Draft
Amendment 10
to the Fishery Management Plan for Coral, Coral Reefs, and Live Hard Bottom Habitat of the South Atlantic Region

Establish a Shrimp Fishery Access Area Along the Northern Extension of the Oculina Bank HAPC

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

August 2021

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NOTE: The following amendment and analyses are in development and subject to change.

Amendment 10
to the Fishery Management Plan for Coral, Coral Reefs, and Live Hard Bottom Habitat of the South Atlantic Region

Proposed actions:	Establish a Shrimp Fishery Access Area Along the Northern Extension of the Oculina Bank HAPC.

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This Environmental Assessment (EA) is being prepared using the 2020 CEQ NEPA Regulations. The effective date of the 2020 CEQ NEPA Regulations was September 14, 2020, and reviews begun after this date are required to apply the 2020 regulations unless there is a clear and fundamental conflict with an applicable statute. 85 Fed. Reg. at 43372-73 (§§ 1506.13, 1507.3(a)). This EA began on [DATE] and accordingly proceeds under the 2020 regulations.

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Why is the South Atlantic Fishery Management Council considering action?

Amendment 10 to the Fishery Management Plan (FMP) for the Coral, Coral Reefs, and Live/Hard Bottom Habitats of the South Atlantic Region (Coral FMP) proposes to establish a shrimp fishery access area (SFAA) along the eastern boundary of the northern extension of the Oculina Bank Habitat Area of Particular Concern (OHAPC) where trawling for rock shrimp is currently prohibited. Rock shrimp fishermen requested that the proposed area be reviewed to determine if historic trawling areas could be reopened to rock shrimp fishing.

The OHAPC was established through the original Coral FMP in 1982. Anchoring within the area by all fishing vessels was prohibited in 1996 (SAFMC 1995) and the area was later expanded to include newly discovered *Oculina* coral habitat. With the discovery of extensive deep-water coral ecosystems, the South Atlantic Fishery Management Council (South Atlantic Council) added the northern extension to the OHAPC through Amendment 8 to the Coral FMP in 2014 (SAFMC 2013; Figures S-1 and S-2). Coral Amendment 8 also allowed transit through the OHAPC by fishing vessels with a valid commercial vessel permit for rock shrimp with rock shrimp on board, and modified vessel monitoring system requirements for rock shrimp fishermen transiting through the OHAPC with rock shrimp on board.

The South Atlantic Council received public comment when it was finalizing Coral Amendment 8 that the areas now proposed in Coral Amendment 10 were important fishing grounds for the rock shrimp fishery. The rock shrimp industry provided coordinates for the proposed fishing areas in March 2013 and further refined the coordinates in March 2014. During the June 2014 Council meeting, after discussing industry concerns over an algae problem which existed on the southern end of the rock shrimp bottom west of the OHAPC and the greater economic impact of the eastern boundary of the northern extension, members agreed the issue warranted further discussion and review. In addition, it was clarified that the review would only focus on the newly closed area, the eastern boundary of the northern extension of the OHAPC, where industry had indicated they were losing economic value. Members considered what information would be needed and indicated the Southeast Fisheries Science Center would be asked to provide the most up-to-date vessel monitoring system data, the rock shrimp bycatch reports, data from the observer trips, mapping results from that area and what percent of the area under question has been mapped. The South Atlantic Council continued discussing whether to allow rock shrimp fishing in the OHAPC, and in June 2015, approved a motion to develop an amendment to consider establishing an SFAA for the rock shrimp portion of the shrimp fishery along the eastern boundary of the northern extension of the OHAPC.

In June 2018, the South Atlantic Council reviewed an options paper for transit provisions during cold-water shrimp closures, golden crab access areas, and SFAAs for the rock shrimp fleet. In September 2019, the South Atlantic Council decided to split these actions into separate FMP amendments. The South Atlantic Council revisited the SFAA action in June 2020 and recommended moving forward with the action in response to the Presidential Executive Order

(EO) 13921 on Seafood Competitiveness and Economic Growth. This amendment would address the EO 13921 recommendation to "Consider Re-Opening Closed Areas" to commercial fishermen that have lost access to areas that have been traditionally fished. The South Atlantic Council began developing Coral Amendment 10 after its September 2020 meeting.

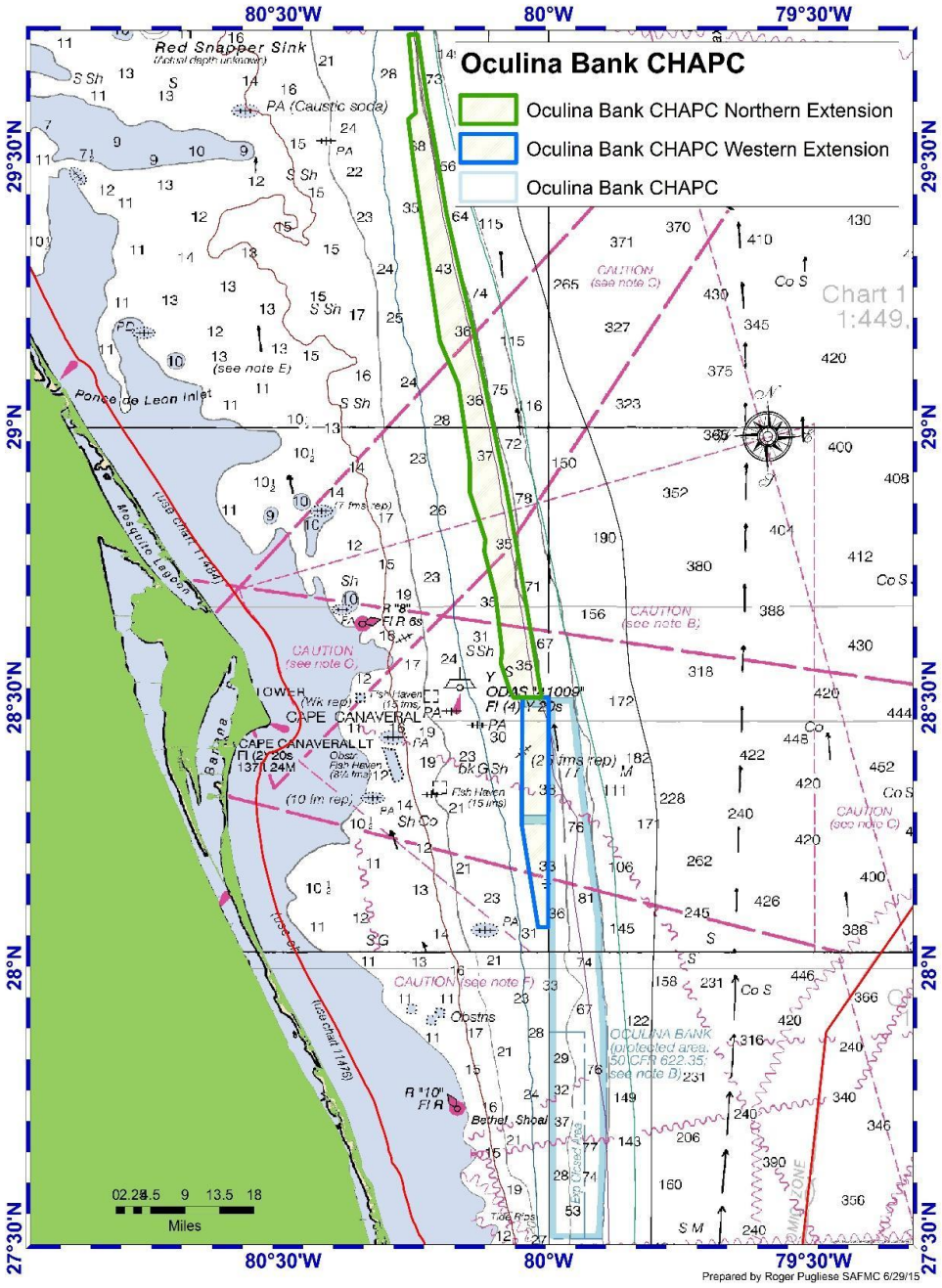

Figure S-1. Map of the OHAPC highlighting Coral Amendment 8 expansions north and west.

