the Fishery Management Unit (FMU) for octocorals to remove octocorals off the coast of Florida from the FMU (SAFMC 2011). The amendment also limited the possession of managed species in the SMZs off South Carolina to the recreational bag limit for snapper grouper and coastal migratory pelagic species; modified sea turtle release gear requirements for

the snapper grouper fishery based upon freeboard height of vessels; amends Council fishery management plans (FMPs) to designate or modify EFH and EFH-HAPCs, including the FMP for Pelagic Sargassum Habitat; amended the Coral FMP to designate EFH for deep-water Coral HAPCs designated under CE-BA 1; and amended the Snapper Grouper FMP to designate EFH-HAPCs for golden and blueline tilefish and the deep-water Marine Protected Areas. The final rule was published in the Federal Register on December 30, 2011, and regulations became effective on January 30, 2012.

Building from a Habitat to an Ecosystem Network to Support the Evolution

Starting with our Habitat and Environmental Protection Advisory Panel, the Council expanded and fostered a comprehensive Habitat network in our region to develop the Habitat Plan of the South Atlantic Region completed in 1998 to support the EFH rule. Building on the core regional collaborations, the Council facilitated an expansion to a Habitat and Ecosystem network to support development of the FEP and CE-BA as well as coordinate with partners on other regional efforts.

Integrated Ocean Observing System (IOOS) and Southeast Coastal and Ocean Observing Regional Association (SECOORA)

The Integrated Ocean Observing System (IOOS®) is a partnership among federal, regional, academic, and private sector parties that works to provide new tools and forecasts to improve safety, enhance the economy, and protect our environment. IOOS supplies critical information about our Nation's oceans, coasts, and Great Lakes. Scientists working to understand climate change, governments adapting to changes in the Arctic, municipalities monitoring local water quality, and industries affected by coastal and marine spatial planning all have the same need: reliable, timely, and sustained access to data and information that inform decision making. Improving access to key marine data and information supports several purposes. IOOS data sustain national defense, marine commerce, and navigation safety. Scientists use these data to issue weather, climate, and marine forecasts. IOOS data are also used to make decisions for energy siting and production, economic development, and ecosystem-based resource management. Emergency managers and health officials need IOOS information to make decisions about public safety. Teachers and government officials rely on IOOS data for public outreach, training, and education.

SECOORA is one of 11 Regional Associations established nationwide through the US IOOS whose primary source of funding is through a 5-year cooperative agreement titled "Coordinated Monitoring, Prediction, and Assessment to Support Decision-Makers Needs for Coastal and Ocean Data and Tools". However, SECOORA was recently awarded funding via a NOAA Regional Ocean Partnership grant through the Governors' South Atlantic Alliance. SECOORA is the regional solution to integrating coastal and ocean observing data in the Southeast United States to inform decision makers and the general public. The SECOORA region encompasses 4 states, over 42 million people, and spans the coastal ocean from North Carolina to the west Coast of Florida and is creating customized products to address these thematic areas: Marine Operations; Coastal Hazards; Ecosystems, Water Quality, Living Marine Resources; and Climate Change. The Council is a voting member and Council staff was recently re-elected to serve on the Board of Directors for the Southeast Coastal Regional Ocean Observing Association to guide and direct priority needs for observation and modeling to support fisheries oceanography and

integration into stock assessments through SEDAR. Cooperation through SECOORA is envisioned to facilitate the following:

- •Refining current or water column designations of EFH and EFH-HAPCs (e.g., Gulf Stream and Florida Current).
- •Providing oceanographic models linking benthic, pelagic habitats, and food webs.
- •Providing oceanographic input parameters for ecosystem models.
- •Integration of OOS information into Fish Stock Assessment process in the SA region.
- •Facilitating OOS system collection of fish and fishery data and other research necessary to support the Council's use of area-based management tools in the SA Region including but not limited to EFH, EFH-HAPCs, Marine Protected Areas, Deep-water Coral Habitat Areas of Particular Concern, Special Management Zones, and Allowable Gear Areas.
- •Integration of OOS program capabilities and research Needs into the South Atlantic Fishery Ecosystem Plan.
- •Collaboration with SECOORA to integrate OOS products with information included in the Council's Habitat and Ecosystem Web Services and Atlas to facilitate model and tool development.
- •Expanding Map Services and the Regional Habitat and Ecosystem Atlas in cooperation with SECOORAs Web Services that will provide researchers access to data or products including those collected/developed by SA OOS partners.

SECOORA researchers are developing a comprehensive data portal to provide discovery of, access to, and metadata about coastal ocean observations in the southeast US. Below are various ways to access the currently available data.

One project recently funded by SECOORA initiated development of species specific habitat models that integrate remotely sensed and in situ data to enhance stock assessments for species managed by the Council. The project during 2013/2014 was initiated to address red porgy, gray triggerfish, black seabass, and vermilion snapper. Gray triggerfish and red porgy are slated for assessment through SEDAR in 2014/15 and 2015/16 respectively.

National Fish Habitat Plan and Southeast Aquatic Resource Partnership (SARP)

In addition, the Council serves on the National Habitat Board and, as a member of the Southeast Aquatic Resource Partnership (SARP), has highlighted this collaboration by including the Southeast Aquatic Habitat Plan (SAHP) and associated watershed conservation restoration targets into the FEP. Many of the habitat, water quality, and water quantity conservation needs identified in the threats and recommendations Volume of the FEP are directly addressed by on-the-ground projects supported by SARP. This cooperation results in funding fish habitat restoration and conservation intended to increase the viability of fish populations and fishing opportunity, which also meets the needs to conserve and manage
EFH for Council managed species or habitat important to their prey. To date, SARP has funded 53 projects in the region through this program. This work supports conservation objectives identified in the SAHP to improve, establish, or maintain riparian zones, water quality, watershed connectivity, sediment flows, bottoms and shorelines, and fish passage, and addresses other key factors associated with the loss and degradation of fish habitats. SARP also developed the Southern Instream Flow Network (SIFN) to address the impacts of flow alterations in the Southeastern US aquatic ecosystems which leverages policy, technical experience, and scientific

resources among partners based in 15 states. Maintaining appropriate flow into South Atlantic estuarine systems to support healthy inshore habitats essential to Council managed species is a major regional concern and efforts of SARP through SIFN are envisioned to enhance state and local partners ability to maintain appropriate flow rates.

Governor's South Atlantic Alliance (GSAA)

Initially discussed as a South Atlantic Eco-regional Compact, the Council has also cooperated with South Atlantic States in the formation of a Governor's South Atlantic Alliance (GSAA). This will also provide regional guidance and resources that will address State and Council broader habitat and ecosystem conservation goals. The GSAA was initiated in 2006. An Executive Planning Team (EPT), by the end of 2007, had created a framework for the Governors South Atlantic Alliance. The formal agreement between the four states (NC, SC, GA, and FL) was executed in May 2009. The Agreement specifies that the Alliance will prepare a "Governors South Atlantic Alliance Action Plan" which will be reviewed annually for progress and updated every five years for relevance of content. The Alliance's mission and purpose is to promote collaboration among the four states, and with the support and interaction of federal agencies, academe, regional organizations, non-governmental organizations, and the private sector, to sustain and enhance the region's coastal and marine resources. The Alliance proposes to regionally implement science-based actions and policies that balance coastal and marine ecosystems capacities to support both human and natural systems. The GSAA Action Plan was released in December 2010 and describes the four Priority Issue Areas that were identified by the Governors to be of mutual importance to the sustainability of the region's resources: Healthy Ecosystems; Working Waterfronts; Clean Coastal and Ocean Waters; and Disaster-Resilient Communities. The goals, objectives, actions, and implementation steps for each of these priorities were further described in the GSAA Implementation Plan released in July 2011. The final Action Plan was released on December 1, 2010 and marked the beginning of intensive work by the Alliance Issue Area Technical Teams (IATTs) to develop implementation steps for the actions and objectives. The GSAA Implementation Plan was published July 6, 2011, and the Alliance has been working to implement the Plan through the IATTs and two NOAA-funded Projects. The Alliance also partners with other federal agencies, academia, non-profits, private industry, regional organizations, and others. The Alliance supports both national and state-level ocean and coastal policy by coordinating federal, state, and local entities to ensure the sustainability of the region's economic, cultural, and natural resources. The Alliance has organized itself around the founding principles outlined in the GSAA Terms of Reference and detailed in the GSAA Business Plan. A team of natural resource managers, scientists, and information management system experts have partnered to develop a Regional Information Management System (RIMS) and recommend decision support tools that will support regional collaboration and decision-making. In addition to regional-level stakeholders, state and local coastal managers and decision makers will also be served by this project, which will enable ready access to new and existing data and information. The collection and synthesis of spatial data into a suite of visualization tools is a critical step for long-term collaborative planning in the South Atlantic region for a wide range of coastal uses. The Council's Atlas presents the spatial representations of EFH, managed areas, regional fish and fish habitat distribution, and fishery operation information and it can be linked to or drawn on as a critical part of the collaboration with the RIMS.

South Atlantic Landscape Conservation Cooperative

One of the more recent collaborations is the Council's participation as Steering Committee member for the newly establish South Atlantic Landscape Conservation Cooperative (SALCC). Landscape Conservation Cooperatives (LCCs) are applied conservation science partnerships focused on a defined geographic area that informs on-the-ground strategic conservation efforts at landscape scales. LCC partners include DOI agencies, other federal agencies, states, tribes, non-governmental organizations, universities, and others. The newly formed Department of Interior Southeast Climate Services Center (CSC) has the LCCs in the region as their primary clients. One of the initial charges of the CSCs is to downscale climate models for use at finer scales.

The SALCC developed a Strategic Plan through an iterative process that began in December 2011. The plan provides a simple strategy for moving forward over the next few years. An operations plan was developed under direction from the SALCC Steering Committee to redouble efforts to develop version 1.0 of a shared conservation blueprint by spring-summer of 2014. The SALCC is developing the regional blueprint to address the rapid changes in the South Atlantic including but not limited to climate change, urban growth, and increasing human demands on resources which are reshaping the landscape. While these forces cut across political and jurisdictional boundaries, the conservation community does not have a consistent cross-boundary, cross-organization plan for how to respond. The South Atlantic Conservation Blueprint will be that plan. The blueprint is envisioned to be a spatially-explicit map depicting the places and actions need to sustain South Atlantic LCC objectives in the face of future change. The steps to creating the blueprint include development of: indicators and targets (shared metrics of success); the State of the South Atlantic (past, present, and future condition of indicators); and a Conservation Blueprint. Potential ways the blueprint could be used include: finding the best places for people and organizations to work together; raising new money to implement conservation actions; guiding infrastructure development (highways, wind, urban growth, etc.); creating incentives as an alternative to regulation; bringing a landscape perspective to local adaptation efforts; and locating places and actions to build resilience after major disasters (hurricanes, oil spills, etc.). Integration of connectivity, function, and threats to river, estuarine and marine systems supporting Council managed species is supported by the SALCC and enhanced by the Council being a voting member of its Steering Committee. In addition, the Council's Regional Atlas presents spatial representations of Essential Fish Habitat, managed areas, regional fish and fish habitat distribution, and fishery operation information and it be linked to or drawn on as a critical part of the collaboration with the recently developed SALCC Conservation Planning Atlas.

Building Tools to support EBM in the South Atlantic Region

The Council has developed a Habitat and Ecosystem Section of the website http://www.safmc.net/ecosystem/Home/EcosystemHome/tabid/435/Default.aspx and, in cooperation with the Florida Wildlife Research Institute (FWRI), developed a Habitat and Ecosystem Internet Map Server (IMS). The IMS was developed to support Council and regional partners' efforts in the transition to EBM. Other regional partners include NMFS Habitat Conservation, South Atlantic States, local management authorities, other Federal partners, universities, conservation organizations, and recreational and commercial fishermen. As technology and spatial information needs evolved, the distribution and use of GIS demands greater capabilities. The Council has continued its collaboration with FWRI in the now

evolution to Web Services provided through the regional SAFMC Habitat and Ecosystem Atlas (http://ocean.floridamarine.org/safmc_atlas/) and the SAFMC Digital Dashboard (http://ocean.floridamarine.org/safmc_dashboard/). The Atlas integrates services for the following:

Species distribution and spatial presentation of regional fishery independent data from the SEAMAP-SA, MARMAP, and NOAA SEFIS systems; SAFMC Fisheries: (http://ocean.floridamarine.org/SA_Fisheries/)

Essential Fish Habitat and Essential Fish Habitat Areas of Particular Concern; SAFMC EFH: (http://ocean.floridamarine.org/sa_efh/)

Spatial presentation of managed areas in the region; SAFMC Managed Areas: (http://ocean.floridamarine.org/safmc_managedareas/)

An online life history and habitat information system supporting Council managed, State managed, and other regional species was developed in cooperation with FWRI. The Ecospecies system is considered dynamic and presents, as developed, detailed individual species life history reports and provides an interactive online query capability for all species included in the system: http://atoll.floridamarine.org/EcoSpecies

Web Services System Updates:
Essential Fish Habitat (EFH) – displays EFH and EFH-HAPCS for SAFMC managed species and NOAA Fisheries Highly Migratory Species.
Fisheries - displays Marine Resources Monitoring, Assessment, and Prediction (MARMAP) and Southeast Area Monitoring and Assessment Program South Atlantic (SEAMAP-SA) data.
Managed Areas - displays a variety of regulatory boundaries (SAFMC and Federal) or management boundaries within the SAFMC's jurisdiction.
Habitat – displays habitat data collected by SEADESC, Harbor Branch Oceanographic Institute (HBOI), and Ocean Exploration dives, as well as the SEAMAP shallow and ESDIM deep-water bottom mapping projects, multibeam imagery, and scientific cruise data.
Multibeam Bathymetry - displays a variety of multibeam data sources and scanned bathymetry charts.
Nautical Charts – displays coastal, general, and overview nautical charts for the SAFMC's jurisdictional area.

Ecosystem Based Action, Future Challenges and Needs

The Council has implemented ecosystem-based principles through several existing fishery management actions including establishment of deep-water Marine Protected Areas for the Snapper Grouper fishery, proactive harvest control rules on species (e.g., dolphin and wahoo) which are not overfished, implementing extensive gear area closures which in most cases eliminate the impact of fishing gear on EFH, and use of other spatial management tools including Special Management Zones. Pursuant to development of the Comprehensive Ecosystem-Based Amendment, the Council has taken an ecosystem approach to protect deep-water ecosystems while providing for traditional fisheries for the Golden Crab and Royal Red shrimp in areas where they do not impact deep-water coral habitat. The stakeholder based process taps in on an

extensive regional Habitat and Ecosystem network. Supporttools facilitate Council deliberations and with the help of regional partners, are being refined to address long-term ecosystem management needs.

One of the greatest challenges to the long-term move to EBM in the region is funding high priority research, including but not limited to, comprehensive benthic mapping and ecosystem model and management tool development. In addition, collecting detailed information on fishing fleet dynamics including defining fishing operation areas by species, species complex, and season, as well as catch relative to habitat is critical for assessment of fishery, community, and habitat impacts and for Council use in place based management measures. Additional resources need to be dedicated to expand regional coordination of modeling, mapping, characterization of species use of habitats, and full funding of regional fishery independent surveys (e.g., MARMAP, SEAMAP, and SEFIS) which are linking directly to addressing high priority management needs. Development of ecosystem information systems to support Council management should build on existing tools (e.g., Regional Habitat and Ecosystem GIS and Arc Services) and provide resources to regional cooperating partners for expansion to address long-term Council needs.

