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

Environmental Assessment, Regulatory Flexibility Act Analysis, and Regulatory Impact Review

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

Award Number FNA15NMF4410010

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

Proposed actions:	Designate artificial reefs as Special Management Zones in federal waters off North Carolina and South Carolina.

Responsible Agencies and Contact Persons

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Why is the South Atlantic Fishery Management Council considering action?

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

The Fishery Management Plan for the Snapper Grouper Fishery of the Southeast Region (Snapper Grouper FMP) (SAFMC 1983) established a framework for designating SMZs. The stated intent of a SMZ is to *create 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 appropriate recreational bag limit. 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 since the 1980s. Four additional artificial reef sites were established in recent years and the SCDNR requested the sites be designated as SMZs with the same restrictions on fishing gear as existing SMZs, namely limiting angling activities to handheld gear—handline, rod and reel and spear (excluding powerheads)—and limiting harvest of snapper grouper species with allowable gear 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. Subsequent amendments to the Snapper Grouper FMP have designated artificial reefs in the EEZ off South Carolina as SMZs and restricted fishing gear to

handheld gear. 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 SMZ designation of the four additional reefs would avoid confusion among users and bring consistency to regulations and enforcement.

Purpose and Need

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

Need: Reduce adverse effects to snapper grouper species and optimize fishing opportunities at the artificial reef sites.

What actions are being proposed in this framework amendment?

Regulatory Amendment 34 to the Snapper Grouper FMP proposes the following:

Action 1. Designate artificial reefs in the exclusive economic zone off North Carolina as special management zones

Currently: There are currently no artificial reefs in the exclusive economic zone off North Carolina designated as special management zones.

Alternative 2. Designate 30 artificial reefs in the exclusive economic zone off North Carolina as special management zones. 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.

Preferred Alternative 3. Designate 30 artificial reefs in the exclusive economic zone off North Carolina as special management zones. 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.

Action 2. Designate additional artificial reefs in the exclusive economic zone off South Carolina as special management zones

Currently: There are currently 28 artificial reefs in the exclusive economic zone off South Carolina designated as special management zones.

Preferred Alternative 2. Designate four additional artificial reefs in the exclusive economic zone off South Carolina as special management zones. 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. Designate four additional artificial reefs in the exclusive economic zone off South Carolina as special management zones. 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?

The proposed actions in this framework amendment would designate 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 actions would also prohibit the use of certain gear types in the SMZs and limit harvest to the recreational bag limit by some or all the gear.

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 (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 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 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. EEZ is conducted under the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP) (SAFMC 1983) (**Figure 1.3.1**). There are 55 species managed by the Council under the Snapper Grouper FMP.

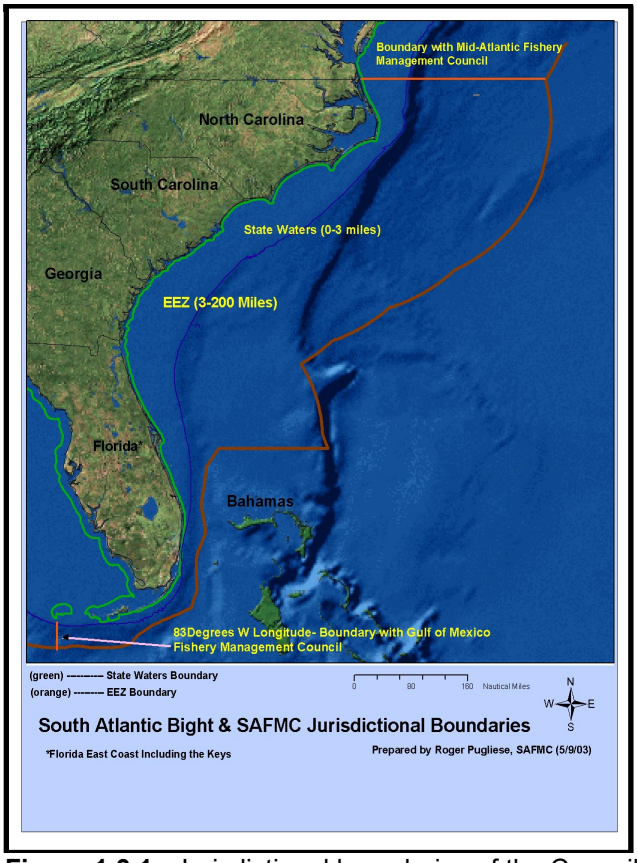

Figure 1.3.1. Jurisdictional boundaries of the Council.

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

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

Need: Reduce adverse effects to snapper grouper species and optimize fishing opportunities at the artificial reef sites.

The Council is considering actions to designate artificial reefs sites in the EEZ off North Carolina and South Carolina as SMZs and to implement fishing gear and harvest restrictions at these sites. The South Carolina Department of Natural Resources (SCDNR) and the North Carolina Division of Marine Fisheries (NCDMF) requested that the Council designate artificial reefs located in the EEZ off their respective coasts as SMZs in letters dated March 1, 2019, and March 12, 2019, respectively. The Council's goal for all SMZs is to restrict fishing gear that could result in high exploitation rates to provide biological benefits to federally managed snapper grouper species at these sites. The Council determined that the condition of certain fish populations at the sites (e.g., species that have complex social structures such as hogfish) could improve as a result of the proposed fishing gear and/or harvest restrictions. The Council also determined that by limiting allowable gear at artificial reef sites, dereliction of gear could become less frequent, therefore minimizing possible impacts to threatened and endangered species. In addition, the proposed restrictions could provide benefits to recreational fishermen by increasing opportunities to catch fish. The Council determined that the proposed action would enhance the fishing experience at the artificial reefs for recreational fishermen, and that optimizing opportunities for recreational fishermen was the original intent of the artificial reef placement at these sites and the current SMZ designations.

The Council specified the SMZ designation process in 1983, and SMZs have been designated in South Carolina, Georgia, and Florida since that time and as recently as in 2000 (see **Section 1.5**). The purpose of the original SMZ designation process, and the subsequent specification of SMZs, was to protect snapper grouper populations at the relatively small, permitted artificial reef sites and "create fishing opportunities that would not otherwise exist."[1] Prior to the SMZ designation process, for example, black sea bass pots were used by commercial fishermen to efficiently remove black sea bass from artificial reefs off South Carolina. At the time, the Council determined that because artificial reefs sites are small (due to the limited amount of

[1] "*The intent of a SMZ is to create 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. [sic] traps harvesting black sea bass from artificial reefs). Fishing gear that offers "exceptional advantage" 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).*

suitable reef-building material), the sites are vulnerable to overexploitation by fishing gear that has the potential to result in localized depletion. In addition, the Council wanted to optimize fishing opportunities for the recreational sector through the designation of SMZs.

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 can be found in Appendix C of Regulatory Amendment 33 to the Snapper Grouper FMP (SAFMC, 2020) and is hereby incorporated by reference. Below is a list of amendments to the Snapper Grouper FMP addressing SMZ designations and gear and harvest restrictions within the SMZs in the South Atlantic EEZ.

Snapper Grouper FMP (1983): Established process for artificial reefs being designated as SMZs.

Regulatory Amendment 1 (1987): Prohibited fishing in SMZs except with handline, rod and reel, and spearfishing gear. Prohibited harvest of goliath grouper in SMZs.

Regulatory Amendment 2 (1988): Designated artificial reefs off Ft. Pierce, Florida, as SMZs.

Regulatory Amendment 3 (1989): Designated artificial reef at Key Biscayne, Florida, as SMZ and prohibited fish trapping, bottom longlining, spearfishing, and harvesting of goliath grouper in SMZ.

Amendment 4 (1991): Prohibited the use of powerheads and bangsticks in SMZs off South Carolina and required snappers and groupers in the South Atlantic EEZ to be landed with head and fins intact.

Regulatory Amendment 5 (1992): Designated artificial reefs in the EEZ off South Carolina and Georgia as SMZs where only handline, rod and reel, and spearfishing (excluding powerheads) gear was allowed.

Regulatory Amendment 7 (1998): Designated 10 artificial reefs off South Carolina as SMZs.

Regulatory Amendment 8 (2000): Designated 12 artificial reefs off Georgia as SMZs; revised the boundaries of 7 existing SMZs to meet Coast Guard specifications, and restricted fishing in new and revised SMZs.

Amendment 23 (in Comprehensive Ecosystem-based Amendment 2; 2012): Limited harvest and possession of snapper grouper species (with the use of all non-prohibited fishing gear) in SMZs off South Carolina to the recreational bag limit.

NOTE: The Comprehensive Ecosystem-Based Amendment 2 also included Amendment 21 to the Fishery Management Plan for the Coastal Migratory Pelagic Resources in the Gulf of Mexico and Atlantic Region, which restricted harvest of king mackerel, Spanish mackerel, and cobia to the recreational bag limit within the South Carolina SMZs.

Chapter 2. Proposed Actions and Alternatives

2.1 Action 1. Designate 30 artificial reefs in the exclusive economic zone off North Carolina as Special Management Zones

Alternative 1 (No Action). There are currently no artificial reef sites in the exclusive economic zone off North Carolina designated as special management zones. 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 designate artificial reef sites as special management zones or implement new restrictions on fishing gear used to harvest snapper grouper species from artificial reefs in the exclusive economic zone off North Carolina.

Alternative 2. Designate 30 artificial reef sites in the exclusive economic zone off North Carolina as special management zones. 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.

Preferred Alternative 3. Designate 30 artificial reef sites in the exclusive economic zone off North Carolina as special management zones. 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:

The North Carolina Division of Marine Fisheries (NCDMF) requested designation of 30 artificial reefs in the exclusive economic zone (EEZ) off North Carolina as special management zones (SMZ) in March 2019. 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.[2] Further, NCDMF requested that harvest of snapper grouper species with spearfishing gear be limited to the recreational bag limit.

The 30 artificial reef sites being proposed for SMZ designation are in the EEZ off North Carolina and are defined by a radius around a central point (**Table D-1** in **Appendix D**, and **Figures 2.1.1 – 2.1.3**).

[2] Note: the use of rebreathers to harvest snapper grouper species with spearfishing gear is prohibited (59 FR 66270, December 23, 1994).

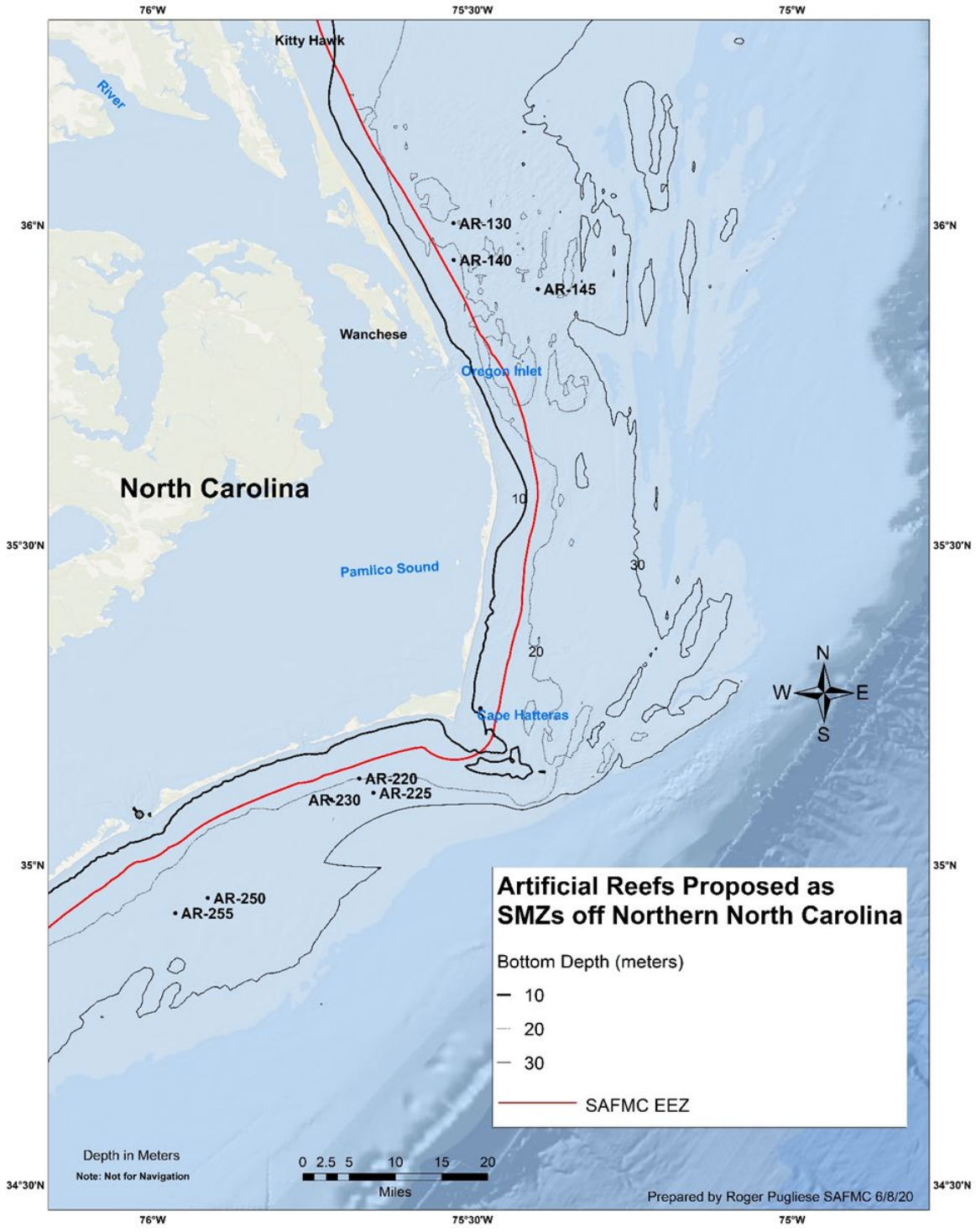

Figure 2.1.1. Proposed SMZs at permitted artificial reef sites in the EEZ off northern North Carolina. Maps of individual sites are in **Appendix D**.
Source: SAFMC.

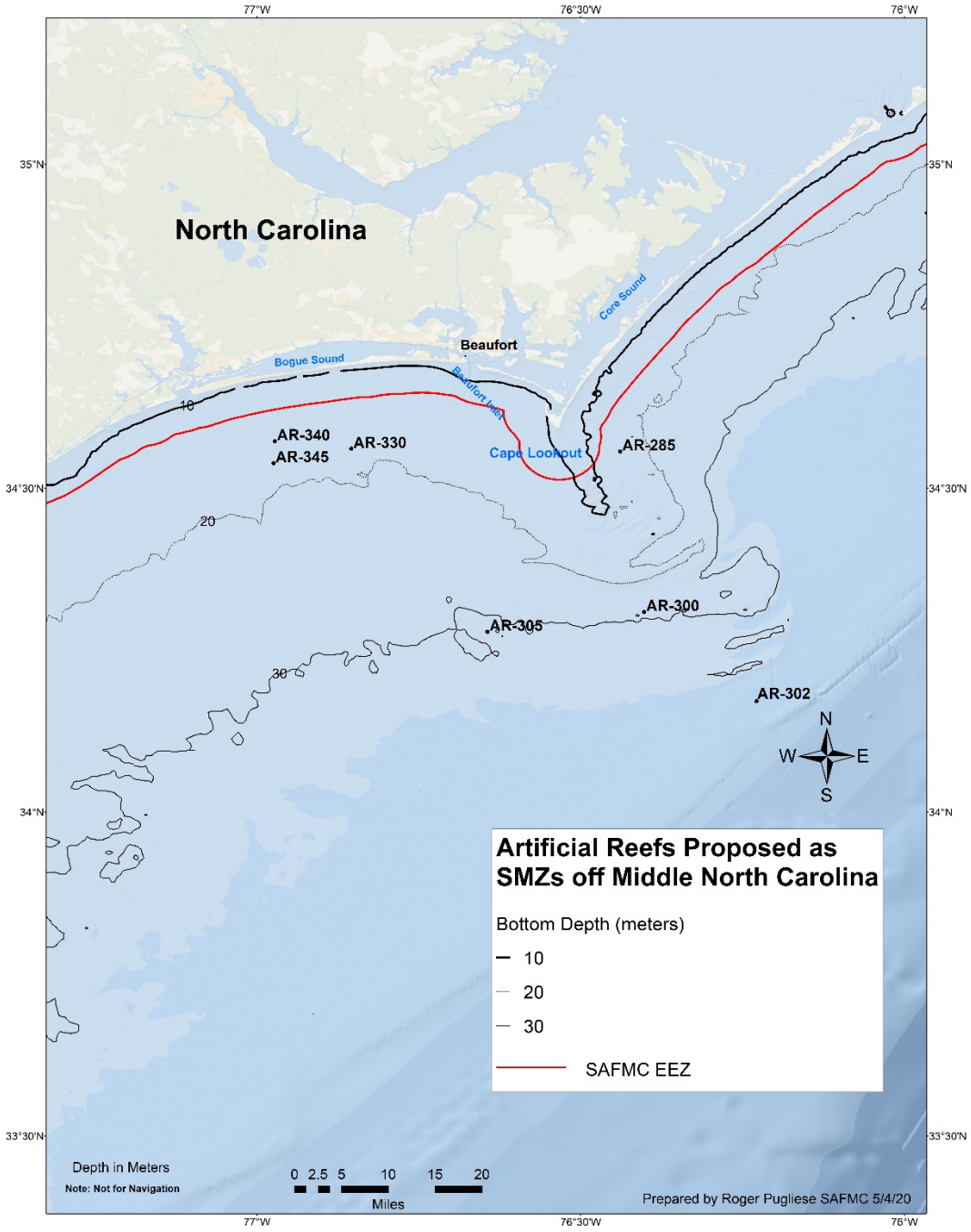

Figure 2.1.2. Proposed SMZs at permitted artificial reef sites in the EEZ off central North Carolina. Maps of individual sites are in **Appendix D**.
Source: SAFMC

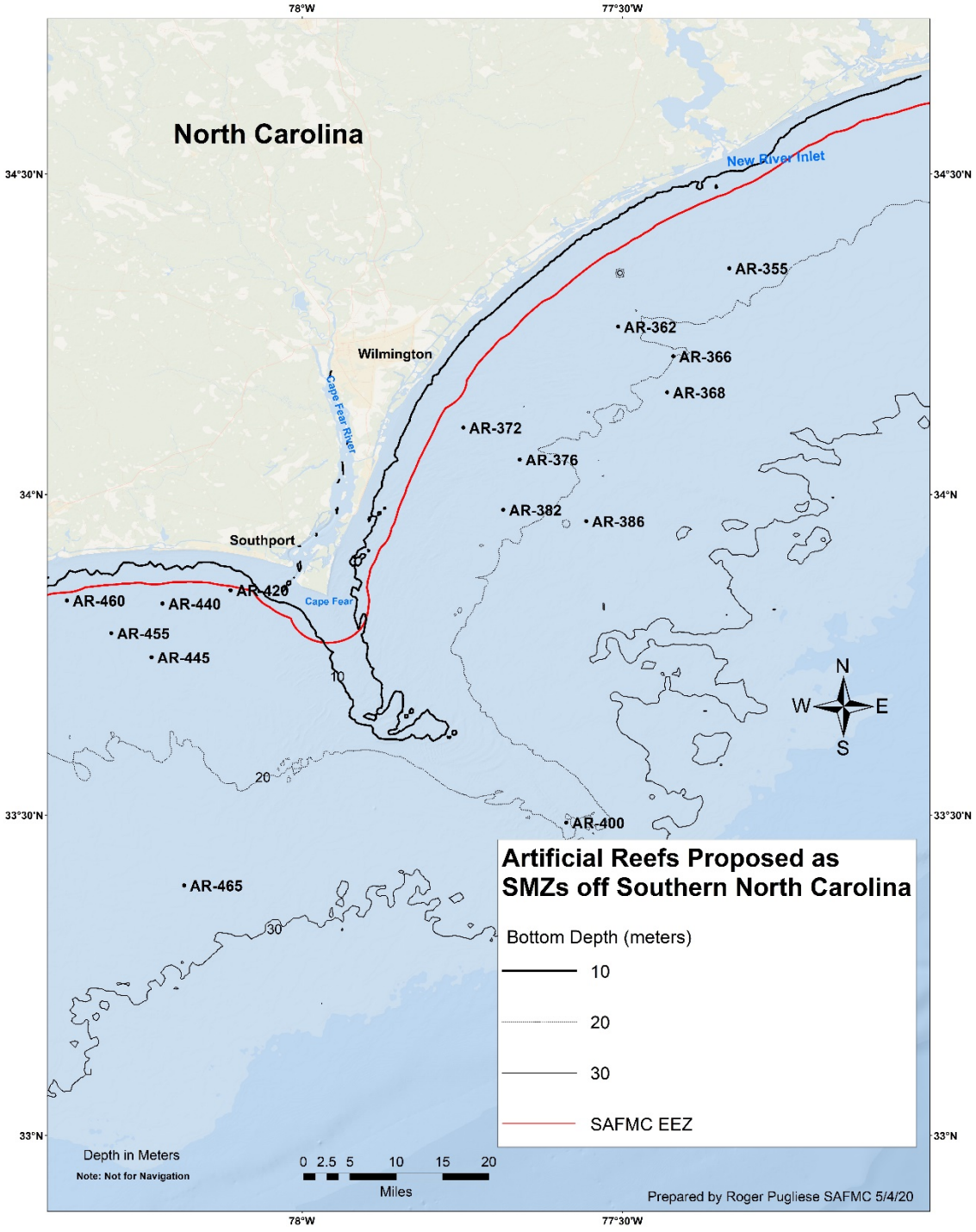

Figure 2.1.3. Proposed SMZs at permitted artificial reef sites in the EEZ off southern North Carolina. Maps of individual sites are in **Appendix D**.
Source: SAFMC.

2.1.1 Comparison of Alternatives:

Alternative 2 and **Preferred 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 greater potential to adversely affect resident communities of snapper grouper species. **Alternative 2** is more restrictive than **Preferred Alternative 3** in that all harvest of snapper grouper species within the SMZs would be restricted to the applicable recreational bag limit. Under **Preferred Alternative 3**, only harvest by spear would be limited to the applicable recreational bag limit. Hence, **Alternative 2** would impart the greatest biological benefits, followed by **Preferred Alternative 3**, and **Alternative 1 (No Action)**.

Adverse effects on sea turtles associated with these reefs are already part of the baseline. Designation of North Carolina's artificial reefs as SMZs would not result in direct adverse effects to protected resources unless the designation results in increased effort above what is considered in the baseline. Thus, any adverse effects on sea turtles associated with these reefs is already part of the baseline. The proposed restriction on allowable fishing gear that can be used in artificial reef sites (**Alternative 2** and **Preferred Alternative 3**) may provide some small benefit to sea turtles to the extent that it reduces overall entangling gear and the likelihood of derelict gear left on the artificial reef relative to the baseline.

Alternative 2 is expected to result in the highest potential economic costs for the commercial sector but the highest potential benefits for the recreational sector because it is the most restrictive alternative, followed by **Preferred Alternative 3**, and **Alternative 1 (No Action)**. Because **Alternative 2** is more restrictive than **Preferred Alternative 3**; it is expected to result in the greatest short-term negative social effects and the greatest long-term positive social effects to coastal communities.

Alternative 1 (No Action) would not change the administrative environment from its current condition. **Preferred Alternative 3** and **Alternative 2** would likely have increased administrative effects in the form of at-sea enforcement of the regulations at the proposed SMZs. The administrative effects of **Preferred 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 (spear).

2.2 Action 2. Designate additional artificial reefs in the exclusive economic zone off South Carolina as Special Management Zones

Alternative 1 (No Action). There are currently 28 artificial reef sites in the exclusive economic zone off South Carolina designated as special management zones. The allowable gear for the snapper grouper fishery management plan for the commercial and recreational sectors are handline, rod and reel, spear (excluding powerheads), bandit gear, pot, and longline (the last two are commercial sector only). Do not designate additional artificial reef sites as special management zones or implement new restrictions on fishing gear used to harvest snapper grouper species from artificial reef sites in the exclusive economic zone off South Carolina.

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

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

Discussion:

Twenty-eight artificial reef sites in the EEZ off South Carolina have been designated as SMZs. Four additional artificial reefs were created in recent years, and the South Carolina Department of Natural Resources (SCDNR) requested the new reefs be designated as SMZs with the same restrictions on fishing gear as existing SMZs off South Carolina. SCDNR requested to limit allowable gear to handline, rod and reel, and spear (excluding powerheads).[3] In addition, SCDNR requested that harvest of snapper grouper species be limited to the federal recreational bag limits.

The four additional artificial reef sites being proposed for SMZ designation are in the EEZ off South Carolina and are defined by a radius around a central point or by corner coordinates (**Table E-1** in **Appendix E**, and **Figures 2.2.1 – 2.1.2**).

Artificial reefs off South Carolina are located on an expansive shelf area largely devoid of any hard or live bottom. The artificial reefs were built to promote recreational fishing and were not sited on live bottom to avoid any impact to commercial fisheries. The artificial reefs have been promoted since their original construction as recreational fishing areas (SAFMC Snapper Grouper Monitoring Team Report #5, 1992) and the South Carolina Marine Artificial Reef Program is financially supported primarily by the recreational community through South

[3] Note: the use of rebreathers to harvest snapper grouper species with spearfishing gear is prohibited (59 FR 66270, December 23, 1994).

Carolina's Saltwater Recreational Fishing License Program and the Federal Aid in Sportfish Restoration Program.

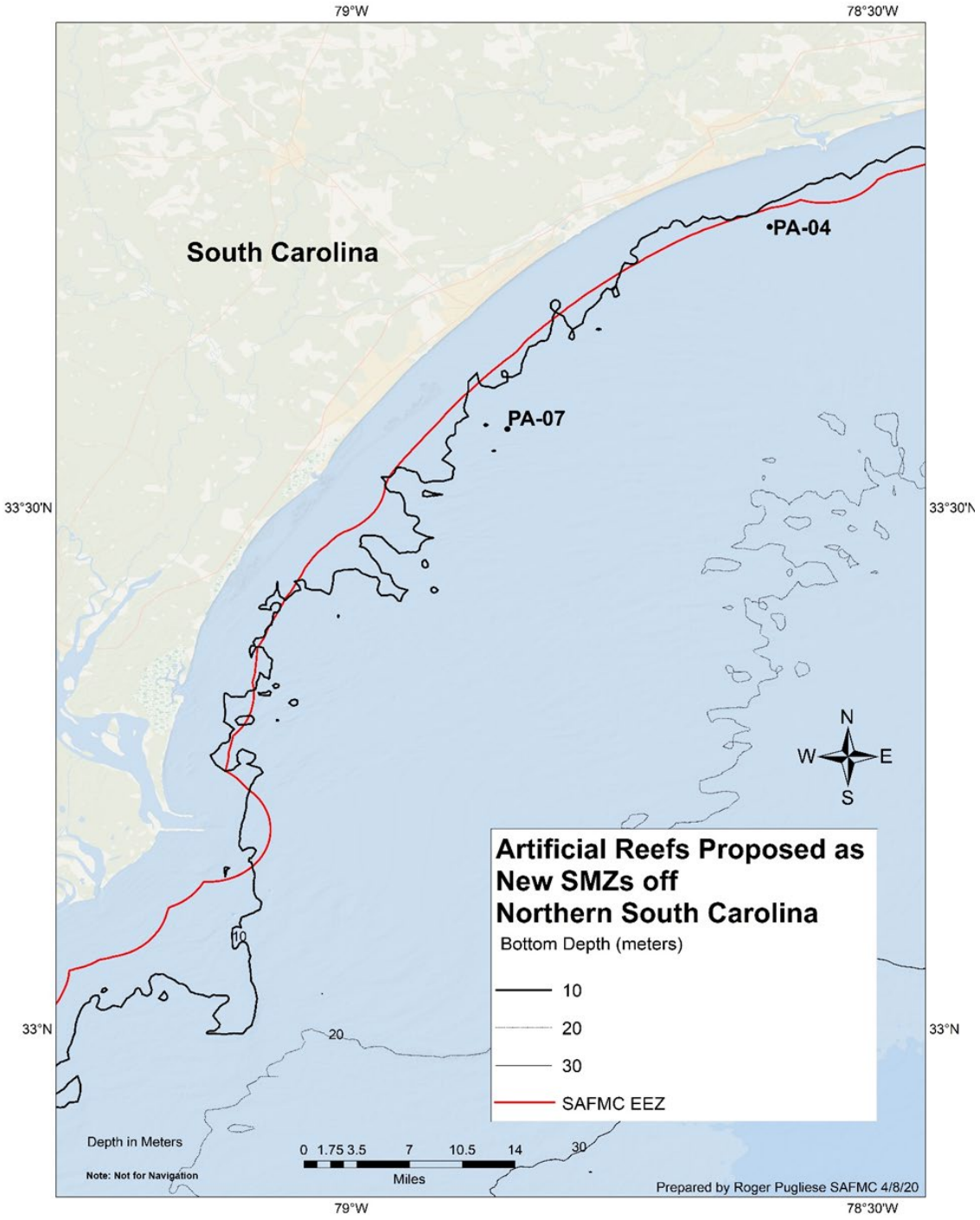

Figure 2.2.1. Proposed SMZs at permitted artificial reef sites in the EEZ off northern South Carolina. Maps of individual sites are in **Appendix E**.
Source: SAFMC.