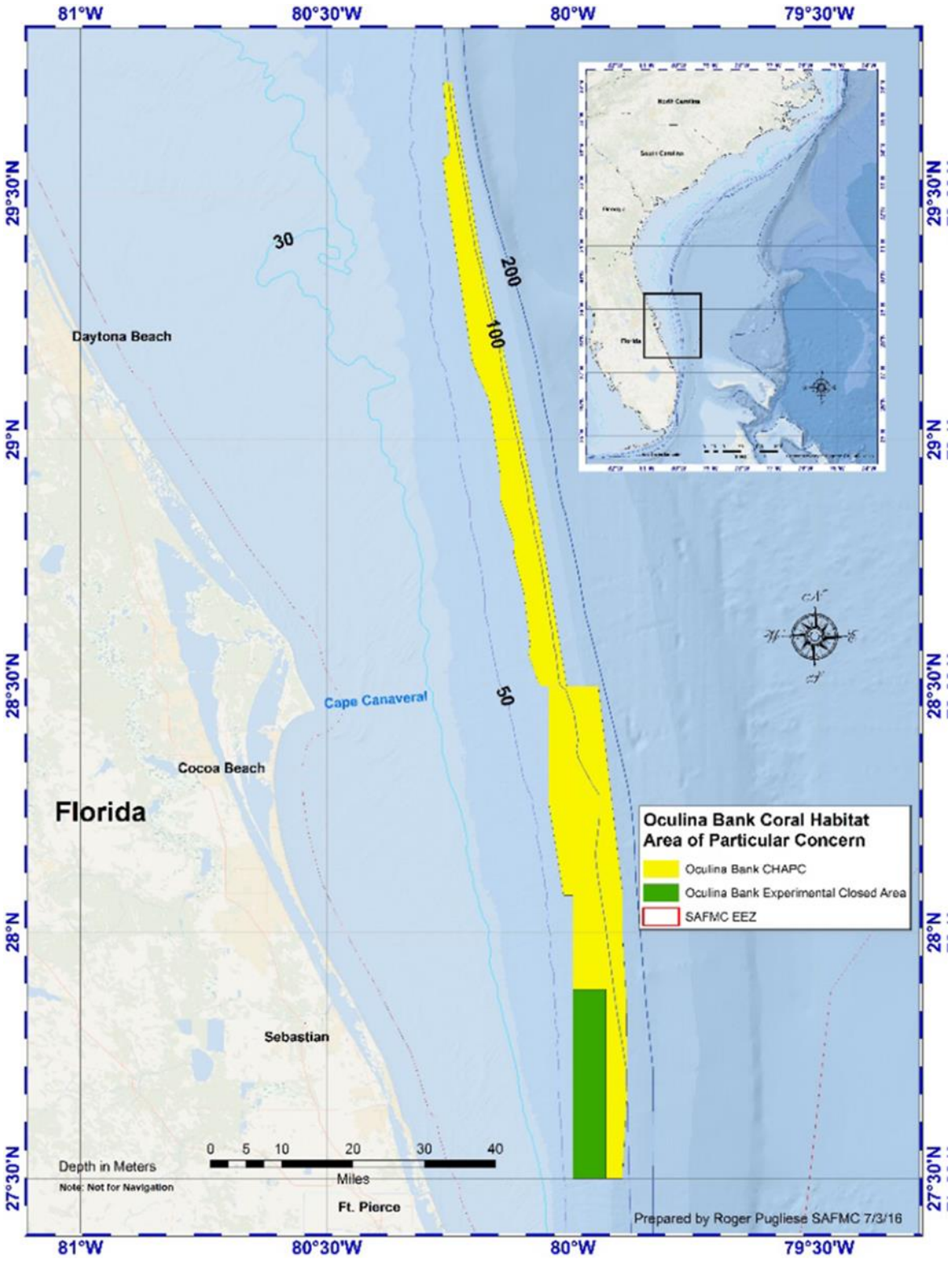

Figure S-2. Map of the OHAPC with implementation of Coral Amendment 8.

Source: Roger Pugliese, SAFMC Staff.

Purpose and Need

Purpose: The purpose of Coral Amendment 10 is to consider establishing a shrimp fishery access area along the eastern edge of the northern extension of the Oculina Bank Habitat Area of Particular Concern where the fishermen who have a valid limited access Commercial Vessel Permit for Rock Shrimp (South Atlantic exclusive economic zone) would be able to fish for and possess rock shrimp.

Need: The need for Coral Amendment 10 is to help achieve optimum yield in the South Atlantic rock shrimp portion of the shrimp fishery and increase economic and social benefits to rock shrimp fishermen by increasing access to historic rock shrimp fishing grounds, while maintaining protection of the *Oculina* deep water coral ecosystems.

What actions are being proposed in this amendment?

Amendment 10 to the Coral FMP proposes the following:

Action 1. Establish a shrimp fishery access area along the eastern edge of the northern extension of the Oculina Bank Habitat Area of Particular Concern.

Currently: No person may use a bottom longline, bottom trawl, dredge, pot, or trap in the Oculina Bank Habitat Area of Particular Concern. If aboard a fishing vessel, no person may anchor, use an anchor and chain, or use a grapple and chain. There is not a shrimp fishery access area along the northern extension of the Oculina Bank Habitat Area of Particular Concern.

The South Atlantic Council's **Preferred Alternative 2** would establish a shrimp fishery access area that is 22 mi^2 along the eastern edge of the northern extension of the Oculina Bank Habitat Area of Particular Concern. Within the proposed SFAA, a shrimp vessel with a valid limited access Commercial Vessel Permit for Rock Shrimp (South Atlantic Exclusive Economic Zone) would be allowed to bottom trawl for rock shrimp. The SFAA would be bound by the following coordinates.