The FEP and CE-BA 1 complement, but do not replace, existing FMPs. In addition, the FEP serves as a source document to the CE-BAs. NOAA should support and build on the regional coordination efforts of the Council as it transitions to a broader management approach. Resources need to be provided to collect information necessary to update and refine our FEP and support future fishery actions including but not limited to completing one of the highest priority needs to support EBM, the completion of mapping of near-shore, mid-shelf, shelf edge, and deep-water habitats in the South Atlantic region. In developing future FEPs, the Council will draw on SAFEs (Stock Assessment and Fishery Evaluation reports) which NMFS is required to provide the Council for all FMPs implemented under the Magnuson-Stevens Act. The FEP, which has served as the source document for CE-BAs, could also meet some of the NMFS SAFE requirements if information is provided to the Council to update necessary sections.

EFH and EFH-HAPC Designations Translated to Cooperative Habitat Policy Development and Protection

The Council actively comments on non-fishing projects or policies that may impact fish habitat. Appendix A of the Comprehensive Amendment Addressing Essential Fish Habitat in Fishery Management Plans of the South Atlantic Region (SAFMC 1998b) outlines the Council's comment and policy development process and the establishment of a four-state Habitat Advisory Panel. Members of the Habitat Advisory Panel serve as the Council's habitat contacts and professionals in the field. AP members bring projects to the Council's attention, draft comment letters, and attend public meetings. With guidance from the Advisory Panel, the Council has developed and approved policies on:

1. Energy exploration, development, transportation, and hydropower re-licensing;
2. Beach dredging and filling and large-scale coastal engineering;
3. Protection and enhancement of submerged aquatic vegetation;
4. Alterations to riverine, estuarine, and nearshore flows;
5. Marine aquaculture;
6. Marine Ecosystems and Non-Native and Invasive Species: and

7. Estuarine Ecosystems and Non-Native and Invasive Species.

NOAA Fisheries, State and other Federal agencies apply EFH and EFH-HAPC designations and protection policies in the day-to-day permit review process. The revision and updating of existing habitat policies and the development of new policies is being coordinated with core agency representatives on the Habitat and Coral Advisory Panels. Existing policies are included at the end of this Appendix.

The Habitat and Environmental Protection Advisory Panel, as part of their role in providing continued policy guidance to the Council, is during 2013/14, reviewing and proposing revisions and updates to the existing policy statements and developing new ones for Council consideration. The effort is intended to enhance the value of the statements and support cooperation and collaboration with NOAA Fisheries Habitat Conservation Division and State and Federal partners in better addressing the Congressional mandates to the Council associated with designation and conservation of EFH in the region.

South Atlantic Bight Ecopath Model

The Council worked cooperatively with the University of British Columbia and the Sea Around Us project to develop a straw-man and preliminary food web models (Ecopath with Ecosim) to characterize the ecological relationships of South Atlantic species, including those managed by the Council. This effort was envisioned to help the Council and cooperators in identifying available information and data gaps while providing insight into ecosystem function. More importantly, the model development process provides a vehicle to identify research necessary to better define populations, fisheries, and their interrelationships. While individual efforts are still underway in the South Atlantic, only with significant investment of new resources through other programs will a comprehensive regional model be further developed.

The latest collaboration builds on the previous Ecopath model developed through the Sea Around Us project for the South Atlantic Bight with a focus on beginning a dialogue on the implications of potential changes in forage fish populations in the region that could be associated with environmental or climate change or changes in direct exploitation of those populations.

Essential Fish Habitat and Essential Fish Habitat Areas of Particular Concern

Following is a summary of the current Council's EFH and EFH-HAPCs. Information supporting their designation was updated (pursuant to the EFH Final Rule) in the Council's Fishery Ecosystem Plan and Comprehensive Ecosystem Amendment:

Snapper Grouper FMP

Essential fish habitat for snapper grouper species includes coral reefs, live/hard bottom, submerged aquatic vegetation, artificial reefs, and medium to high profile outcroppings on and around the shelf break zone from shore to at least 600 feet (but to at least 2,000 feet for wreckfish) where the annual water temperature range is sufficiently warm to maintain adult populations of members of this largely tropical complex. EFH includes the spawning area in the water column above the adult habitat and the additional pelagic environment, including *Sargassum*, required for larval survival and growth up to and including settlement. In addition the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse snapper grouper larvae.

For specific life stages of estuarine dependent and nearshore snapper grouper species, essential fish habitat includes areas inshore of the 100-foot contour, such as attached macroalgae; submerged rooted vascular plants (seagrasses); estuarine emergent vegetated wetlands (saltmarshes, brackish marsh); tidal creeks; estuarine scrub/shrub (mangrove fringe); oyster reefs and shell banks; unconsolidated bottom (soft sediments); artificial reefs; and coral reefs and live/hard bottom.

Areas which meet the criteria for EFH-HAPCs for species in the snapper-grouper management unit include medium to high profile offshore hard bottoms where spawning normally occurs; localities of known or likely periodic spawning aggregations; nearshore hard bottom areas; The Point, The Ten Fathom Ledge, and Big Rock (North Carolina); The Charleston Bump (South Carolina); mangrove habitat; seagrass habitat; oyster/shell habitat; all coastal inlets; all state-designated nursery habitats of particular importance to snapper grouper (e.g., Primary and Secondary Nursery Areas designated in North Carolina); pelagic and benthic *Sargassum*; Hoyt Hills for wreckfish; the *Oculina* Bank Habitat Area of Particular Concern; all hermatypic coral habitats and reefs; manganese outcroppings on the Blake Plateau; and Council-designated Artificial Reef Special Management Zones (SMZs). In addition, the Council through CEBA 2 (SAFMC 2011) designated the deep-water snapper grouper MPAs and golden tilefish and blueline tilefish habitat as EFH-HAPCs under the Snapper Grouper FMP as follows:

EFH-HAPCs for golden tilefish to include irregular bottom comprised of troughs and terraces inter-mingled with sand, mud, or shell hash bottom. Mud-clay bottoms in depths of 150-300 meters are HAPC. Golden tilefish are generally found in 80-540 meters, but most commonly found in 200-meter depths.

EFH-HAPC for blueline tilefish to include irregular bottom habitats along the shelf edge in 45-65 meters depth; shelf break or upper slope along the 100-fathom contour (150-225 meters); hardbottom habitats characterized as rock overhangs, rock outcrops, manganese-phosphorite rock slab formations, or rocky reefs in the South Atlantic Bight; and the Georgetown Hole (Charleston Lumps) off Georgetown, SC.

EFH-HAPCs for the snapper grouper complex to include the following deep-water Marine Protected Areas (MPAs) as designated in Snapper Grouper Amendment 14: Snowy Grouper

Wreck MPA, Northern South Carolina MPA, Edisto MPA, Charleston Deep Artificial Reef MPA, Georgia MPA, North Florida MPA, St. Lucie Hump MPA, and East Hump MPA.

Deep-water Coral HAPCs designated in Comprehensive Ecosystem-Based Amendment 1 are designated as Snapper Grouper EFH-HAPCs: Cape Lookout Coral HAPC, Cape Fear Coral HAPC, Blake Ridge Diapir Coral HAPC, Stetson-Miami Terrace Coral HAPC, and Pourtalés Terrace Coral HAPC.

Shrimp FMP

For penaeid shrimp, EFH includes inshore estuarine nursery areas, offshore marine habitats used for spawning and growth to maturity, and all interconnecting water bodies as described in the Habitat Plan. Inshore nursery areas include tidal freshwater (palustrine), estuarine, and marine emergent wetlands (e.g., intertidal marshes); tidal palustrine forested areas; mangroves; tidal freshwater, estuarine, and marine submerged aquatic vegetation (e.g., seagrass); and subtidal and intertidal non- vegetated flats. This applies from North Carolina through the Florida Keys.

For rock shrimp, essential fish habitat consists of offshore terrigenous and biogenic sand bottom habitats from 18 to 182 meters in depth with highest concentrations occurring between 34 and 55 meters. This applies for all areas from North Carolina through the Florida Keys. Essential fish habitat includes the shelf current systems near Cape Canaveral, Florida, which provide major transport mechanisms affecting planktonic larval rock shrimp. These currents keep larvae on the Florida Shelf and may transport them inshore in spring. In addition, the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse rock shrimp larvae.

Essential fish habitat for royal red shrimp include the upper regions of the continental slope from 180 meters (590 feet) to about 730 meters (2,395 feet), with concentrations found at depths of between 250 meters (820 feet) and 475 meters (1,558 feet) over blue/black mud, sand, muddy sand, or white calcareous mud. In addition, the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse royal red shrimp larvae.

Areas which meet the criteria for EFH-HAPCs for penaeid shrimp include all coastal inlets, all state-designated nursery habitats of particular importance to shrimp (for example, in North Carolina this would include all Primary Nursery Areas and all Secondary Nursery Areas), and state-identified overwintering areas.

Coastal Migratory Pelagics FMP

Essential fish habitat for coastal migratory pelagic species includes sandy shoals of capes and offshore bars, high profile rocky bottom, and barrier island ocean-side waters, from the surf to the shelf break zone, but from the Gulf Stream shoreward, including *Sargassum*. In addition, all coastal inlets and all state-designated nursery habitats of particular importance to coastal migratory pelagics (for example, in North Carolina this would include all Primary Nursery Areas and all Secondary Nursery Areas).

For Cobia essential fish habitat also includes high salinity bays, estuaries, and seagrass habitat. In addition, the Gulf Stream is an EFH because it provides a mechanism to disperse coastal migratory pelagic larvae.

For king and Spanish mackerel and cobia essential fish habitat occurs in the South Atlantic and Mid-Atlantic Bights.

Areas which meet the criteria for EFH-HAPCs include sandy shoals of Capes Lookout, Cape Fear, and Cape Hatteras from shore to the ends of the respective shoals, but shoreward of the Gulf stream; The Point, The Ten-Fathom Ledge, and Big Rock (North Carolina); The Charleston Bump and Hurl Rocks (South Carolina); The Point off Jupiter Inlet (Florida); *Phragmatopoma* (worm reefs) reefs off the central east coast of Florida; nearshore hard bottom south of Cape Canaveral; The Hump off Islamorada, Florida; The Marathon Hump off Marathon, Florida; The "Wall" off of the Florida Keys; Pelagic *Sargassum*; and Atlantic coast estuaries with high numbers of Spanish mackerel and cobia based on abundance data from the ELMR Program. Estuaries meeting these criteria for Spanish mackerel include Bogue Sound and New River, North Carolina; Bogue Sound, North Carolina (Adults May-September salinity >30 ppt); and New River, North Carolina (Adults May-October salinity >30 ppt). For Cobia they include Broad River, South Carolina; and Broad River, South Carolina (Adults & juveniles May-July salinity >25ppt).

Golden Crab FMP

Essential fish habitat for golden crab includes the U.S. Continental Shelf from Chesapeake Bay south through the Florida Straits (and into the Gulf of Mexico). In addition, the Gulf Stream is an essential fish habitat because it provides a mechanism to disperse golden crab larvae. The detailed description of seven essential fish habitat types (a flat foraminferan ooze habitat; distinct mounds, primarily of dead coral; ripple habitat; dunes; black pebble habitat; low outcrop; and soft-bioturbated habitat) for golden crab is provided in Wenner et al. (1987). There is insufficient knowledge of the biology of golden crabs to identify spawning and nursery areas and to identify HAPCs at this time. As information becomes available, the Council will evaluate such data and identify HAPCs as appropriate through the framework.

Spiny Lobster FMP

Essential fish habitat for spiny lobster includes nearshore shelf/oceanic waters; shallow subtidal bottom; seagrass habitat; unconsolidated bottom (soft sediments); coral and live/hard bottom habitat; sponges; algal communities (*Laurencia*); and mangrove habitat (prop roots). In addition, the Gulf Stream is an EFH because it provides a mechanism to disperse spiny lobster larvae.

Areas which meet the criteria for EFH-HAPCs for spiny lobster include Florida Bay, Biscayne Bay, Card Sound, and coral/hard bottom habitat from Jupiter Inlet, Florida through the Dry Tortugas, Florida.

Coral, Coral Reefs, and Live/Hard Bottom Habitats FMP

Essential fish habitat for corals (stony corals, octocorals, and black corals) incorporate habitat for over 200 species. EFH for corals include the following:

A. Essential fish habitat for hermatypic stony corals includes rough, hard, exposed, stable substrate from Palm Beach County south through the Florida reef tract in subtidal waters to 30 m depth; subtropical (15°-35° C), oligotrophic waters with high (30-35$^{o}/_{oo}$) salinity and turbidity levels sufficiently low enough to provide algal symbionts adequate sunlight penetration for photosynthesis. Ahermatypic stony corals are not light restricted and their EFH includes defined hard substrate in subtidal to outer shelf depths throughout the management area.

B. Essential fish habitat for *Antipatharia* (black corals) includes rough, hard, exposed, stable substrate, offshore in high (30-35$^{o}/_{oo}$) salinity waters in depths exceeding 18 meters (54 feet), not restricted by light penetration on the outer shelf throughout the management area.

C. Essential fish habitat for octocorals excepting the order Pennatulacea (sea pens and sea pansies) includes rough, hard, exposed, stable substrate in subtidal to outer shelf depths within a wide range of salinity and light penetration throughout the management area.

D. Essential fish habitat for Pennatulacea (sea pens and sea pansies) includes muddy, silty bottoms in subtidal to outer shelf depths within a wide range of salinity and light penetration.

Areas which meet the criteria for EFH-HAPCs for coral, coral reefs, and live/hard bottom include: The 10-Fathom Ledge, Big Rock, and The Point (North Carolina); Hurl Rocks and The Charleston Bump (South Carolina); Gray's Reef National Marine Sanctuary (Georgia); The *Phragmatopoma* (worm reefs) reefs off the central east coast of Florida; Oculina Banks off the east coast of Florida from Ft. Pierce to Cape Canaveral; nearshore (0-4 meters; 0-12 feet) hard bottom off the east coast of Florida from Cape Canaveral to Broward County); offshore (5-30 meter; 15-90 feet) hard bottom off the east coast of Florida from Palm Beach County to Fowey Rocks; Biscayne Bay, Florida; Biscayne National Park, Florida; and the Florida Keys National Marine Sanctuary. In addition, the Council through CEBA 2 (SAFMC 2011) designated the Deep-water Coral HAPCs as EFH-HAPCs under the Coral FMP as follows:

Deep-water Coral HAPCs designated in Comprehensive Ecosystem-Based Amendment 1 as Snapper Grouper EFH-HAPCs: Cape Lookout Coral HAPC, Cape Fear Coral HAPC, Blake Ridge Diapir Coral HAPC, Stetson-Miami Terrace Coral HAPC, and Pourtalés Terrace Coral HAPC.