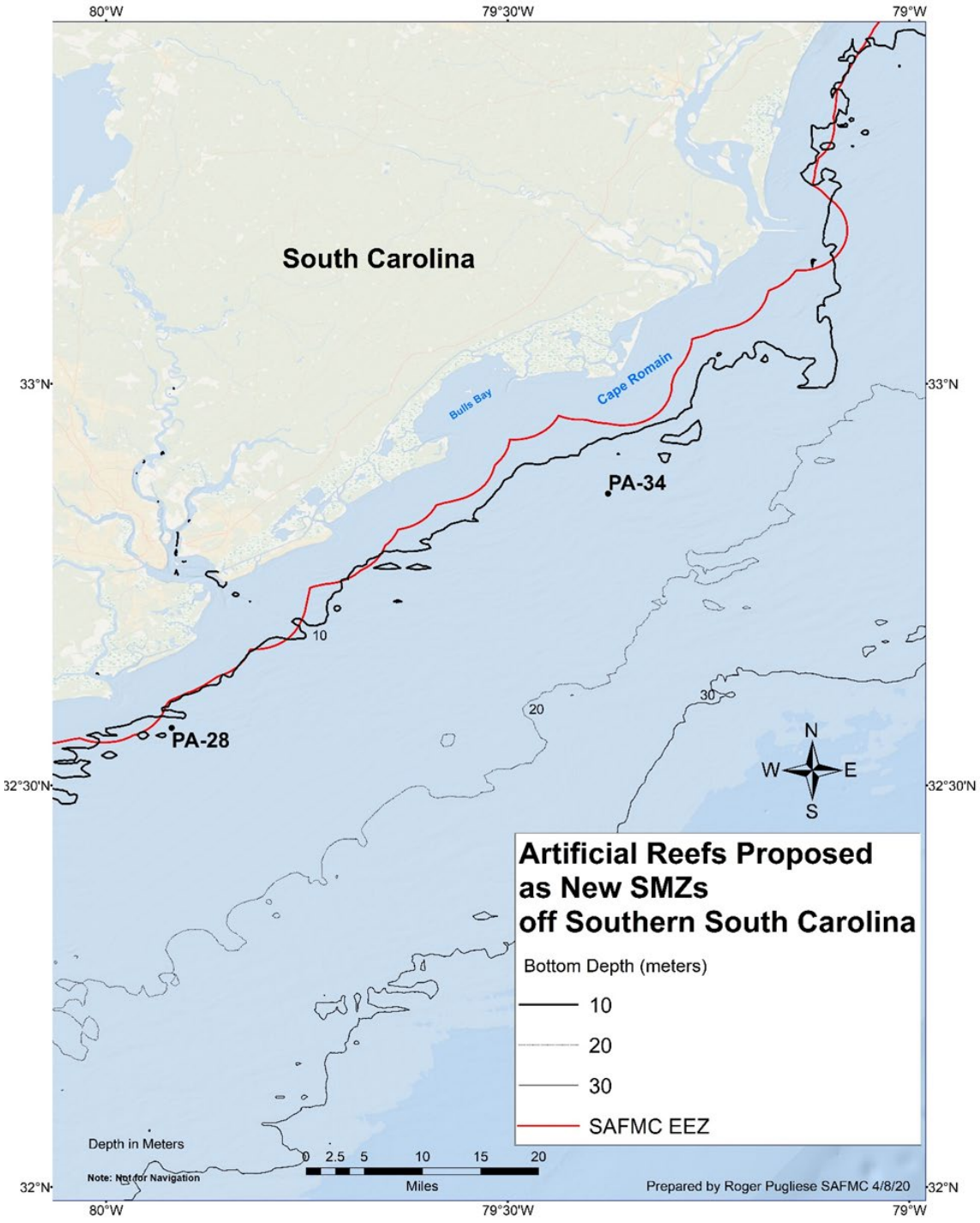

Figure 2.2.2. Proposed SMZs at permitted artificial reef sites in the EEZ off southern South Carolina. Maps of individual sites are in **Appendix E**.
Source: SAFMC.

2.1.2 Comparison of Alternatives:

Harvest of snapper grouper species is currently restricted to the applicable recreational bag limits in all South Carolina SMZs. 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 of the four additional reefs as SMZs with the same gear and harvest restrictions would avoid confusion among users and bring consistency to regulations and enforcement.

Biological effects of designating four additional artificial reefs as SMZs with restrictions on the use of fishing gear that has a greater potential to remove large numbers of snapper grouper species from these small reefs, as proposed under **Preferred Alternative 2** and **Alternative 3**, would be positive relative to **Alternative 1 (No Action)** since the potential for localized depletion would be minimized on four additional reefs.

Adverse effects on sea turtles associated with these reefs are already part of the baseline. Designation of South Carolina's artificial reefs as SMZs would not result in direct adverse effects to protected resources unless the designation results in increased effort above what is considered in the baseline. The proposed restriction on allowable fishing gear that can be used in artificial reef sites (**Preferred Alternative 2** and **Alternative 3**) may provide some small benefit to sea turtles to the extent that it reduces overall entangling gear and likelihood of derelict gear left on the artificial reef relative to the baseline.

Preferred Alternative 2 is expected to result in the highest potential economic costs for the commercial sector but the highest potential benefits for the recreational sector because it is the most restrictive alternative, followed by **Alternative 3**, and **Alternative 1 (No Action)**. Because **Preferred Alternative 2** is more restrictive than **Alternative 3**; it is expected to result in the greatest short-term negative social effects and the greatest long-term positive social effects to coastal communities.

Alternative 1 (No Action) would not change the administrative environment from its current condition. **Preferred Alternative 2** and **Alternative 3** would likely have increased administrative effects in the form of at-sea enforcement of the regulations at the proposed SMZs. The 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 (spear).

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. Artificial Reefs

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.

Artificial reef structures are 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.

Thirty of 68 artificial reefs off the coast of North Carolina 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). A guide to North Carolina's artificial reefs is available at the following link: http://portal.ncdenr.org/web/mf/artificial-reefs-program. In addition, an interactive application with maps of all the sites is available here: http://portal.ncdenr.org/web/mf/artificial-reefs-program. The artificial reefs proposed for SMZ designation in this framework amendment are located from one-half mile to 38 miles from shore and are situated so they can be reached from maintained inlets in North Carolina. This proximity creates an opportunity for high exploitation of the fishery resources aggregated by these reefs. **Appendix D** contains detailed maps and coordinates for the 30 artificial reefs off North Carolina being proposed for SMZ designation in this framework amendment as well as materials used in their construction.

An interactive mapping application of South Carolina's artificial reefs is available here: https://www.arcgis.com/apps/webappviewer/index.html?id=4f78b6685750438297e1f42e9a38d323. Additional information, including background on South Carolina's artificial reef program and information on reef materials and location for each site is available here: http://www.dnr.sc.gov/artificialreefs/. Off South Carolina, most of the continental shelf is covered with sand several feet deep, while only about 5 to 10 percent of the bottom has the appropriate geological makeup to allow for the formation of a reef community. Hence, artificial reefs represent valuable habitat. Artificial reefs off South Carolina range from small areas to one square mile in size, with multiple reef structures placed within the boundaries of each area. All sites are located on flat, featureless, sand bottom which offered little interest to divers or fishermen prior to the placement of reef materials. Reef construction sites are selected to provide easy access to users while attempting to avoid possible conflicts with any other use of the bottom or waters near the permitted areas. Most reef sites are buoyed to assist in their location. The reefs are constructed from a wide variety of materials. Steel-hulled vessels comprise most of the material used in South Carolina's artificial reef construction, with over 100 having been sunk off the state since 1969. Other scrap materials recycled on South Carolina reefs include steel and concrete bridges, concrete culvert pipe, steel dry dock work platforms, ex-military aircraft and even intercontinental ballistic missiles. See **Appendix E** for detailed maps of the four artificial reefs proposed for SMZ designation, and materials used in their construction.

3.1.2 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.

3.1.3 Habitat Areas of Particular Concern

Areas which meet the criteria for Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPC) 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 HAPC; all hermatypic coral habitats and reefs; manganese outcroppings on the Blake Plateau; 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 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 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 proposed actions in this framework amendment may have on EFH 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.

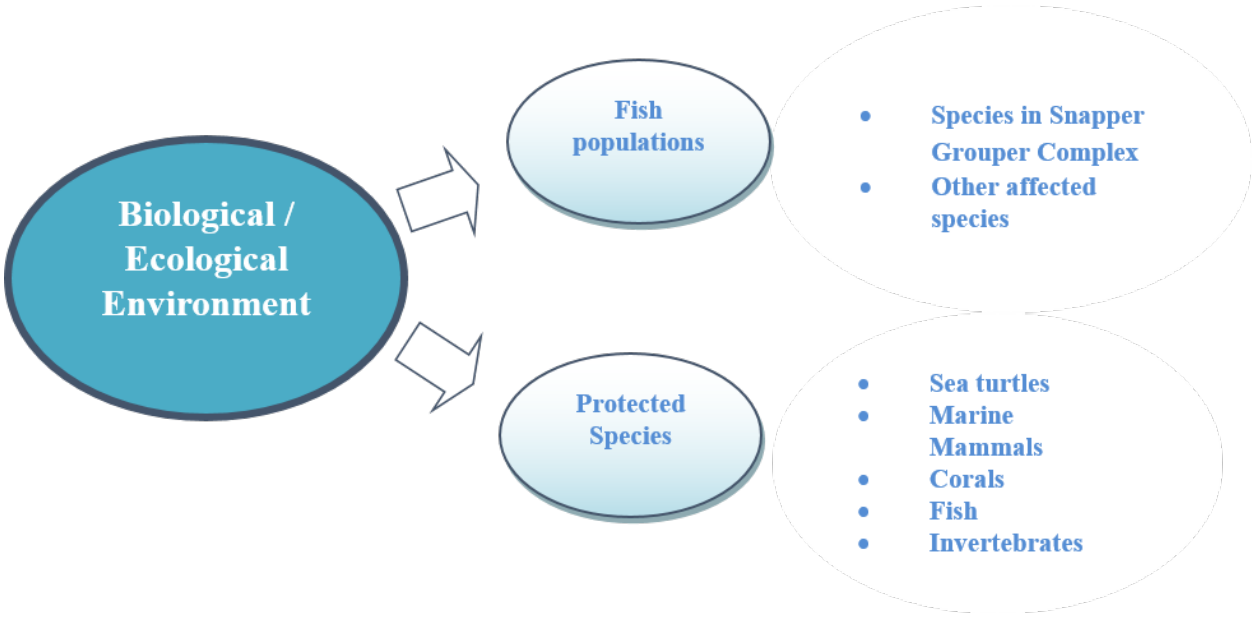

Figure 3.2.1. Two components of the biological environment described in this document.

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 framework amendment are the 55 species in the snapper grouper fishery management unit. However, not all 55 species are found in the EEZ off North and South Carolina. Snapper grouper species found in artificial reefs off North Carolina include black seabass, gag, gray triggerfish, greater amberjack, vermilion snapper, and red porgy. Snapper grouper species commonly found in South Carolina's artificial reefs include greater amberjack, groupers, red porgy, and black sea bass.

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.[4]

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

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 which are available on the SEDAR website http://sedarweb.org/. Stock status for species expected to be directly affected by actions in this amendment is in **Table 3.2.1.1.**

Table 3.2.1.1. Stock status information for select snapper grouper species.

Species	Last Assessment	Terminal Year	Overfishing	Overfished
Black Sea Bass	SEDAR 56 (2018)	2016	No	No
Gag	SEDAR 10 (2014)	2012	Yes	No
Gray Triggerfish	SEDAR 41 (2016)	N/A	No	Unknown
Greater Amberjack	SEDAR 59 (2019)	2017	No	No
Vermilion Snapper	SEDAR 55 (2018)	2016	No	No
Red Porgy	SEDAR 60 (2019)	2017	Yes	Yes

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 and spear. Available information is not of a high enough resolution to allow for analyses of the level of commercial bycatch and discards at the artificial reef sites. The sites range in size from 0.2 to 1 square miles, whereas commercial data are reported based on a 60-square nautical mile grid. Similarly, information on bycatch and discards in the recreational fishery is insufficient in terms of geographic resolution to allow for such a characterization.

3.2.3 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 (DPS) 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 North Atlantic right whales (NARW), 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)[5] classifies U.S. commercial fisheries into three categories based on the number of incidental mortality or serious injury they cause to marine mammals.

[5] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-list-fisheries/

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 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, and 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 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 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 (SAFMC 2019). 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 that apply to North and South Carolina are provided below.

Permits

Any commercial fishing vessel that harvests and sells any species within the snapper grouper fishery from the South Atlantic EEZ must have a valid South Atlantic commercial snapper grouper permit, which is a limited access permit. As of March 12, 2020, there were 147 valid or renewable unlimited permits and 11 valid or renewable 225-lb trip-limited permits held by entities located in the Carolinas (**Table 3.3.1.1**).

Table 3.3.1.1. Number of vessels with snapper grouper permits by state.

State	Unlimited	225-lb	Total
NC	102	10	112
SC	45	1	46
Total	147	11	158

Source: SERO PIMS March 12, 2020.

Landings, Value, and Effort

Although the number of permitted vessels that report snapper grouper landings is significantly less than the number of vessels with the permit region-wide, the numbers of permitted vessels that land snapper grouper in North and South Carolina are greater than the numbers of permitted vessels held by entities residing in those states (**Table 3.3.1.2**).

Table 3.3.1.2. Number of permitted vessels and number of permitted vessels that reported snapper grouper (SG) landings in North and South Carolina (2014 – 2018).

Year	NC Permitted Vessels	Vessels that Reported Landing SG in NC	SC Permitted Vessels	Vessels that Reported Landing SG in SC
2014	120	122	53	57
2015	116	108	52	53
2016	115	109	52	57
2017	123	121	53	59
2018	127	126	56	58
Average	120	117	53	57

Source: SERO SFD for historical permit counts and SEFSC Socioeconomic Panel Series (v. 10) accessed by the SEFSC Economic Query System (March 13, 2020) for vessels with reported SG landings.

The number of permitted vessels that reported snapper grouper landings (lbs gw) in North Carolina declined from 206 in 2009 to 126 in 2018, but it was not a consistent decline. Similarly, the number that reported snapper grouper landings in South Carolina declined from 63 to 2009 to 58 in 2018, but it was not a steady decline (**Tables 3.3.1.3** and **3.3.1.4**). Snapper grouper landings in those states and average snapper grouper landings per vessel and per trip also

generally declined over that time.

Table 3.3.1.3. Numbers of permitted vessels with snapper grouper (SG) landings in North Carolina and trips with those landings, SG landings (lbs gw) reported, and average SG landings (lbs gw) per vessel and per trip (2009-2018).

Year	Permitted Vessels with SG Landings in NC	Trips with Those SG Landings	SG Landings in NC	Average SG Landings in NC per Vessel	Average SG Landings in NC per Trip
2009	206	2,933	1,952,787	9,480	666
2010	147	2,286	1,704,585	11,596	746
2011	123	1,676	1,173,837	9,543	700
2012	120	1,719	1,301,282	10,844	757
2013	123	1,799	1,132,435	9,207	629
2014	122	2,066	1,149,363	9,421	556
2015	108	1,779	946,204	8,761	532
2016	109	2,163	1,043,635	9,575	482
2017	121	2,161	1,060,426	8,764	491
2018	126	2,029	1,074,056	8,524	529
Ave 2009-13	144	2083	1,452,985	10,134	700
Ave 2014-18	127	1,909	1,292,300	10,122	678

Source: SEFSC Socioeconomic Panel Series (v. 10) accessed by the SEFSC Economic Query System (March 13, 2020).

Table 3.3.1.4. Numbers of permitted vessels with snapper grouper (SG) landings in South Carolina and trips with those landings, SG landings (lbs gw) reported, and average SG landings (lbs gw) per vessel and per trip (2009-2018).

Year	Permitted Vessels with SG Landings in SC	Trips with Those SG Landings	SG Landings in SC	Average SG Landings in SC per Vessel	Average SG Landings in SC per Trip
2009	63	933	1,136,473	18,039	1,218
2010	60	743	1,189,203	19,820	1,601
2011	57	737	1,209,763	21,224	1,641
2012	57	805	1,031,644	18,099	1,282
2013	57	897	1,140,989	20,017	1,272
2014	57	847	1,032,189	18,109	1,219
2015	53	810	948,905	17,904	1,171
2016	57	783	826,271	14,496	1,055
2017	59	854	928,122	15,731	1,087
2018	58	670	742,566	12,803	1,108
Ave 2009-13	59	823	1,141,614	19,440	1,403
Ave 2014-18	57	793	895,613	15,808	1,128

Source: SEFSC Socioeconomic Panel Series (v. 10) accessed by the SEFSC Economic Query System (March 13, 2020).

Note that average snapper grouper landings per vessel per trip for those with landings in South Carolina are about twice as large as average snapper grouper landings per vessel per trip for the vessels with landings in North Carolina. The average vessel with snapper grouper landings in North Carolina takes a two-day trip, while the average vessel with snapper grouper landings in South Carolina takes a four-day trip.

On average (2014 through 2018), the 120 permitted vessels that landed snapper grouper in North Carolina did so on approximately 73% of their collective trips and snapper grouper accounted for approximately 74% of their collective annual revenue from all landings (**Tables 3.3.1.5** and **3.3.1.6**).

Table 3.3.1.5. Number of trips with and without snapper grouper (SG) landings made by vessels that landed SG in North Carolina and percent of trips with snapper grouper landings (2014-2018).

Year	Trips with SG Landings in NC	Other Trips Made by Vessels	Total Trips Made by Vessels with SG Landings in NC	Percent Trips with SG Landings
2014	2,066	1,013	3,079	67.1%
2015	1,779	582	2,361	75.3%
2016	2,163	841	3,004	72.0%
2017	2,161	795	2,956	73.1%
2018	2,029	666	2,695	75.3%
Average	2,040	779	2,819	72.6%

Source: SEFSC Socioeconomic Panel Series (v. 10) accessed by the SEFSC Economic Query System (March 13, 2020).

Table 3.3.1.6. Dockside revenue (2018 dollars) from snapper grouper (SG) landings in North Carolina and from all other landings made by vessels with those landings and percentage of the vessels' collective revenue from SG landings (2014 – 2018).

Year	Revenue from SG Landings in NC	Revenue from All Other Landings Made by Those Vessels	Total Revenue	Percent Revenue from SG Landings
2014	$3,866,259	$1,613,484	$5,480,013	70.6%
2015	$3,275,857	$1,046,111	$4,321,969	75.8%
2016	$3,718,190	$1,319,817	$5,038,007	73.8%
2017	$3,812,106	$1,402,188	$5,214,295	73.1%
2018	$3,795,091	$1,099,604	$4,894,695	77.5%
Average	$3,693,555	$1,296,241	$4,989,796	74.2%

Source: SEFSC Socioeconomic Panel Series (v. 10) accessed by the SEFSC Economic Query System (March 13, 2020) and Bureau of Economic Analysis (BEA) average annual Gross Domestic Product (GDP) deflator.

On average (2014 through 2018), the 53 permitted vessels that landed snapper grouper in South Carolina did so on approximately 95% of their collective trips and snapper grouper accounted for approximately 92% of their collective annual revenue from all landings (**Tables 3.3.1.7** and **3.3.1.8**). Comparisons of the two states shows that vessels that land snapper grouper

in South Carolina are more dependent on snapper grouper landings than those that land snapper grouper in North Carolina. During that time period, the average price per pound gutted weight of snapper grouper species landed by permitted vessels in North Carolina ranged from $3.36 to $3.59 (2018 dollars) and in South Carolina from $3.85 to $4.60 (**Table 3.3.1.9**).

Table 3.3.1.7. Number of trips with and without snapper grouper (SG) landings made by vessels that landed SG in South Carolina and percent of trips with snapper grouper landings (2014-2018).

Year	Trips with SG Landings in SC	Other Trips Made by Vessels	Total Trips Made by Vessels with SG Landings in SC	Percent Trips with SG Landings
2014	847	43	890	95.2%
2015	810	39	849	95.4%
2016	783	43	826	94.8%
2017	854	51	905	94.4%
2018	670	28	698	96.0%
Average	793	41	834	95.1%

Source: SEFSC Socioeconomic Panel Series (v. 10) accessed by the SEFSC Economic Query System (March 13, 2020).

Table 3.3.1.8. Dockside revenue (2018 dollars) from snapper grouper (SG) landings in South Carolina and from all other landings made by vessels with those landings and percentage of the vessels' collective revenue from SG landings (2014 – 2018).

Year	Revenue from SG Landings in SC	Revenue from All Other Landings Made by Those Vessels	Total Revenue	Percent Revenue from SG Landings
2014	$3,978,812	$310,556	$4,289,368	92.8%
2015	$3,803,751	$262,427	$4,066,178	93.5%
2016	$3,797,317	$322,855	$4,120,172	92.2%
2017	$4,088,123	$434,959	$4,523,081	90.4%
2018	$3,225,881	$276,026	$3,501,907	92.1%
Average	$3,778,777	$321,365	$4,199,141	92.2%

Source: SEFSC Socioeconomic Panel Series (v. 10) accessed by the SEFSC Economic Query System (March 13, 2020) and Bureau of Economic Analysis (BEA) average annual Gross Domestic Product (GDP) deflator.

Table 3.3.1.9. Average price (2018 dollars) per pound (lbs gw) of snapper grouper species by state (2014 – 2018).

Year	NC	SC
2014	$3.36	$3.85
2015	$3.46	$4.01
2016	$3.56	$4.60
2017	$3.59	$4.40
2018	$3.53	$4.34
Average	$3.50	$4.24

Source: SEFSC Socioeconomic Panel Series (v. 10) accessed by the SEFSC Economic Query System (March 13, 2020) and BEA average annual GDP deflator.

From 2014 through 2018, the average North Carolina vessel that landed snapper grouper received $26,846 (2018 dollars) in annual revenue from snapper grouper landings, while the average South Carolina vessel that landed snapper grouper received $66,620 (2018 dollars) in annual revenue from those landings (**Table 3.3.1.10**).

Table 3.3.1.10. Average revenue (2018 dollars) per vessel from snapper grouper landings by state (2014-2018).

Year	NC	SC
2014	$31,693	$69,804
2015	$30,332	$71,769
2016	$34,112	$66,620
2017	$31,505	$69,290
2018	$30,120	$55,619
Average	$31,552	$66,620

Source: SEFSC Socioeconomic Panel Series (v. 10) accessed by the SEFSC Economic Query System (March 13, 2020) and BEA average annual GDP deflator.

In North Carolina, snapper grouper landings are at their highest from May through August (**Figure 3.3.1.1**). That does not hold in South Carolina. The top four months of snapper grouper landings in South Carolina are in January, February, July and August (**Figure 3.3.1.2**).

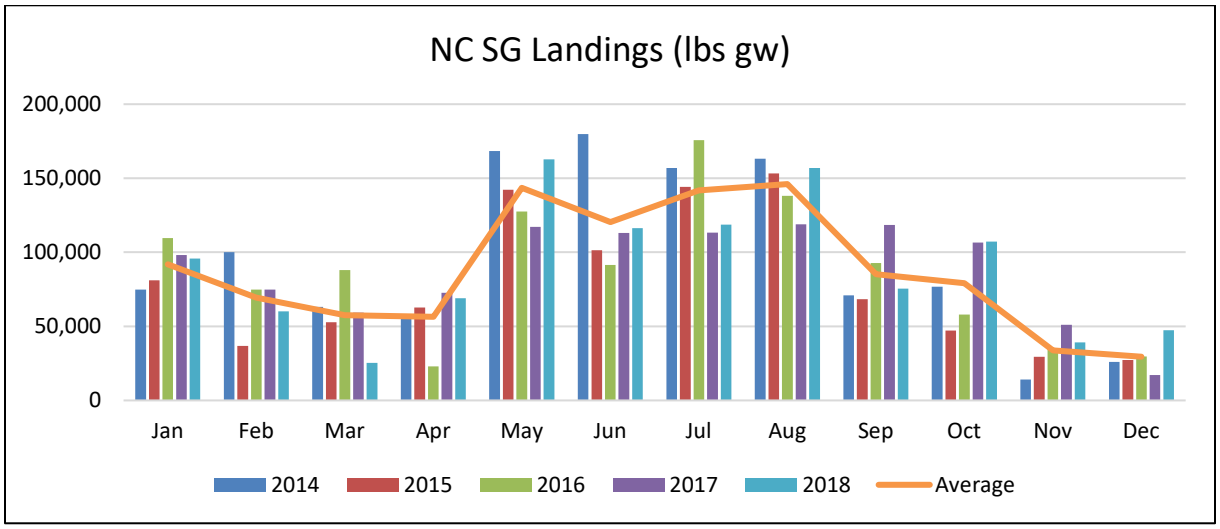

Figure 3.3.1.1. Monthly and average monthly snapper grouper landings (lbs gw) in North Carolina (2014 – 2018).
Source: SEFSC Socioeconomic Panel Series (v. 10) accessed by the SEFSC Economic Query System (March 13, 2020).

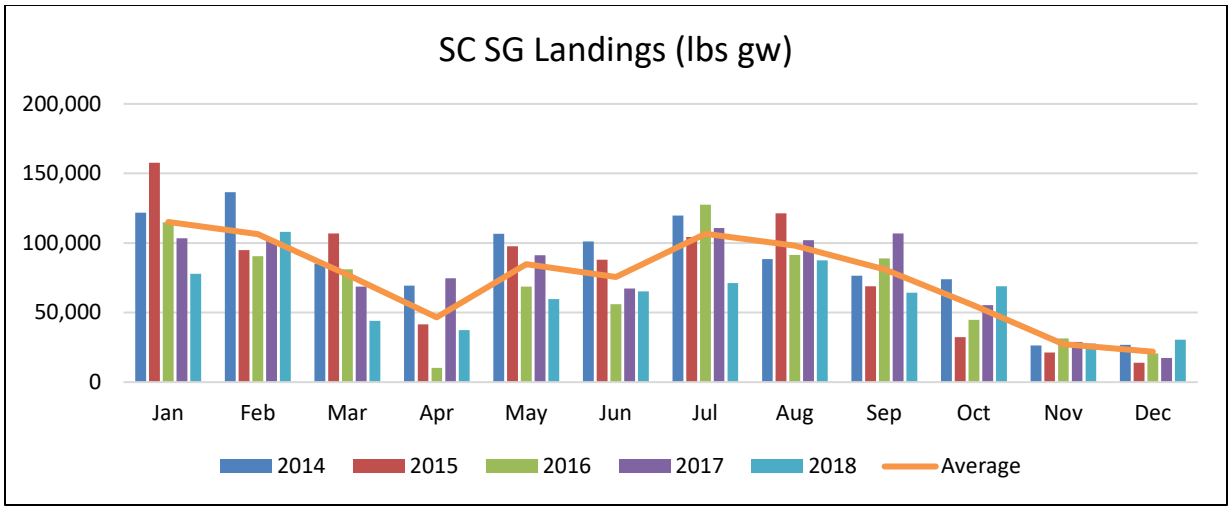

Figure 3.3.1.2. Monthly and average monthly snapper grouper landings (lbs gw) in South Carolina (2014 – 2018).
Source: SEFSC Socioeconomic Panel Series (v. 10) accessed by the SEFSC Economic Query System (March 13, 2020).