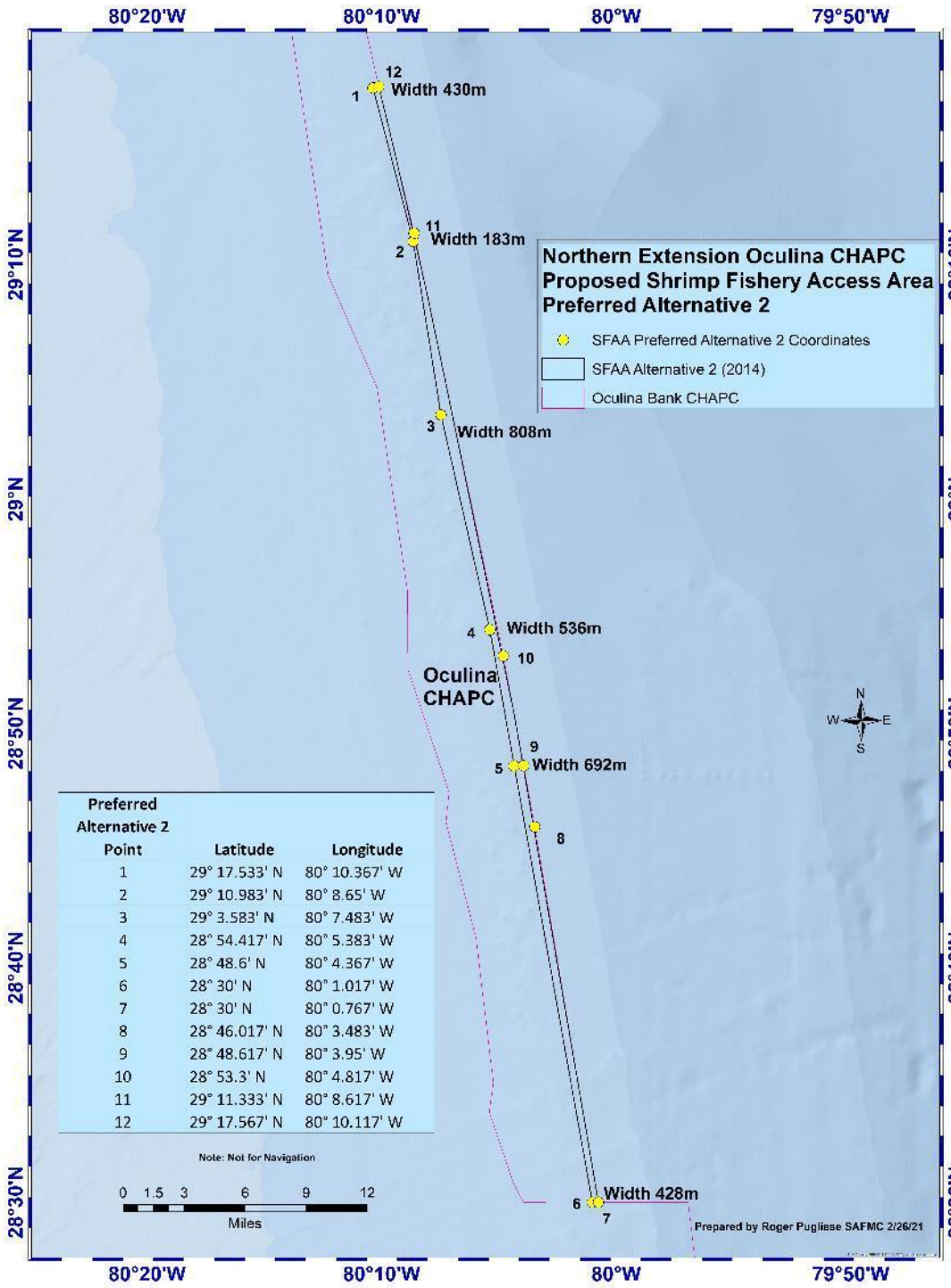

Figure S-3. Proposed Shrimp Fishery Access Area (SFAA) (**Preferred Alternative 2**).

Source: Roger Pugliese, SAFMC Staff.

Chapter 1. Introduction

1.1 What actions are being proposed in this amendment?

The proposed action in Amendment 10 to the Fishery Management Plan (FMP) for Coral, Coral Reefs, and Live Hard Bottom Habitat of the South Atlantic Region (Coral FMP) would allow access to a discrete historic fishing area along the eastern boundary of the northern extension of the Oculina Bank Habitat Area of Particular Concern (OHAPC) through establishment of a shrimp fishery access area (SFAA). Fishing in this area was prohibited through regulations implementing Amendment 8 to the Coral FMP (SAFMC 2013). However, prior to the finalization of Coral Amendment 8, rock shrimp fishermen requested that the proposed area be reviewed to determine if this specific historic trawling area could be reopened to fishing for rock shrimp.

1.2 Who is proposing the amendment?

The South Atlantic Fishery Management Council (South Atlantic Council) is responsible for managing coral, coral reefs, and live hard bottom habitat in the South Atlantic region. The South Atlantic Council develops the amendment and submits it to the National Marine Fisheries Service (NMFS) who behalf of the Secretary of Commerce (Secretary), ultimately approves, disapproves, or partially approves the plan amendment. NMFS is an agency of the National Oceanic and Atmospheric Administration within the Department of Commerce. Guided by the Magnuson-Stevens Fishery Conservation and Management Act, the South Atlantic Council works with NMFS and other partners to sustainably manage fishery resources in the South Atlantic.

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

The South Atlantic Council and NMFS are also responsible for making this document available for public comment. The draft environmental assessment (EA) was made available to the public during the scoping process, public hearings, and South Atlantic Council meetings. The EA/amendment will be made available for comment during the rulemaking process.

1.3 Where is the project located?

Management and conservation of coral, coral reefs, and live hard bottom habitat in waters off the southeastern United States (South Atlantic) in the 3-200 nautical miles U.S. exclusive economic zone (EEZ) is conducted under the Coral FMP (GMFMC & SAFMC 1982) (Figure 1.3.1). The South Atlantic Council manages over 400 coral species and associated habitat under this FMP. The OHAPC, as modified through Coral Amendment 8 (SAFMC 2013), is located off the east coast of Florida (Figure 1.3.2). The OHAPC protects the known distribution of *Oculina* coral in the region.

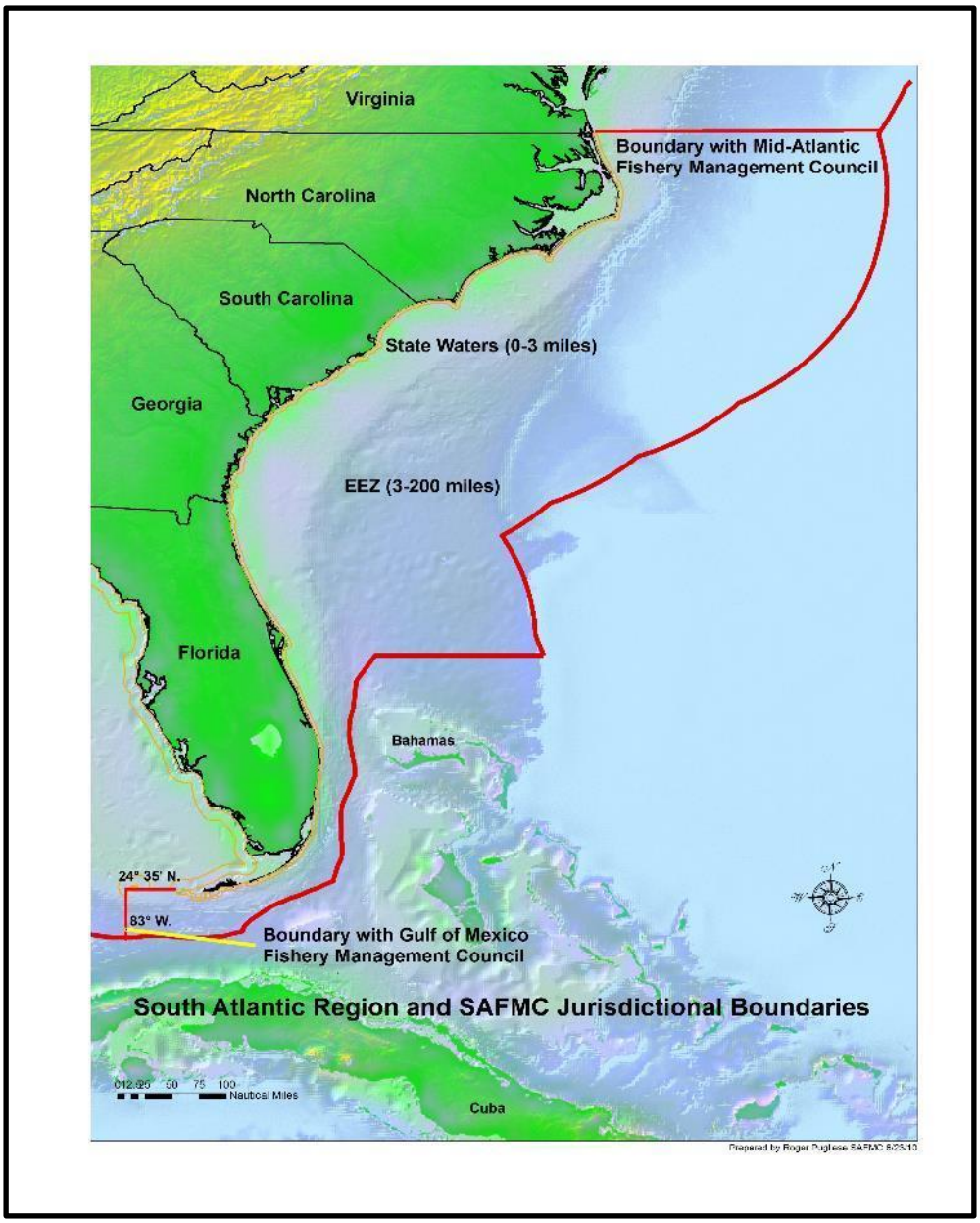

Figure 1.3.1. Jurisdictional boundaries of the South Atlantic Council.