Dolphin and Wahoo FMP

EFH for dolphin and wahoo is the Gulf Stream, Charleston Gyre, Florida Current, and pelagic *Sargassum*. This EFH definition for dolphin was approved by the Secretary of Commerce on June 3, 1999 as a part of the Council's Comprehensive Habitat Amendment (SAFMC 1998b) (dolphin was included within the Coastal Migratory Pelagics FMP at that time).

Areas which meet the criteria for EFH-HAPCs for dolphin and wahoo in the Atlantic include The Point, The Ten-Fathom Ledge, and Big Rock (North Carolina); The Charleston Bump and The Georgetown Hole (South Carolina); The Point off Jupiter Inlet (Florida); The Hump off Islamorada, Florida; The Marathon Hump off Marathon, Florida; The "Wall" off of the Florida Keys; and Pelagic *Sargassum*. This EFH-HAPC definition for dolphin was approved by

the Secretary of Commerce on June 3, 1999 as a part of the Council's Comprehensive Habitat Amendment (dolphin was included within the Coastal Migratory Pelagics FMP at that time).

Pelagic *Sargassum* Habitat FMP

The Council through CEBA 2 (SAFMC 2011) designated the top 10 meters of the water column in the South Atlantic EEZ bounded by the Gulfstream, as EFH for pelagic Sargassum.

Actions Implemented That Protect EFH and EFH-HAPCs

Snapper Grouper FMP

- Prohibited the use of the following gear to protect habitat: bottom longlines in the EEZ inside of 50 fathoms or anywhere south of St. Lucie Inlet, Florida; bottom longlines in the wreckfish fishery; fish traps; bottom tending (roller- rig) trawls on live bottom habitat; and entanglement gear.
- Established the *Oculina* Experimental Closed Area where the harvest or possession of all species in the snapper grouper complex is prohibited.
- Established deep-water Marine Protected Areas (MPAs) as designated in Snapper Grouper Amendment 14: Snowy Grouper Wreck MPA, Northern South Carolina MPA, Edisto MPA, Charleston Deep Artificial Reef MPA, Georgia MPA, North Florida MPA, St. Lucie Hump MPA, and East Hump MPA.

Shrimp FMP

- Prohibition of rock shrimp trawling in a designated area around the *Oculina* Bank,
- Mandatory use of bycatch reduction devices in the penaeid shrimp fishery,
- Mandatory Vessel Monitoring System (VMS) in the Rock Shrimp Fishery.
- A mechanism that provides for the concurrent closure of the EEZ to penaeid shrimping if environmental conditions in state waters are such that the overwintering spawning stock is severely depleted.

***Pelagic Sargassum* Habitat FMP**

- Prohibited all harvest and possession of *Sargassum* from the South Atlantic EEZ south of the latitude line representing the North Carolina/South Carolina border (34° North Latitude).
- Prohibited all harvest of *Sargassum* from the South Atlantic EEZ within 100 miles of shore between the 34° North Latitude line and the Latitude line representing the North Carolina/Virginia border.
- Harvest of *Sargassum* from the South Atlantic EEZ is limited to the months of November through June.
- Established an annual Total Allowable Catch (TAC) of 5,000 pounds landed wet weight.
- Required that an official observer be present on each *Sargassum* harvesting trip. Require that nets used to harvest *Sargassum* be constructed of four-inch stretch mesh or larger fitted to a frame no larger than 4 feet by 6 feet.

Coastal Migratory Pelagics FMP

- Prohibited of the use of drift gillnets in the coastal migratory pelagic fishery.

Golden Crab FMP

- In the northern zone, golden crab traps can only be deployed in waters deeper than 900 feet; in the middle and southern zones traps can only be deployed in waters deeper than 700 feet.

Northern zone - north of the 28°N. latitude to the North Carolina/Virginia border;
Middle zone - 28°N. latitude to 25° N. latitude; and
Southern zone - south of 25°N. latitude to the border between the South Atlantic and Gulf of Mexico Fishery Management Councils.

Coral, Coral Reefs and Live/Hard Bottom FMP

- Established an optimum yield of zero and prohibiting all harvest or possession of these resources which serve as essential fish habitat to many managed species.
- Designated the *Oculina* Bank Habitat Area of Particular Concern.
- Expanded the *Oculina* Bank Habitat Area of Particular Concern (HAPC) to an area bounded to the west by 80°W. longitude, to the north by 28°30' N. latitude, to the south by 27°30' N. latitude, and to the east by the 100 fathom (600 feet) depth contour.
- Established the following two Satellite *Oculina* HAPCs: (1) Satellite *Oculina* HAPC #1 is bounded on the north by 28°30'N. latitude, on the south by 28°29'N. latitude, on the east by 80°W. longitude, and on the west by 80°3'W. longitude; and (2) Satellite *Oculina* HAPC #2 is bounded on the north by 28°17'N. latitude, on the south by 28°16'N. latitude, on the east by 80°W. longitude, and on the west by 80°3'W. longitude.
- Prohibited the use of all bottom tending fishing gear and fishing vessels from anchoring or using grapples in the *Oculina* Bank HAPC.
- Established a framework procedure to modify or establish Coral HAPCs.
- Established the following five deep-water CHAPCs:

Cape Lookout Lophelia Banks CHAPC;
Cape Fear Lophelia Banks CHAPC;
Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace (Stetson- Miami Terrace) CHAPC;
Pourtales Terrace CHAPC; and
Blake Ridge Diapir Methane Seep CHAPC.

- Within the deep-water CHAPCs, the possession of coral species and the use of all bottom damaging gear are prohibited including bottom longline, trawl (bottom and mid-water), dredge, pot or trap, or the use of an anchor, anchor and chain, or grapple and chain by all fishing vessels.

Council Policies for Protection and Restoration of Essential Fish Habitat
SAFMC Habitat and Environmental Protection Policy

In recognizing that species are dependent on the quantity and quality of their essential habitats, it is the policy of the SAFMC to protect, restore, and develop habitats upon which fisheries species depend; to increase the extent of their distribution and abundance; and to improve their productive capacity for the benefit of present and future generations. For purposes of this policy, "habitat" is defined as the physical, chemical, and biological parameters that are necessary for continued productivity of the species that is being managed. The objectives of the SAFMC policy will be accomplished through the recommendation of no net loss or significant environmental degradation of existing habitat. A long-term objective is to support and promote a net-gain of fisheries habitat through the restoration and rehabilitation of the productive capacity of habitats that have been degraded, and the creation and development of productive habitats where increased fishery production is probable. The SAFMC will pursue these goals at state, Federal, and local levels. The Council shall assume an aggressive role in the protection and enhancement of habitats important to fishery species, and shall actively enter Federal, decision making processes where proposed actions may otherwise compromise the productivity of fishery resources of concern to the Council.

SAFMC EFH Policy Statements

In addition to implementing regulations to protect habitat from fishing related degradation, the Council in cooperation with NOAA Fisheries, actively comments on non-fishing projects or policies that may impact fish habitat. The Council adopted a habitat policy and procedure document that established a four-state Habitat Advisory Panel and adopted a comment and policy development process. Members of the Habitat Advisory Panel serve as the Council's habitat contacts and professionals in the field. With guidance from the Advisory Panel, the Council has developed and approved a number of habitat policy statements which are available on the Habitat and Ecosystem section of the Council website (http://www.safmc.net/ecosystem/Home/EcosystemHome/tabid/435/Default.aspx).

References:

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SAFMC (South Atlantic Fishery Management Council). 1998b. Comprehensive Amendment Addressing Essential Fish Habitat in Fishery Management Plans of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 2009a. Fishery Ecosystem Plan for the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

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Appendix X. Detailed maps and tables for proposed Special Management Zones off North Carolina

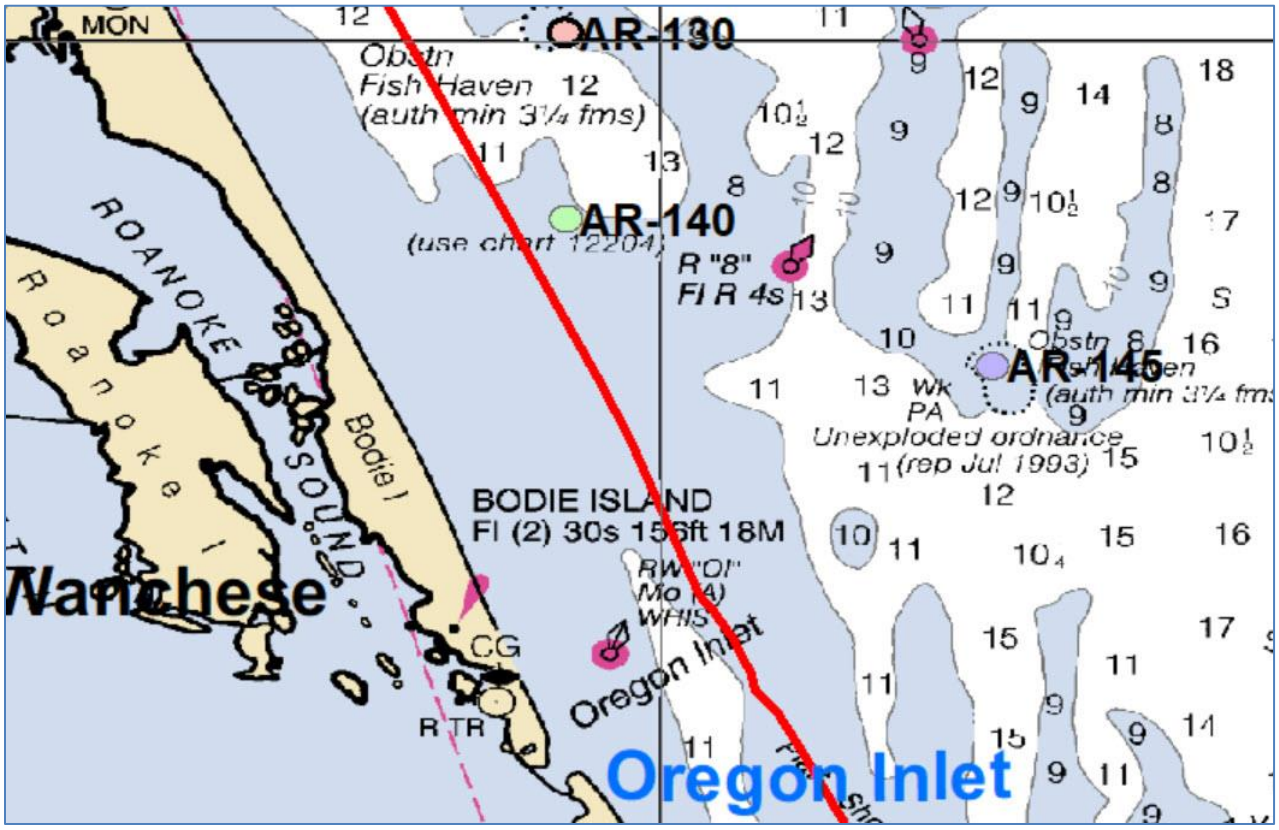

Figure B-1. Artificial Reefs (AR-130, AR-140 and AR-145) Proposed as Special Management Zones in the Exclusive Economic Zone off Northern North Carolina.

Table B-1. Distance and Bearing to Artificial Reefs (AR-130, AR-140 and AR-145) Source: NCDMF.

AR-130	345.3° magnetic - 11.6 nm from Oregon Inlet Sea Buoy
AR-140	343.4° magnetic - 8.2 nm from Oregon Inlet Sea Buoy
AR-145	35.3° magnetic - 7.7 nm from Oregon Inlet Sea Buoy

Table B-3. Materials Placed in Artificial Reefs (AR-130, AR-140 and AR-145) Source: North Carolina DMF Artificial Reef Material Shapefile 2019.

Reef Site	Material Category	Area Sq. Ft.	Material Details
AR-130	Train Boxcar	116	Train Boxcar
AR-130	Train Boxcar	135	Train Boxcar
AR-130	Train Boxcar	366	Train Boxcar
AR-130	Pilings	39	Bridge Piling Cutoff
AR-130	Pilings	29	2 Bridge Piling Cutoffs
AR-130	Pilings	80	Bridge Piling Cutoff
AR-130	Pilings	86	Bridge Piling Cutoff
AR-130	Pilings	17	Bridge Piling Cutoff
AR-130	Reef Balls	1,326	66 Reef Balls
AR-140	Pipe	548	1,000 Tons
AR-140	Pipe	548	1,000 Tons
AR-140	Train Boxcar	349	
AR-145	Vessels	4077	115 FT Landing Craft ""LCU 1468""
AR-145	Pipe	889	Small Load Of Concrete Pipe
AR-145	Aircraft	487	USCG HU-25 ""Falcon""
AR-145	Aircraft	575	USCG HU-25 ""Falcon""
AR-145	Pipe	18471	Large Load Of Concrete Pipe
AR-145	Concrete Rubble	1951	Washington Baum"" Bridge Rubble
AR-145	Pipe	190	Large Load Of Concrete Pipe
AR-145	Vessels	1453	185 FT USN Patrol Craft Escort ""ADVANCE II""

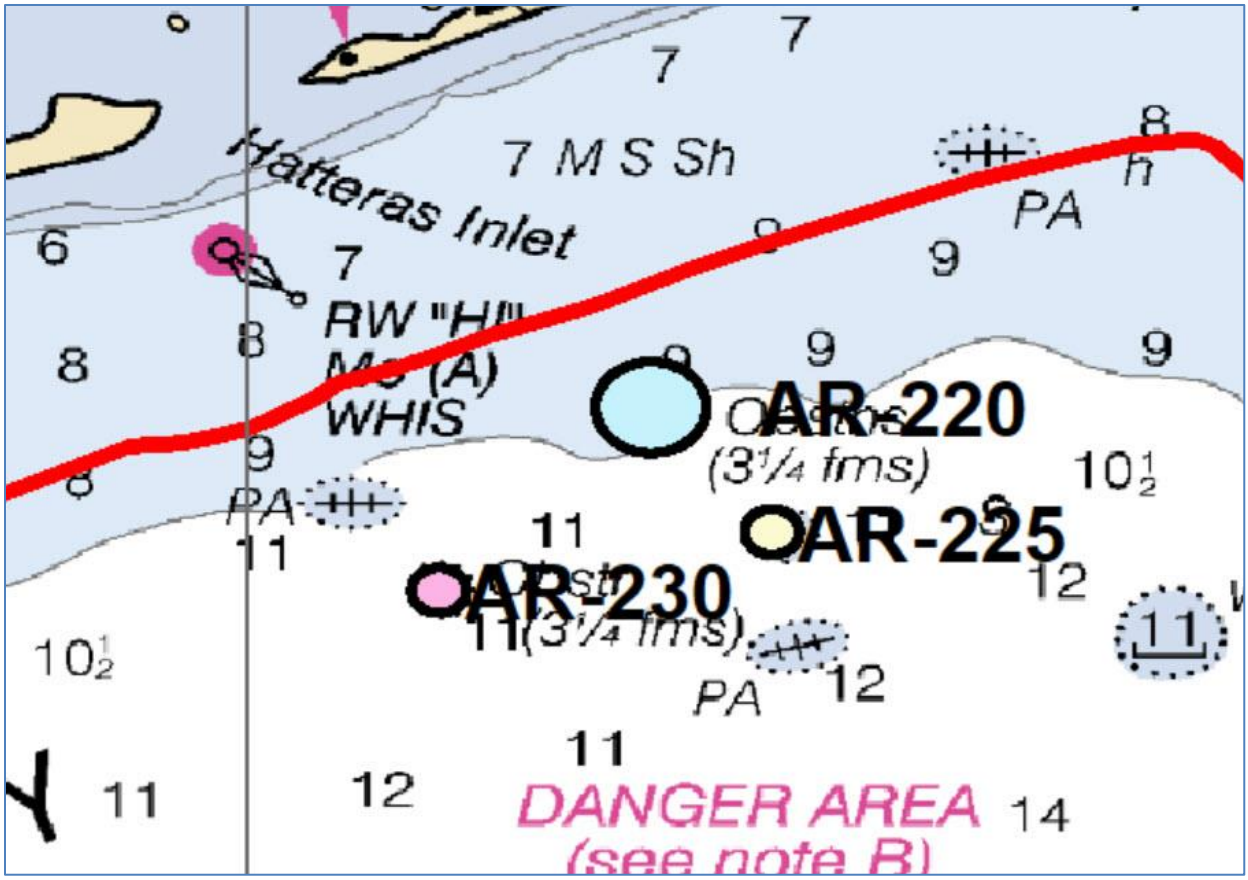

Figure B-2. Artificial Reefs (AR-220, AR-225 and AR-230) Proposed as Special Management Zones in the Exclusive Economic Zone off Northern North Carolina.