Business Activity

The commercial sector of the snapper grouper fishery generates economic benefits in the forms of jobs, income, sales, and value-added impacts. The harvest and subsequent sales of snapper grouper 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 purchases are made, such as full-time and part-time jobs in local fish markets, grocers, restaurants, and fishing supply establishments. The fishery also generates income impacts in the form of wages, salaries, and self-employed income.

From 2014 through 2018, snapper grouper landings in North Carolina generated 228 jobs, approximately $5.4 million in income, $12.7 million in sales, and $7.1 million in value-added impacts (**Table 3.3.1.11**). Similarly, snapper grouper landings in South Carolina generated 208 jobs, approximately $5.4 million in income, approximately $12.7 million in sales, and $7.1 million in value-added impacts (**Table 3.3.1.12**). These economic impacts are direct, indirect (impacts from suppliers to seafood industry) and induced (spending by employees on personal and household expenditures); they do not include imports.

Table 3.3.1.11. Average annual economic impacts from snapper grouper (SG) landings in North Carolina (2014 – 2018). All monetary estimates are in thousands of 2018 dollars.

Impacts	Harvesters	Primary Dealers/ Processors	Secondary Wholesalers/ Distributors	Grocers	Restaurants	Harvesters and Seafood Industry
Jobs	101	18	6	13	91	228
Income	$2,643	$549	$248	$319	$1,607	$5,366
Value-Added	$3,548	$710	$328	$402	$2,083	$7,070
Sales	$6,208	$1,412	$708	$663	$3,691	$12,682

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2019).

Table 3.3.1.12. Average annual economic impacts from snapper grouper landings in South Carolina (2014 – 2018). All monetary estimates are in thousands of 2018 dollars.

Impacts	Harvesters	Primary Dealers/ Processors	Secondary Wholesalers/ Distributors	Grocers	Restaurants	Harvesters and Seafood Industry
Jobs	83	16	6	12	91	208
Income	$2,690	$540	$243	$320	$1,612	$5,374
Value-Added	$3,591	$694	$319	$403	$2,091	$7,098
Sales	$6,212	$1,380	$692	$661	$3,683	$12,628

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2019).

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 fresh snapper and fresh grouper into the South Atlantic region that directly compete with domestic harvest of snapper grouper.

From 2014 through 2018 there were no imports of fresh snapper or fresh grouper through the two Customs Districts in the Carolinas (Charleston, SC and Charlotte, NC). Instead, the large majority of fresh snapper and grouper imports come through Miami.

Artificial Reefs

Artificial reefs are deployed to provide benefits to those in the commercial and recreational fishing sectors and other users of the resource, such as diving enthusiasts and amateur and professional underwater photographers. Researchers such as Vivekanandan et al. (2006), Leitao et al. (2009) and Sun et al. (2017) have demonstrated the potential role of artificial reefs in resource enhancement and economic benefits, especially to the commercial sector. They showed that the catches from artificial reefs can comprise of high-quality fishes, enabling commercial fishermen to realize better returns per unit effort than the returns from non-reef areas. However, with those higher returns per effort, especially for those with more efficient gear, there are accompanying recreational/commercial gear conflicts, which reduce the benefits to other intended and actual users of the artificial reefs.

While some use of permitted artificial reefs by commercial fishing interests has been reported over past decades in South Carolina, this activity has been difficult to quantify since these practices do not have popular support with the majority of the fishing public or may in some cases be illegal. Similarly, there is lack of information to quantify any economic benefits that commercial fishermen may derive from permitted artificial reefs in North Carolina.

3.3.2 Economic Description of the Recreational Sector

The recreational fishing sector is divided into two modes: private and for-hire. The private mode includes anglers fishing from shore (all land-based structures) and from private or rental boats operating in state or federal waters. Although the private/rental boats are not required to have a federal permit for anglers on board to fish for or possess snapper grouper in the EEZ, anglers aboard must either be federally registered or licensed in states that have a system to provide complete information on the states' saltwater anglers to the national registry.

The for-hire mode includes persons/businesses who operate charter vessels and headboats (also called party boats) to take anglers onto state and/or federal waters. Charter boats can carry up to six passengers and their operators typically charge a fee on an entire vessel basis, whereas headboats that satisfy a required U.S. Coast Guard inspection can carry more than six passengers for hire. Headboat passengers typically pay a fee per person. For a person aboard a charter vessel or headboat to fish for or possess South Atlantic snapper grouper in or from the EEZ, a South Atlantic snapper-grouper charter/headboat permit must have been issued to the vessel and must be on board. The permit is an open-access permit. A vessel may have both a charter vessel/headboat permit and a commercial snapper grouper permit; however, when operating as a charter vessel or headboat, persons onboard must adhere to the bag limits.

Charter/Headboat Permits

From 2009 through 2018, there was an increase in the number of snapper grouper charter/headboat permits held be entities with a mailing address in the Carolinas (**Table 3.3.2.1**). The largest increase was in South Carolina where the number of permits rose by 54%. However, as of April 21, 2020, there are 293 permits held by entities residing in North Carolina and 152 permits held by those residing in South Carolina, a decline of 25% from a total of 592 in 2018.

Table 3.3.2.1. Numbers of snapper grouper charter/headboat permits held by entities residing in North and South Carolina (2009-2018).

Year	NC	SC	Total
2009	349	146	495
2010	331	145	476
2011	331	132	463
2012	313	138	451
2013	308	150	458
2014	294	160	454
2015	308	188	496
2016	331	212	543
2017	362	215	577
2018	367	225	592
Ave 2009-13	326	142	469
Ave 2014-18	332	200	532

Source: NMFS SERO Permit Counts.

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

- 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[6] are provided in **Table 3.3.2.2**. 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 3.3.2.2** 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 Carolinas, as estimated by MRIP, were recorded in North Carolina and the private/rental mode was the predominant mode of fishing on these trips (**Table 3.3.2.2**). Note that there were no estimated snapper grouper species target or catch trips that used spear gear in South Carolina from 2013 through 2017.

Table 3.3.2.2. Recreational snapper grouper target trips, by mode and state, 2013-2017 in North Carolina and South Carolina.

Year	NC Shore	SC Shore	NC Charter*	SC Charter*	NC Private	SC Private	NC Total	SC Total
2013	51,762	13,468	11,314	2,761	245,049	60,146	308,126	76,375
2014	55,933	34,707	17,056	34,173	196,663	128,598	269,652	197,478
2015	47,240	39,450	16,811	34,083	246,634	117,281	310,685	190,814
2016	78,075	37,392	18,074	17,057	261,591	95,026	357,740	149,476
2017	80,672	18,072	17,104	41,520	260,454	123,813	358,231	183,405
Average	62,736	28,618	16,072	25,919	242,078	104,973	320,887	159,510

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.[7] In North Carolina and South Carolina there were modest fluctuations in headboat effort in terms of angler days, from 2013 through 2017 (**Table 3.3.2.3**). Headboat effort tends to be the highest, on average, during the summer months of June through August.

[6] These estimates include all trips that targeted or caught one or more of the species managed under the South Atlantic Snapper Grouper FMP.
[7] 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 0.5 angler days, etc. Angler days are not standardized to an hourly measure of effort and actual trip durations may vary within each category.

Table 3.3.2.3. Headboat angler days in North Carolina and South Carolina (2013-2017).

Year	NC	SC	Total
2013	20,547	40,963	61,510
2014	22,691	42,025	64,716
2015	22,716	39,702	62,418
2016	21,565	42,207	63,772
2017	20,170	36,914	57,084
Average	21,538	40,362	61,900

Source: NMFS Southeast Region Headboat Survey (SRHS).

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).[8] 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, the Carter and Liese 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.

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

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

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 3.3.2.4**. 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 3.3.2.4**, 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 3.3.2.4** 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 3.3.2.4** 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 3.3.2.4. Estimated annual average economic impacts (2013-2017) from South Atlantic recreational snapper grouper target trips in North and South Carolina using state-level multipliers by mode.* All monetary estimates are in 2017 dollars (in thousands).

	NC Char	NC Priv/Rent	NC Shore	NC Total	SC Char	SC Priv/Rent	SC Shore	SC Total
Target Trips	1,920	15,615	2,471	20,006	3,778	12,789	70	16,636
Jobs	10	10	3	24	26	5	0	32
Income	$460	$365	$97	$922	$1,015	$158	$2	$1,176
Value Added	$677	$585	$158	$1,420	$1,560	$264	$4	$1,828
Sales	$1,266	$1,039	$275	$2,580	$2,882	$479	$7	$3,369

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.
***:** Charter (Charter), Private/Rental (Priv/Rent).

Artificial Reefs

Artificial reefs are deployed to provide benefits to those in the commercial and recreational fishing sectors and other users of the resource, especially diving enthusiasts. Multiple studies have evaluated the economic benefits of artificial reefs to the recreational fishing sector and to divers, such as Johns et al. (2003), Pendleton (2005), Oh et al. (2008), Morgan et al. (2009), Swett et al. (2010), and Huth et al. (2015).

Recreational anglers have been and are the primary group associated with artificial reef utilization in both North and South Carolina. Recreational anglers' annual fishing activities on artificial reef sites in South Carolina alone account for greater than 200,000 angler-days, which result in an estimated total economic benefit to the state of approximately $82.6 million (2006 dollars) each year (Rhodes and Pan 2007), which when adjusted for inflation would be approximately $100.7 million (2017 dollars) (Bureau of Labor Statistics, Consumer Price Index Inflation Calculator).

3.4 Social Environment

This framework amendment affects the commercial and recreational management of the snapper grouper fishery in the South Atlantic particularly in North and South Carolina. 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. Descriptions of the top-ranking communities by the number of commercial snapper grouper permits are included, along with descriptions of the top communities with landings of commercial snapper grouper and commercial engagement and reliance, descriptions of the top-ranking communities by the number of for-hire permits, and descriptions of top recreational fishing communities based on recreational engagement and reliance. 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 of December 30, 2019, there were 170 South Atlantic commercial snapper grouper unlimited permits in North and South Carolina. In the period 2014 through 2018, the number of snapper grouper unlimited permits has fluctuated over time with recent increases in the number for both states (**Table 3.4.1.1**). Most snapper grouper unlimited permits are issued to individuals in North Carolina with South Carolina having about half the number of permits on average.

Table 3.4.1.1. Number of North and South Carolina commercial snapper grouper unlimited permits, by state, 2014-2018.

State	2014	2015	2016	2017	2018	Average
North Carolina	113	108	107	112	114	111
South Carolina	50	50	51	53	56	52

Source: NMFS, SERO Permits Dataset, 2019.

In the period 2014 through 2018, the number of snapper grouper 225-lb trip-limited permits has also fluctuated over time (**Table 3.4.1.2**). Between the two states, the majority of snapper grouper 225-lb trip-limited permits are issued to individuals in North Carolina which has increased in recent years. South Carolina has had only two individuals holding 225-lb trip-limited permits with that number down to one in recent years.

Table 3.4.1.2. Number of North and South Carolina commercial snapper grouper 225-lb trip-limited permits, by state, 2014-2018.

State	2014	2015	2016	2017	2018	Average
North Carolina	8	8	8	11	12	9
South Carolina	2	2	1	1	1	1

Source: NMFS, SERO Permits Dataset, 2019.

Recreational

As of December 30, 2019, there were 607 South Atlantic for-hire snapper grouper permits in North and South Carolina. In the period 2014 through 2018, the number of for-hire snapper grouper permits increased over time (**Table 3.4.1.3**). North Carolina has had more permits with an average of 341 over the 5-year time period, while over the same time period South Carolina has had an average of 205.

Table 3.4.1.3. Number of South Atlantic for-hire snapper grouper permits, by state, 2014-2018.

State	2014	2015	2016	2017	2018	Average
North Carolina	300	322	341	368	372	341
South Carolina	169	194	212	215	235	205

Source: NMFS, SERO Permits Dataset, 2019.

3.4.2 Fishing Communities

Commercial

South Atlantic commercial snapper grouper unlimited permits are held by entities with mailing addresses in 43 communities in North and South Carolina for 2018. Communities within the top five snapper grouper 225-lb trip-limited permits are in both North Carolina and South Carolina. Murrells Inlet, South Carolina has the most followed by the communities of Morehead City, North Carolina, Southport, North Carolina, Little River, South Carolina, and Sneads Ferry, North Carolina, which all have nearly the same number of permits **(Table 3.4.2.1**). The communities that follow have half the number of permits, however, permits are located by vessel homeport, which may be different than where fish are off-loaded **(Figure 3.4.2.1)**.

Table 3.4.2.1. Top ranking North Carolina and South Carolina communities based on the number of South Atlantic commercial snapper grouper unlimited permits in 2018, in descending order.

State	Community	Permits
SC	MURRELLS INLET	21
NC	MOREHEAD CITY	14
NC	SOUTHPORT	14
SC	LITTLE RIVER	14
NC	SNEADS FERRY	13
NC	HOLDEN BEACH	7
NC	BEAUFORT	6
NC	WILMINGTON	6
SC	MCCLELLANVILLE	6
NC	ATLANTIC BEACH	5
NC	CAROLINA BEACH	5
NC	HATTERAS	5
NC	WANCHESE	5
NC	WRIGHTSVILLE BEACH	5
SC	CHARLESTON	5
NC	HAMPSTEAD	4
SC	GEORGETOWN	4
NC	CAPE CARTERET	3

Source: NMFS SERO permit office, December 30, 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.

North and South Carolina communities with commercial landings of snapper grouper are ranked by their Value RQ of snapper grouper species in **Figure 3.4.2.1**. Beaufort, North Carolina, has the highest Value RQ followed by Little River and Murrells Inlet, South Carolina. Myrtle Beach, South Carolina, has a higher Value RQ than either Southport or Wanchese, North Carolina, both of which have higher Pounds RQs. The difference may indicate a higher valued species being landed in those ports with the higher RQ for value or higher prices being paid for similar species.

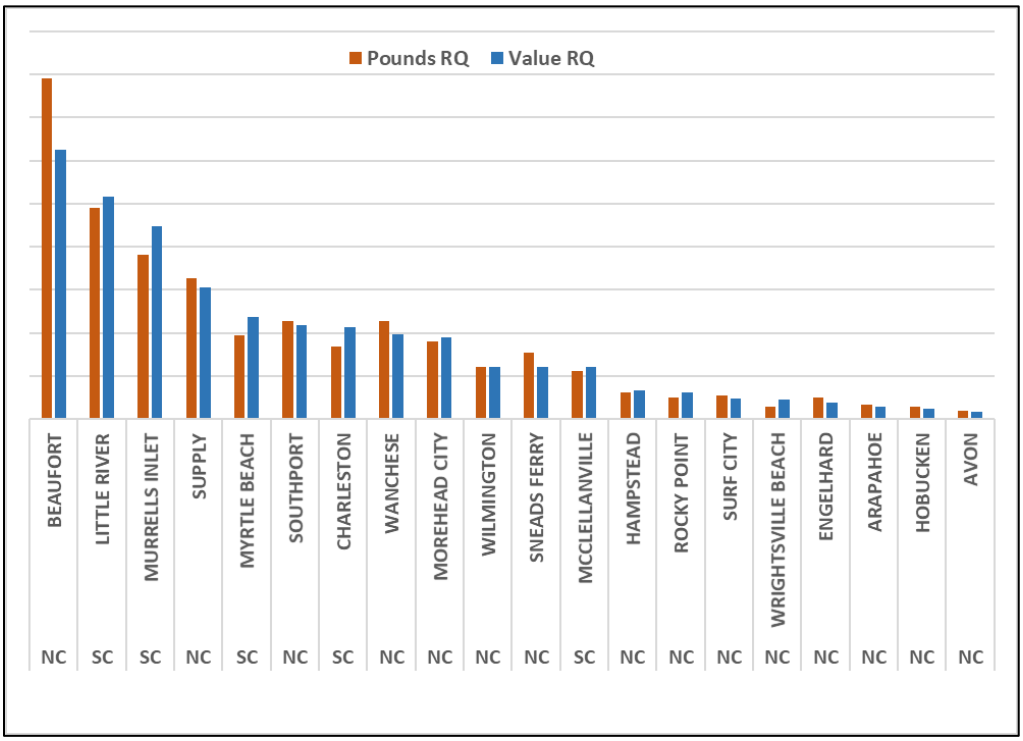

Figure 3.4.2.1. Top North Carolina and South Carolina communities ranked by pounds and value RQ of snapper grouper. The actual RQ values (y-axis) are omitted from the figure to maintain confidentiality. Source: SERO, Community ALS 2017.

Commercial fishing engagement is represented by the number of vessels designated as "commercial" on the permit application by homeport and owner address, number of dealers within a community and value of landings. Fishing reliance includes the same variables as fishing engagement, divided by population. Factor scores of both engagement and reliance were plotted with thresholds of 1 standard deviation and 1/2 standard deviation from the mean. Communities were analyzed and rank ordered by commercial fishing engagement in **Figure 3.4.2.2**.

All the communities in **Figure 3.4.2.2** meet the threshold of 1 standard deviation, which means that commercial fishing is likely an important part of the local economy. Several communities (Beaufort, North Carolina; Wanchese, North Carolina; Sneads Ferry, North Carolina; Southport, North Carolina; Hampstead, North Carolina; Hatteras, North Carolina; McClellanville, South Carolina; Oriental, North Carolina; and Englehard, North Carolina) also exceed the threshold of 1 standard deviation for commercial fishing reliance. These communities are likely to have commercial fishing playing a larger role in the local economy as

they are smaller communities with an economic base that may not be as diverse as larger communities.

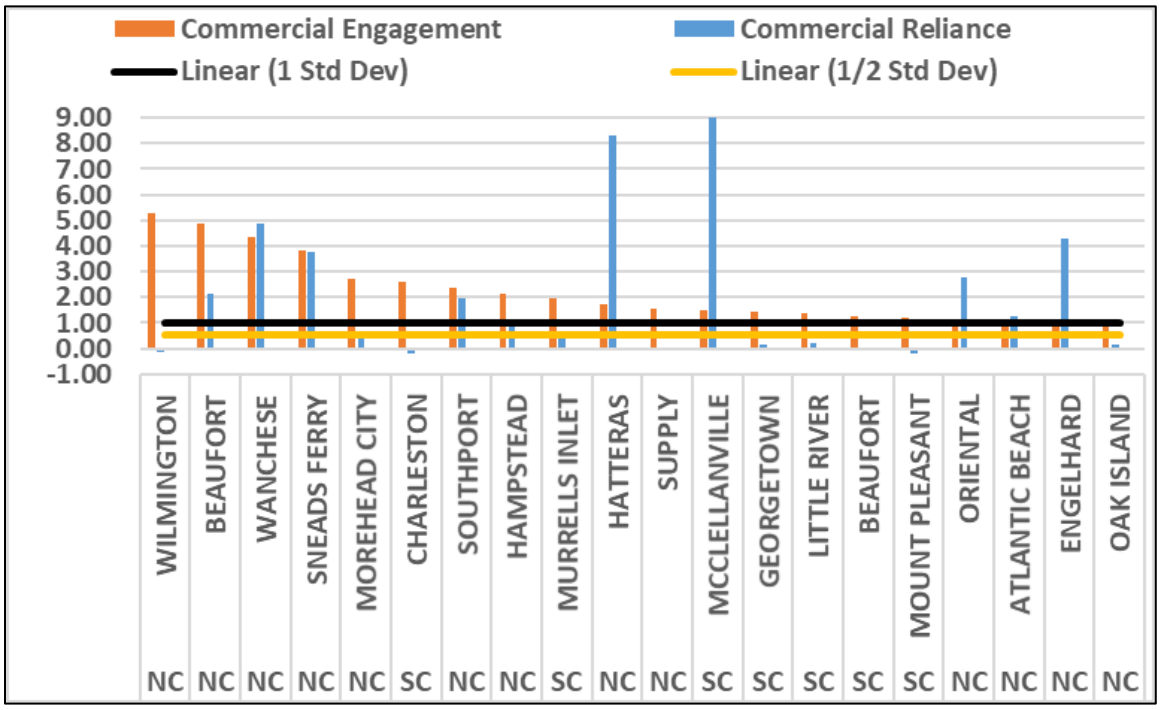

Figure 3.4.2.2. Top North and South Carolina communities ranked by commercial fishing engagement and reliance.
Source: SERO, Community ALS 2017.

Recreational

South Atlantic for-hire snapper grouper permits are held by those with mailing addresses in 76 communities located in North and South Carolina for 2018 (**Table 3.4.2.2**). Permits are relatively equally spread between the top communities in both states with Charleston, South Carolina having the most permits with 51 and Hatteras, North Carolina, next with 46 for-hire snapper grouper permits.

Table 3.4.2.2. Top ranking North Carolina and South Carolina communities based on the number of South Atlantic for-hire snapper grouper permits, in descending order for 2018.

State	Community	2018
SC	CHARLESTON	51
NC	HATTERAS	46
SC	MURRELLS INLET	41
SC	HILTON HEAD	37
NC	MANTEO	32
NC	MOREHEAD CITY	31
NC	WANCHESE	28
SC	LITTLE RIVER	27
NC	SNEADS FERRY	22
NC	ATLANTIC BEACH	19
NC	CAROLINA BEACH	19
SC	GEORGETOWN	19
NC	NAGS HEAD	18
NC	SOUTHPORT	16
NC	HOLDEN BEACH	14
SC	MOUNT PLEASANT	14
NC	BEAUFORT	12
NC	WRIGHTSVILLE BEACH	11
NC	CALABASH	10
NC	WILMINGTON	10

Source: NMFS SERO permit office, December 30, 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 owner address. Fishing reliance includes the same variables as fishing engagement, divided by population. Factor scores of both engagement and reliance were plotted with thresholds of one standard and one-half standard deviation from the mean. Communities were analyzed and rank ordered by recreational fishing engagement.

Figure 3.4.2.3 identifies the top 20 recreational communities located in North Carolina and South Carolina that are the most engaged and reliant on recreational fishing, in general. All included communities demonstrate high levels of recreational engagement as their engagement scores all exceed one standard deviation from the mean. Seven communities (Hatteras, North Carolina; Murrells Inlet, South Carolina; Manteo, North Carolina; Atlantic Beach, North Carolina; Nags Head, North Carolina; Sneads Ferry, North Carolina; and Southport, North Carolina) demonstrate high levels of recreational reliance.

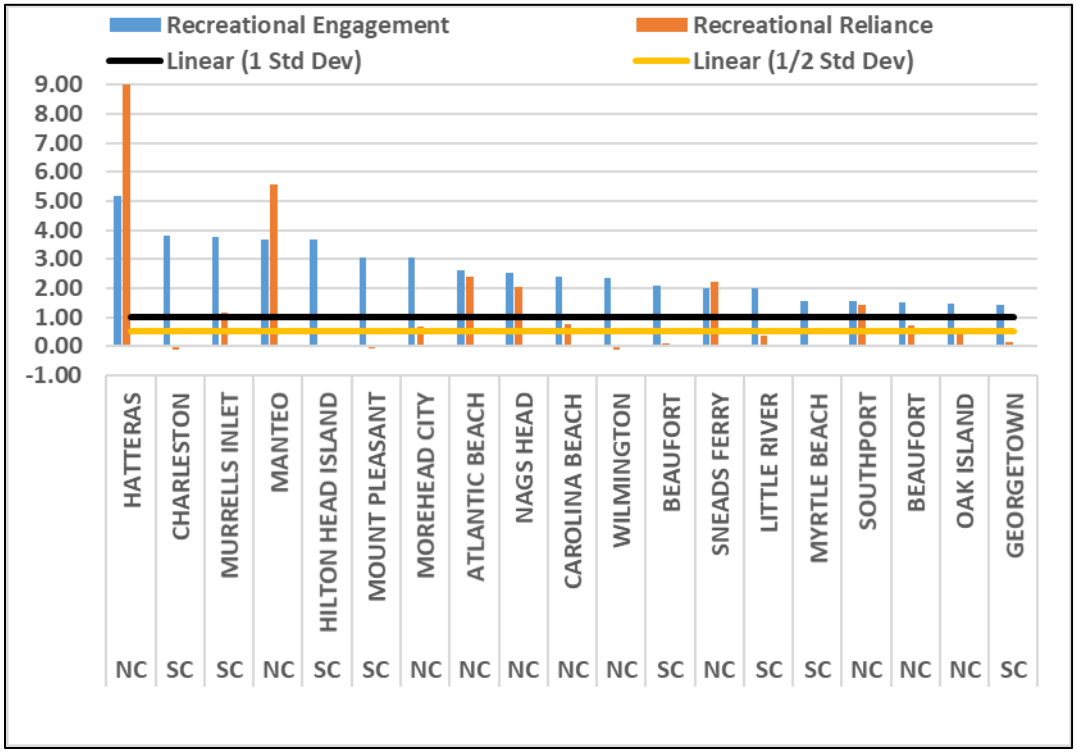

Figure 3.4.2.3. Top 20 North Carolina and South Carolina recreational fishing communities' engagement and reliance.
Source: SERO, Community Social Vulnerability Indicators Database 2019.

Additional detailed information about fishing communities contained in this description can be found on the SERO Community Snapshots website.[9]

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 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 each sector is not available. Although information is available concerning communities' overall status regarding

[9] https://www.fisheries.noaa.gov/southeast/socioeconomics/snapshots-human-communities-and-fisheries-gulf-mexico-and-south-atlantic/

minorities and poverty (e.g., census data), such information is not specific to individual fishermen, their households, and those involved in the industries and associated 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 provides the social vulnerability of the top commercial and recreational communities in North Carolina. Several communities exceed the threshold of 0.5 standard deviation for at least one of the social vulnerability indices: Beaufort, Calabash, Morehead City, and Sneads Ferry, North Carolina. These communities have moderate vulnerabilities and may be susceptible to further effects from any regulatory changes depending upon the direction and extent of that change.

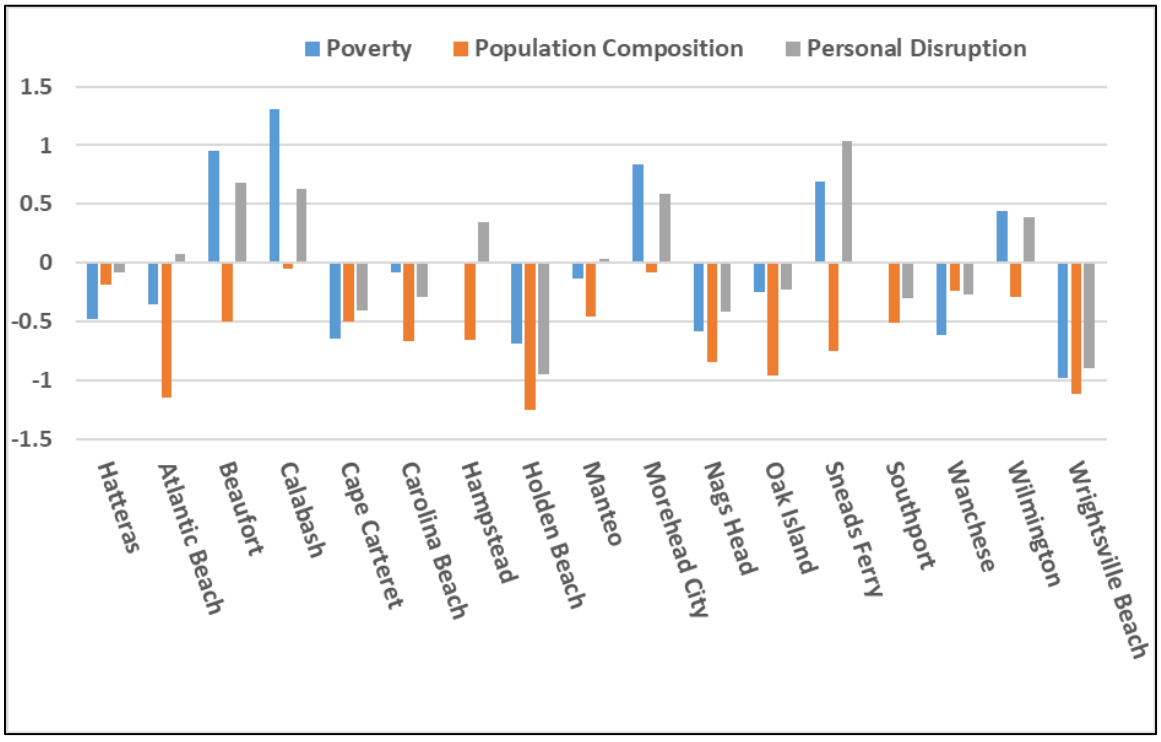

Figure 3.4.4.1. Social vulnerability indices for top commercial and recreational communities in North Carolina.
Source: SERO, Community Social Vulnerability Indicators Database 2019 (American Community Survey 2013-2017).