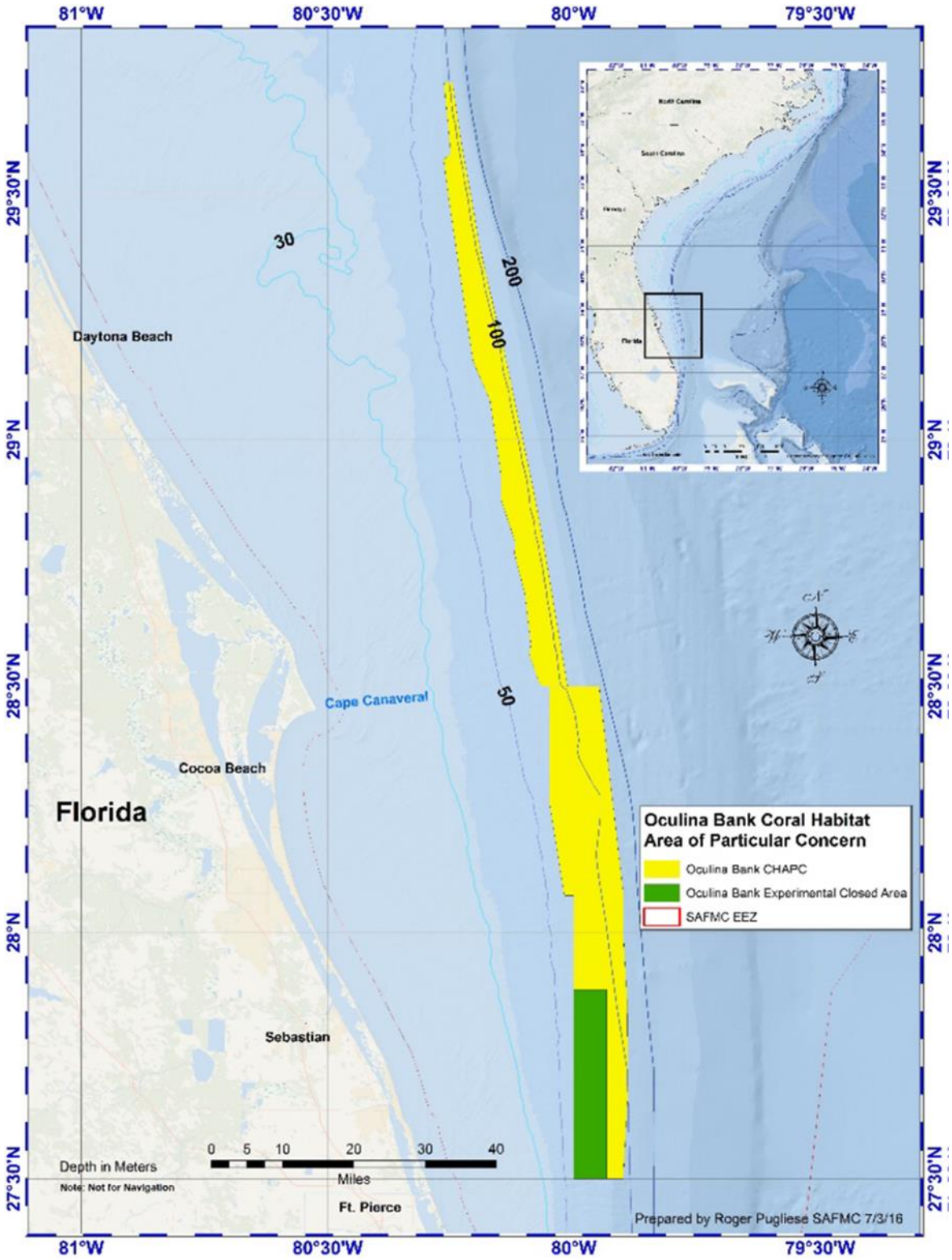

Figure 1.3.2. Map of the OHAPC as implemented through Coral Amendment 8.
Source: Roger Pugliese, SAFMC Staff.

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

Purpose for Action

The purpose of Coral Amendment 10 is to consider establishing a shrimp fishery access area along the eastern edge of the northern extension of the Oculina Bank Habitat Area of Particular Concern where the fishermen who have a valid limited access Commercial Vessel Permit for Rock Shrimp (South Atlantic exclusive economic zone) would be able to fish for and possess rock shrimp.

Need for Action

The need for Coral Amendment 10 is to help achieve optimum yield in the South Atlantic rock shrimp portion of the shrimp fishery and increase economic and social benefits to rock shrimp fishermen by increasing access to historic rock shrimp fishing grounds, while maintaining protection of the *Oculina* deep water coral ecosystems.

The South Atlantic Council received public comment when it was finalizing Coral Amendment 8 that a discrete area along the eastern edge of the northern extension, now proposed in Coral Amendment 10, was an important fishing ground for rock shrimp. The rock shrimp industry provided coordinates for the historic fishing areas in March 2013 and further refined the coordinates in March 2014. During the May 2014 Deep-water Shrimp Advisory Panel (AP) meeting, members indicated vessel monitoring system (VMS) data verified past rock shrimp fishing in the proposed areas. The AP Chair also noted the rock shrimp portion of the shrimp fishery is transitory as fishing effort changes based on upwelling conditions and shifting catch composition. During the June 2014 Council meeting, after discussing industry concerns over an algae problem which existed on the southern end of the rock shrimp bottom west of the OHAPC and the greater economic impact of the eastern boundary of the northern extension, members agreed the issue warranted further discussion and review. In addition, it was clarified that the review would only focus on the newly closed area, the eastern boundary of the northern extension of the OHAPC, where industry had indicated they were losing economic value. Members considered what information would be needed and indicated the Southeast Fisheries Science Center would be asked to provide the most up-to-date VMS data, the rock shrimp bycatch reports, data from the observer trips, mapping results from that area and what percent of the area under question has been mapped. In June 2015, the South Atlantic Council decided to develop an amendment to consider establishing an SFAA for rock shrimp fishing along the eastern boundary of the northern extension of the OHAPC.

In June 2018, the South Atlantic Council reviewed an options paper for transit provisions during cold-water shrimp closures, golden crab access areas, and SFAAs for the rock shrimp fleet. In September 2019, the South Atlantic Council split these actions into separate FMP amendments. The South Atlantic Council revisited the SFAA action in June 2020 and recommended moving forward with the action in response to the Presidential Executive Order (EO) 13921 on Seafood Competitiveness and Economic Growth. Coral Amendment 10 would address the EO 13921

recommendation to "Consider Re-Opening Closed Areas" to commercial fishermen that have lost access to areas that have been traditionally fished. While landings and revenue from rock shrimp are highly variable, even peak landings from recent years have fallen far short of maximum sustainable yield (MSY) and optimum yield (OY) levels established in Amendment 4 to the FMP for the Shrimp Fishery of the South Atlantic Region (1998). Thus, rock shrimp has been consistently operating well below OY/MSY during this time. Development of Coral Amendment 10 began following the South Atlantic Council's guidance at the September 2020 meeting.

1.5 What is the history of management for coral, coral reefs, and live hard bottom habitat?

Coral is highly regulated, and regulations have been in place since the implementation of the Coral FMP in 1982. A detailed history of management can be found in Appendix G. Below are amendments to the Coral FMP addressing gear and harvest restrictions within the South Atlantic EEZ.