Table B-4. Distance and Bearing to Artificial Reefs (AR-220, AR-225 and AR-230) Source: NCDMF.

AR-220	97.5° magnetic - 4.6 nm from Hatteras Inlet Sea Buoy
AR-225	106.5° magnetic - 6.1 nm from Hatteras Inlet Sea Buoy
AR-230	133.7° magnetic - 4.2 nm from Hatteras Inlet Sea Buoy

Table B-5. Materials Placed in Artificial Reefs (AR-220, AR-225 and AR-230) North Carolina DMF Artificial Reef Material Shapefile 2019.

Reef Site	Material Category	Area Sq. Ft.	Material Details
AR-220	Reef Balls	793	200 Reef Balls deployed over a large area.
AR-220	Reef Balls	75	200 Reef Balls deployed over a large area.
AR-220	Reef Balls	75	200 Reef Balls deployed over a large area.
AR-220	Reef Balls	63	200 Reef Balls deployed over a large area.
AR-220	Reef Balls	100	200 Reef Balls deployed over a large area.
AR-220	Pipe	314	75 Tons
AR-220	Reef Balls	38	200 Reef Balls deployed over a large area.
AR-225	Consolidated Concrete	305	105 Tons of Concrete Pieces
AR-225	Consolidated Concrete	510	105 Tons of Concrete Pieces
AR-225	Train Boxcar	971	
AR-230	Vessels	2313	75 FT Landing Craft
AR-230	Vessels	3333	105 FT Tug ""Mr. J.C.""
AR-230	Vessels	4116	130 FT Yard Freighter

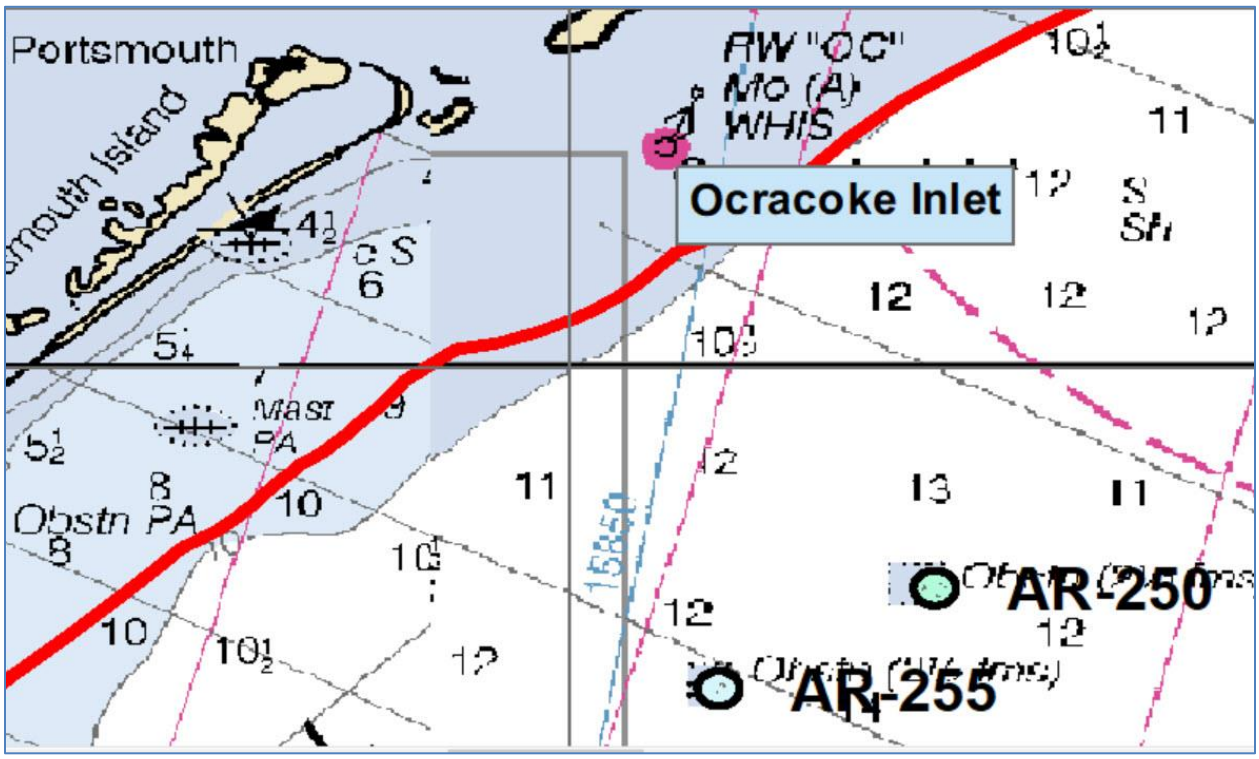

Figure B-3. Artificial Reefs (AR-250 and AR-255) Proposed as Special Management Zones in the Exclusive Economic Zone off Northern North Carolina.

Table B-6. Distance and Bearing to Artificial Reefs (AR-250 and AR-255) Source: NCDMF.

AR-250	146.9° magnetic - 7.1 nm from Ocracoke Inlet Sea Buoy
AR-255	167.8° magnetic - 8 nm from Ocracoke Inlet Sea Buoy

Table B-7. Materials Placed in Artificial Reefs (AR-250 and AR-255) North Carolina DMF Artificial Reef Material Shapefile 2019.

Reef Site	Material Category	Area Sq. Ft.	Material Details
AR-250	Consolidated Concrete	2788	63 Concrete Boxes
AR-250	Bridge Frame	6996	220 FT Steel Bridge Span
AR-250	Concrete Rubble	2208	500 Tons
AR-255	Bridge Frame	3072	Old Hobucken Bridge"" steel truss span 150 FT
AR-255	Concrete Rubble	3996	80 Tons

Figure B-4. Artificial Reefs Proposed as Special Management Zones in the Exclusive Economic Zone off Middle North Carolina.

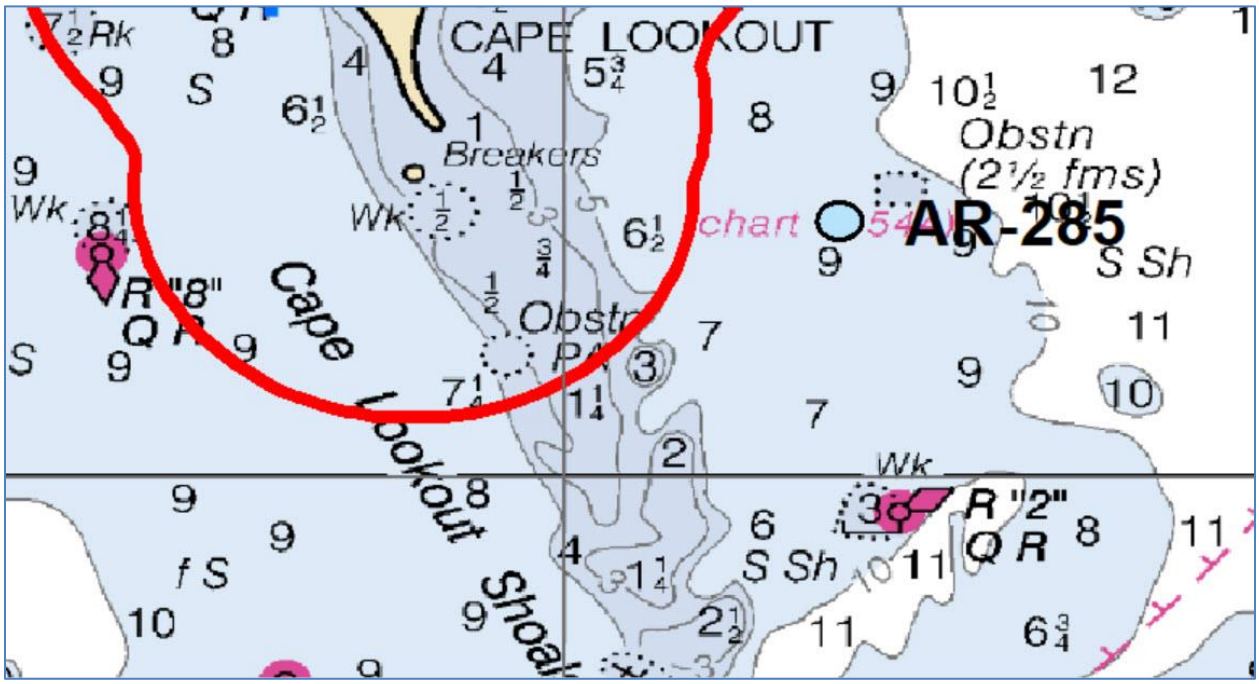

Figure B-4. Artificial Reefs (AR-285) Proposed as Special Management Zones in the Exclusive Economic Zone off Middle North Carolina.

Table B-8. Distance and Bearing to Artificial Reef (AR-285) Source: NCDMF.

AR-285	341.1° magnetic - 3.9 nm from Cape Lookout Shoals Lighted Buoy #2

Table B-9. Materials Placed in Artificial Reef (AR-285) North Carolina DMF Artificial Reef Material Shapefile 2019.

Reef Site	Material Category	Area Sq. Ft.	Material Details
AR-285	Vessels	4173	130 FT Steel Hull Fishing Vessel ""NANCY LEE""
AR-285	H"" Units	500	2 ""H"" Units
AR-285	Reef Balls	3134	100 Reef Balls
AR-285	Manhole Sections	3852	Assorted Manholes & Risers
AR-285	Pipe	3200	50 Large Pieces
AR-285	Pipe	20574	605 Pieces

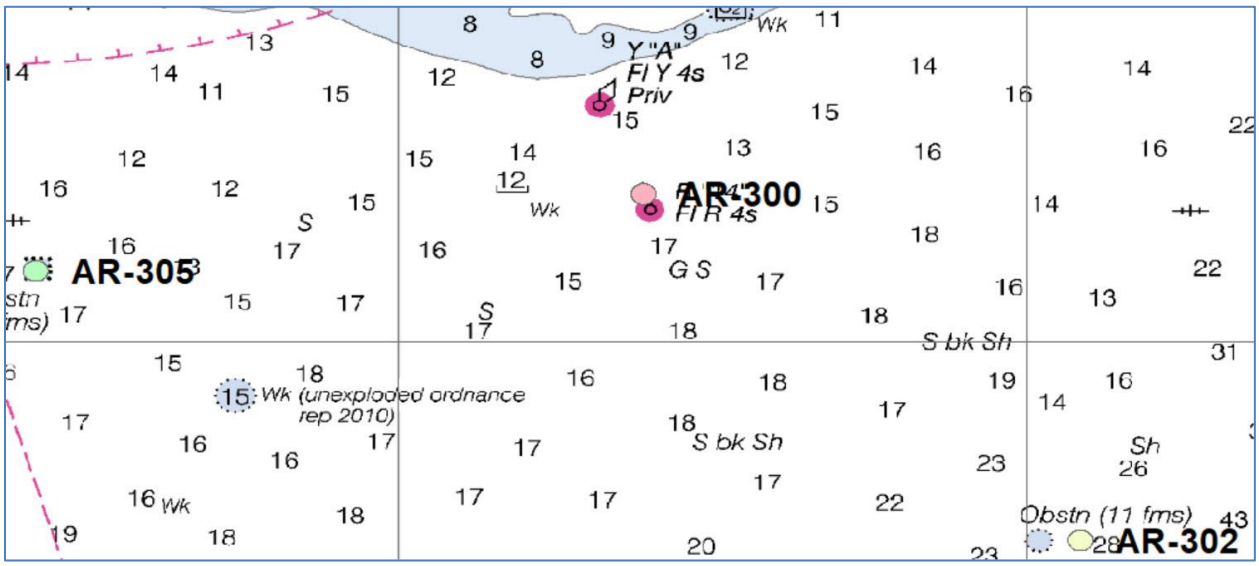

Figure B-5. Artificial Reefs (AR-300, AR-302 and AR-305) Proposed as Special Management Zones in the Exclusive Economic Zone off Middle North Carolina.

Table B-10. Distance and Bearing to Artificial Reefs (AR-300, AR-303 and AR-305) Source: NCDMF.

AR-300	163.6° magnetic - 11.1 nm from Cape Lookout Shoals Lighted Buoy #2 or 128.1° magnetic - 11.8 nm from Cape Lookout Shoals Lighted Buoy #6
AR-302	126.8° magnetic - 33.7 nm from Beaufort Inlet Sea Buoy or 142.9° magnetic - 21.7 nm from Cape Lookout Shoals Lighted Buoy #2
AR-305	162.5° magnetic - 18.3 nm from Beaufort Inlet Sea Buoy

Table B-11. Materials Placed in Artificial Reefs (AR-300, AR-302, and AR-305) North Carolina DMF Artificial Reef Material Shapefile 2019.