Figure 3.4.4.2 provides the social vulnerability of the top commercial and recreational communities in South Carolina. The community of Georgetown exceeds the 1 standard

deviation threshold for all three indicators which suggests that the community may have significant vulnerabilities and have difficulty adapting to adverse effects of regulatory change. Only one other community, Beaufort, exhibits vulnerabilities and exceeds the threshold of 0.5 standard deviation for at least one of the social vulnerability indices. That suggests there may be moderate vulnerabilities and susceptibility to further effects from any regulatory changes depending upon the direction and extent of that change.

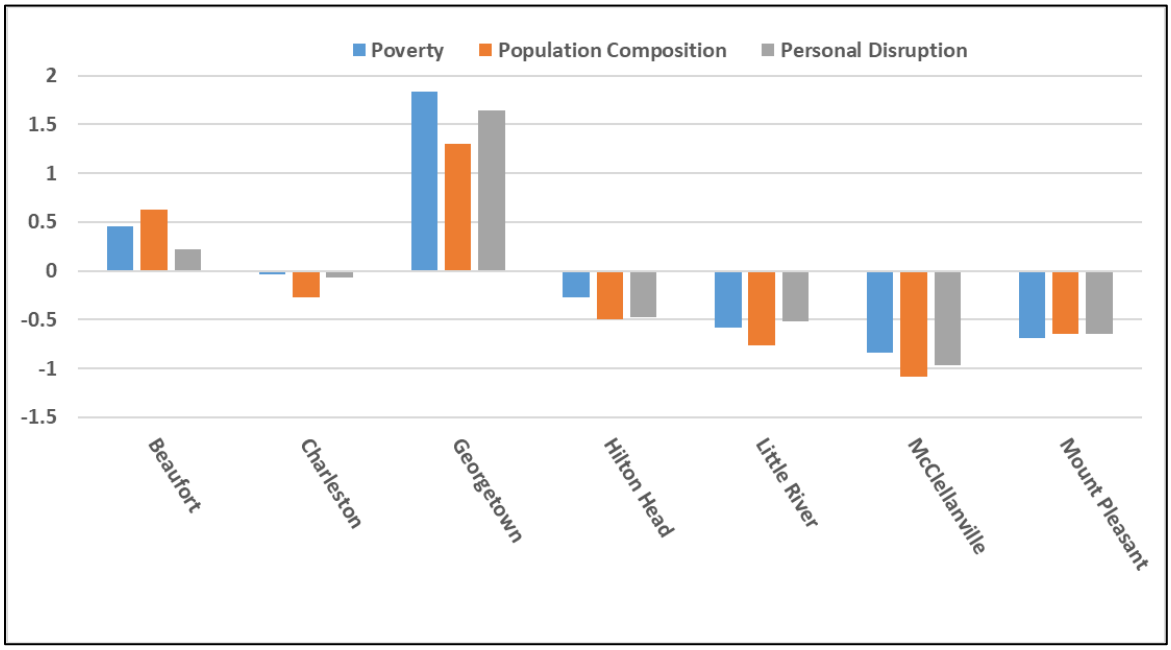

Figure 3.4.4.2. Social vulnerability indices for top commercial and recreational communities in South Carolina.
Source: SERO, Community Social Vulnerability Indicators Database 2019 (American Community Survey 2013-2017).

People in these communities may be affected by fishing regulations in two ways: participation and employment. Although those communities that exceed the thresholds 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 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 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 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 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 (USCG), State Department, and Atlantic States Marine Fisheries Commission (ASMFC). The Council has adopted procedures whereby the non-voting members serving on the Council Committees have full voting rights at the Committee level but not at the full Council level. The Council also established two voting seats for the Mid-Atlantic Council on the South Atlantic Mackerel Committee. 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 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 manages South Carolina's marine fisheries. Georgia's marine fisheries are managed by the Coastal Resources Division of the Department of Natural Resources. The Division of Marine Fisheries Management 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 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 complementary state regulations to conserve coastal species. The ASFMC is also represented at the Council but does not have voting authority at the 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 USCG have the authority and the responsibility to enforce 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

4.1 Action 1. Designate 30 artificial reefs in the exclusive economic zone off North Carolina as Special Management Zones

Alternatives*

1 (No Action). Do not designate artificial reefs in the EEZ off North Carolina as Special Management Zones.

2. Designate 30 artificial reefs in the EEZ off North Carolina as SMZs. 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. Designate 30 artificial reefs in the EEZ off North Carolina as SMZs. 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

Expected Effects to Snapper Grouper Species and Essential Fish Habitat

Designation of artificial reefs as special management zones (SMZs) would not result in direct biological effects to snapper grouper species. However, **Alternative 2** and **Preferred Alternative 3** would be expected to impart biological and ecological benefits to snapper grouper stocks relative to **Alternative 1 (No Action)** since they would prohibit use of fishing gear with a greater potential to result in overexploitation of resident communities of snapper grouper species. Of these, **Alternative 2** is more restrictive than **Preferred Alternative 3** in that all harvest of snapper grouper species within the SMZs would be restricted to the applicable recreational bag limit; hence, it would impart the greatest biological benefits of the alternatives considered.

Preferred Alternative 3 would impart biological benefits to snapper grouper species relative to **Alternative 1 (No Action)** as it proposes the same gear restrictions as **Alternative 2** but would only limit harvest with spear to the applicable recreational bag limits. While spearfishing is considered a highly selective means of harvest with little to no bycatch, it can also lead to localized depletion. Meyer (2007) reported spearfishing can remove a greater biomass of reef fishes than rod and reel fishing. Spearfishing can also impact ecosystem health by altering the composition of the overall natural community of species (Lloret et al. 2008). Reduction in the larger predatory fishes can have a "top-down" effect on fish assemblages by allowing other fish populations to increase, altering the composition of the overall natural community of species, including invertebrates (Lloret et al. 2008). The largest fish are important as predators in maintaining a balanced and complete ecosystem; therefore, their selective removal may cause ecological imbalance (McClanahan and Muthiga 1988; Dulvy et al. 2002). Spearfishing has also been found to alter fish behavior (Schroeder and Parrish 2005) and may cause fish to move to different habitats (Jouvenel and Pollard 2001) which could be less favorable for growth and reproduction. By limiting harvest by spear to the recreational bag limits, **Preferred Alternative**

3 would reduce the potential of negative biological effects attributed to commercial spearfishing on snapper grouper species at the artificial reef sites. However, the potential would still exist for anglers to disproportionately remove large individuals from an area with spearfishing gear. 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.

The biological effects discussed here cannot be quantified due to the relatively small size of the individual sites being considered paired with data limitations. Similarly, it is not possible to quantify the likely change to bycatch from the proposed actions. Bycatch could decrease if all harvest is limited to the recreational regulations as proposed under **Alternative 2**. However, bycatch could increase if recreational fishing effort increases in the proposed SMZs and more fish are caught. Increased bycatch could result in increased mortality that may contribute to an overfishing stock status and may delay rebuilding of overfished stocks.

Artificial reefs were designated essential fish habitat (EFH) in the South Atlantic in the Comprehensive EFH Amendment (SAFMC 1998). The protection of these habitats from gear impacts and excessive harvest by fishing gear that could lead to high exploitation rates, as proposed under **Alternative 2** and **Preferred Alternative 3**, promotes conservation and enhances protection of EFH in the exclusive economic zone (EEZ) off North Carolina.

Expected Effects to Protected Species

Sea turtles, primarily loggerhead sea turtles, use artificial reef material for shelter or for foraging, similar to how they use natural reefs, ledges and outcroppings. Barnette (2017) describes how sea turtles may benefit from artificial reefs and shipwrecks by the structures providing resting and foraging habitat, as well as structure for removing fouling biological growth from their carapaces, like natural ledges and outcroppings provide for sea turtles. However, Barnette (2017) also describes how artificial reefs may expose sea turtles to entrapment (if the reef structure has openings only on the bottom) and entanglement, and increase predation risk on hatchlings (if the reef structure is in close proximity to a nesting beach). The risk of entanglement increases as monofilament caught on the reef from fishing activity accumulates. When fishing activities occur on artificial reefs and shipwrecks, monofilament and anchor lines sometimes get fouled on the material. Over time, or with significant fishing pressure, monofilament and other lines can accumulate significantly on these structures, which then presents a threat to sea turtles utilizing artificial reefs and shipwrecks as resting habitat. Sea turtles wedging themselves under structure to rest may encounter lost monofilament or anchor lines, which could become wrapped around a flipper or neck. If the line is fouled securely into the artificial reef or shipwreck, an unfortunate sea turtle may become effectively anchored to the bottom, unable to surface and breathe, and ultimately drown.

The risk of entanglement in fishing line on artificial reef material is not static and not consistent across reefs. There are significant variations in how fast monofilament accumulates on artificial reef material due to differences between: artificial reef materials; distance from shore or closest inlet; regional fishing effort; regional reef fishing opportunities; site proximity to natural habitat (i.e., abundant hard-bottom habitat in the immediate vicinity versus the “oasis effect” of a solitary, isolated artificial reef on predominantly sandy habitat); depth; current;

latitudinal seasonal effects (i.e., water temperature); storm events; and other influences. Likewise, differences in sea turtle distribution and abundance also introduce more variability.

Adverse effects on sea turtles associated with these reefs are already part of the baseline. Designation of North Carolina's artificial reefs as SMZs would not result in direct adverse effects to protected resources unless the designation results in increased effort above what is considered in the baseline. The proposed restriction on allowable fishing gear that can be used in artificial reef sites (**Alternative 2** and **Preferred Alternative 3**) may provide some small benefit to sea turtles to the extent that it reduces overall entangling gear and the likelihood of derelict gear left on the artificial reef relative to the baseline.

4.1.2 Economic Effects

Alternative 1 (No Action) would maintain the ability to harvest commercial quantities of snapper grouper species in the 30 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 and direct economic benefits for the commercial sector from these sites among the alternatives considered. There may be long-term indirect costs imposed if harvesting commercial quantities of snapper grouper species leads to localized depletion of these species. Should this occur, the 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 reefs, which would lead to reduced overall benefits for the recreational sector measured by a decrease in 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 and thus reduced direct economic benefits for the commercial sector. It may also result in increased trip costs if vessels need to travel farther 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 and thus increased indirect economic benefits for the recreational sector. On the other hand, over the longer term, larger aggregations of snapper grouper species could lead to higher catch rates by recreational anglers, which could result in shorter seasons, an unintended potential cost to the recreational sector, if regulations remain the same over time.

Preferred Alternative 3 would have similar economic effects as **Alternative 2** but is less restrictive for the commercial sector, thus the potential direct economic effects for the commercial sector and indirect economic effects for the recreational sector would be less pronounced. **Preferred 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 and thus reduced direct economic benefits for the commercial sector. It may also result in increased trip costs if vessels need to travel farther 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 and thus increased indirect economic benefits for the recreational sector. On the other hand, over the longer term, larger aggregations of snapper grouper species could lead to higher catch rates by recreational anglers which could result in shorter seasons, an unintended potential cost to the recreational sector, if regulations remain the same over time.

While the economic effects of **Alternative 2** and **Preferred Alternative 3** on the commercial sector cannot be quantified with precision due to data limitations, a general range can be determined by comparing the size of the proposed SMZ sites to the Southeast Fisheries Science Center (SEFSC) Coastal Logbook statistical grid that the sites fall within**. Table 4.1.2.1** includes the total area as reported in nautical square miles (n. sq. mi.) of the proposed SMZs off North Carolina by the SEFSC Coastal Logbook Program statistical reporting grids. SMZs are circular with radii as reported in **Table D-1** in **Appendix D**. Grid numbers follow lines of latitude and longitude. The first two digits in the four-digit grid numbers are latitude degrees, and the second two digits are longitude degrees. The maximum area of a reporting grid in the South Atlantic EEZ is 3,600 n. sq. mi. while grids closer to shore will cover less space due to truncation of the water area by coastline. **Table 4.1.2.1** reports an upper bound estimate of the amount of commercial fishing activity in the proposed SMZs off North Carolina. To estimate the proportion of possible commercial fishing activity in the SMZs, the total area of the SMZs was divided by the maximum amount of one statistical grid (3,600 n. sq. mi.). Note that the proportion of fishing is an overestimate since the total area of all statistical reporting grids is not listed in **Table 4.1.2.1**.

Table 4.1.2.1. Area (n. sq. mi.) of proposed SMZs off North Carolina by the SEFSC Coastal Logbook Statistical Reporting Area and estimated maximum annual loss of commercial snapper grouper gross revenues.

Statistical Reporting Grid	Area of Proposed SMZs (Nautical Square Miles)	Proportion of Commercial Fishing in SMZs (Upper Bound)	Estimated Maximum Annual Loss of Snapper Grouper Gross Revenues (2018 dollars)
3675	0.25		
3575	2.00		
3475	0.50		
3476	2.50		
3477	1.50		
3377	0.75		
3378	1.50		
Total	9.00	0.25%	$9,225

Source: SEFSC.

Table 3.3.1.6 estimates average annual dockside revenue generated by snapper grouper landings in North Carolina from 2014-2018 of $3.69 million. To arrive at an estimate of the maximum annual loss of revenue in the short term (i.e., one year) to the commercial sector if all snapper grouper commercial fishing activity was prohibited in the SMZs in **Table 4.1.2.1**, annual estimated revenues are multiplied by the estimated upper bound of the proportion of fishing activity. Since most commercial fishing activity is still allowed in the SMZs, these loss figures are clearly overestimates of the likely impact. On the other hand, the lower bound of revenue

loss would be zero if commercial fishing activity were not affected. Due to unavailability of site-specific landings data, this rough boundary of impacts to the commercial fishing sector is the best estimate of short-term ex-vessel revenue losses.

According to Overstreet, Perruso, and Liese (2018), from 2014 through 2016, "trip net cash flow" from snapper grouper trips was 42% of the gross revenue on those trips, while "trip net revenue" was 23.9% of the gross revenue from these trips. "Trip net cash flow" represents the additional flow of money to the business from taking a trip. Specifically, trip net cash flow is gross revenue minus the variable costs for fuel, bait, ice, groceries, miscellaneous, and hired crew. As producer surplus is defined as gross revenue minus variable costs, trip net cash flow is the best measure of net economic benefits to the commercial harvesting sector. "Trip net revenue" represents economic profit at the trip level. Specifically, trip net revenue is gross revenue minus the above variable costs for fuel, bait, ice, groceries, miscellaneous, hired crew, as well as the opportunity cost of the owner's time as captain. The estimated potential annual decrease in gross revenue, trip net cash flow, and trip net revenue from **Alternative 2** and **Preferred Alternative 3** is $0 to $9,225, $0 to $3,875, and $0 to $2,372 respectively (2018 dollars). Since **Alternative 2** would be the most restrictive and thus have the highest potential costs for the commercial sector, it is likely that the realized economic effects would fall towards the higher end of the range of the estimated decrease in revenue compared to **Preferred Alternative 3**.

The economic effects on the recreational sector of the alternatives in **Action 1** also cannot be quantified due to lack of sufficient data. Recreational catch estimates do not exist in high enough resolution to match the area of the proposed SMZs. However, it is noted that snapper grouper species could be locally available for harvest in higher quantities due to the proposed limitation on gear and harvest restrictions, and thus recreational landings from the site may increase leading to higher overall CS generated from the sites and thus increased economic benefits for the recreational sector. Changes in recreational landings cannot be quantified, however as noted in **Section 3.3.2**, estimates of net benefits for the recreational sector, as measured in CS for snapper grouper species range from approximately $13 to $144 dollars per fish (2018 dollars). While the net benefits of the alternatives in **Action 1** cannot be determined, it is plausible that an increase in net benefits for the recreational sector may partially or fully offset the decrease in net benefits noted for the commercial sector. Again, it should be noted that larger aggregations of snapper grouper species could lead to higher catch rates by recreational anglers which could result in shorter seasons, an unintended potential cost to the recreational sector, if regulations remain the same over time.

As noted, the economic effects described cannot be explicitly quantified due to the relatively small size of the individual sites being considered paired with data limitations that do not allow quantified economic effects at such a high resolution geographically. However, these effects can be ranked and compared to one another. 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 **Preferred 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 fishing gear that has greater potential to lead to high exploitation rates—such as pots and bandit gear—as proposed in **Alternative 2** and **Preferred 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 proposed 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 spear (**Preferred Alternative 3**) would be limited to the applicable recreational bag limit. Alternatively, if prohibiting these gear types and restricting harvest via other gear to the recreational bag limit 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 **Preferred Alternative 3**; thus, it would result in greatest short-term negative social effects and the greatest long-term positive social effects to coastal communities.

Anticipated biological benefits from SMZ designation and harvest/gear restrictions would be compromised without effective compliance and enforcement. **Alternative 2** would limit all harvest to the applicable recreational bag limits, which would provide more consistency in regulations than **Preferred Alternative 3**. Consistency in regulations 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. **Alternative 2** and **Preferred Alternative 3** would likely have increased administrative effects in the form of at-sea enforcement of the regulations at the proposed SMZs. The administrative effects of **Preferred 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. Designate additional artificial reefs in the exclusive economic zone off South Carolina as Special Management Zones

Alternatives*

1 (No Action). Do not designate additional artificial reefs in the EEZ off South Carolina as SMZs.

2. Designate four additional artificial reefs in the EEZ off South Carolina as SMZs. 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. Designate four additional artificial reefs in the EEZ off South Carolina as SMZs. 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

Expected Effects to Snapper Grouper Species and Essential Fish Habitat

In the existing SMZs off South Carolina, allowable fishing gear for snapper grouper species includes handline, rod and reel, and spear (excluding powerheads), and harvest and possession of snapper grouper species by recreational and commercial fishermen is limited to recreational bag limits (**Alternative 1, No Action**). Biological effects of designating four additional artificial reefs as SMZs with restrictions on the use of fishing gear that has a greater potential to remove large numbers of snapper grouper species from these small reefs, as proposed under **Preferred Alternative 2** and **Alternative 3**, would be positive relative to **Alternative 1 (No Action)** since the potential for localized depletion would be minimized on four additional reefs. The biological effects cannot be quantified due to the relatively small size of the sites being considered paired with data limitations that prevent quantitative analysis of biological effects at such a high geographic resolution. Similarly, it is not possible to quantify the likely change to bycatch from the proposed actions. Bycatch could decrease if all harvest is limited to the recreational regulations as proposed under **Preferred Alternative 2**. However, bycatch could increase if recreational fishing effort increases in the proposed SMZs and more fish are caught. Increased bycatch could result in increased mortality that may contribute to an overfishing stock status and may delay rebuilding of overfished stocks.

Preferred Alternative 2 would impart additional protection to snapper grouper species relative to **Alternative 1 (No Action)** and **Alternative 3** as it would limit all harvest to the applicable recreational bag limits. As discussed in **Section 4.1.1**, while spearfishing is considered a highly selective means of harvest with little to no bycatch, it can also lead to localized depletion and the disproportionate removal of large individuals from an area, especially among species that change sex (e.g., grouper and hogfish), can lead to alterations in sex ratio and social structure, possibly affecting the reproductive potential of a population. Hence, by limiting all harvest within the artificial reefs to the recreational bag limits, **Preferred Alternative 2** is the most likely alternative among those considered to result in biological benefits to snapper grouper species that utilize the artificial reefs.

A precedent for limiting all harvest of snapper grouper species within the proposed SMZs to the recreational bag limits was set in 2009 when, in a letter to the South Atlantic Fishery Management Council (Council), the South Carolina Department of Natural Resources (SCDNR)

expressed concern over reports of commercially viable quantities of snapper grouper species being removed from the SMZs, a practice not keeping with the intended purpose for which the sites were established. The SCDNR requested that the Council consider limiting all recreational, for-hire, and commercial harvest of snapper grouper species[10] within the SMZs off South Carolina to the appropriate recreational bag limit. The Council took action to implement this request in Comprehensive Ecosystem-Based Amendment 2 (SAFMC 2012). **Preferred Alternative 2** would extend biological benefits expected from the proposed restrictions to four additional artificial reefs. Moreover, as mentioned in **Section 4.1.1**, the concurrent designation of these areas as EFH under **Preferred Alternative 2** and **Alternative 3** would similarly impart biological benefits relative to **Alternative 1 (No Action)**.

Expected Effects to Protected Species

Section 4.1.1 provides general information on potential benefits and impacts to sea turtles from artificial reefs.

Adverse effects on sea turtles associated with these reefs are already part of the baseline. Designation of South Carolina's artificial reefs as SMZs would not result in direct adverse effects to protected resources unless the designation results in increased effort above what is considered in the baseline. Thus, any adverse effects on sea turtles associated with these reefs is already part of the baseline. The proposed restriction on allowable fishing gear that can be used in artificial reef sites (**Preferred Alternative 2** and **Alternative 3**) may provide some small benefit to sea turtles to the extent that it reduces overall entangling gear and the likelihood of derelict gear left on the artificial reef relative to the baseline.

4.2.2 Economic Effects

Alternative 1 (No Action) would maintain the ability to harvest commercial quantities of snapper grouper species in the four 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 and direct economic benefits for the commercial sector from these sites among the alternatives considered. There may be long-term indirect costs imposed if harvesting commercial quantities of snapper grouper species leads to localized depletion of these species. Should this occur, the 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 benefits for the recreational sector measured by a decrease in 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 and thus reduced direct economic benefits for the commercial sector. It may also result in increased trip costs if vessels need to travel farther to areas where other commercial gear could be used for snapper grouper species or

[10] The Comprehensive Ecosystem-based Amendment 2 (SAFMC 2012) also included Amendment 21 to the Fishery Management Plan for Coastal Migratory Pelagics of the Gulf of Mexico and Atlantic Region, which restricted harvest of king mackerel, Spanish mackerel and cobia to the recreational bag limit within the South Carolina SMZs.

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 and thus increased indirect economic benefits for the recreational sector. Alternatively, over the longer term, larger aggregations of snapper grouper species could lead to higher catch rates by recreational anglers which could result in shorter seasons, an unintended potential cost to the recreational sector, if regulations remain the same over time.

Alternative 3 would have similar economic effects as **Preferred Alternative 2** but is less restrictive for the commercial sector, thus the potential direct economic effects for the commercial sector and indirect economic effects for the recreational sector would be less pronounced. **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 and thus reduced direct economic benefits for the commercial sector. It may also result in increased trip costs if vessels must travel farther 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, then recreational landings from the site may increase leading to higher overall CS generated from the sites and thus increased indirect economic benefits for the recreational sector. Alternatively, over the longer term, larger aggregations of snapper grouper species could lead to higher catch rates by recreational anglers which could result in shorter seasons, an unintended potential cost to the recreational sector, if regulations remain the same over time.

While the economic effects of **Preferred Alternative 2** and **Alternative 3** on the commercial sector cannot be quantified with precision due to data limitations, a general range can be determined by comparing the size of the proposed SMZ sites to the SEFSC Coastal Logbook statistical grid that the sites fall within. **Table 4.2.2.1** includes the total area as reported in nautical square miles (n. sq. mi.), of the proposed SMZs off South Carolina by the SEFSC Coastal Logbook Program statistical reporting grids SMZs are circular with radii as reported in **Table E-1** in **Appendix E**. Grid numbers follow lines of latitude and longitude. The first two digits in the four-digit grid numbers are latitude degrees, and the second two digits are longitude degrees. The maximum area of a reporting grid in the South Atlantic EEZ is 3,600 n. sq. mi. while grids closer to shore will cover less space due to truncation of the water area by coastline. **Table 4.2.2.1** reports an upper bound estimate of the amount of commercial fishing activity in the proposed SMZs off South Carolina. To estimate the proportion of possible commercial fishing activity in the SMZs, the total area of the SMZs was divided by the maximum amount of one statistical grid (3,600 n. sq. mi.). Note that the proportion of fishing is an overestimate since the total area of all statistical reporting grids is not listed in **Table 4.2.2.1**.

Table 4.2.2.1. Area (n. sq. mi.) of proposed SMZs off South Carolina by SEFSC Coastal Logbook Statistical Reporting Area and estimated maximum annual loss of commercial snapper grouper gross revenues.

Statistical Reporting Grid	Area of Proposed SMZs (Nautical Square Miles)	Proportion of Commercial Fishing in SMZs (Upper Bound)	Estimated Maximum Annual Loss of SG Gross Revenues (2018 dollars)
3378	0.37		
3279	0.08		
Total	0.45	0.0125%	$472

Source: SEFSC.

Table 3.3.1.8 estimates average annual dockside revenue generated by snapper grouper landings in South Carolina from 2014-2018 of $3.78 million. To arrive at an estimate of the maximum annual loss in the short term (i.e., one year) to the commercial sector if all commercial fishing activity was prohibited in the SMZs in **Table 4.2.2.1**, annual estimated revenues are multiplied by the estimated upper bound of the proportion of fishing activity. Since most commercial fishing activity is still allowed in the SMZs, these loss figures are clearly overestimates of the likely impact. On the other hand, the lower bound of revenue loss would be zero if commercial fishing activity were not affected. Due to unavailability of site-specific landings data, this rough boundary of impacts to the commercial fishing sector is the best estimate of short-term gross revenue losses.

According to Overstreet, Perruso, and Liese (2018), from 2014 through 2016, "trip net cash flow" from snapper grouper trips was 42% of the gross revenue on those trips, while "trip net revenue" was 23.9% of the gross revenue from these trips. "Trip net cash flow" represents the additional flow of money to the business from taking a trip. Specifically, trip net cash flow is gross revenue minus the variable costs for fuel, bait, ice, groceries, miscellaneous, and hired crew. As producer surplus is defined as gross revenue minus variable costs, trip net cash flow is the best measure of net economic benefits to the commercial harvesting sector. "Trip net revenue" represents economic profit at the trip level. Specifically, trip net revenue is gross revenue minus the above variable costs for fuel, bait, ice, groceries, miscellaneous, hired crew, as well as the opportunity cost of the owner's time as captain. The estimated potential annual decrease in gross revenue, trip net cash flow, and trip net revenue from **Preferred Alternative 2** and **Alternative 3** is $0 to $472, $0 to $199, and $0 to $113 respectively (2018 dollars). Since **Preferred Alternative 2** would be the most restrictive and thus have the highest potential costs for the commercial sector, it is likely that the realized economic effects would fall towards the higher end of the range of estimated decreases in revenue compared to **Alternative 3**.

The economic effects on the recreational sector of the alternatives in **Action 2** also cannot be quantified due to lack of sufficient data. Recreational catch estimates do not exist in high enough resolution to match the area of the proposed SMZs. However, it is noted that snapper grouper species could be locally available for harvest in higher quantities due to the proposed limitation on gear and harvest restrictions, and thus recreational landings from the site may increase leading to higher overall CS generated from the sites and thus increased economic benefits for the recreational sector. Changes in recreational landings cannot be quantified, however as noted in **Section 3.3.2**, estimates of net benefits for the recreational sector, as measured in CS for snapper grouper species range from approximately $13 to $144 dollars per

fish (2018 dollars). While the net benefits of the alternatives in **Action 2** cannot be determined, it is plausible that an increase in net benefits for the recreational sector may partially or fully offset the decrease in net benefits noted for the commercial sector. Again, it should be noted that larger aggregations of snapper grouper species could lead to higher catch rates by recreational anglers which could result in shorter seasons, an unintended potential cost to the recreational sector, if regulations remain the same over time.

As noted, the economic effects described cannot be explicitly quantified due to the relatively small size of the individual sites being considered paired with data limitations that do not allow quantified economic effects at such a high resolution geographically. However, these effects can be ranked and compared to one another. 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 fishing gear that has greater potential to lead to high exploitation rates—such as pots 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 spear (**Alternative 3**) would be limited to the applicable recreational bag limit. Alternatively, if prohibiting these gear types and restricting harvest via other gear to the recreational bag limit 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.

Anticipated biological benefits from SMZ designation and harvest/gear restrictions would be compromised without effective compliance and enforcement. **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 regulations 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 increased administrative effects in the form of at-sea enforcement of the regulations at the proposed SMZs. The 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. Designate 30 artificial reefs in the exclusive economic zone off North Carolina as Special Management Zones

5.1.1 Snapper Grouper Advisory Panel (AP) Comments and Recommendations

The South Atlantic Fishery Management Council's (Council) Snapper Grouper AP discussed this framework amendment at their October 2019 meeting and had the following comments:

Alternatives

1 (No Action). Do not designate artificial reefs in the EEZ off North Carolina as Special Management Zones.