Coral FMP (1982)
Management of coral resources was originally established with the joint Gulf of Mexico Fishery Management Council (Gulf Council) and South Atlantic Council Coral FMP (GMFMC & SAFMC 1982). The Coral FMP's intent was to optimize the benefits generated from the coral resource while conserving the coral and coral reefs. Specific management objectives addressed through the Coral FMP were to: (1) develop scientific information necessary to determine feasibility and advisability of harvest of coral; (2) minimize, as appropriate, adverse human impacts on coral and coral reefs; (3) provide, where appropriate, special management for Coral Habitat Areas of Particular Concern (HAPC); (4) increase public awareness of the importance and sensitivity of coral and coral reefs; and (5) provide a coordinated management regime for the conservation of coral and coral reefs.

The Coral FMP implemented the following management measures for coral and coral reefs: (1) disallowed any level of foreign fishing and established the domestic annual harvest to equal the OY; (2) prohibited the taking of stony corals and sea fans or the destruction of these corals and coral reefs anywhere in the EEZ of the Gulf and South Atlantic Councils' area of jurisdiction; (3) established that stony corals and sea fans taken incidentally in other fisheries must be returned to the water in the general area of capture as soon as possible (with the exception of the groundfish, scallop, or other similar fisheries where the entire unsorted catch is landed, in which case stony corals and sea fans may be landed but not sold); (4) established that the Councils may notify the Secretary of the threat of widespread or localized depletion from overharvest of one or more species of octocorals and recommend specific actions; (5) established a permit system for the use of chemicals for the taking of fish or other organisms that inhabit coral reefs; (6) established a permit system for taking prohibited corals for scientific and educational purposes; and (7) identified HAPCs and established time and area restrictions in HAPCs.

Amendment 3 (1995)
Amendment 3 implemented the following: (1) established a live rock aquaculture permit system for the South Atlantic EEZ; (2) prohibited octocoral harvest north of Cape Canaveral to prevent

expansion of the shrimp fishery to areas where octocorals constitute a more significant portion of the live/hard bottom habitat; and (3) prohibited anchoring of all fishing vessels in the OHAPC.

Amendment 4 (1998)
Amendment 4, included in the Comprehensive Essential Fish Habitat Amendment (SAFMC 1998), expanded the OHAPC to an area bounded to the west by 80°W., to the north by 28°30' N., to the south by 27°30' N., and to the east by the 100 fa (600 ft) depth contour. Amendment 4 expanded the OHAPC to include the area closed to rock shrimp harvest. The expanded OHAPC is 60 nm long by about 5 nm wide although the width tracks the 100 fa (600 ft) depth contour rather than a longitude line. Within the expanded OHAPC area, no person may:
1. Use a bottom longline, bottom trawl, dredge, pot, or trap.
2. If aboard a fishing vessel, anchor, use an anchor and chain, or use a grapple and chain.
3. Fish for rock shrimp or possess rock shrimp in or from the area on board a fishing vessel.

Amendment 6 (2009)
Amendment 6, included in the Comprehensive Ecosystem-Based Amendment 1 (SAFMC 2009), established deep-water coral HAPCs (CHAPC) and prohibited the use of bottom tending gear in these areas, established "Shrimp Fishery Access Areas" within the Stetson-Miami Terrace CHAPC and established "Allowable Golden Crab Fishing Areas" within the Stetson-Miami Terrace and Pourtalés Terrace CHAPCs.

Amendment 8 (2014)
With the discovery of extensive deep-water coral ecosystems, the South Atlantic Council added the northern extension of the OHAPC through Coral Amendment 8 in 2014. Coral Amendment 8 also allowed transit through the OHAPC by fishing vessels with rock shrimp on board, and modified vessel monitoring system requirements for rock shrimp fishermen transiting through the OHAPC with rock shrimp on board.

1.6 What is the history of management for rock shrimp?

A detailed history of management can be found in Appendix H. Below are amendments to the FMP for the Shrimp Fishery of the South Atlantic Region (Shrimp FMP) addressing rock shrimp within the South Atlantic EEZ.

Shrimp FMP (1993)
Provided South Atlantic states with the ability to request concurrent closure of the white shrimp in the EEZ adjacent to their closed state waters following severe winter cold weather; established a buffer zone extending seaward from shore 25 nautical miles, inside which no trawling is allowed with a net having less than 4 inches stretch mesh during an EEZ closure. The plan also provided for transit through the EEZ during closure of white shrimp. The plan provided an exemption for royal red and rock shrimp to allow harvest of rock shrimp fishery to be prosecuted with minimal disruption during a closure of federal waters for protection of white shrimp.

Amendment 1 (1995)
Added rock shrimp to the management unit; limited the impact of the rock shrimp portion of the shrimp fishery on essential bottom habitat by prohibiting trawling for rock shrimp east of 80° W longitude between 27°30' N. latitude and 28°30' N. latitude in depths less than 100 fathoms; and implemented measures to ensure adequate reporting and monitoring.

Amendment 2 (1996)
Added pink shrimp to the management unit; defined overfishing for brown and pink shrimp; defined optimum yield for brown and pink shrimp; required the use of certified bycatch reduction devices (BRD) in all penaeid shrimp trawls in the South Atlantic EEZ; and established a framework for BRD certification which specifies BRD certification criteria and testing protocol.

Amendment 3 (1998)
Identified Essential Fish Habitat (EFH) and EFH Habitat Areas of Particular Concern.

Amendment 5 (2003)
Addressed requirements for rock shrimp including the establishment of a limited access program requiring limited access endorsements for owners of vessels who qualified; required operator permits; established a minimum mesh size for the cod end of a rock shrimp trawl in the EEZ off Florida and Georgia of 1 7/8 inches to allow the escapement of juvenile shrimp; and required the use of VMS for vessels operating in the South Atlantic to protect increase enforcement capability and protect habitat, especially the OHAPC off the East Coast of Florida that is closed to trawling.

Amendment 6 (2005)
Established a federal permit for the penaeid (pink, white, and brown) shrimp, required BRDs in the rock shrimp portion of the shrimp fishery, amended the BRD Testing Protocol and criteria for certification, established a method to monitor and assess bycatch in the shrimp fishery, and addressed stock status determination criteria.

Amendment 7 (2008)
Shrimp Amendment 7 addressed the landing requirement for rock shrimp limited access endorsements, reinstated endorsements lost due either to not meeting the landing requirement in one of four consecutive calendar years or not renewing the endorsement on time; renamed the permit/endorsement system to minimize confusion; required verification of a VMS to renew, reinstate or transfer a limited access endorsement; and required provision of economic data by federal shrimp permit holders.

Comprehensive Ecosystem-Based Amendment 1 (2009)
Addressed mapping requirement for EFH and established SFAAs in the Stetson Miami Terrace CHAPC.

Chapter 2. Proposed Actions and Alternatives

2.1 Action 1. Establish a shrimp fishery access area along the eastern edge of the northern extension of the Oculina Bank Habitat Area of Particular Concern.

Alternative 1 (No Action). No person may use a bottom longline, bottom trawl, dredge, pot, or trap in the Oculina Bank Habitat Area of Particular Concern. If aboard a fishing vessel, no person may anchor, use an anchor and chain, or use a grapple and chain. There are no shrimp fishery access areas within the Oculina Bank Habitat Area of Particular Concern.

Preferred Alternative 2. Establish a shrimp fishery access area that is 22 mi^2 along the eastern edge of the northern extension of the Oculina Bank Habitat Area of Particular Concern. Allow a shrimp vessel with a valid limited access Commercial Vessel Permit for Rock Shrimp (South Atlantic Exclusive Economic Zone) to bottom trawl for rock shrimp within the established area bounded by the following coordinates.

Point	Latitude	Longitude
1	29° 17.533' N	80° 10.367' W
2	29° 10.983' N	80° 8.65' W
3	29° 3.583' N	80° 7.483' W
4	28° 54.417' N	80° 5.383' W
5	28° 48.6' N	80° 4.367' W
6	28° 30' N	80° 1.017' W
7	28° 30' N	80° 0.767' W
8	28° 46.017' N	80° 3.483' W
9	28° 48.617' N	80° 3.95' W
10	28° 53.3' N	80° 4.817' W
11	29° 11.333' N	80° 8.617' W
12	29° 17.567' N	80° 10.117' W

Alternative 3. Establish a shrimp fishery access area that is 32 mi^2 along the eastern edge of the northern extension of the Oculina Bank Habitat Area of Particular Concern. Allow a shrimp vessel with a valid limited access Commercial Vessel Permit for Rock Shrimp (South Atlantic Exclusive Economic Zone) to bottom trawl for rock shrimp within the established area bounded by the following coordinates.