Reef Site	Material Category	Area Sq. Ft.	Material Details
AR-300	Pipe	7181	1,000 Pieces of 48" x 8'
AR-300	Pipe	7329	1,000 Pieces of 48" x 8'
AR-300	Pipe	3216	500 Pieces 48"" x 8'
AR-300	Vessels	4540	174 FT Yard Oiler ""FS-26""
AR-300	Pipe	1077	500 Pieces of 48"" x 8'
AR-302	Vessels	30266	YANCEY"" 459 FT Assualt Transport Ship
AR-302	Pipe	10742	830 Pieces
AR-302	Pipe	3760	830 Pieces
AR-305	Vessels	4596	183 FT USCG Buoy Tender ""SPAR""
AR-305	Vessels	12762	439 FT USN Cable Layer ""AEOLUS""

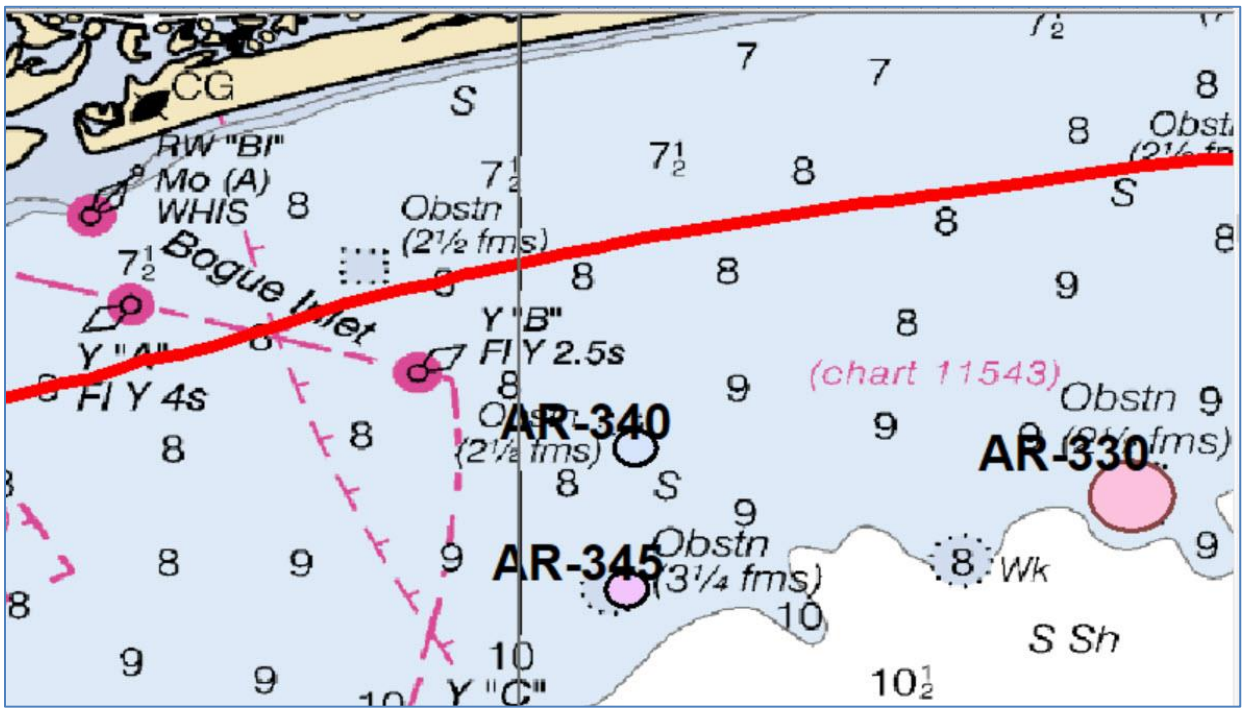

Figure B-6. Artificial Reefs (AR-330, AR-340 and AR-345) Proposed as Special Management Zones in the Exclusive Economic Zone off Middle North Carolina.

Table B-12. Distance and Bearing to Artificial Reefs (AR-330, AR-340 and AR-345) Source: NCDMF.

AR-330	251.6° magnetic - 8.1 nm from Beaufort Inlet Sea Buoy or 217.8° magnetic - 11.9 nm from Beaufort Inlet at Fort Macon Jetty
AR-340	106.7° magnetic - 7.2 nm from Bogue Inlet Sea Buoy or 258.1° magnetic - 13.8 nm from Beaufort Inlet Sea Buoy
AR-345	120° magnetic - 8.2 nm from Bogue Inlet Sea Buoy or 249.8° magnetic - 14.2 nm from Beaufort Inlet Sea Buoy

Table B-13. Materials Placed in Artificial Reefs (AR-330, AR-340, and AR-345) North Carolina DMF Artificial Reef Material Shapefile 2019.

Reef Site	Material Category	Area Sq. Ft.	Material Details
AR-330	Pipe	35841	822 Tons Concrete Pipe
AR-330	Pipe	32314	411 Tons Concrete Pipe
AR-330	Pipe	28695	548 Tons Concrete Pipe
AR-330	Pipe	22235	274 Tons Concrete Pipe
AR-330	Pipe	13004	137 Tons Concrete Pipe
AR-330	Pipe	31600	685 Tons Concrete Pipe
AR-330	H"" Units	3641	45 ""H"" Units
AR-330	H"" Units	1521	43 ""H-Units""
AR-330	Pipe	36689	600 Tons Concrete Pipe
AR-330	Reef Balls	3287	45 Reef Balls
AR-330	Pipe	3860	201 Pieces Concrete Pipe
AR-330	Fiberglass Domes	420	3 Pre-Fabricated Fiberglass Domes
AR-330	Aircraft	176	2 C-130 Aircraft
AR-330	Reef Balls	8059	45 Reef Balls
AR-330	Vessels	13377	320 FT Landing Craft Repair Ship ""INDRA""
AR-330	Vessels	421	55 FT Steel Sailboat ""NEPOMUK""
AR-330	Vessels	112	49 FT Ferro-Cement Sailboat ""HARD ROCK""
AR-330	Vessels	673	45 FT Ferro-Cement Sailboat ""CEMENT LADY""
AR-330	Vessels	3776	200 FT Deck Barge TBM IX
AR-330	Vessels	3662	107 ft. Tugboat "James J. Francesconi"
AR-330	Vessels	1384	67 ft. Tugboat "The Tramp"
AR-340	Reef Balls	7726	71 Reef Balls
AR-340	Pipe	28821	42"" X 8' Concrete Pipe
AR-340	Pipe	88538	Concrete Pipe - 1000 Tons / 500 Pieces
AR-340	Consolidated Concrete	18442	137 Pieces Concrete Panels, Headers, Dock Panels, Roof Panels, & Pipe
AR-340	Train Boxcar	1424	4 Train Boxcars
AR-340	Boat Mold	6311	5 Hatteras Boat Molds
AR-340	Manhole Sections	4732	46 Manhole Sections
AR-340	Boat Mold	1259	2 Hatteras Boat Molds
AR-345	Reef Balls	14375	75 Reef Balls
AR-345	Reef Balls	8030	20 Reef Balls in 4 groups of 5
AR-345	Reef Balls	5282	50 Ultra Reef Balls & 1 Reef Ball
AR-345	Consolidated Concrete	81583	Consolidated Concrete: 750 Pieces Concrete Pipe, 1500 Tons Manhole Sections
AR-345	Pipe	4543	Concrete Pipe
AR-345	Pipe	10526	170 Pieces Concrete Pipe
AR-345	Vessels	2631	116 FT Tug Boat ""TITAN""
AR-345	Train Boxcar	1699	10 Train Boxcars (In multiple pieces)

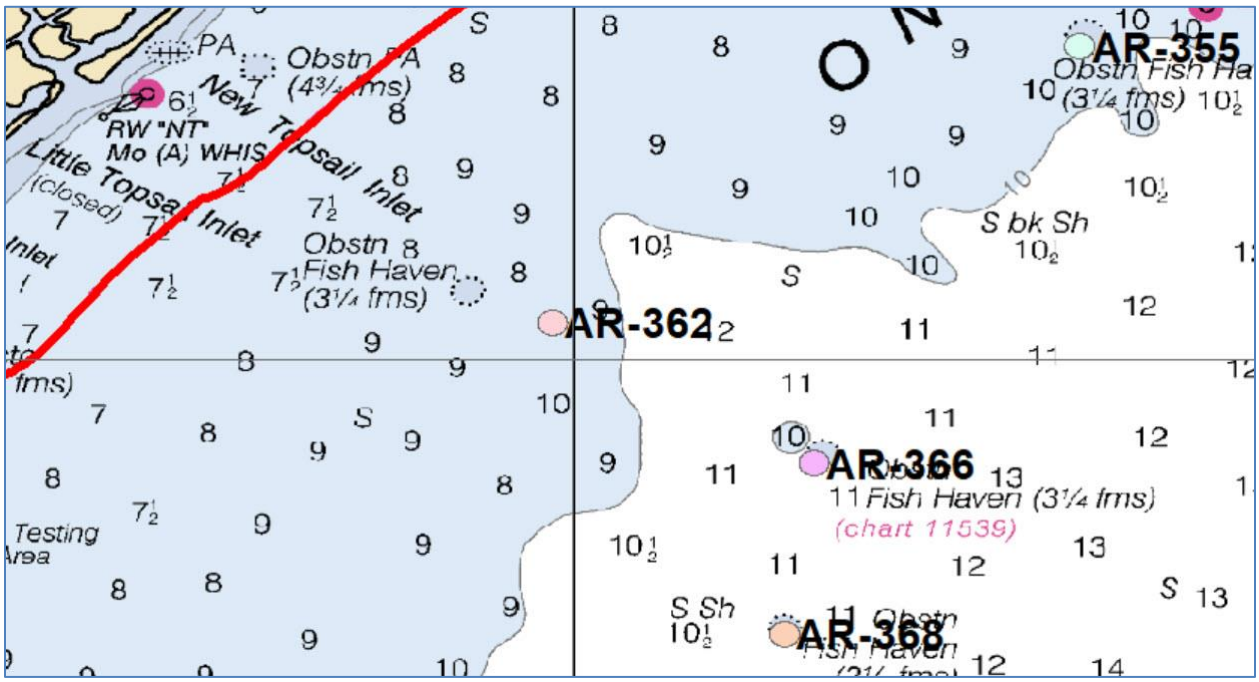

Figure B-7. Artificial Reefs (AR-355, AR-362, AR-366 and AR-368) Proposed as Special Management Zones in the Exclusive Economic Zone off Southern North Carolina.

Table B-14. Distance and Bearing to Artificial Reefs (AR-355, AR-362, AR-366 and AR-368) Source: NCDMF.

AR-355	172.1° magnetic - 9.9 nm from New River Inlet Sea Buoy or 76.2° magnetic - 15.3 nm from New Topsail Inlet Sea Buoy
AR-362	114.1° magnetic - 8 nm from New Topsail Inlet Sea Buoy
AR-366	113.5° magnetic - 13.1 nm from New Topsail Inlet Sea Buoy
AR-368	125.5° magnetic - 14.9 nm from New Topsail Inlet Sea Buoy or 82.5° magnetic - 18.3 nm from Masonboro Inlet Sea Buoy

Table B-15. Materials Placed in Artificial Reefs (AR-355, AR-362, AR-366 and AR-368) North Carolina DMF Artificial Reef Material Shapefile 2019.

Reef Site	Material Category	Area Sq. Ft.	Material Details
AR-355	Train Boxcar	2250	7 Train Boxcars
AR-355	Concrete Rubble	11965	Hwy. 172 Bridge Rubble 10 Barge Loads of Pilings and Rails
AR-355	Concrete Rubble	8320	Hwy. 172 Bridge Rubble 10 Barge Loads of Pilings and Rails
AR-355	Concrete Rubble	11296	Hwy. 172 Bridge Rubble 10 Barge Loads of Pilings and Rails
AR-355	Concrete Rubble	5888	Hwy. 172 Bridge Rubble 10 Barge Loads of Pilings and Rails
AR-362	Pipe	8812	130 Tons Concrete Pipe
AR-362	Pipe	51537	850 Pieces of 48"" X 8' Concrete Pipe
AR-362	Train Boxcar	1434	5 Train Boxcars
AR-366	Train Boxcar	8542	
AR-366	Pipe	10905	260 tons of Concrete Pipe
AR-366	Pipe	75440	850 pieces of 48"" x 8' Concrete Pipe
AR-366	Manhole Sections	17310	61 pieces
AR-366	Consolidated Concrete	15701	28 pieces of Manhole Sections and Concrete Risers / 66 Concrete Culvert Box
AR-366	Train Boxcar	4466	
AR-368	Train Boxcar	3118	4 Train Boxcars
AR-368	Vessels	9210	241 FT Loa Barge ""LC-16""
AR-368	Pipe	3091	130 Tons Concrete Pipe - Topsail Beach Offshore Fishing Club

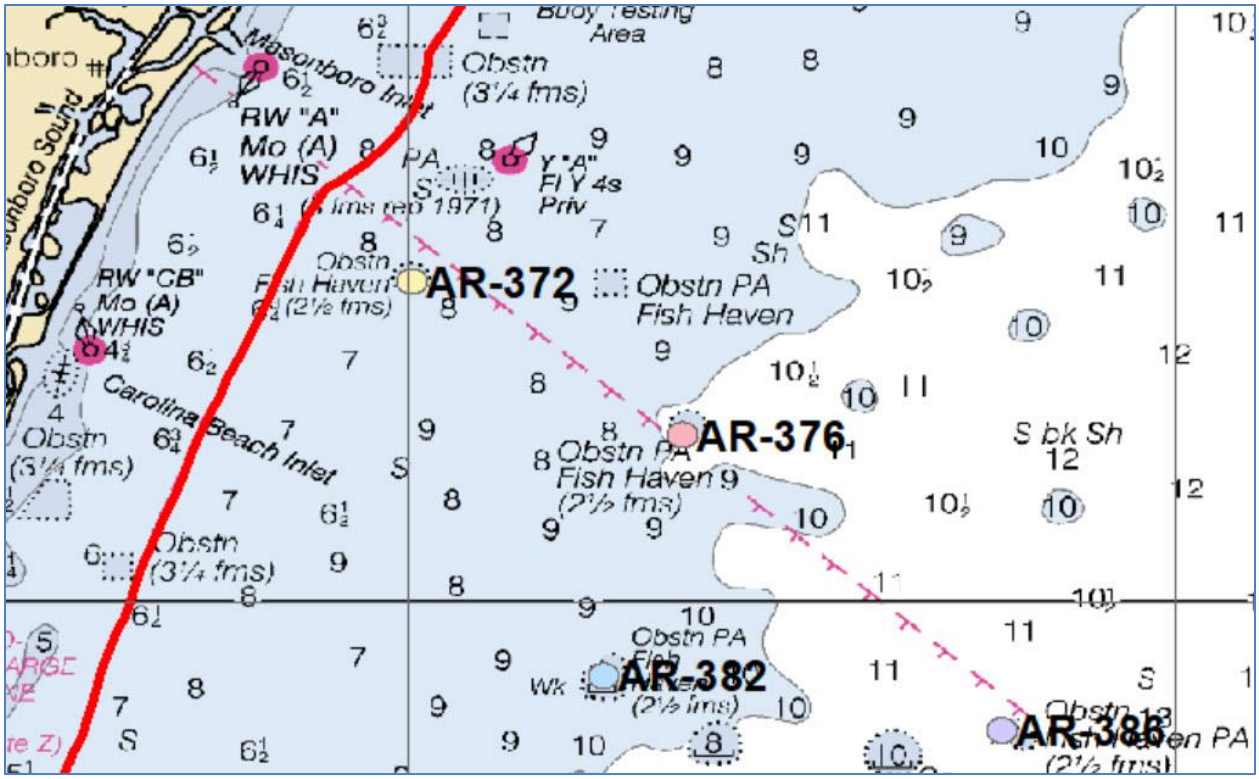

Figure B-8. Artificial Reefs (AR-372, AR-376, AR-382 and AR-386) Proposed as Special Management Zones in the Exclusive Economic Zone off Southern North Carolina.