2. Designate 30 artificial reefs in the EEZ off North Carolina as SMZs. 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. Designate 30 artificial reefs in the EEZ off North Carolina as SMZs. 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.

- One AP member from North Carolina stated an opinion that during the past few years, research and fisheries enhancement programs have become mostly funded by the North Carolina recreational fishing license due to state budget cuts. He stated that in fairness the artificial reefs should then favor recreational angling by restricting very efficient commercial gear.
- One AP member from North Carolina stated that the artificial reefs were founded with private funding by recreational fishing organizations, and how the North Carolina Department of Marine Fisheries came to own and assume management of the artificial reefs (Note: they are funded through Sport Fish Restoration).
- One AP member from North Carolina stated that the proposed gear restrictions would likely not directly affect commercial fishermen in the southern portion of North Carolina as the proposed sites (except two of them) are close to shore.
- One AP member inquired as to how enforcement would address a situation in which a commercial vessel (e.g., with bandit gear) stopped to fish an artificial reef with rod and reel during a commercial trip.
- The AP inquired as to whether there would be buffer zones specified around the reefs as part of the special management zone (SMZ) designation.

- One AP member from Florida pointed out that North Carolina does not have a Joint Enforcement Agreement with the National Marine Fisheries Service like the rest of the South Atlantic states.
- Suggest including definition of various types of gear in the document.

MOTION: WITH RESPECT TO ACTION 1, REQUEST THAT THE COUNCIL DESIGNATE THE 30 ARTIFICIAL REEFS WITHIN THE EEZ OFF NC AS SMZs. RESTRICT LEGAL GEAR (COMMERCIAL AND RECREATIONAL) TO HANDLINE, ROD AND REEL AND SPEARFISHING AND LIMIT SPEARFISHING HARVEST TO THE RECREATIONAL BAG LIMIT.
APPROVED BY AP (11 IN FAVOR, 3 ABSTENTIONS)

5.1.2 Law Enforcement AP Comments and Recommendations

Comments from the LE AP were requested on the amendment via email on May 11, 2020. Below are comments submitted by individual AP members:

The representative for NOAA's Office of General Counsel, Enforcement Section (GCES), submitted the following for the Council's consideration:

The *Guidelines for Resource Managers on the Enforceability of Fishery Management Measures* produced by the LEAP of the Atlantic States Marine Fisheries Commission in 2015 offers some recommendations for the establishment of closed areas that NOAA Office of Law Enforcement and GCES support.

- It is critical to have clearly defined areas. Use exact latitude/longitude and straight lines with regularly shaped areas as much as possible. Avoid general descriptions such as distance offshore, or a center point and radius. Do not use depth contours to define closed areas.
- Closed areas are more likely to be understood by fishermen, and to result in less unintentional non-compliance, if they are regular in shape, and where possible, oriented north-south and east-west in concert with latitude/longitude boundaries.
- Successful prosecution of violations must generally include the capability to conduct vessel monitoring, aerial and at-sea surveillance. Even with Vessel Monitoring System (VMS) capability, law enforcement must document the violation at-sea to gather sufficient evidence for prosecuting the violation.
- Depending on the fishery and gear type, restrictions on only certain activities within a closed area may require at-sea boarding to document a violation. The more complete the closure to all fishing activity, the easier it is to enforce and successfully prosecute violations.
- Large, contiguous areas are preferable to more numerous, smaller areas. If possible, the area should be closed to transit with fishing gear onboard. If transit is allowed, regulations should clearly specify the proper stowage of fishing gear during transit through the closed area. Transit must be specified as continuous, direct and expeditious. If an allowance for loitering or stopping is included in regulations, there should be a mandatory call-in or reporting requirement.

- Gear closure areas or regulated mesh areas are very difficult to enforce. If regulations only prohibit the use of a particular gear type within a closed area, possession of that gear within the closed area should be prohibited.

Consistent with these general recommendations, NOAA OLE and GCES pointed out the inherent difficulties involved in patrolling these numerous small scattered areas and enforcing the proposed regulations that would allow transit and some but not all fishing.

Such areas, if created, should be in the shape of a box and should be defined using latitude and longitude coordinates, consistent with practice the Council has followed in creating past SMZs. Any slight increase in area size attributable to using a box rather than a circle to define the areas is more than made up for by ease of use and enforcement.

The representative of the U.S. Coast Guard (USCG) on the LE AP concurred with the comments above, adding:

- The USCG enforcement of a square area (or a shape four points parallel to lat. & longs; with 90-degree angles) is more effective than a centroid with a radius. The main tool used by the public and law enforcement to determine position is a marine Global Positioning System (GPS); a GPS is much better suited to showing someone if they are 'in' our 'out' of a given area that is square.
- With the proposed SMZs being relatively small, the threshold for reading the GPS position to determine if a boater is 'in' or 'out' of the SMZ gets into the hundredths of decimal places. So, the smaller the area the more room there is for error/inaccuracy.
- When an area is circular (centroid with a radius), the tools to determine or detect a violation are not as readily available when compared to a squared shape.
- To instruct officers, the USCG already has a precedent to using 'square' areas and GPS to detect violations; these 'best practices' have been institutionally built into USCG enforcement.

5.1.3 Scientific and Statistical Committee (SSC) Comments and Recommendations

The SSC received the draft amendment for their review via email on May 22, 2020. Below are individual comments from SSC members:

- The discussion does not explicitly describe how increased bycatch may not be consistent with the Council's efforts to rebuild or end overfishing for certain fish stocks most likely to be affected (e.g., red porgy). (Note: This comment was addressed in **Sections 4.1.1** and **4.2.1**.)
- The science behind artificial reefs is still controversial. Also, the amendment is really a management/allocation decision, not a scientific/biological/assessment one. Although there are several statements in the document about gear restrictions reducing impact on fish, no scientific data are provided to support this. It may be that allowing only hook and line might catch fewer fish than allowing traps and longlines, but that really depends on effort (6 anglers = 1 trap?) and other variables that for which no data are provided.
- Concerns about the cost-benefit analysis included in the amendment in that the net benefits from the proposed actions need to outweigh the costs. The current analysis is insufficient to prove net benefits to society will increase. (Note: additional analyses were

conducted to address this comment and are included in **Sections 4.1.2** and **4.2.2** in **Chapter 4**.)

5.1.4 Public Comments and Recommendations

Summary of scoping comments:

- Three comments were received online (as of 11/1/2019).
- Scoping hearings were held over three days, October 28-30, 2019, with three listening stations in Manteo, Morehead City, and Wilmington, North Carolina.
- Six members of the public (non-Council or other agency staff) attended the listening stations.
- A total of four comments were provided during webinar/listening stations.
- Six members of the public (non-Council or other agency staff) attended the webinars.
- One commenter had no objection to the designation and thought it would be useful.
- Artificial reefs off North Carolina were built with recreational funding (Coastal Recreational Fishing License) and it would be helpful to that sector to limit commercial gear on the artificial reefs.
- One commenter maintained the artificial reefs are owned by the federal government and the law (National Fishery Enhancement Act of 1984) requires that the reefs facilitate utilization of the artificial reefs by both commercial and recreational fishermen.
- One commercial fisherman stated that he does not utilize any artificial reefs so the designation would not affect him.

Summary of public hearing comments:

- Public hearings for Regulatory Amendment 34 were held via webinar on May 4 and 5, 2020. The comment period was from April 20 through May 8.
- Five comments were received online; one comment was provided during the webinar hearings.
- One commenter maintains that the proposed actions would complicate enforcement and provide no biological benefit.
- Two commenters expressed frustration at the level of regulations that have already been imposed on the commercial fishery.
- One commenter supported Alternative 2 under Action 1.
- The Coastal Conservation Association submitted a letter in support of the proposed actions.

5.1.5 South Atlantic Council's Conclusion

During development of this amendment, some Council members expressed concern over the role of artificial reefs in general, stating that artificial reefs tend to aggregate fish and make them easier to catch; which, in turn, can result in higher exploitation rates, shorter seasons, create potential for user conflict, and bring enforcement challenges. Other Council members acknowledged the beneficial role artificial reefs play in providing fishing opportunity to the public and creating hardbottom habitat for reef species. Ultimately, however, this framework amendment addresses the placing of gear and/or harvest restrictions as a condition to use existing reefs, many of which were created decades ago and have been in place since. As such, the Council is responding to North Carolina's request to extend SMZ designation to artificial reefs in the exclusive economic zone (EEZ) off its coast and thus impart the biological and socio-

economic benefits that were envisioned from the onset of the SMZ designation process in the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP; SAFMC 1983).

Preferred Alternative 3 restricts the type of fishing gear that can be used to fish within the boundaries of the proposed North Carolina SMZs to handheld gear (handline, rod and reel, and spear) and restricts harvest by spear to the appropriate recreational bag limit. The proposed restrictions are intended to reduce the likelihood of localized depletion attributed to fishing gear that has the capacity to remove large numbers of fish from a small area in a short time. Such gear, used in the commercial snapper grouper fishery, includes back sea bass pots, bandit gear, and longline. In addition, there is concern among the public and Council members that spearfishing gear also has the potential to efficiently remove large individuals from an area, resulting in negative biological impacts, particularly for species with complex social structures, such as grouper and hogfish.

During discussions at the June 2020 Council meeting, representatives from NOAA's OLE, GCES, and the USCG again voiced concerns over the proposed SMZ designations being in the shape of a circle instead of a polygon with corner coordinates (see **Section 5.1.2**). However, state representatives on the Council reiterated that the proposed areas are intended to match those originally permitted by the Army Corps of Engineers for artificial reef placement to maintain consistency, potentially improve compliance, and avoid confusion among fishermen; hence, the proposed SMZs should be of the same size and shape as the permitted areas. It was acknowledged that, because artificial reefs can pose a potential hazard to navigation, they are displayed on NOAA's Nautical Charts and labeled as "fish havens." However, according to NOAA OLE, of North Carolina's 30 artificial reefs located in federal waters, eight plot at or near the center of already charted circular fish havens, eight plot in or near fish havens that appear as rectangles or squares on NOAA's charts, and the remaining 14 do not appear to align with any existing charted fish havens or are not centered in existing fish havens. According to the North Carolina state representative on the Council, the state's artificial reef program has been attempting to reconcile this discrepancy with the National Ocean Service since the late 1990s. He stated that efforts would continue to align the permitted areas with those designated on nautical charts. Given that the process is already underway and outside of the Council's purview, the Council did not wish to further delay imparting the potential biological, economic, and social benefits that would be expected from designating the artificial reef areas as SMZs. Moreover, North Carolina disseminates the locations of their artificial reefs, both electronically and in written material; therefore, even if there are some discrepancies on the NOAA charts, the public has ready access to the correct information.

The Council determined that **Preferred Alternative 3** would best meet the purpose imparting biological benefits to snapper grouper species and ensuring that artificial reefs continue to be utilized for the purpose they were intended, namely, to optimize fishing opportunities. In addition, **Preferred Alternative 3** best meets the goals and objectives of the Snapper Grouper FMP, as amended, while complying with the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and other applicable law.

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

This action addresses several objectives and strategies in the Vision Blueprint for the Snapper Grouper fishery. The proposed action addresses Objective 3, under the management goal to "ensure that management decisions help maximize social and economic opportunity for all sectors." Further, it directly addresses Strategy 3.2 to "consider development of management approaches that support recreational fishing and allow increased opportunity for trip satisfaction." In addition, the proposed action also addresses Objective 5 under the management goal to "support management measures that incorporate ecosystem and habitat considerations for the snapper grouper fishery." The proposed action would provide the basis for Strategy 5.1 to "evaluate the use of artificial reefs as a mechanism to improve fishery production."

5.2 Action 2. Designate additional artificial reefs in the exclusive economic zone off South Carolina as Special Management Zones

5.2.1 Snapper Grouper AP Comments and Recommendations

The Snapper Grouper AP discussed this framework amendment at their October 2019 meeting. AP comments are summarized in **Section 5.1.1**. There were no comments specific to the proposed SMZs off South Carolina.

Alternatives*

1 (No Action). Do not designate additional artificial reefs in the EEZ off South Carolina as SMZs.

2. Designate four additional artificial reefs in the EEZ off South Carolina as SMZs. 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. Designate four additional artificial reefs in the EEZ off South Carolina as SMZs. 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.

5.2.2 Law Enforcement AP Comments and Recommendations

See comments in **Section 5.1.2.**

5.2.3 SSC Comments and Recommendations

See comments in **Section 5.1.3.**

5.2.4 Public Comments and Recommendations

Summary of scoping comments:

- Three comments were received online (as of 11/1/2019).
- Scoping hearings were held over three days, October 28-30, 2019, with three listening stations in Manteo, Morehead City, and Wilmington, North Carolina.
- Six members of the public (non-Council or other agency staff) attended the listening stations.
- A total of four comments were provided during webinar/listening stations.
- Six members of the public (non-Council or other agency staff) attended the webinars.
- There were no scoping or comments addressing proposed SMZs off South Carolina.

Summary of public hearing comments:

- Public hearings for Regulatory Amendment 34 were held via webinar on May 4 and 5, 2020. The comment period was from April 20 through May 8.
- Five comments were received online; one comment was provided during the webinar hearings.
- One comment letter from the Coastal Conservation Association was submitted in support of the proposed action.

5.2.5 South Atlantic Council's Conclusion

During development of this amendment, some Council members expressed concern over the role of artificial reefs in general, stating that artificial reefs tend to aggregate fish and make them easier to catch; which, in turn, can result in higher exploitation rates, shorter seasons, create potential for user conflict, and bring enforcement challenges. Other Council members

acknowledged the beneficial role artificial reefs play in providing fishing opportunity to the public and creating hardbottom habitat for reef species. Ultimately, however, this framework amendment addresses the placing of gear and/or harvest restrictions as a condition to use existing reefs, many of which were created decades ago. As such, the Council is responding to South Carolina's request to extend SMZ designation to four additional artificial reefs in the EEZ off its coast and thus impart the biological and socio-economic benefits that were envisioned from the onset of the SMZ designation process in the Snapper Grouper FMP (SAFMC 1983).

Preferred Alternative 2 restricts the type of fishing gear that can be used to fish within the boundaries of the proposed South Carolina SMZs to handheld gear (handline, rod and reel, and spear) and restricts harvest to the appropriate recreational bag limit. Twenty-eight artificial reefs in the EEZ off South Carolina are already designated as SMZs with the same restrictions on allowable gear and harvest limit. South Carolina's request to extend the same designation and regulations to four additional sites would bring consistency in the regulations and promote a more stable regulatory environment and potentially increase compliance.

During discussions at the June 2020 Council meeting, representatives from NOAA's OLE, GCES, and the USCG again voiced concerns over the proposed SMZ designations being in the shape of a circle instead of a polygon with corner coordinates (see **Section 5.1.2**). However, state representatives on the Council reiterated that the proposed areas are intended to match those originally permitted by the Army Corps of Engineers for artificial reef placement to maintain consistency and avoid confusion among fishermen; hence, the proposed SMZs should be of the same size and shape as the permitted areas. It was acknowledged that, because artificial reefs can pose a potential hazard to navigation, they are displayed on NOAA's Nautical Charts and labeled as "fish havens." According to NOAA OLE, the four proposed SMZs in federal waters off South Carolina do align with the locations of "fish havens" on NOAA nautical charts. Moreover, South Carolina disseminates the locations of their artificial reefs, both electronically and in written material; therefore, the public has ready access to that information.

The Council determined that **Preferred Alternative 2** would best meet the purpose imparting biological benefits to snapper grouper species and ensuring that artificial reefs continue to be utilized for the purpose they were intended, namely, to optimize fishing opportunities. In addition, **Preferred Alternative 2** best meets the goals and objectives of the Snapper Grouper FMP, as amended, while complying with the requirements of the Magnuson-Stevens Act and other applicable law.

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

This action addresses several objectives and strategies in the Vision Blueprint for the Snapper Grouper fishery. The proposed action addresses Objective 3, under the management goal to "ensure that management decisions help maximize social and economic opportunity for all sectors." Further, it directly addresses Strategy 3.2 to "consider development of management approaches that support recreational fishing and allow increased opportunity for trip satisfaction." In addition, the proposed action also addresses Objective 5 under the management goal to "support management measures that incorporate ecosystem and habitat considerations for the snapper grouper fishery." The proposed action would provide the basis for Strategy 5.1 to "evaluate the use of artificial reefs as a mechanism to improve fishery production."

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 and South Carolina, which is within the South Atlantic Fishery Management Council's (Council) area of jurisdiction. Considering the available information, the extent of the boundaries for the affected area 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 Volume II of the Fishery Ecosystem Plan.[11] For the proposed actions found in Regulatory Amendment 34 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 2017 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 (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)** of Regulatory Amendment 33 to the Snapper Grouper FMP (SAFMC 2020).

Past Actions

Amendment 36 to the Snapper Grouper FMP, effective on July 31, 2017, was implemented to establish new spawning special management zones (SMZ) to protect spawning areas for snapper grouper species.

Amendment 37 to the Snapper Grouper FMP, effective on August 24, 2017, modified the hogfish fishery management unit in response to genetically different stocks along the South Atlantic, specified fishing levels for the two stocks, established a rebuilding plan for the Florida Keys/East Florida stock, and established or revised management measures for both hogfish stocks such as size limits, recreational bag limits, and commercial trip limits.

Amendment 43 to the Snapper Grouper FMP, effective on July 26, 2017, specified recreational and commercial annual catch limits (ACL) for red snapper beginning in 2018.

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

Abbreviated Framework 1 to the Snapper Grouper FMP, 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 exclusive economic zone (EEZ).

Abbreviated Framework 2 to the Snapper Grouper FMP, effective on May 9, 2019, revised fishing levels for black sea bass and vermilion snapper in response to the latest stock assessments for those species in the South Atlantic.

Amendment 42 to the Snapper Grouper FMP, effective on January 8, 2020, added three newly approved sea turtle release devices and updated the regulations to simplify and clarify the specifications for other release gear requirements. The new devices and updates provide more options to fulfill the requirements for sea turtle release gear on board vessels with commercial and charter/for-hire snapper grouper permits in the South Atlantic. The amendment also streamlines the procedure to implement newly approved devices and handling procedures in the future.

Regulatory Amendment 27 (Vision Blueprint Regulatory Amendment 27) to the Snapper Grouper FMP, effective on February 26, 2020, addresses specific action items in the 2016-2020 Vision Blueprint for the commercial sector of the snapper grouper fishery. The framework amendment revised 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.

Regulatory Amendment 30 to the Snapper Grouper FMP, effective on March 9, 2020, revised the rebuilding plan for red grouper, extended the annual spawning closure for that species off North and South Carolina, and established a commercial trip limit.

Regulatory Amendment 26 (Vision Blueprint Regulatory Amendment 26) to the Snapper Grouper FMP, effective on March 30, 2020, addresses specific action items in the 2016-2020 Vision Blueprint for the recreational sector of the snapper grouper fishery. The framework amendment modified the 20-fish aggregate bag limits, and minimum size limits for certain species.

Regulatory Amendment 29 to the Snapper Grouper FMP, effective July 15, 2020, modified gear requirements for South Atlantic snapper grouper species. Actions included requirements for descending and venting devices, and modifications to requirements for circle hooks and powerheads.

Present Actions

Abbreviated Framework 3 to the Snapper Grouper FMP, effective August 17, 2020, revises fishing levels for blueline tilefish in the South Atlantic region.

Regulatory Amendment 33 to the Snapper Grouper FMP proposes removing the requirement that if projections indicate the South Atlantic red snapper season (commercial or recreational) would be three days or fewer, the commercial and/or recreational seasons would not open for that fishing year. If this requirement is removed, red snapper harvest could be open for either

recreational or commercial harvest for fewer than four days. The framework amendment was submitted for formal review on January 24, 2020, and the proposed rule published on May 14, 2020 (85 FR 28924).

Reasonably Foreseeable Future Actions

Comprehensive Acceptable Biological Catch (ABC) Control Rule Amendment (Amendment 45 to the Snapper Grouper FMP) 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. This amendment will continue being developed in 2020.

Amendment 46 to the Snapper Grouper FMP proposes actions to focus on private recreational permit requirements and reporting. Development of this amendment is currently on hold.

Regulatory Amendment 31 to the Snapper Grouper FMP could include actions to revise recreational accountability measures to allow more flexibility in managing recreational fisheries. Development of this framework amendment is currently on hold.

Expected Impacts from Past, Present, and Future Actions

The intent of Regulatory Amendment 34 is to address requests from North and South Carolina to extend SMZ designation to existing artificial reefs in the exclusive economic zone off those states. The proposed actions in Regulatory Amendment 34 are not expected to result in significant cumulative adverse biological or socio-economic effects (see **Chapter 4**). In recent years, participants in 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 Council's jurisdiction. The proposed actions could result in beneficial effects to the snapper grouper stocks at the artificial reef sites by restricting harvest to certain gear. However, the proposed actions 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 and thus reduced direct economic benefits for the commercial sector. It may also result in increased trip costs if vessels need to travel farther 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 consumer surplus generated from the sites and thus increased indirect economic benefits for the recreational sector.

When combined with the impacts of past, present, and future actions affecting the snapper grouper fishery, 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.fisheries.noaa.gov/topic/climate), 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 marine 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 would designate existing artificial reefs in the EEZ off North and South Carolina as SMZs and implement gear and/or harvest restrictions. The actions are expected to reduce adverse effects to snapper grouper species from fishing gear that has the potential to result in overexploitation and optimize fishing opportunities at the artificial reef sites. 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
Manny Antonaras	SERO/OLE	Deputy Special Agent in Charge
Adam Bailey	SERO/SF	Technical Writer and Editor
Myra Brouwer	SAFMC	Fishery Scientist/IPT Lead
Brian Cheuvront	SAFMC	Deputy Director for Management
Chip Collier	SAFMC	Deputy Director for Science and Statistics
Kevin Craig	SEFSC	Biologist
David Dale	SERO/Habitat	Regional EFH Coordinator
Rick DeVictor	SERO/SF	South Atlantic Branch Chief/IPT Lead
Mike Errigo	SAFMC	Data analyst
Alisha Gray	SERO/SF	Data Analyst
Shepherd Grimes	NOAA GC	General Counsel
John Hadley	SAFMC	Economist
Frank Helies	SERO/SF	Fishery Biologist
Michael Jepson	SERO/SF	Socio-economic Branch Chief
Denise Johnson	SERO/SF	Economist
Jennifer Lee	SERO/PR	Biologist
Christina Package-Ward	SERO/SF	Social Scientist
Larry Perruso	SEFSC	Economist
Roger Pugliese	SAFMC	Senior Fishery Biologist
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 Agencies
South Atlantic Fishery Management Council (Administrative Lead)
4055 Faber Place Drive, Suite 201
N. Charleston, South Carolina 29405
843-571-4366/ 866-SAFMC-10 (TEL)
843-769-4520 (FAX)
www.safmc.net

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

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
National Marine Fisheries Service
- Washington Office
- Office of Ecology and Conservation
- Southeast Regional Office
- Southeast Fisheries Science Center

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Appendix A. Regulatory Impact Review

Introduction

The National Marine Fisheries Service (NMFS) requires a Regulatory Impact Review (RIR) for all regulatory actions that are of public interest to satisfy our obligations under Executive Order (E.O.) 12866, as amended. In conjunction with the analysis of direct and indirect effects in the "Environmental Consequences" section of this Amendment, the RIR: 1) provides a comprehensive review of the level and incidence of impacts associated with a regulatory action; 2) provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives which could be used to solve the problem; and 3) ensures that the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost effective way. The RIR also serves as the basis for determining whether any proposed regulations are a "significant regulatory action" under certain criteria provided in Executive Order (E.O.) 12866. In addition, the RIR provides some information that may be used in conducting an analysis of the effects on small entities pursuant to the Regulatory Flexibility Act (RFA). This RIR analyzes the effects this regulatory action would be expected to have on the recreational and commercial sectors of the South Atlantic snapper grouper fishery.

Problems and Objectives

The problems and objectives for the proposed actions are presented in **Section 1.4** of this amendment and are incorporated herein by reference.

Description of Fisheries

A description of recreational and commercial sectors in the snapper grouper fishery of the South Atlantic region is provided in **Section 3.3** of this amendment and is incorporated herein by reference.

Effects of Management Measures

Action 1. Designate 30 artificial reefs in the exclusive economic zone off North Carolina as Special Management Zones

A detailed analysis and discussion of the expected economic effects of the proposed action is included in **Section 4.1.2**. The following discussion summarizes the expected economic effects of the preferred South Atlantic Fishery Management Council (South Atlantic Council) alternative relative to the No Action alternative (i.e., the status quo).

Preferred 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 and thus reduced direct economic benefits for the commercial sector. It may also result in increased trip costs if vessels need to travel farther 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 consumer surplus (CS) generated from the sites and thus increased indirect economic benefits for the recreational sector. On the other hand, over the longer term, larger aggregations of snapper grouper species could lead to higher catch rates by recreational anglers which could result in shorter seasons, an unintended potential cost to the recreational sector, if regulations remain the same over time.

According to Overstreet, Perruso, and Liese (2018), from 2014 through 2016, "trip net cash flow" from snapper grouper trips was 42% of the gross revenue on those trips, while "trip net revenue" was 23.9% of the gross revenue from these trips. "Trip net cash flow" represents the additional flow of money to the business from taking a trip. Specifically, trip net cash flow is gross revenue minus the variable costs for fuel, bait, ice, groceries, miscellaneous, and hired crew. Trip net cash flow is gross revenue minus the variable costs for fuel, bait, ice, groceries, miscellaneous, and hired crew. As producer surplus is defined as gross revenue minus variable costs, trip net cash flow is the best measure of net economic benefits to the commercial harvesting sector. "Trip net revenue" represents economic profit at the trip level. Specifically, trip net revenue is gross revenue minus the above variable costs for fuel, bait, ice, groceries, miscellaneous, hired crew, as well as the opportunity cost of the owner's time as captain. The estimated potential annual decrease in gross revenue, trip net cash flow, and trip net revenue from **Preferred Alternative 3** is $0 to $9,225, $0 to $3,875, and $0 to $2,372 respectively (2018 dollars).

The economic effects on the recreational sector of **Preferred Alternative 3** also cannot be quantified due to lack of sufficient data. Recreational catch estimates do not exist in high enough resolution to match the area of the proposed SMZs. However, it is noted that snapper grouper species could be locally available for harvest in higher quantities due to the proposed limitation on gear and harvest restrictions, and thus recreational landings from the site may increase leading to higher overall consumer surplus (CS) generated from the sites and thus increased economic benefits for the recreational sector. Changes in recreational landings cannot be quantified, however as noted in **Section 3.3.2**, estimates of net benefits for the recreational sector, as measured in CS for snapper grouper species range from approximately $13 to $144 dollars per fish (2018 dollars). While the net benefits of **Preferred Alternative 3** cannot be determined, it is plausible that an increase in net benefits for the recreational sector may partially or fully offset the decrease in net benefits noted for the commercial sector.

Action 2. Designate additional artificial reefs in the exclusive economic zone off South Carolina as Special Management Zones

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 and thus reduced direct economic

benefits for the commercial sector. It may also result in increased trip costs if vessels need to travel farther 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 and thus increased indirect economic benefits for the recreational sector. On the other hand, over the longer term, larger aggregations of snapper grouper species could lead to higher catch rates by recreational anglers which could result in shorter seasons, an unintended potential cost to the recreational sector, if regulations remain the same over time.

According to Overstreet, Perruso, and Liese (2018), from 2014 through 2016, "trip net cash flow" from snapper grouper trips was 42% of the gross revenue on those trips, while "trip net revenue" was 23.9% of the gross revenue from these trips. "Trip net cash flow" represents the additional flow of money to the business from taking a trip. Specifically, trip net cash flow is gross revenue minus the variable costs for fuel, bait, ice, groceries, miscellaneous, and hired crew. As producer surplus is defined as gross revenue minus variable costs, trip net cash flow is the best measure of net economic benefits to the commercial harvesting sector. "Trip net revenue" represents economic profit at the trip level. Specifically, trip net revenue is gross revenue minus the above variable costs for fuel, bait, ice, groceries, miscellaneous, hired crew, as well as the opportunity cost of the owner's time as captain. The estimated potential annual decrease in gross revenue, trip net cash flow, and trip net revenue from **Preferred Alternative 2** is $0 to $472, $0 to $199, and $0 to $113 respectively (2018 dollars).