Point	Latitude	Longitude
1	29° 17.533' N	80° 10.367' W
2	29° 11.333' N	80° 8.9' W
3	28° 53.25' N	80° 5.45' W
4	28° 48.6' N	80° 4.55' W
5	28° 45.95' N	80° 4.083' W
6	28° 30' N	80° 1.017' W
7	28° 30' N	80° 0.767' W
8	28° 46.017' N	80° 3.483' W
9	28° 48.617' N	80° 3.95' W
10	28° 53.3' N	80° 4.817' W
11	29° 11.333' N	80° 8.617' W
12	29° 17.567' N	80° 10.117' W

Discussion:

Alternative 1 (No Action) would keep all the current regulations in place protecting *Oculina* coral and would not establish a shrimp fishery access area (SFAA) along the northern extension of the Oculina Bank Habitat Area of Particular Concern (OHAPC).

Preferred Alternative 2 (Figure 2.1.1) would establish an SFAA that encompasses approximately 22 mi^2 and is based on coordinates presented by rock shrimp fishermen as part of March 2014 public comment for Coral Amendment 8. This set of coordinates was reaffirmed during the most recent meeting of the Deep-water Shrimp Advisory Panel on November 10, 2020. The depths of the western boundary of the SFAA in **Preferred Alternative 2** range from 92 to 95 meters (m). On the eastern boundary of the SFAA, along the edge of the existing OHAPC, the average depth is 98 m.

Alternative 3 (Figure 2.1.2) would establish an SFAA that encompasses approximately 32 mi^2 and is based on coordinates presented by rock shrimp fishermen as part of their March 2013 public comment for Coral Amendment 8. The depths of the western boundary of the SFAA in **Alternative 3** range from 88 to 90 m. On the eastern boundary of the SFAA, along the edge of the existing OHAPC, the average depth is 98 m.

Figure 2.1.3 presents the two alternatives overlapped for comparison. **Preferred Alternative 2**, at various points along the proposed western boundary, has a width between 250 m to 500 m narrower than **Alternative 3**.

Vessels are required to carry a vessel monitoring system (VMS) to fish for deep-water rock shrimp. VMS is therefore a source of vessel operating information, and VMS points that correspond to a vessel moving at speeds between 2 and 4 knots are used as a proxy for fishing activity. Prior to 2014, when this area was closed to harvest for rock shrimp, rock shrimping along the eastern boundary of the northern extension of the OHAPC predominately occurred east of the existing boundary. Rock shrimp fishing inside the edge of the boundary accounted for 1.76% of all fishing points from 2003 through 2014, 2.20% of points during 2013, and 8.50% of points during 2014, based on historic trawling operations as represented by VMS data (Table 2.1.1, Figure 2.1.4). The amount of fishing effort that occurred along the eastern edge of the northern extension of the OHAPC, as measured by VMS fishing points, was essentially the same for 2013 and 2014. However, the percentage of the total fishing effort that occurred within that area increased in 2014 (8.5%) due to the decreased total rock shrimp fishing activity for the year. No information on fishing activity from VMS data exists from within the OHAPC from 2015 to present since trawling within the area was prohibited through the implementation of Coral Amendment 8 (final rule effective August 17, 2015). The final rule for Coral Amendment 8 required rock shrimp vessels transiting through the OHAPC to maintain a minimum speed of no less than 5 knots as determined by a VMS, which transmits vessel location at a rate acceptable to law enforcement (i.e., every 5 minutes). The fact that these vessels had VMS requirements was significant in the South Atlantic Council's decision to allow transit through the OHAPC with possession of rock shrimp on board, and the VMS has enhanced the ability of law enforcement to enforce the OHAPC regulations, including those proposed in this amendment. Currently, when a rock shrimp vessel with rock shrimp onboard transits the Oculina HAPC, the VMS on that vessel must transmit at a minimum ping rate of 1 ping per 5 minutes. It is the Council's intent that under either Alternative 2 or 3, when a rock shrimp vessel is within the Oculina SFAA the vessel must continue to transmit at a minimum ping rate of 1 ping per 5 minutes.

Table 2.1.1. Past rock shrimp fishing activity based on historic VMS data.

Rock Shrimp Fishery	Total VMS Points	Total Rock Shrimp Points	Rock Shrimp Fishing Points (2-4 knots)	Rock Shrimp Fishing Points in the Eastern Edge of Northern Extension of the Oculina CHAPC	% Rock Shrimp Fishing Points in the Eastern Edge of Northern Extension of the Oculina CHAPC	% Rock Shrimp Fishing Points in Northern Extension as Presented in Coral 8
2003 -2007	1,139,266	156,877	58,560	1,170	2.00%	4.90%
2008 -2014	1,848,303	143,250	38,656	538	1.39%	2.70%
Total (2003-2014)	3,127,042	301,861	97,251	1,708	1.76%	4.22%
2013	241,777	19,329	5,718	126	2.20%	
2014	223,194	7,114	1,470	125	8.50%	

Source: VMS Data (2003-2014) and Coral Amendment 8 (SAFMC 2014).

Total VMS Points- VMS points recorded by all shrimp vessels required to carry VMS
Total Rock Shrimp Points- VMS points for vessels operating in the area of the rock fishery
Rock Shrimp Fishing Points- VMS points for vessels in the area of the rock fishery with speed 2-4 knots
Rock Shrimp Fishing Points in E. Edge of N. Extension- VMS points for vessels with speed 2-4 knots in Eastern Edge of N. Extension