Table B-16. Distance and Bearing to Artificial Reefs (AR-372, AR-376, AR-382 and AR-386) Source: NCDMF.

AR-372	140.1° magnetic - 4.8 nm from Masonboro Inlet Sea Buoy or 65.7° magnetic - 5.3 nm from Carolina Beach Inlet Sea Buoy
AR-376	126.3° magnetic - 9.9 nm from Masonboro Inlet Sea Buoy or 89.5° magnetic - 9.7 nm from Carolina Beach Inlet Sea Buoy
AR-382	117.5° magnetic - 10.4 nm from Carolina Beach Inlet Sea Buoy
AR-386	127.1° magnetic - 17.6 nm from Masonboro Inlet Sea Buoy

Table B-17. Materials Placed in Artificial Reefs (AR-372, AR-376, AR-382 and AR-386) North Carolina DMF Artificial Reef Material Shapefile 2019.

Reef Site	Material Category	Area Sq. Ft.	Material Details
AR-372	Vessels	5449	220 FT Barge
AR-372	Vessels	8959	220 FT Barge
AR-372	Reef Balls	11484	128 Reef Balls
AR-372	Train Boxcar	6109	Train Boxcars - In Multiple Pieces
AR-372	Pipe	29080	Concrete Pipe 265.2 Tons
AR-372	Pipe	23324	Concrete Pipe 252.1 Tons
AR-372	Pipe	30275	Concrete Pipe 253.4 Tons
AR-372	Pipe	25212	Concrete Pipe 236.6 Tons
AR-372	Atlantic Pods	13816	50 Pieces
AR-376	Pipe	69271	850 Pieces of 60"" X 8' Concrete Pipe
AR-376	Waffle-Crete	226	2 Pieces Waffle Crete
AR-376	Train Boxcar	624	Train Boxcars - In Multiple Pieces
AR-382	Reef Balls	916	100 Reef Balls Deployed in this area.
AR-382	Reef Balls	1263	100 Reef Balls Deployed in this area.
AR-382	Reef Balls	574	100 Reef Balls Deployed in this area.
AR-382	Reef Balls	517	100 Reef Balls Deployed in this area.
AR-382	Vessels	2415	105 FT Tug ""POCHAHONTAS""
AR-382	Vessels	1463	86 Ft Tug ""R.R. STONE""
AR-382	Vessels	6276	Dredge ""PLAYA"" - Marine Casualty
AR-386	Vessels	10750	150 FT YTT Barge ""ALTON LENNON""
AR-386	Vessels	9240	215 FT USACOE Dredge ""HYDE""
AR-386	Vessels	13042	320 FT USACOE Dredge ""MARKHAM""
AR-386	Train Boxcar	2693	Train Boxcars - In Multiple Pieces

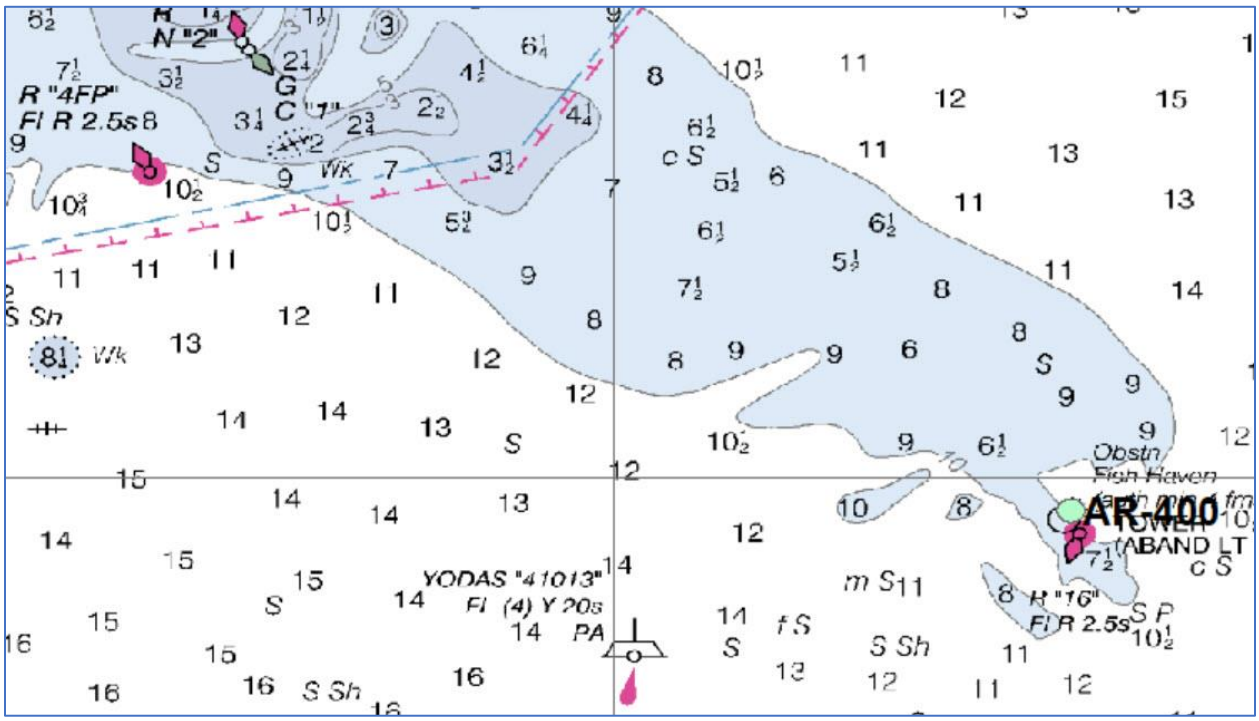

Figure B-9. Artificial Reef (AR-400) Proposed as Special Management Zones in the Exclusive Economic Zone off Southern North Carolina.

Table B-18. Distance and Bearing to Artificial Reefs (AR-400) Source: NCDMF.

AR-400	329.4° magnetic - 0.7 nm from Frying Pan Tower

Table B-19. Materials Placed in Artificial Reefs (AR-400) North Carolina DMF Artificial Reef Material Shapefile 2019.

Reef Site	Material Category	Area Sq. Ft.	Material Details
AR-400	Vessels	5609	Capt. Greg MicKey"" Menhaden Vessel

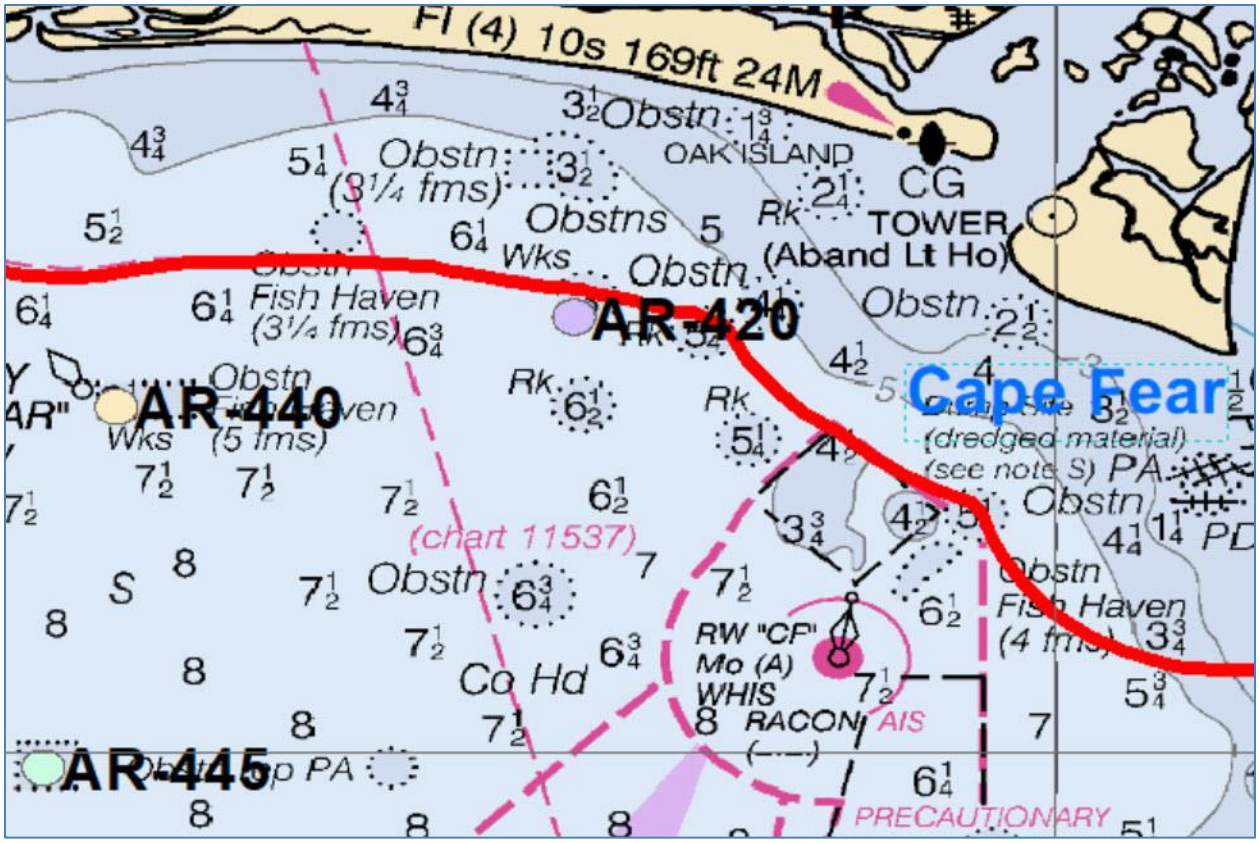

Figure B-10. Artificial Reefs (AR-420, AR-440 and AR-445) Proposed as Special Management Zones in the Exclusive Economic Zone off Southern North Carolina.

Table B-20. Distance and Bearing to Artificial Reefs (AR-420, AR-440 and AR-445) Source: NCDMF.

AR-420	317.3° magnetic - 5.7 nm from Cape Fear River Sea Buoy, 226.7° magnetic - 4.6 nm from Oak Island Light, or 104.3° magnetic - 6.7 nm from Lockwood's Folly Sea Buoy
AR-440	282.9° magnetic - 9.1 nm from Cape Fear River Sea Buoy, 237.6° magnetic - 9.9 nm from Oak Island Light, or 158.1° magnetic - 4.1 nm from Lockwood's Folly Inlet Sea Buoy
AR-445	250.8° magnetic - 9.3 nm from Cape Fear River Sea Buoy, 218.7° magnetic - 13.3 nm from Oak Island Light, or 170° magnetic - 9.1 nm from Lockwood's Folly Inlet Sea Buoy

Table B-21. Materials Placed in Artificial Reef (AR-420) North Carolina DMF Artificial Reef Material Shapefile 2019.

Reef Site	Material Category	Area Sq. Ft.	Material Details
AR-420	Vessels	4141	110 FT Water Barge YC-794 ""POTTER BARGE""
AR-420	Bridge Frame	3679	230 FT Bridge Span
AR-420	Consolidated Concrete	30837	Consolidated Concrete: 354 Misc Concrete Pieces and 600 Tons Manhole Sections
AR-420	Manhole Sections	14526	
AR-420	Pipe	15410	Concrete Pipe: 123 (36"X8'), 15 (18"X8'), 265 (15"X8')
AR-420	Consolidated Concrete	8486	Consolidated Concrete: 309 Tons Pipe and Manhole Sections
AR-420	Consolidated Concrete	6037	Concrete Pipe and Manhole Sections
AR-420	Reef Balls	1477	50 Reef Balls, 100 deployed in 4 groups of 25
AR-420	Reef Balls	1631	50 Reef Balls, 100 deployed in 4 groups of 25
AR-420	Reef Balls	2275	50 Reef Balls
AR-420	Vessels	4715	180 FT Barge HT-85
AR-420	Pipe	21716	464 Pieces of 24"" Concrete Pipe
AR-420	Consolidated Concrete	2263	Consolidated Concrete: Pipe (162), Pilings (3), Parking Dividers (62) & Various Material (65+).
AR-420	Manhole Sections	17191	

Table B-21. Materials Placed in Artificial Reefs (AR-440 and AR-445) Source: North Carolina DMF Artificial Reef Material Shapefile 2019.

Reef Site	Material Category	Area Sq. Ft.	Material Details
AR-440	Vessels	1785	65 FT Tug ""COOPEDGE""
AR-440	Vessels	976	65 FT Tug ""A.T.PINER""
AR-440	Pipe	21593	500 Pieces Concrete Pipe
AR-440	Consolidated Concrete	3405	Consolidated Concrete: Assorted Concrete Items
AR-440	Boiler Pieces	1229	6 Boiler Pieces
AR-440	Train Boxcar	747	
AR-440	Pipe	7119	151 Pieces of 24"" X 8' Concrete Pipe
AR-440	Pipe	11736	500 Tons High Density Concrete Pipe
AR-440	Pipe	36213	500 Tons Low Density Concrete Pipe
AR-440	Pipe	32645	414 Pieces Concrete Pipe
AR-440	Pipe	215	Outlying Individual Concrete Pipe - Unknown Deployment Date
AR-440	Reef Balls	8469	50 Reef Balls
AR-440	Boiler Pieces	271	1 Boiler Piece (Donated By Phiser)
AR-440	Pipe	6515	150 Pieces Concrete Pipe
AR-440	Consolidated Concrete	265	60 Tons Consolidated Concrete
AR-440	Consolidated Concrete	177	60 Tons Consolidated Concrete
AR-440	Consolidated Concrete	35	60 Tons Consolidated Concrete
AR-440	Consolidated Concrete	145	60 Tons Consolidated Concrete
AR-445	Vessels	3702	174 FT Vessel ""JELL II'
AR-445	Vessels	715	55 FT Tug ""ADMIRAL CHARLIE""
AR-445	Pipe	30192	140 Pieces and 617 Tons Concrete Pipe
AR-445	Concrete Rubble	5240	Concrete Rubble: Scrap Concrete & Scrap Reef Balls
AR-445	Manhole Sections	10728	160 Tons Manhole Sections
AR-445	Pipe	24215	317 Pieces Concrete Pipe
AR-445	Pipe	22842	250 Pieces Concrete Pipe
AR-445	Reef Balls	3669	33 Reef Balls
AR-445	Reef Balls	1833	33 Reef Balls
AR-445	Reef Balls	3217	34 Reef Balls
AR-445	Boat Mold	517	Fiberglass and Steel Boat Molds
AR-445	Boat Mold	328	Fiberglass and Steel Boat Molds