The economic effects on the recreational sector of **Preferred Alternative 2** also cannot be quantified due to lack of sufficient date. Recreational catch estimates do not exist in high enough resolution to match the area of the proposed SMZs. However, it is noted that snapper grouper species could be locally available for harvest in higher quantities due to the proposed limitation on gear and harvest restrictions, and thus recreational landings from the site may increase leading to higher overall consumer surplus (CS) generated from the sites and thus increased economic benefits for the recreational sector. Changes in recreational landings cannot be quantified, however as noted in **Section 3.3.2**, estimates of net benefits for the recreational sector, as measured in CS for snapper grouper species range from approximately $13 to $144 dollars per fish (2018 dollars). While the net benefits of **Preferred Alternative 2** cannot be determined, it is plausible that an increase in net benefits for the recreational sector may partially or fully offset the decrease in net benefits noted for the commercial sector.

Public Costs of Regulations

The preparation, implementation, enforcement, and monitoring of this or any federal action involves the expenditure of public and private resources, which can be expressed as costs associated with the regulations. Costs to the private sector are discussed in the effects of management measures. Estimated public costs associated with this action include:

South Atlantic Council costs of document preparation, meetings, public hearings, and information dissemination	$13,647

NMFS administrative costs of document preparation, meetings, and review	$9,540
TOTAL[12]	$23,187

The estimate provided above does not include any law enforcement costs. Any enforcement duties associated with this action would be expected to be covered under routine enforcement costs rather than an expenditure of new funds. The South Atlantic Council and NMFS administrative costs directly attributable to this amendment and the rulemaking process would be incurred prior to the effective date of the final rule implementing this amendment.

Net Benefits of Regulatory Action

It is important to specify the time period being considered when evaluating benefits and costs. According to OMB's FAQs regarding Circular A-4,[13] "When choosing the appropriate time horizon for estimating costs and benefits, agencies should consider how long the regulation being analyzed is likely to have resulting effects. The time horizon begins when the regulatory action is implemented and ends when those effects are expected to cease. Ideally, analysis should include all future costs and benefits. Here as elsewhere, however, a 'rule of reason' is appropriate, and the agency should consider for how long it can reasonably predict the future and limit its analysis to this time period. Thus, if a regulation has no predetermined sunset provision, the agency will need to choose the endpoint of its analysis on the basis of a judgment about the foreseeable future."

For current purposes, the reasonably "foreseeable future" is considered to be the next five years. There are two primary reasons for considering the next five years the appropriate time period for evaluating the benefits and costs of this regulatory action rather than a longer (or shorter) time period. First, this regulatory action does not include a predetermined sunset provision. Second, based on the history of management in the snapper-grouper fishery in the South Atlantic, regulations such as those considered in this amendment are often revisited within five years or so.

The analyses of the quantified net changes in economic benefits indicates an annual decrease of $0 to $4,074 (2018 dollars). In discounted terms and over a five-year time period, the total net present value of this change in net economic benefits is $0 to -$16,704 using a 7% discount rate and $0 to -$18,658 using a 3% discount rate (2018 dollars). The estimated non-discounted public costs resulting from the regulation are $23,187 (2018 dollars). The costs resulting from the amendment and the associated rulemaking process should not be discounted as they will be incurred prior to the effective date of the final rule.

[12] Calculations are inclusive of the estimated cost of total staff time dedicated to amendment development and applicable meeting costs (Scoping, Public Hearings, South Atlantic Fishery Management Council, Scientific and Statistical Committee, and Advisory Panel meetings).

[13] See p. 4 at https://obamawhitehouse.archives.gov/sites/default/files/omb/assets/OMB/circulars/a004/a-4_FAQ.pdf

Based on the quantified economic effects, this regulatory action may decrease net benefits to the Nation. Over a 5-year time period, the quantified change in net economic benefits is expected to be -$23,187 to -$39,891 using a 7% discount rate and -$23,187 to -$41,845 using a 3% discount rate (2018 dollars). However, based on a qualitative analysis of the economic effects of this regulatory action, as discussed in **Section 4.1.2** and **4.2.2**, there are potential positive economic effects that could outweigh the quantified decrease in net benefits. Based on these qualitative and quantitative analyses of economic effects, it is unclear what the effect will be on net economic benefits and there is the potential that this regulatory action may in fact increase net benefits to the Nation.

Determination of Significant Regulatory Action

Pursuant to E.O. 12866, a regulation is considered a "significant regulatory action" if it is likely to result in: 1) an annual effect of $100 million or more or adversely affect 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 or communities; 2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; 3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights or obligations of recipients thereof; or 4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this executive order. Based on the information provided above, these actions have been determined to not be economically significant for the purposes of E.O. 12866.

Appendix B. Regulatory Flexibility Analysis

Introduction

The purpose of the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA), is to fit regulatory requirements to the scale of the businesses, organizations, and governmental jurisdictions subject to the regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure that small entities have been given the opportunity to participate in the rulemaking process. The RFA does not contain any decision criteria; instead, the purpose of the RFA is to inform the agency, as well as the public, of the expected economic impacts of the alternatives contained in the fishery management plan (FMP) or amendment (including framework management measures and other regulatory actions) and to ensure that the agency considers alternatives that minimize the expected impacts while meeting the goals and objectives of the FMP and applicable statutes.

With certain exceptions, the RFA requires agencies to conduct a formal regulatory flexibility analysis for each proposed rule. The regulatory flexibility analysis is designed to assess the impacts various regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those impacts.[14] The following regulatory flexibility analysis was conducted to assess the direct compliance costs and benefits of the proposed rule on small entities, determine if the proposed rule would have a significant economic impact on a substantial number of small entities or not, and explore regulatory alternatives to reduce significant economic impact on a substantial number of such entities if any.[15] Any methods that small businesses may engage in to reduce the adverse impacts of direct compliance costs are discussed in the section on economic impacts.

[14]The RFA does not require assessment of the indirect impacts on small entities. The courts have held that the RFA requires an agency to perform a regulatory flexibility analysis of small entity impacts only when a rule directly regulates small entities. These direct impacts are the direct compliance costs and benefits.

[15] Direct compliance costs of an action include, but are not limited to, losses of revenues due to the legal inability of small businesses to continue all or part of their operations, such as small commercial fishing businesses having to cease fishing for and landings of a particular stock/stock complex because the fishing season for that stock/stock complex has closed for the remainder of the fishing year. Direct compliance benefits include, but are not limited to, increases in revenues due to the legal ability of small businesses to expand all or part of their operations, such as small fishing businesses increasing fishing for and landings of a particular stock/stock complex because the annual catch limit for that stock/stock complex has been increased.

Statement of the need for, objective of, and legal basis for the proposed rule

The South Atlantic Fishery Management Council (Council) received requests from the North Carolina Division of Marine Fisheries (NCDMF) and the South Carolina Department of Natural Resources (SCDNR) to extend special management zone (SMZ) designation to permitted artificial reef sites in the exclusive economic zone (EEZ) off the two states. There are 30 such sites off North Carolina and four off South Carolina.

The NCDMF requested that fishing gear other than handline, rod and reel, and spear be prohibited within the 30 proposed SMZs off the North Carolina coast. Further, the NCDMF requested that harvest of snapper grouper species with spearfishing gear be limited to the appropriate recreational bag limit.

The SCDNR requested that fishing gear other than handline, rod and reel and spear (excluding powerheads) be prohibited within the four proposed SMZs off the South Carolina coast. Further, the SCDNR requested that harvest of snapper grouper species with allowable gear be limited to the appropriate to the recreational bag limits.

Hence, the purpose of this proposed rule is to designate artificial reefs sites in the EEZ off North Carolina and South Carolina as SMZs and restrict fishing gear use within the areas. The need is to reduce adverse effects to snapper grouper species and optimize fishing opportunities at the artificial reef sites.

Federal fishery management is conducted under the authority of the Magnuson-Stevens Act (16 U.S.C. 1801 et seq.). The Magnuson-Stevens Act claims sovereign rights and exclusive fishery management authority over most fishery resources within the EEZ, an area extending from the seaward boundary of each coastal state to 200 nm from shore, as well as authority over anadromous species that spawn in fresh or estuarine waters of the U.S. and migrate into ocean waters and continental shelf resources that occur beyond the EEZ. Responsibility for federal fishery management decision-making in the South Atlantic EEZ is divided between the U.S. Secretary of Commerce and the South Atlantic Fishery Management Council (Council), and the Council is responsible for preparing, monitoring, and revising management plans for fisheries needing management within their jurisdiction.

Identification of federal rules which may duplicate, overlap or conflict with the proposed rule

No federal rules have been identified that duplicate, overlap or conflict with the proposed rule.

Description and estimate of the number of small entities to which the proposed action would apply

This proposed rule would have a direct economic impact on small businesses that operate commercial fishing vessels that harvest snapper grouper stocks/stock complexes within the 30 proposed SMZs in the EEZ off North Carolina and the four proposed SMZs in the EEZ off South Carolina. Any commercial fishing vessel that harvests and sells snapper grouper stocks/stock

complexes from the South Atlantic EEZ must have a valid South Atlantic commercial snapper grouper permit, which is a limited access permit. As of June 10, 2020, there were 525 vessels with a valid or renewable unlimited permits and 101 vessels with a valid or renewable 225-lb trip-limited permits. Approximately 27% (141) of the trip-unlimited permits and 11% (11) of the 225-lb permits were held by entities residing in the Carolinas, and 128 unique entities hold those 152 permits.[16]

Although the number of permitted vessels that report snapper grouper landings is significantly less than the number of vessels with the permit region-wide, the numbers of permitted vessels that land snapper grouper in North and South Carolina are greater than the numbers of permitted vessels held by entities residing in those states (**Table B-1**). This due to permitted vessels held by entities in one state, South Carolina for example, making landings in a different state, North Carolina for example. Consequently, this analysis uses the average annual numbers of permitted vessels with reported landings of snapper grouper in North and South Carolina as the estimates of the maximum number of permitted vessels that would be directly affected by the proposed SMZs off each state.

Table B-1. Number of permitted vessels and number of permitted vessels that reported snapper grouper (SG) landings in North and South Carolina (2014 – 2018).

Year	NC Permitted Vessels	Vessels that Reported Landing SG in NC	SC Permitted Vessels	Vessels that Reported Landing SG in SC
2014	120	122	53	57
2015	116	108	52	53
2016	115	109	52	57
2017	123	121	53	59
2018	127	126	56	58
Average	120	117	53	57

Source: SERO SFD for historical permit counts and SEFSC Socioeconomic Panel Series (v. 10) accessed by the SEFSC Economic Query System (March 13, 2020) for vessels with reported SG landings.

On average (2014 through 2018), the average 120 permitted vessels that landed snapper grouper in North Carolina did so on approximately 73% of their collective trips. Snapper grouper accounted for approximately 74% of their collective annual revenue from all landings (**Table B-2**). Average annual revenue for the 120 permitted vessels was $42,619 (**Table B-3**).

Also, the average 53 permitted vessels that landed snapper grouper in South Carolina did so on approximately 95% of their collective trips and snapper grouper accounted for approximately 92% of their collective annual revenue from all landings (**Table B-4**). Average annual revenue for the 53 permitted vessels was $72,259 (**Table B-3**).

[16] As of March 12, 2020, there were six more trip-unlimited valid and renewable permits. The decrease of six permits from March to June represents a decline of approximately 4% of the trip-unlimited permits during that 4-month period.

Table B-2. Dockside revenue (2018 dollars) from SG landings in North Carolina and from all other landings made by vessels with those landings and percentage of the vessels' collective revenue from SG landings (2014 – 2018).

Year	Revenue from SG Landings in NC	Revenue from All Other Landings Made by Those Vessels	Total Revenue	Percent Revenue from SG Landings
2014	$3,866,259	$1,613,484	$5,480,013	70.6%
2015	$3,275,857	$1,046,111	$4,321,969	75.8%
2016	$3,718,190	$1,319,817	$5,038,007	73.8%
2017	$3,812,106	$1,402,188	$5,214,295	73.1%
2018	$3,795,091	$1,099,604	$4,894,695	77.5%
Average	$3,693,555	$1,296,241	$4,989,796	74.2%

Source: SEFSC Socioeconomic Panel Series (v. 10) accessed by the SEFSC Economic Query System (March 13, 2020) and Bureau of Economic Analysis (BEA) average annual Gross Domestic Product (GDP) deflator.

Table B-3. Average annual revenue per permitted vessel from all reported landings for those vessels that reported snapper grouper landings by state (2014 – 2018).

Year	NC	SC
2014	$44,918	$75,252
2015	$40,018	$76,720
2016	$46,220	$72,284
2017	$43,093	$76,662
2018	$38,847	$60,378
Average	$42,619	$72,259

Table B-4. Dockside revenue (2018 dollars) from SG landings in South Carolina and from all other landings made by vessels with those landings and percentage of the vessels' collective revenue from SG landings (2014 – 2018).

Year	Revenue from SG Landings in SC	Revenue from All Other Landings Made by Those Vessels	Total Revenue	Percent Revenue from SG Landings
2014	$3,978,812	$310,556	$4,289,368	92.8%
2015	$3,803,751	$262,427	$4,066,178	93.5%
2016	$3,797,317	$322,855	$4,120,172	92.2%
2017	$4,088,123	$434,959	$4,523,081	90.4%
2018	$3,225,881	$276,026	$3,501,907	92.1%
Average	$3,778,777	$321,365	$4,199,141	92.2%

Source: SEFSC Socioeconomic Panel Series (v. 10) accessed by the SEFSC Economic Query System (March 13, 2020) and Bureau of Economic Analysis (BEA) average annual Gross Domestic Product (GDP) deflator.

A business in the commercial fishing industry (NAICS code 11411) is a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates) and its combined annual receipts that are no more than $11 million for all of its affiliated operations worldwide. The average permitted vessels with landings in North Carolina and South Carolina have total annual dockside revenues substantially less than $11 million. Moreover, all of the estimated 128 businesses that operate those vessels have annual revenues less than $11 million.

Description and economic impacts of the compliance requirements of the proposed rule

Preferred Alternative 3 of Action 1 would designate 30 artificial reefs in the exclusive economic zone off North Carolina as SMZs and **Preferred Alternative 2** of Action 2 would designate four additional artificial reefs in the exclusive economic zone off South Carolina as SMZs. Within the SMZs, harvest of snapper grouper species would only be allowed with handline, rod and reel, and spear. Within the SMZs off North Carolina, all harvest by spear would be limited to the applicable recreational bag limit, whereas within the SMZs off South Carolina, all harvest would be limited to the applicable recreational bag limit.

The proposed 30 SMZs in the EEZ off the North Carolina lie within seven statistical reporting grids and collectively those SMZs would cover 9.00 square nautical miles. That combined area represents approximately 0.0025% of the combined areas of the seven statistical grids. The four proposed SMZs in the EEZ off South Carolina lie within two statistical reporting grids, collectively cover 0.45 square nautical miles, and represent approximately 0.0001% of the combined area of the two statistical reporting grids. So, they collectively cover a relatively very small area within the EEZ. There is insufficient information to determine precise numbers of snapper grouper landings that derive from the proposed SMZs.

If the proportion of the area covered by the 30 SMZs off North Carolina (0.0025%) is consistent with the proportion of snapper grouper landings in North Carolina, then on average 26 lbs gw of snapper grouper are harvested from the 30 SMZs annually (**Table B-5**). Similarly, if the proportion of the area covered by the four SMZs off South Carolina (0.0001%) is consistent with the proportion of snapper grouper landings in South Carolina, then on average one lb gw of snapper grouper is harvested annually from the combined four SMZs (**Table B-5**). Also, if the proportions apply equally to dockside revenue from snapper grouper landings, then an average of $92 in dockside revenue derives from snapper grouper landings for the 30 proposed SMZs off North Carolina and an average of $4 in dockside revenues derives from snapper grouper landings in the four proposed SMZs off South Carolina. If divided across the 120 permitted vessels that land snapper grouper in North Carolina and across the 53 permitted vessels that land snapper grouper in South Carolina, the proposed SMZs account for less than $1 of snapper grouper landed per permitted vessel: $0.79 for the average permitted vessel with snapper grouper landings in North Carolina and $0.07 for the average permitted vessel with snapper grouper landings in South Carolina.

Table B-5. SG landings in North Carolina and South Carolina and proportion of those landings from proposed SMZs, (2014 – 2018).

Year	SG (lbs gw) Landed in NC	0.0025% of SG Landed in NC	SG (lbs gw) Landed in SC	0.0001% of SG Landed in SC
2014	1,149,363	29	1,032,189	1
2015	946,204	24	948,905	1
2016	1,043,635	26	826,271	1
2017	1,060,426	27	928,122	1
2018	1,074,056	27	742,566	1
Average	1,054,737	26	895,611	1

Source: SEFSC Socioeconomic Panel Series (v. 10) accessed by the SEFSC Economic Query System (March 13, 2020).

Table B-6. Dockside revenue (2018 $) from SG landings in North Carolina and South Carolina and proportion of those revenues from proposed SMZs, (2014 – 2018).

Year	Dockside Revenue from SG Landings in NC	0.0025% of Dockside Revenue from Landings in NC	Dockside Revenue from SG Landings in SC	0.0001% of Dockside Revenue from Landings in SC
2014	$3,866,529	97	$3,978,812	4
2015	$3,275,857	82	$3,803,751	4
2016	$3,718,190	93	$3,797,317	4
2017	$3,812,106	95	$4,088,123	4
2018	$3,795,091	95	$3,225,881	3
Average	$3,693,555	92	$3,778,777	4

Source: SEFSC Socioeconomic Panel Series (v. 10) accessed by the SEFSC Economic Query System (March 13, 2020) and Bureau of Economic Analysis (BEA) average annual Gross Domestic Product (GDP) deflator.

Significance of economic impacts on a substantial number of small entities

The estimates of landings and associated dockside revenues are less than $1 for the average permitted vessel that lands snapper grouper in North Carolina ($0.79) or South Carolina ($0.07) harvested from the proposed SMZs. If Action 1 and Action 2 prohibited all harvest of snapper grouper within the proposed SMZs, the average annual loss per permitted vessel would be equivalent to those estimates. However, **Preferred Alternative 3** of Action 1 and **Preferred Alternative 2** of Action 2 would allow for permitted vessels to use handline, rod and reel, and spear. However, **Preferred Alternative 2** of Action 2 would limit landings by those gear to the recreational bag limit. Nonetheless, if all commercial landings of snapper grouper harvested within the proposed SMZs were prohibited, which is more prohibitive than the preferred alternatives, the direct compliance cost would be less than $0.79 and $0.07 per vessel. From that, it is concluded that the proposed rule would not have a significant economic impact on a substantial number of small businesses.

Appendix C. 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. Regulatory Amendment 34 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Regulatory Amendment 34) 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 framework 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 34 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 framework 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 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.

1.5 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.

1.6 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.

1.7 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.

1.8 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.

1.9 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.

1.10 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.

1.11 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 D. Detailed maps and tables for proposed Special Management Zones off North Carolina

Table D-1. North Carolina artificial reefs proposed as SMZs based on permitted locations, including centroids and radius.

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	1500
AR-330	34° 33.634' N	76° 51.267' W	3000
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, August 2019.

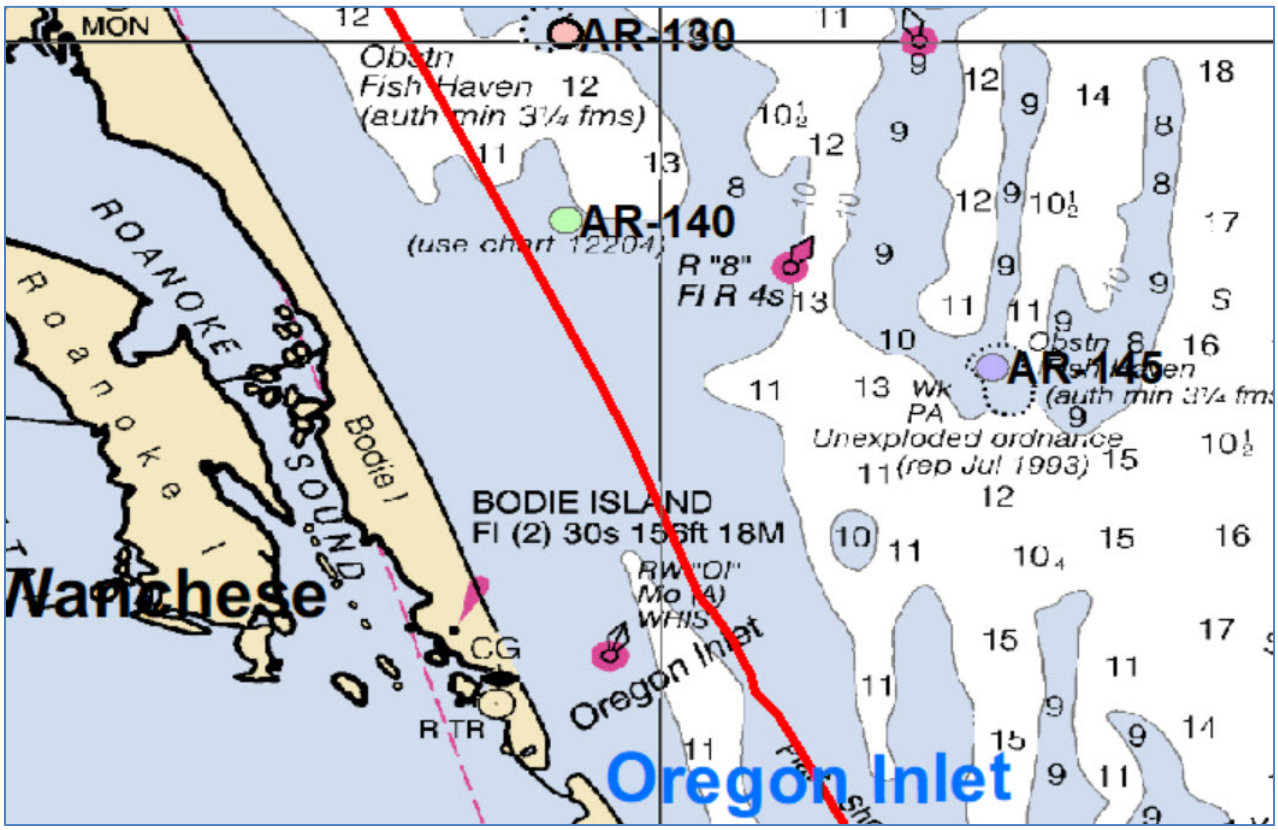

Figure D-1. Artificial reefs AR-130, AR-140 and AR-145 proposed as special management zones in the exclusive economic zone off northern North Carolina.

Table D-2. Distance and bearing to artificial reefs AR-130, AR-140 and AR-145.

Reef Site	Bearing and Distance
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

Source: NCDMF.

Table D-3. Materials placed in artificial reefs AR-130, AR-140 and AR-145.

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

Source: North Carolina DMF Artificial Reef Material Shapefile 2019.

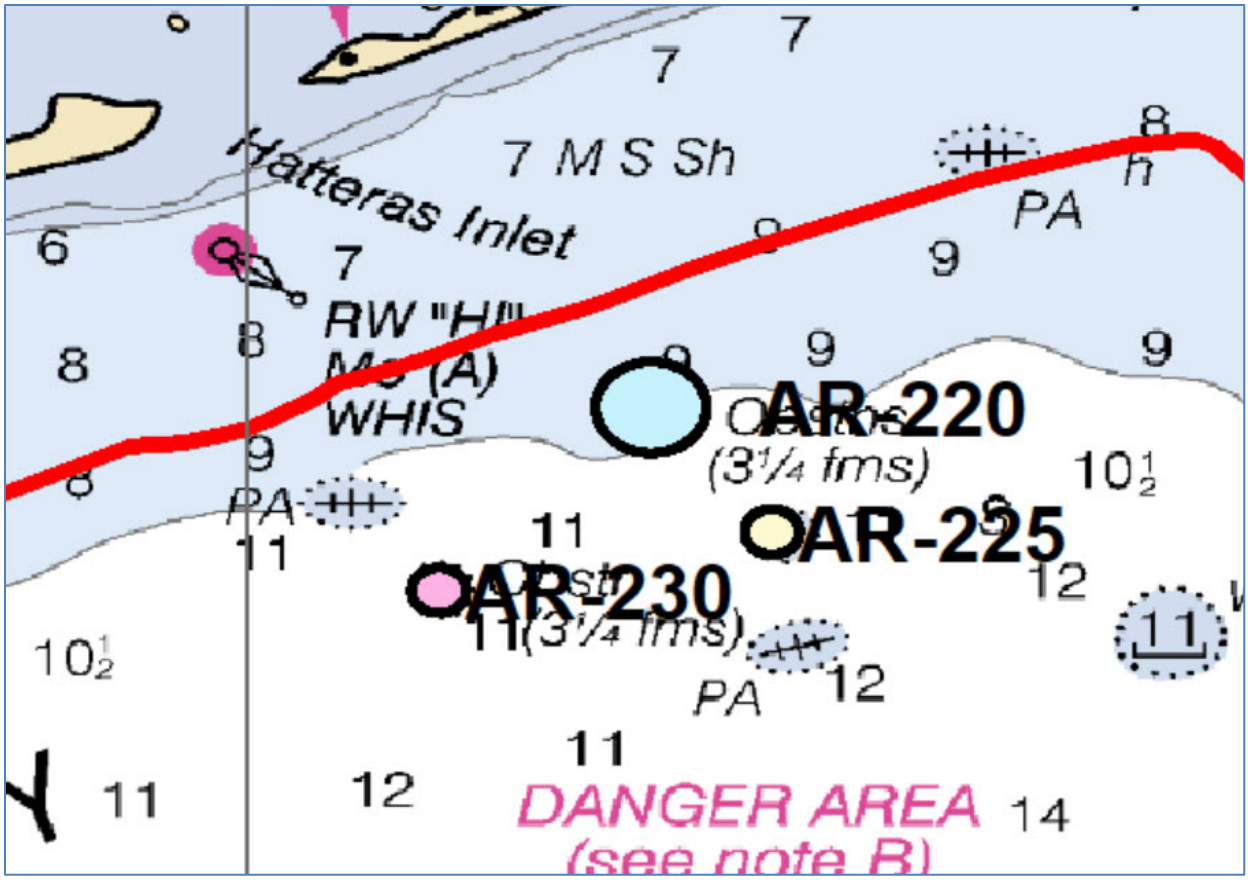

Figure D-2. Artificial reefs AR-220, AR-225 and AR-230 proposed as special management zones in the exclusive economic zone off northern North Carolina.

Table D-4. Distance and bearing to artificial reefs AR-220, AR-225 and AR-230.

Reef Site	Bearing and Distance
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

Source: NCDMF.

Table D-5. Materials placed in artificial reefs AR-220, AR-225 and AR-230.

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

Source: North Carolina DMF Artificial Reef Material Shapefile 2019.