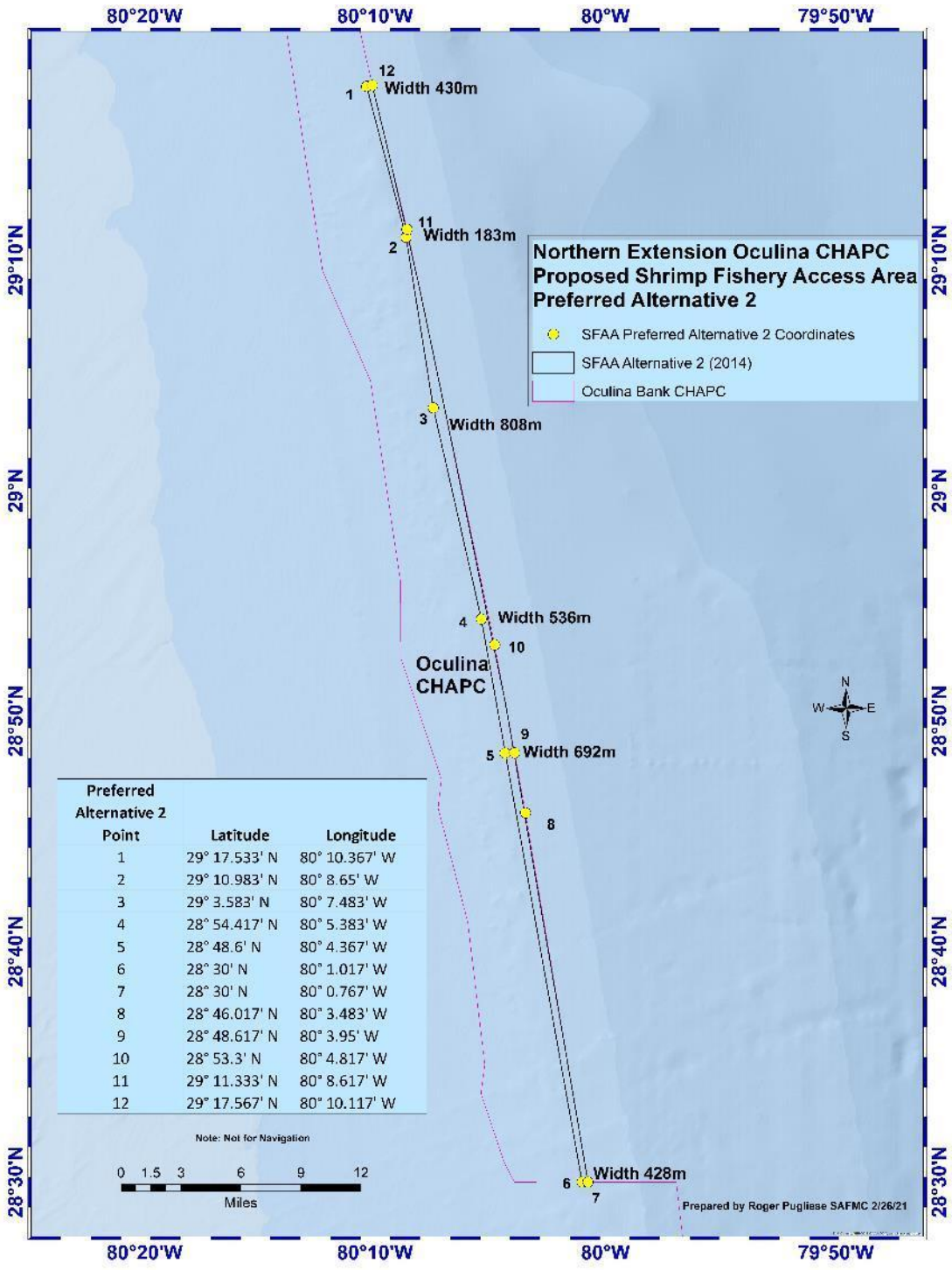

Figure 2.1.1. Coordinates and approximate widths for the proposed SFAA (Preferred Alternative 2; based on 2014 fishermen input).

Note: OHAPC Northern Extension width range (6,700-1,500 m)

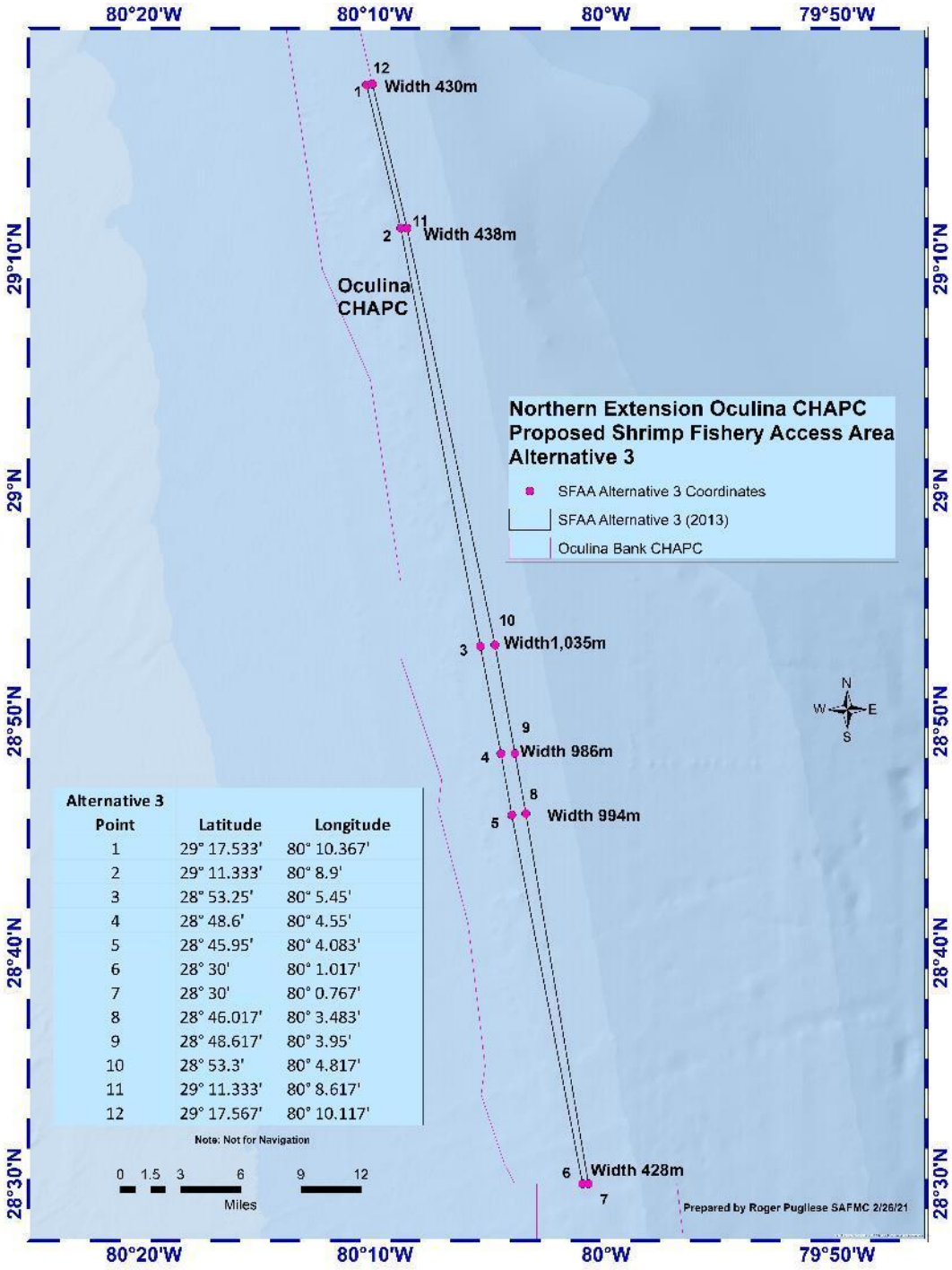

Figure 2.1.2 Coordinates and approximate widths for the proposed SFAA (Alternative 3; based on 2013 fishermen input).

Note: OHAPC Northern Extension width range (6,700-1,500 m.)