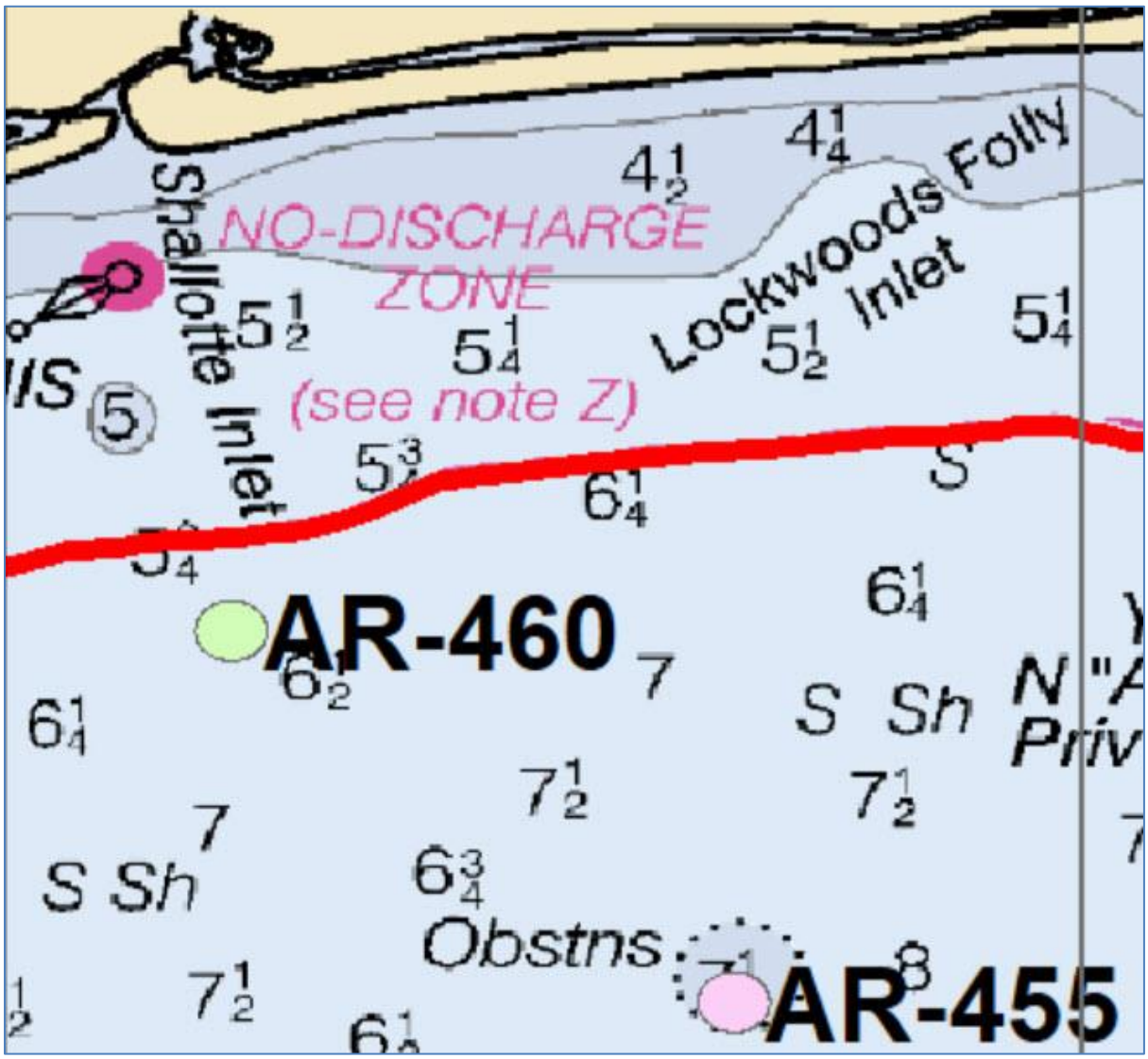

Figure B-11. Artificial Reefs (AR-455 and AR-460) Proposed as Special Management Zones in the Exclusive Economic Zone off Southern North Carolina.

Table B-22. Distance and Bearing to Artificial Reefs (AR-455 and AR-460) Source: NCDMF.

AR-455	263.6° magnetic - 12.4 nm from Cape Fear River Sea Buoy or 194.8° magnetic - 7.5 nm from Lockwood's Folly Inlet Sea Buoy
AR-460	155.4° magnetic - 2.8 nm from Shallotte Inlet Sea Buoy or 231.3° magnetic - 7.5 nm from Lockwood's Folly Inlet Sea Buoy

Table B-23. Materials Placed in Artificial Reefs (AR-455 and AR-460) North Carolina DMF Artificial Reef Material Shapefile 2019.

Reef Site	Material Category	Area Sq. Ft.	Material Details
AR-455	Manhole Sections	32426	Manhole Sections (Part 2 of 2 of a 150 Deployment)
AR-455	Pipe	882	6 Pieces Concrete Pipe
AR-455	Consolidated Concrete	15904	Consolidated Concrete: Ultra Reef Balls, Dale Ward Reef Ball, Manhole Sections, Pipe
AR-455	Pipe	10673	600 Tons Concrete Pipe
AR-455	Vessels	2457	104 FT Navy Tug ""PAWTUCKET""
AR-455	Pipe	313	3 Pieces of Pipe
AR-455	Consolidated Concrete	25861	Consolidated Concrete: 800 Tons Concrete Pipe and Manhole Sections
AR-455	Pipe	22645	369 Pieces Concrete Pipe
AR-455	Manhole Sections	17666	Manhole Sections (Part 1 of 2 of a 150 Deployment)
AR-455	Pipe	904	5 Pieces Concrete Pipe
AR-455	Reef Balls	1931	34 Reef Balls
AR-455	Reef Balls	8415	100 Reef Balls (4 groups of 25)
AR-455	Reef Balls	5392	66 Reef Balls in 2 Groups of ~33
AR-455	Reef Balls	72	3 Outlier Reef Balls
AR-460	Pipe	17105	500 Tons, Low Density Concrete Pipe
AR-460	Pipe	20969	406 Pieces Concrete Pipe
AR-460	Pipe	23746	231+ Pieces Concrete Pipe
AR-460	Reef Balls	17182	100 Reef Balls (4 groups of 25)
AR-460	Pipe	32076	500 Tons, High Density Concrete Pipe
AR-460	Train Boxcar	1068	2 Train Boxcars
AR-460	Train Boxcar	811	2 Train Boxcars
AR-460	Train Boxcar	3412	5 Train Boxcars
AR-460	Vessels	1352	40 FT USCG Launch
AR-460	Vessels	8250	330 FT Barge
AR-460	Reef Balls	5433	100 Reef Balls (4 groups of 25)
AR-460	Reef Balls	5355	100 Reef Balls (2 groups of 50)
AR-460	Manhole Sections	10343	Approx. 360 Tons Manhole Sections

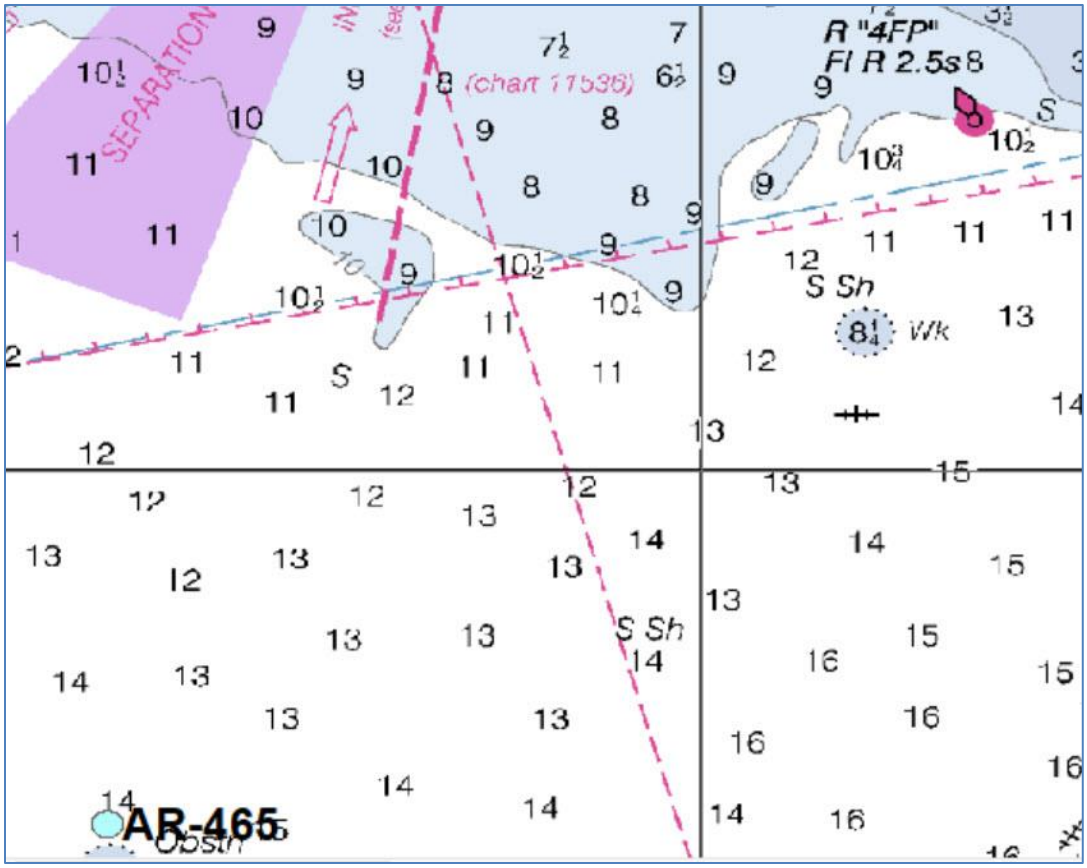

Figure B-12. Artificial Reef (AR-465) Proposed as Special Management Zones in the Exclusive Economic Zone off Southern North Carolina.

Table B-24. Distance and Bearing to Artificial Reefs (AR-465) Source: NCDMF.

AR-465	186.3° magnetic - 23.8 nm from Cape Fear River Sea Buoy River Inlet, 165.2° magnetic - 30.5 nm from Lockwood's Folly Inlet Sea Buoy, or 151.5° magnetic - 31.2 nm from Shallotte Inlet Sea Buoy

Table B-25. Materials Placed in Artificial Reefs (AR-465) North Carolina DMF Artificial Reef Material Shapefile 2019.

Reef Site	Material Category	Area Sq. Ft.	Material Details
AR-465	Reef Balls	13013	100 Ultra Reef Balls
AR-465	Pipe	33773	925 Tons of Concrete Pipe
AR-465	Reef Balls	2229	100 Reef Balls
AR-465	Manhole Sections	4679	
AR-465	Vessels	3724	180 FT ""Mance Lassiter""
AR-465	Pipe	16670	Concentration of Concrete Pipe

Appendix Y. Detailed maps and tables for proposed Special Management Zones off South Carolina.

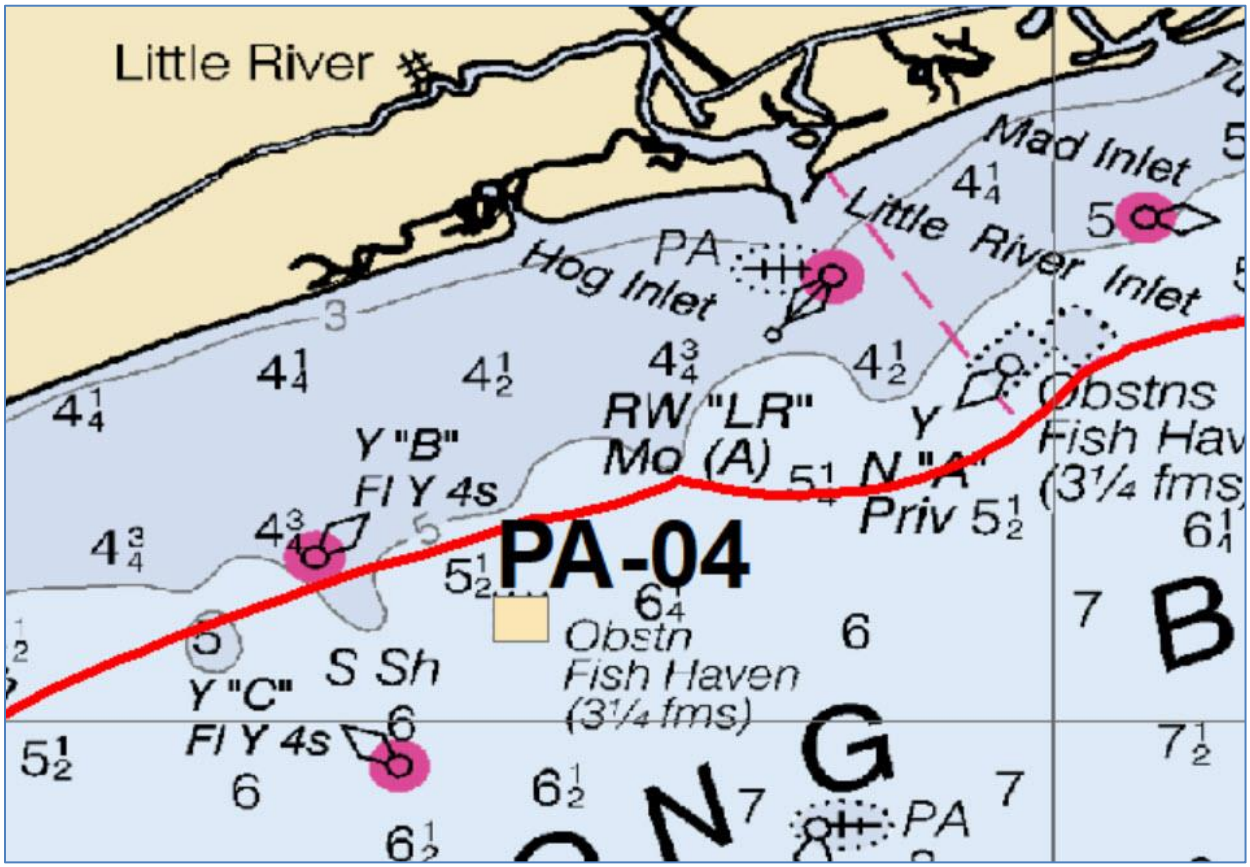

Figure C-1. Artificial Reef (PA-04) Proposed as New Special Management Zones in the Exclusive Economic Zone off Northern South Carolina.

Table C-1. Distance and Bearing to Artificial Reef (PA-04) Source: SCDNR.

PA-04	211° magnetic - 5 nm from south jetty at Little River Inlet - water depth 35'

Table C-2. Materials Placed and Location in Artificial Reef (PA-04) Source: SCDNR.