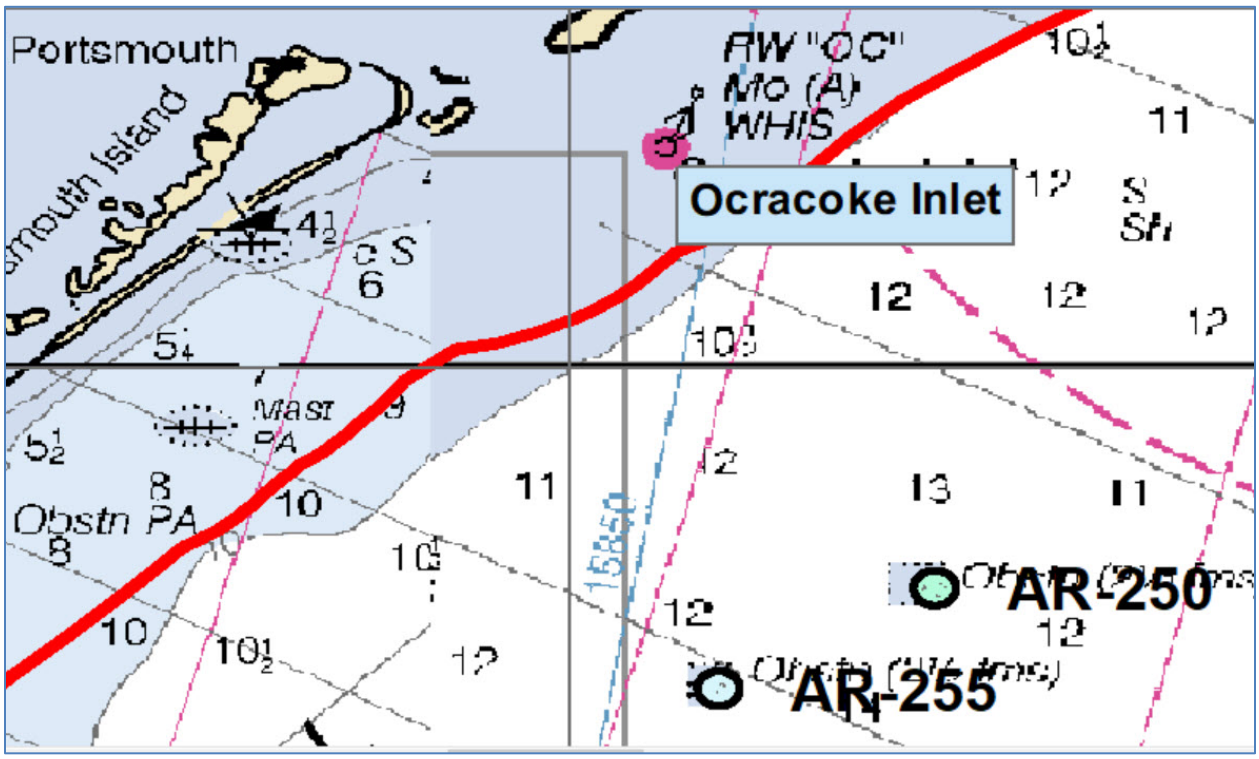

Figure D-3. Artificial reefs AR-250 and AR-255 proposed as special management zones in the exclusive economic zone off northern North Carolina.

Table D-6. Distance and bearing to artificial reefs AR-250 and AR-255.

Reef Site	Bearing and Distance
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

Source: NCDMF.

Table D-7. Materials placed in artificial reefs AR-250 and AR-255.

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

Source: North Carolina DMF Artificial Reef Material Shapefile 2019.

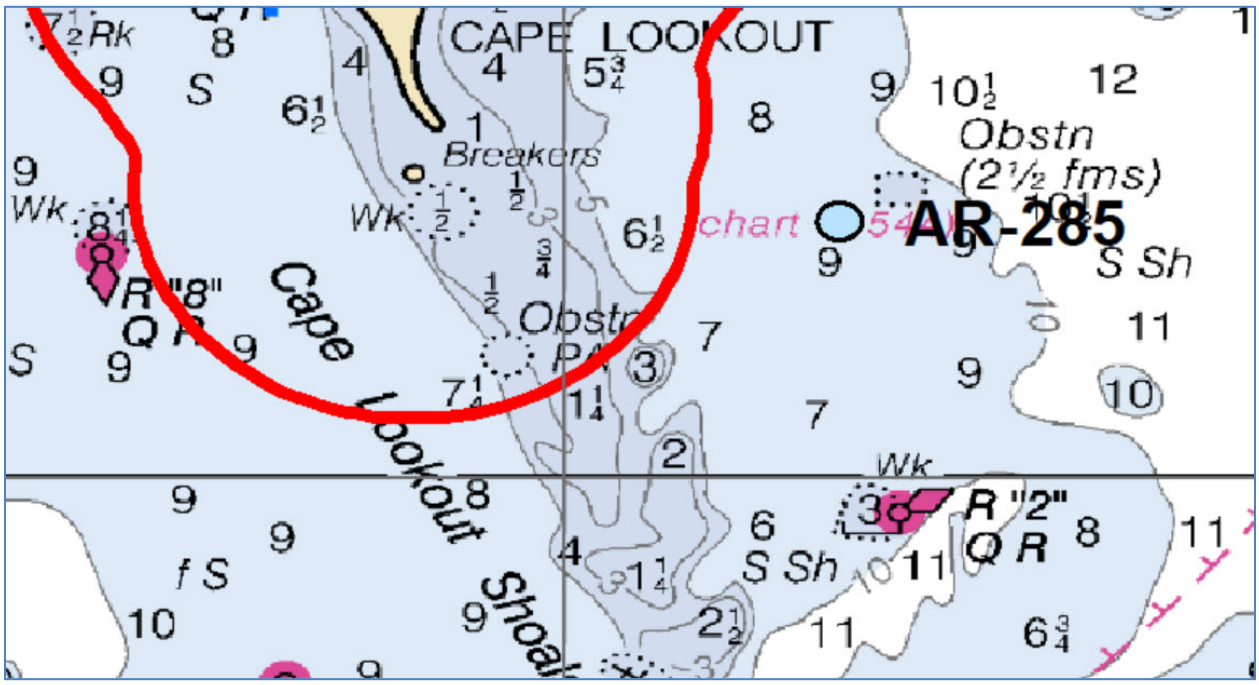

Figure D-4. Artificial reefs AR-285 proposed as special management zone in the exclusive economic zone off middle North Carolina.

Table D-8. Distance and Bearing to artificial reef AR-285.

Reef Site	Bearing and Distance
AR-285	341.1° magnetic - 3.9 nm from Cape Lookout Shoals Lighted Buoy #2

Source: NCDMF.

Table D-9. Materials placed in artificial reef AR-285.

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

Source: North Carolina DMF Artificial Reef Material Shapefile 2019.

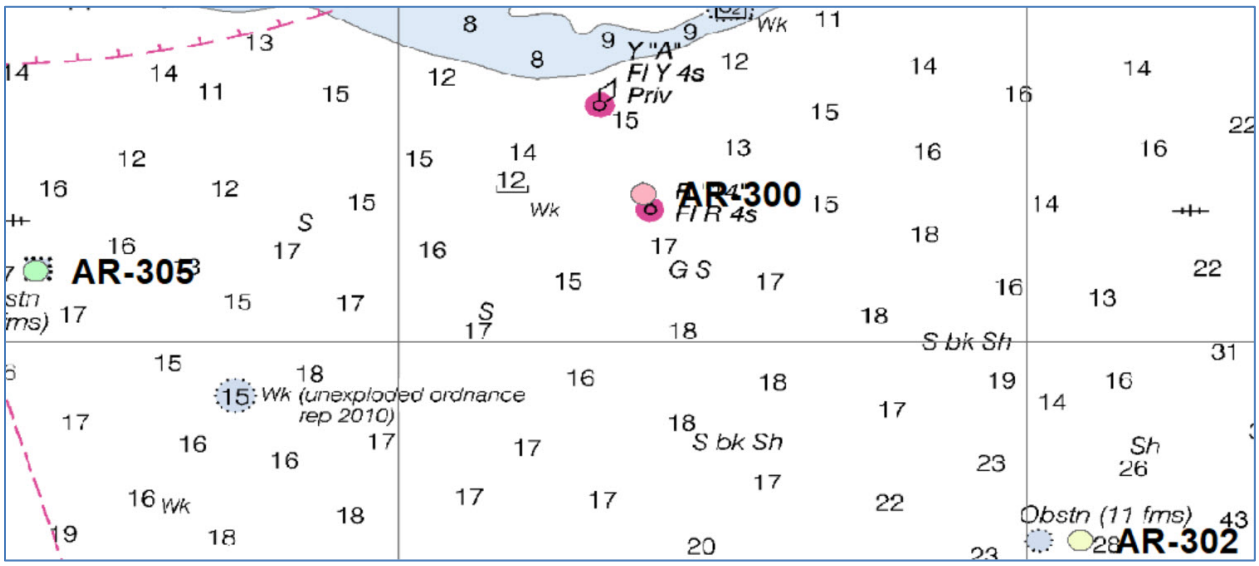

Figure D-5. Artificial reefs AR-300, AR-302 and AR-305 proposed as special management zones in the exclusive economic zone off middle North Carolina.

Table D-10. Distance and bearing to artificial reefs AR-300, AR-303 and AR-305.

Reef Site	Bearing and Distance
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

Source: NCDMF.

Table D-11. Materials placed in artificial reefs AR-300, AR-302, and AR-305.

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

Source: North Carolina DMF Artificial Reef Material Shapefile 2019.

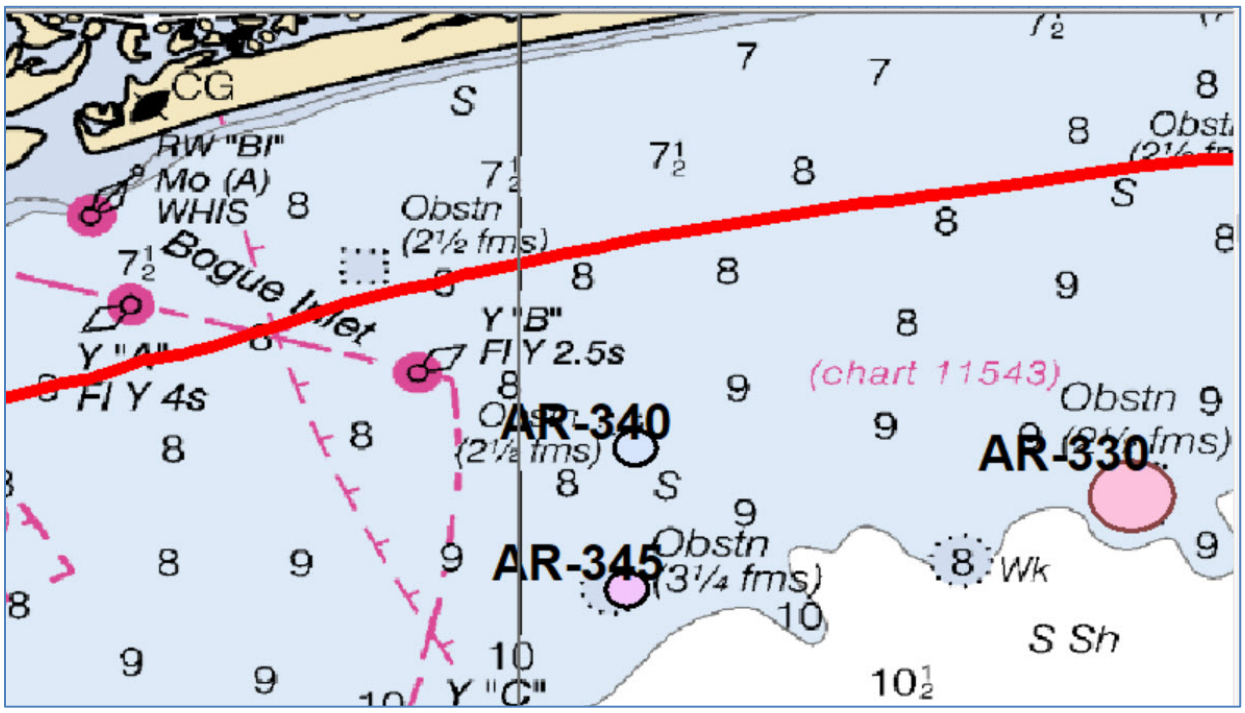

Figure D-6. Artificial reefs AR-330, AR-340 and AR-345 proposed as special management zones in the exclusive economic zone off middle North Carolina.

Table D-12. Distance and bearing to artificial reefs AR-330, AR-340 and AR-345.

Reef Site	Bearing and Distance
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

Source: NCDMF.

Table D-13. Materials placed in artificial reefs AR-330, AR-340, and AR-345.

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

Source: North Carolina DMF Artificial Reef Material Shapefile 2019.

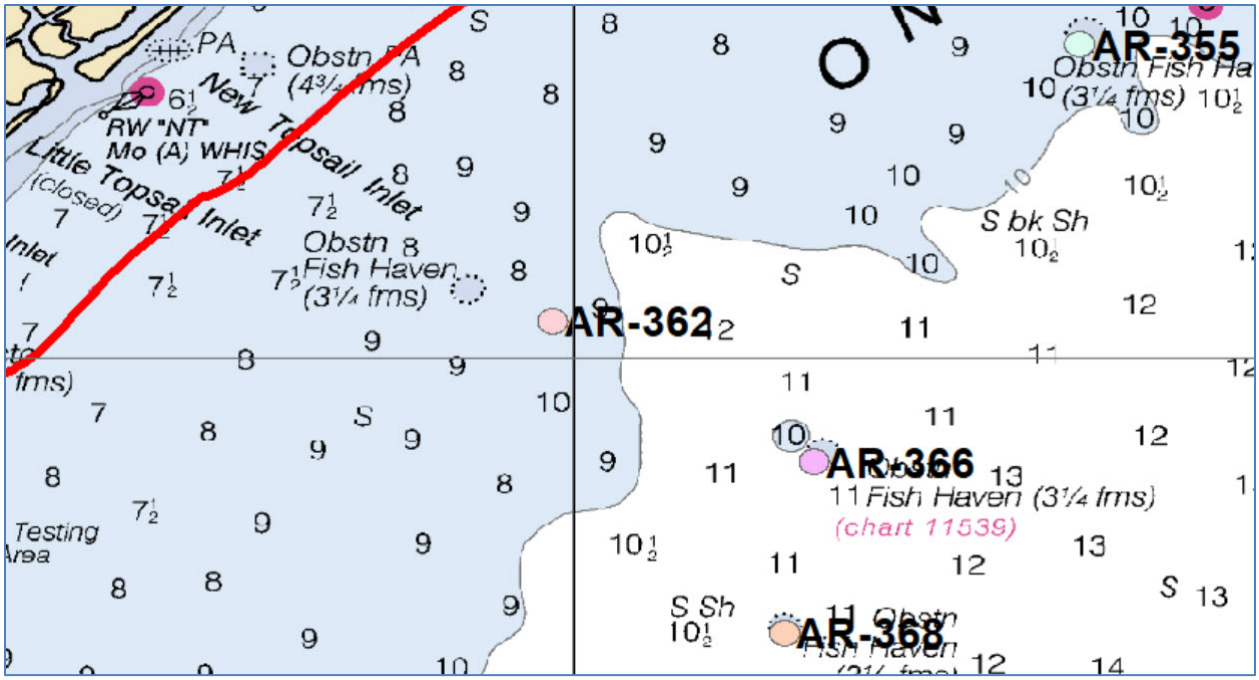

Figure D-7. Artificial reefs AR-355, AR-362, AR-366 and AR-368 proposed as special management zones in the exclusive economic zone off southern North Carolina.

Table D-14. Distance and bearing to artificial reefs AR-355, AR-362, AR-366 and AR-368.

Reef Site	Bearing and Distance
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

Source: NCDMF.

Table D-15. Materials placed in artificial reefs AR-355, AR-362, AR-366 and AR-368.

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

Source: North Carolina DMF Artificial Reef Material Shapefile 2019.

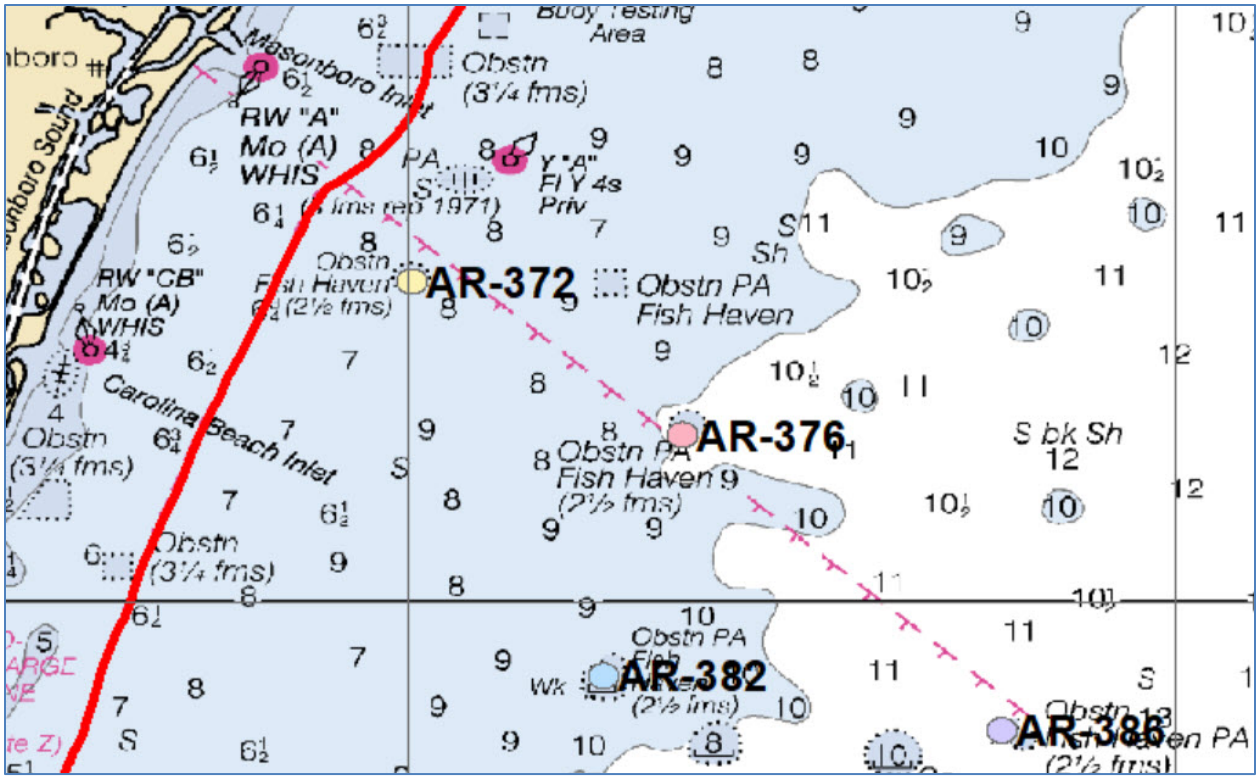

Figure D-8. Artificial reefs AR-372, AR-376, AR-382 and AR-386 proposed as special management zones in the exclusive economic zone off southern North Carolina.

Table D-16. Distance and bearing to artificial reefs AR-372, AR-376, AR-382 and AR-386.

Reef Site	Bearing and Distance
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

Source: NCDMF.

Table D-17. Materials placed in artificial reefs AR-372, AR-376, AR-382 and AR-386.

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

Source: North Carolina DMF Artificial Reef Material Shapefile 2019.

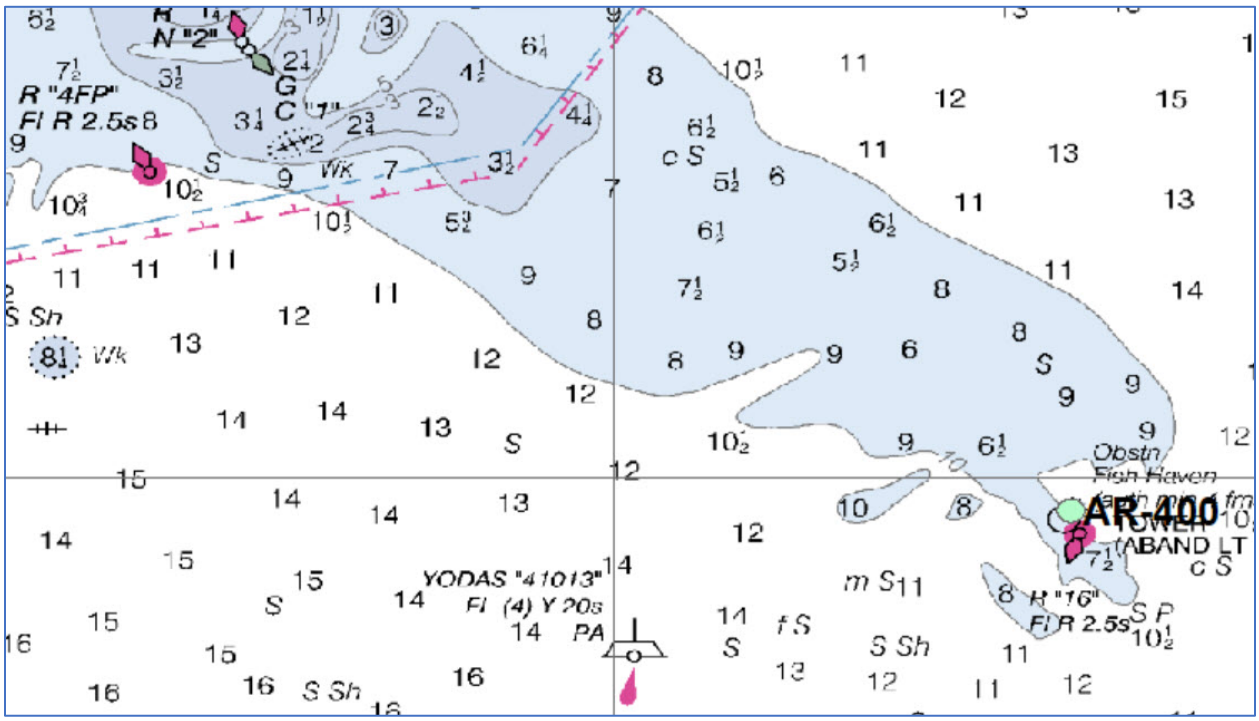

Figure D-9. Artificial reef AR-400 proposed as special management zone in the exclusive economic zone off southern North Carolina.

Table D-18. Distance and bearing to artificial reef AR-400.

Reef Site	Bearing and Distance
AR-400	329.4° magnetic - 0.7 nm from Frying Pan Tower

Source: NCDMF.

Table D-19. Materials placed in artificial reef AR-400.

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

Source: North Carolina DMF Artificial Reef Material Shapefile 2019.

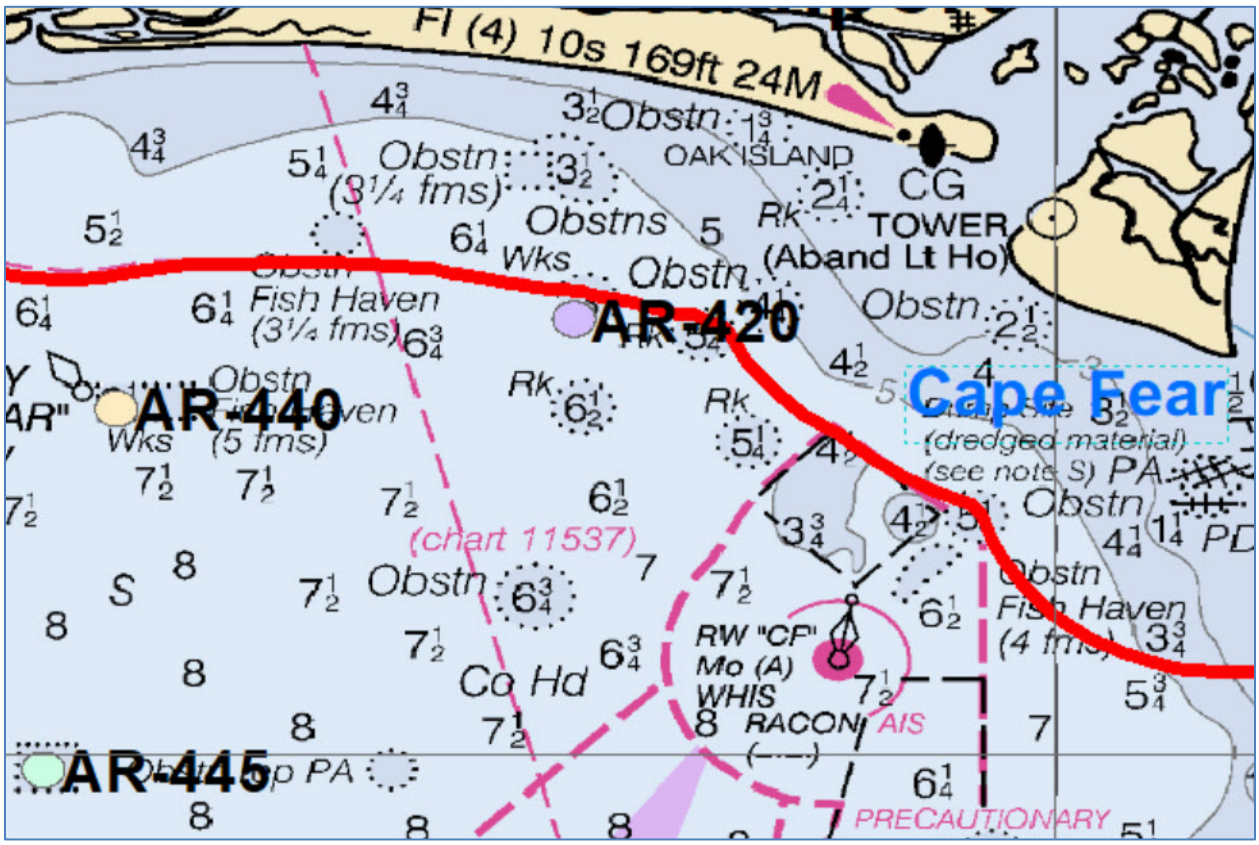

Figure D-10. Artificial reefs AR-420, AR-440 and AR-445 proposed as special management zones in the exclusive economic zone off southern North Carolina.

Table D-20. Distance and bearing to artificial reefs AR-420, AR-440 and AR-445.

Reef Site	Bearing and Distance
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

Source: NCDMF.

Table D-21. Materials placed in artificial reef AR-420.

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

Source: North Carolina DMF Artificial Reef Material Shapefile 2019.

Table D-22. Materials placed in artificial reefs AR-440 and AR-445.

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

Source: North Carolina DMF Artificial Reef Material Shapefile 2019.

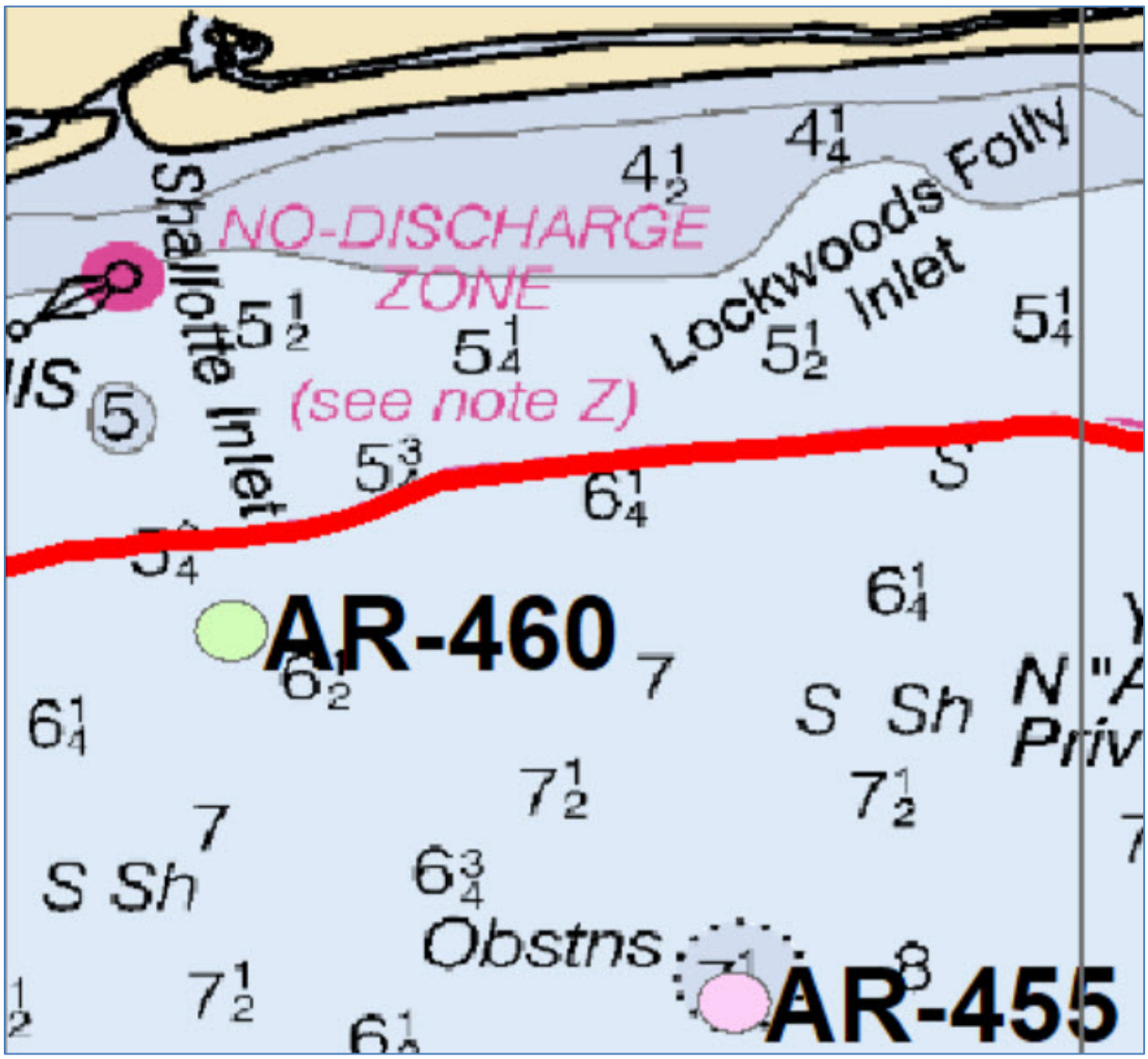

Figure D-11. Artificial reefs AR-455 and AR-460 proposed as special management zones in the exclusive economic zone off southern North Carolina.