Reef Site	Material Details	Location	
		Latitude	Longitude
PA-04	Shrimp Trawler section	33° 46.168' N	78° 35.893' W
PA-04	Shrimp Trawler section	33° 46.181' N	78° 35.912' W
PA-04	Shrimp Trawler section	33° 46.184' N	78° 35.891' W
PA-04	Concrete Boxes & Cones	33° 46.128' N	78° 35.887' W
PA-04	Concrete Boxes & Cones	33° 46.129' N	78° 35.862' W
PA-04	Concrete Boxes & cones	33° 46.139' N	78° 35.878' W
PA-04	Concrete Boxes & cones	33° 46.144' N	78° 35.874' W
PA-04	Concrete Boxes & cones	33° 46.148' N	78° 35.855' W
PA-04	Concrete Boxes & cones	33° 46.157' N	78° 35.853' W

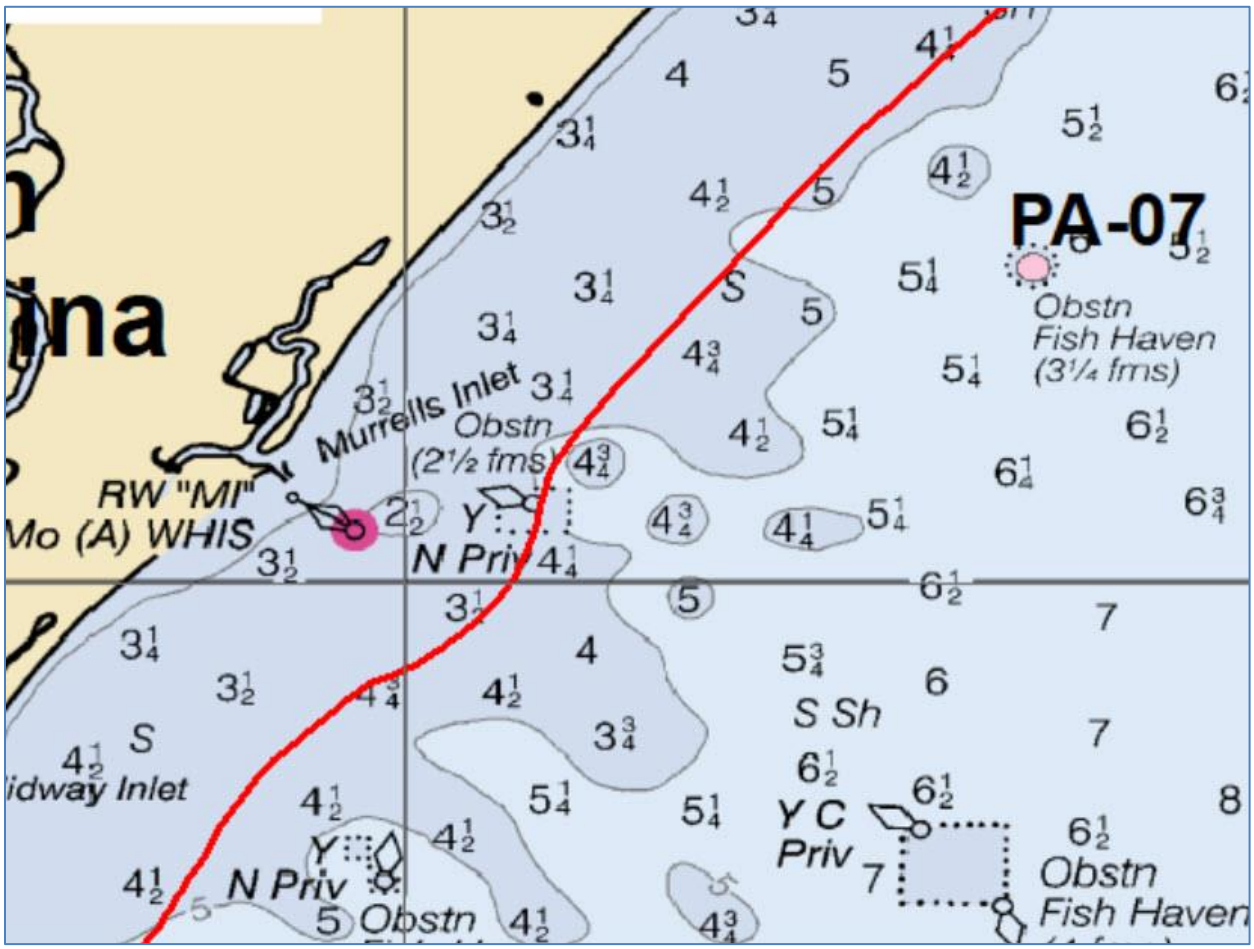

Figure C-2. Artificial Reef (PA-07) Proposed as New Special Management Zones in the Exclusive Economic Zone off Northern South Carolina.

Table C-3. Distance and Bearing to Artificial Reef (PA-07) Source: Bob Martore, SCDNR.

PA-07	72° magnetic – 9.3 nm from the north jetty at Murrells Inlet, off Surfside Beach - water depth 35'

Table C-4. Materials Placed and Location in Artificial Reef (PA-07) Source: Bob Martore, SCDNR.

Reef Site	**Material Details**
PA-07	Concrete Culvert Pipe
PA-07	Concrete Junction Boxes
PA-07	Concrete Catch Basins

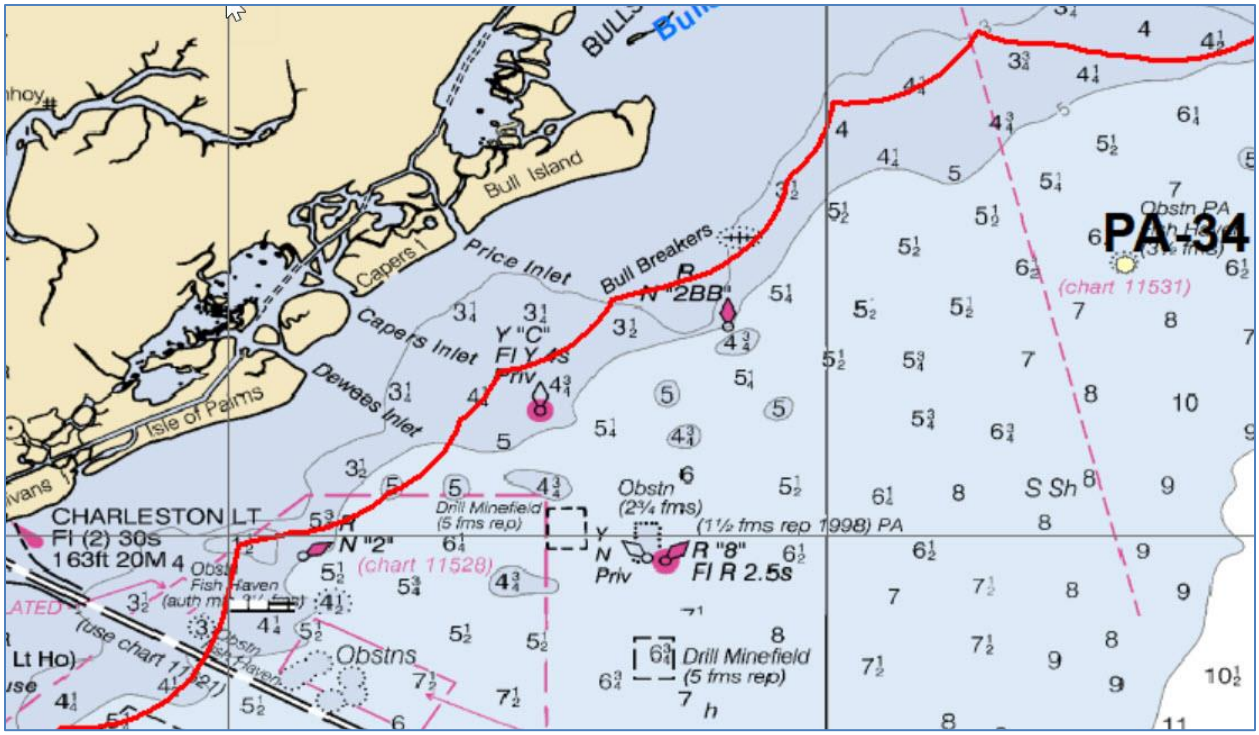

Figure C-3. Artificial Reef (PA-34) Proposed as New Special Management Zones in the Exclusive Economic Zone off Southern South Carolina.

Table C-5. Distance and Bearing to Artificial Reef (PA-34) Source: SCDNR.

PA-34	138° magnetic - 9 nm from Sandy Point channel buoy R"2" - water depth 47'

Table C-6. Materials Placed and Location in Artificial Reef (PA-34) Source: SCDNR.

Reef Site	**Material Details**	**Location**	
		Latitude	**Longitude**
PA-34	Concrete & steel rubble	32° 51.833' N	79° 22.538' W
PA-34	Concrete & steel rubble	32° 51.803' N	79° 22.517' W
PA-34	Concrete & steel rubble	32° 51.798' N	79° 22.514' W
PA-34	105' Tugboat (Capt Morgan)	32° 51.807' N	79° 22.484' W
PA-34	Cooper River Bridge rubble	32° 51.750' N	79° 22.440' W
PA-34	Cooper River Bridge rubble	32° 51.750' N	79° 22.480 W
PA-34	Cooper River Bridge rubble	32° 51.737' N	79° 22.536' W
PA-34	Cooper River Bridge rubble	32° 51.790' N	79° 22.450' W
PA-34	50 concrete culvert pipes	32° 51.780' N	79° 22.500' W
PA-34	45' Tugboat (Duane Merritt)	32° 51.844' N	79° 22.480' W
PA-34	85 concrete culvert pipes	32° 51.840' N	79° 22.465' W

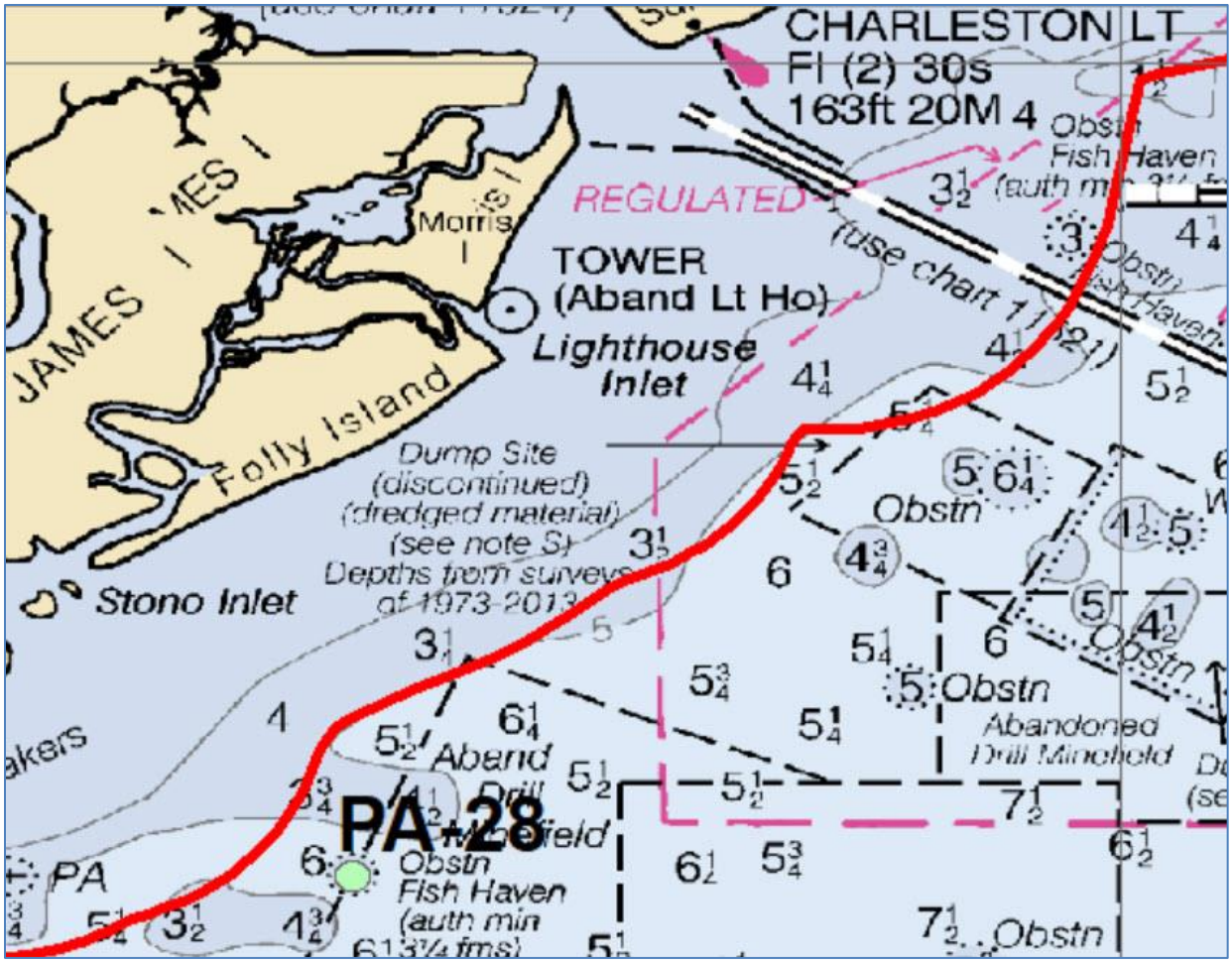

Figure C-4. Artificial Reef (PA-28) Proposed as New Special Management Zones in the Exclusive Economic Zone off Southern South Carolina.

Table C-7. Distance and Bearing to Artificial Reef (PA-28) Source: SCDNR.

PA-28	131° magnetic - 2.4 nm from Stono Inlet buoy '1S' - water depth 40'

Table C-8. Materials Placed and Location in Artificial Reef (PA-28) Source: SCDNR.

Reef Site	Material Details	Location	
		Latitude	Longitude
PA-28	Concrete pyramids	32° 34.262' N	79° 55.145' W
PA-28	Concrete pyramids	32° 34.279' N	79° 55.135' W
PA-28	Concrete pyramids	32° 34.254' N	79° 55.120' W
PA-28	CAFB runway rubble	32° 34.268' N	79° 55.173' W
PA-28	CAFB runway rubble	32° 34.260' N	79° 55.162' W
PA-28	CAFB runway rubble	32° 34.234' N	79° 55.171' W
PA-28	50' Houseboat	32° 34.449' N	79° 55.114' W
PA-28	CPW concrete	32° 34.300' N	79° 55.100' W
PA-28	Limehouse bridge rubble	32° 34.330' N	79° 55.070' W
PA-28	Cooper River Bridge rubble	32° 34.345' N	79° 55.153' W
PA-28	Cooper River Bridge rubble	32° 34.240' N	79° 55.065' W
PA-28	Cooper River Bridge rubble	32° 34.265' N	79° 55.200' W
PA-28	Cooper River Bridge rubble	32° 34.340' N	79° 55.130' W
PA-28	Cooper River Bridge rubble	32° 34.360' N	79° 55.100' W
PA-28	Concrete rubble	32° 34.285' N	79 °55.180' W
PA-28	Concrete rubble	32° 34.305' N	79° 55.144' W
PA-28	Concrete culvert pipe	32° 34.252' N	79° 55.156' W
PA-28	Concrete blocks & slabs	32° 34.290' N	79° 55.080' W

Table C-9. South Carolina Artificial Reefs proposed as Special Management Zones (Based on permitted locations including three with centroids and radius and one with corner coordinates in Degrees Decimal Minutes (Source: SCDNR March 2019))**.**

Reef Name	Centroid Latitude DDM	Centroid Longitude DDM	Radius (ft)
PA-07	33° 34.510' N	78° 51.000' W	200
PA-28	32° 34.300' N	79° 55.100' W	200
PA-34	32° 51.800' N	79° 22.500' W	200

Reef Name	Corner	Latitude	Longitude
PA-04	NW	33° 46.400' N	78° 36.200' W
	SW	33° 45.900' N	78° 36.200' W
	NE	33° 46.400' N	78° 35.600' W
	SE	33° 45.900' N	78° 35.600' W