Table D-23. Distance and bearing to artificial reefs AR-455 and AR-460.

Reef Site	Bearing and Distance
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

Source: NCDMF.

Table D-24. Materials placed in artificial reefs AR-455 and AR-460.

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

Source: North Carolina DMF Artificial Reef Material Shapefile 2019.

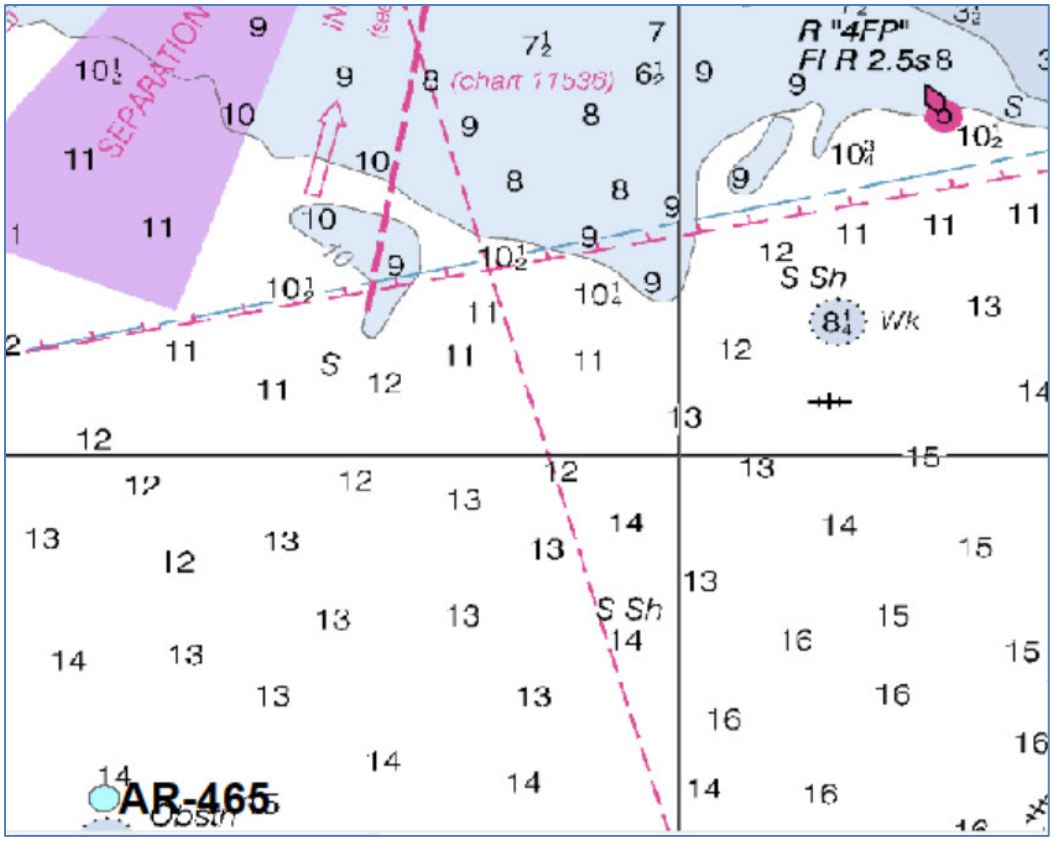

Figure D-12. Artificial reef AR-465 proposed as special management zone in the exclusive economic zone off southern North Carolina.

Table D-25. Distance and bearing to artificial reef AR-465.

Reef Site	Bearing and Distance
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

Source: NCDMF.

Table D-26. Materials placed in artificial reef AR-465.

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

Source: North Carolina DMF Artificial Reef Material Shapefile 2019.

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

Table E-1. 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)	Area (square miles)
PA-07- Pop Nash Reef	33° 34.510' N	78° 51.000' W	200	0.041
PA-28- Lowcountry Anglers Reef	32° 34.300' N	79° 55.100' W	200	0.041
PA-34- CCA-McClellanville Reef	32° 51.800' N	79° 22.500' W	200	0.041

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.

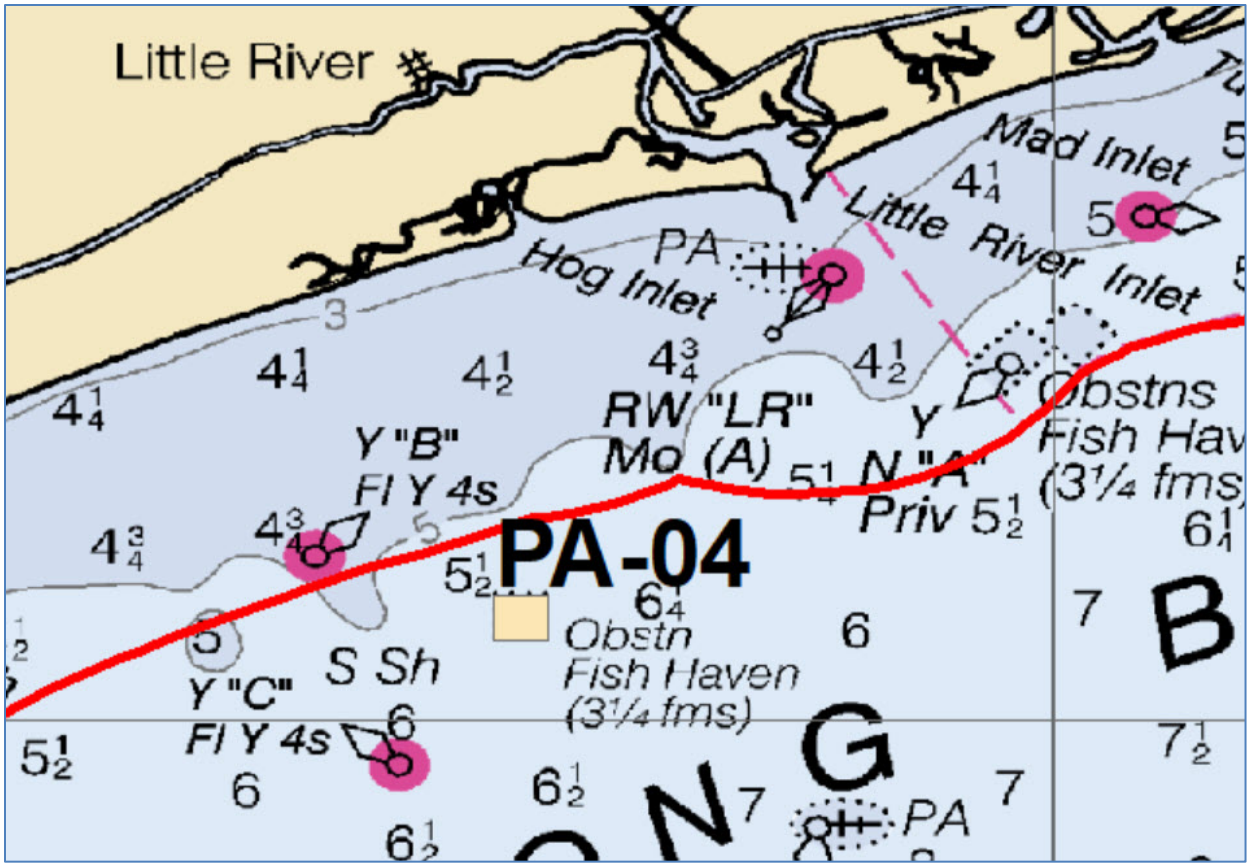

Figure E-1. Artificial reef PA-04 proposed as special management zone in the exclusive economic zone off northern South Carolina.

Table E-2. Distance and bearing to artificial reef PA-04.

Reef Site	Bearing and Distance
PA-04	211° magnetic - 5 nm from south jetty at Little River Inlet - water depth 35'

Source: SCDNR.

Table E-3. Materials placed and location in artificial reef PA-04.

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

Source: SCDNR.

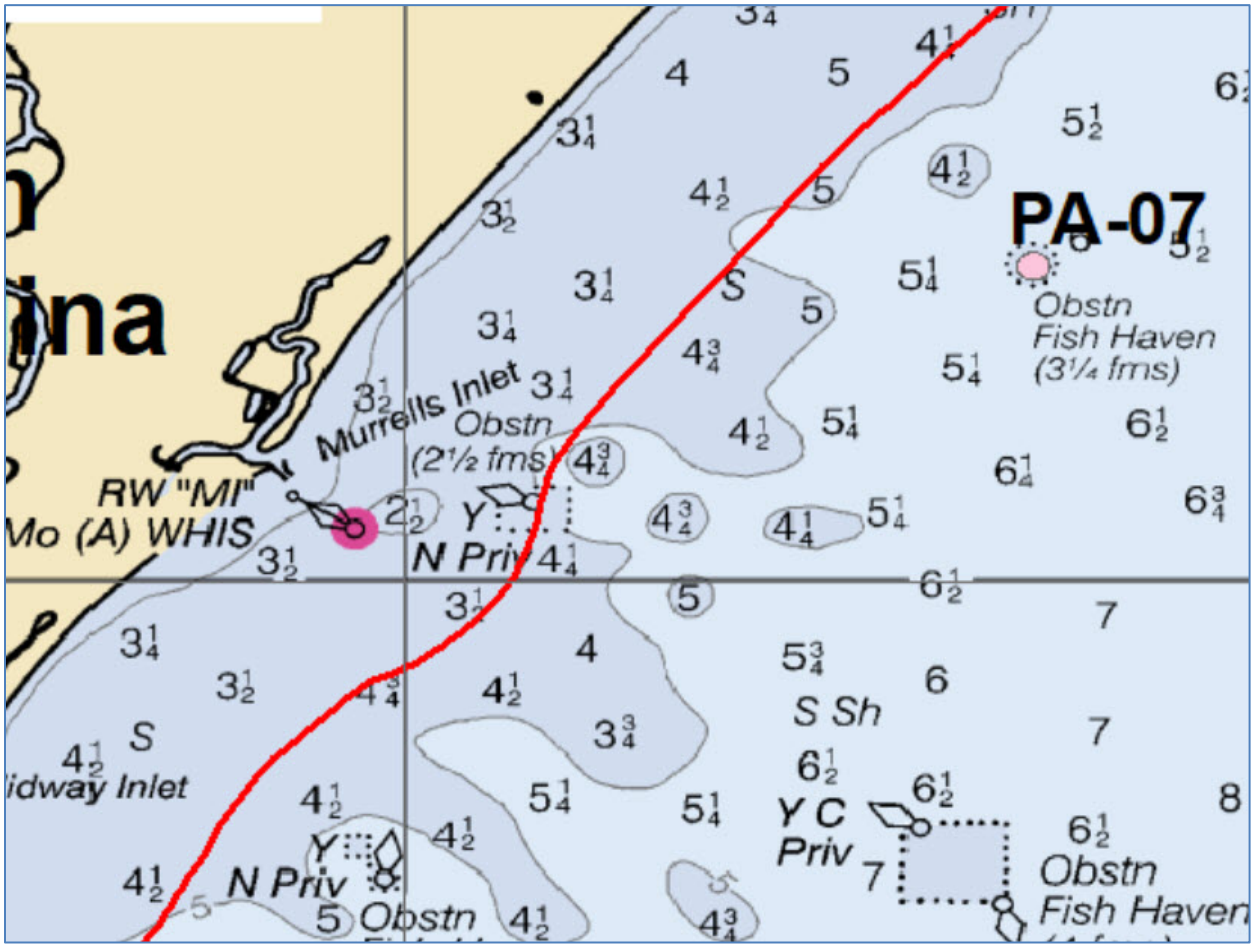

Figure E-2. Artificial reef PA-07 proposed as special management zone in the exclusive economic zone off northern South Carolina.

Table E-4. Distance and bearing to artificial reef PA-07.

Reef Site	Bearing and Distance
PA-07	72° magnetic - 9.3 nm from the north jetty at Murrells Inlet, off Surfside Beach - water depth 35'

Source: SCDNR.

Table E-5. Materials placed in artificial reef PA-07.

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

Source: SCDNR.

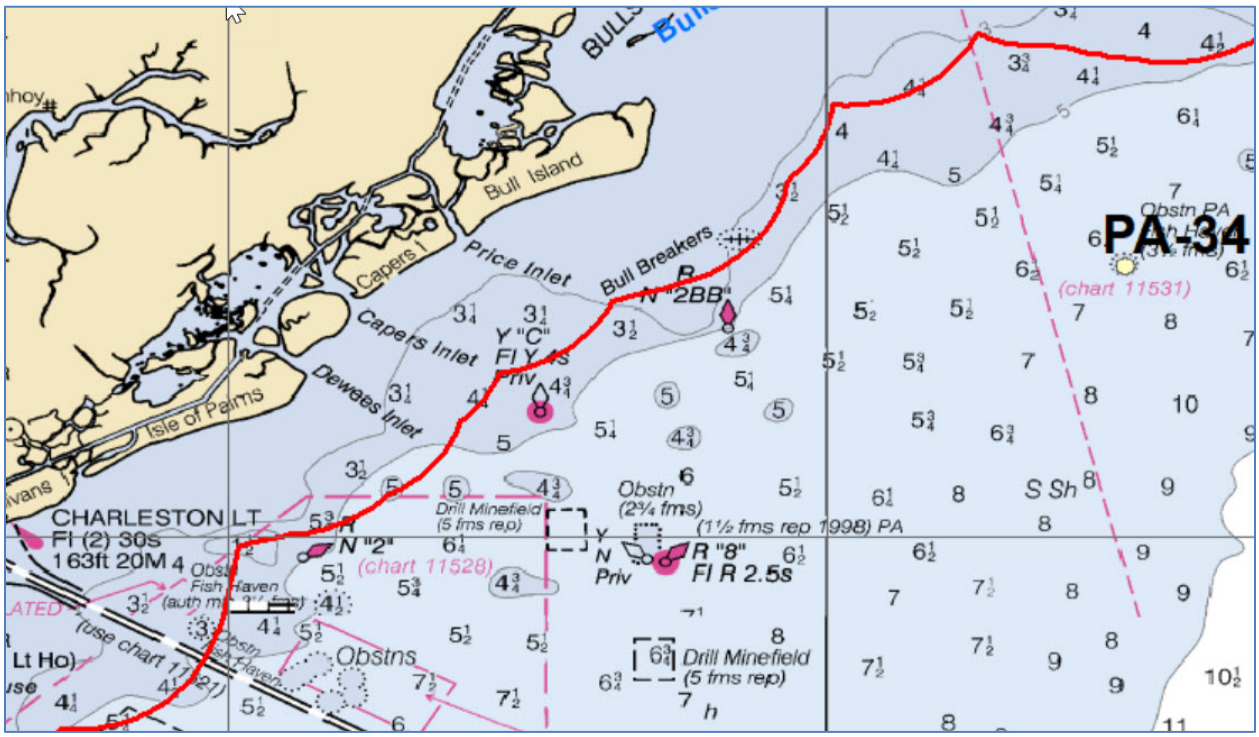

Figure E-3. Artificial reef PA-34 proposed as special management zone in the exclusive economic zone off southern South Carolina.

Table E-6. Distance and bearing to artificial reef PA-34.

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

Source: SCDNR.

Table E-7. Materials placed and location in artificial reef PA-34.

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

Source: SCDNR.

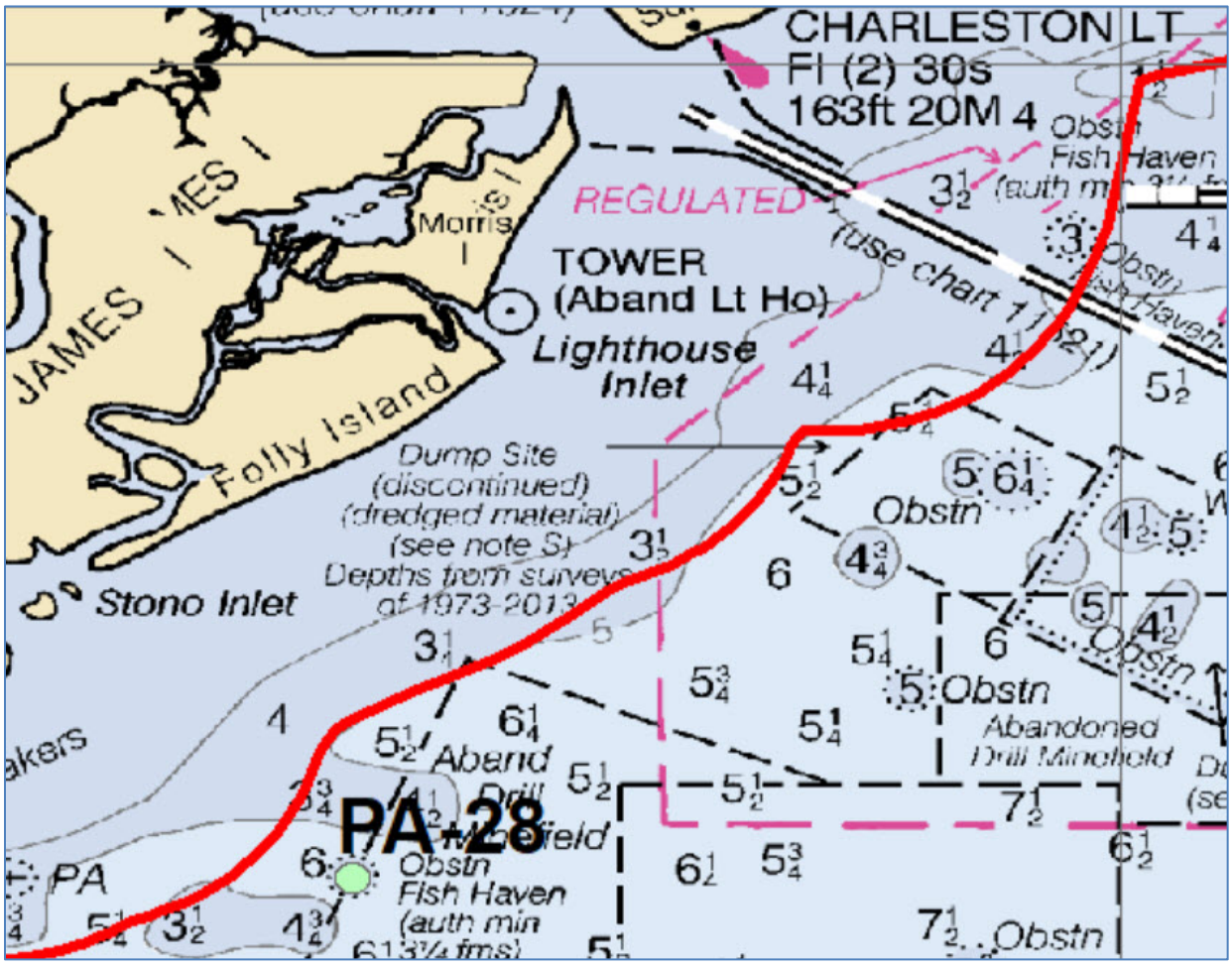

Figure E-4. Artificial reef PA-28 proposed as special management zone in the exclusive economic zone off southern South Carolina.

Table E-8. Distance and bearing to artificial reef PA-28.

Reef Site	Bearing and Distance
PA-28	131° magnetic - 2.4 nm from Stono Inlet buoy '1S' - water depth 40'

Source: SCDNR.

Table E-9. Materials placed and location in artificial reef PA-28.

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

Source: SCDNR.

Appendix F. Monitoring Team Report

I. Introduction

The process to designate artificial reefs, permitted by the Army Corps of Engineers, in the exclusive economic zone (EEZ) off the South Atlantic states as special management zones (SMZ) was established in the Fishery Management Plan (FMP) for the Snapper Grouper Fishery of the South Atlantic Region (SAFMC 1983). The process allows states to request fishing gear restrictions within the SMZs with the intent to "create the incentive to create artificial reefs and fish attraction devices that will increase biological production and/or create fishing opportunities that would not otherwise exist (SAFMC 1983)."

Part of the SMZ designation process involves a monitoring team to evaluate the proposed designation. In the original designation process, the monitoring team was composed of staff from the National Marine Fisheries Service's (NMFS) Southeast Fisheries Science Center (SEFSC), the NMFS Southeast Regional Office (SERO), and the South Atlantic Fishery Management Council (Council). However, for purposes of this framework amendment and because of the collaboration between Council, SEFSC, and SERO staff to develop amendments to FMPs, the Interdisciplinary Plan Team (IPT) would serve as the monitoring team. Further, the monitoring team is not responsible for explicitly monitoring activity at the artificial reefs but serves to conduct the initial evaluation of the states' requests based on the following criteria. The monitoring team should (1) evaluate fairness and equity; (2) promote conservation; (3) prevent excessive shares; (4) ensure that SMZs are consistent with the objectives of the FMP, the Magnuson-Stevens Fishery Conservation and Management Act, and other applicable law; (5) evaluate impacts on historical uses of the sites; and (6) evaluate cumulative environmental impacts.

II. States' Requests

North Carolina

To date, none of the artificial reefs in the EEZ off North Carolina have been designated as SMZs. In a letter dated March 1, 2019, the North Carolina Division of Marine Fisheries requested that the Council designate 30 artificial reef sites in the EEZ as SMZs and implement fishing gear and harvest restrictions. An excerpt of the request and the accompanying rationale is below:

North Carolina has one of the most extensive artificial reef programs in the country consisting of 68 estuarine, nearshore and ocean reefs, and sanctuaries. Of these, the North Carolina Artificial Reef Program maintains 30 artificial reef sites in the Exclusive Economic Zone (EEZ) off the coast of North Carolina. Nearshore and ocean reef sites are located from one-half mile to 38 miles from shore and are situated so they can be reached from every maintained inlet in the state. This proximity creates an opportunity for high exploitation of the fishery resources aggregated by these reefs.

The first Fishery Management Plan for Snapper and Grouper in the South Atlantic recognized the potential negative impacts on the relative abundance of fish by "exceptional gears" in and around these sites. The plan established a mechanism by which states could request special management zones with specific gear restriction around their artificial reefs in the EEZ to mitigate the negative affects highly efficient gears could have on the aggregated resource. Gears that could be considered exceptional commonly used in the EEZ off of North Carolina include black seabass pots, sink nets, and bandit gear. The catch per unit effort of these gears are high and have the potential to remove large amounts of aggregated snapper and grouper species from these sites, disproportionately affecting access to other anglers.

To ensure equitable access to the fishery resource around these reefs to all user groups, the North Carolina Division of Marine Fisheries requests that the South Atlantic Fishery Management council designate 30 artificial reefs within the EEZ off of North Carolina as Special Management Zones. Gear restrictions in the zones should include the prohibition of fishing with any gear other than hand line, rod and reel, and spearfishing gear. Additionally, the Division requests that the harvest and possession of snapper and grouper with spearfishing gear be limited to the recreational bag limits for those species.

The Division believes designating artificial reefs as Special Management Zones with the preceding restrictions will 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 and social life histories are selectively harvested. Numerous snapper and grouper species have reproductive strategies that include complex social structures predicated on large individuals controlling reproduction by out competing others for spawning and maintaining harems. If numerous large individuals within a group are removed, it may take considerable time for the social group to restructure affecting reproductive success. Spearfishing gear has the potential to selectively remove large individuals from a reef and by limiting removals to the recreational limits lessons the chance that the complex community structure on the site is affected.

A restriction on gear types may also benefit certain species listed and protected under the Endangered Species Act of 1973 (ESA). 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.

South Carolina

Twenty-eight of South Carolina's artificial reefs have been designated as SMZs since the process was implemented in 1983. Since the Council most recently acted to that end, four additional artificial reefs have been constructed in the EEZ off South Carolina. In a letter dated March 12, 2019, the South Carolina Department of Natural Resources requested SMZ designation of four artificial reef sites with the same fishing gear and harvest restrictions that currently exist for SMZs. An excerpt of the state's request is below:

The South Carolina Department of Natural Resources currently holds the permits for 28 artificial reef sites, located in federal waters, which have been designated as Special Management Zones (SMZs) by the South Atlantic Fisheries Management Council. Since receiving this designation, we have permitted four additional artificial reef sites, also within the EEZ, which we would like to request also receive SMZ status.

Our current SMZ regulations limit angling activities 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, harvest and possession by recreational and commercial fishermen is limited to recreational bag limits within the Special Management Zones. We request that these same restrictions apply to the newly designated locations as well.

III. Monitoring Team Evaluation

Artificial reefs in the EEZ off North and South Carolina have been sited in areas devoid of hardbottom with the intent of creating suitable habitat for reef-dwelling species such as snappers and groupers. Each state's artificial reef program has promoted utilization of the artificial reefs and developed educational and other material for resource users. Resources, including interactive maps and descriptions of the reef-building materials, are available online at the links below:

North Carolina Artificial Reef Program
South Carolina Artificial Reef Program

A quantitative analysis of the evaluation criteria (see Section I) is not possible for the artificial reefs being considered for SMZ designation in this framework amendment because recent data on reef utilization are unavailable.

Fairness and Equity. The monitoring team concluded that North Carolina's and South Carolina's requests are fair and equitable because reefs were constructed on non-fished areas and were established to provide fishing opportunities for recreational fishermen that would otherwise not exist. The monitoring team acknowledges that the proposed actions may result in a decline or cessation of all commercial harvest within the SMZs because other areas with fewer restrictions may be better options for commercial fishermen. However, there are no data to indicate that commercial harvesters have relied on artificial reefs in recent years. Reduced commercial fishing on the artificial reefs could reduce congestion issues, create less competition between recreational and commercial fishermen, and decrease the potential for user conflict. Moreover, both North Carolina's and South Carolina's artificial reef programs are funded through state and federal sources associated with recreational fishing. A percentage of sales of

the states' recreational fishing licenses funds the programs that support construction and maintenance of the artificial reefs. The Sportfish Restoration Program, administered by the U.S. Fish and Wildlife Service, provides federal funding to support artificial reefs and can only be used for projects and programs that impact or enhance recreational fishing. Recreational fishing clubs and other entities tied to recreational fishing interests also contribute to artificial reef programs through private donations. Hence, the states' requests to designate artificial reefs as SMZs are fair and equitable. The proposed SMZs would promote orderly utilization of the resource and the requests directly address the original intent of the artificial reefs to optimize fishing opportunities for all users.

Promoting Conservation. Artificial reefs constitute essential fish habitat (EFH). As such, the areas benefit from a higher level of protection from non-fishing activities (e.g., oil and gas exploration) through the EFH consultation process. The IPT concluded that protecting suitable habitat for reef-dwelling fish and placing limits on fishing gear that can lead to excessive harvest and increased risk of localized depletion is an avenue to promote conservation.

Excessive Shares. The IPT does not have enough information to evaluate the states' requests based on this criterion and what constitutes "excessive shares" has not been defined by the Council.

Consistency with objectives of the FMP, the Magnuson Stevens Fishery Conservation and Management Act, and other applicable law. The Council's Conclusion (see **Chapter 5**) discusses the Council's evaluation of this criterion as well as a discussion of how the proposed actions address objectives in the 2016-2020 Vision Blueprint for the Snapper Grouper Fishery of the South Atlantic Region.

Impacts on Historical Uses. As mentioned previously and in **Section 3.1.1** artificial reefs are constructed in unproductive areas devoid of hardbottom. As such, it is expected that the areas have not been utilized historically and there are no concerns related to impacts on historical uses.

Cumulative Impacts. Expected impacts from the actions proposed in this framework amendment, in combination with past, present, and future actions have been determined not to be significant. Although several other management actions, in addition to this framework 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 impact (refer to **Chapter 6**).