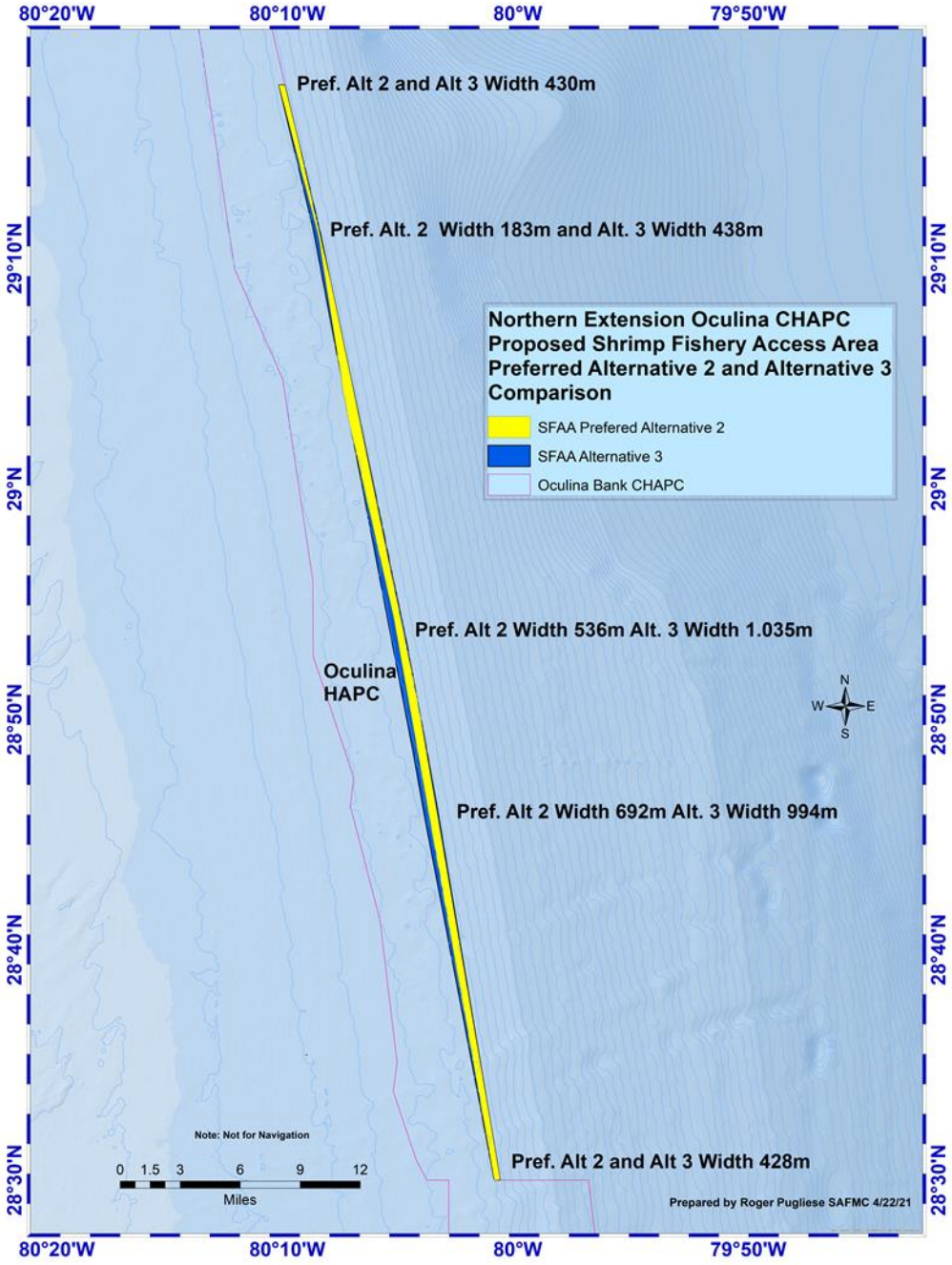

Figure 2.1.3. Comparison of SFAA Preferred Alternative 2 and Alternative 3 layout and widths.

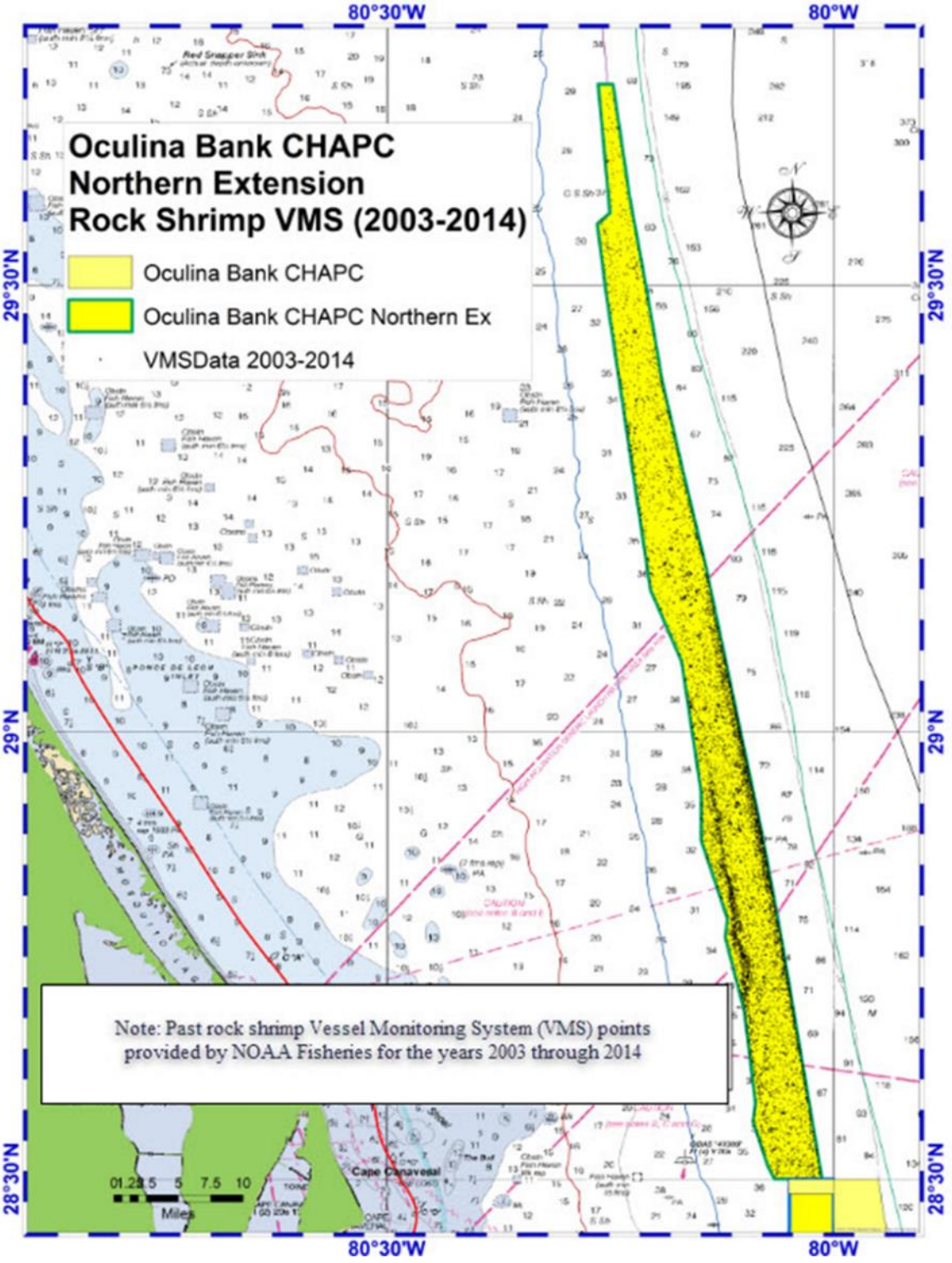

Figure 2.1.4. Rock shrimp VMS points in the northern extension of the OHAPC (2003-2014).

Source: Roger Pugliese SAFMC Staff.

2.1.1 Comparison of Alternatives:

Alternative 1 (No Action) would keep all of the current regulations in place protecting *Oculina* coral and would not establish an SFAA. **Preferred Alternative 2** and **Alternative 3** would establish SFAAs of 22 mi^2 and 32 mi^2, respectively. Establishing SFAAs as proposed under **Preferred Alternative 2** and **Alternative 3** could result in negative biological impacts to the deep-water coral habitat within the SFAAs as they would allow intermittent bottom trawling for rock shrimp. However, trawling would likely occur where rock shrimp were previously caught in low relief and predominately sand bottom areas already impacted by past fishing activities. Fishing effort in the area was historically low and the impact is not expected to be large.

Alternative 1 (No Action) would result in foregone landings of rock shrimp and thus foregone economic benefits associated with these landings compared to **Preferred Alternative 2** and **Alternative 3**. **Preferred Alternative 2** and **Alternative 3** would result in net economic benefits by allowing vessels fishing for rock shrimp with bottom trawl gear to potentially increase landings of rock shrimp through access to an additional 22 mi^2 or 32 mi^2 areas, respectively. Given the likely variability in usage of the area as well as exhibited variability in overall participation in the limited access component of the rock shrimp portion of the shrimp fishery, the economic effects of **Alternative 3** would likely be similar to those described for **Preferred Alternative 2**, but economic benefits under **Alternative 3** would be comparatively higher since this alternative would allow access to 10 more square miles than **Preferred Alternative 2**.

Alternative 1 (No Action) would likely result in minimal social effects because the fleet is already harvesting in open areas and prohibited from working in the closed areas. **Preferred Alternative 2** and **Alternative 3** address stakeholder concerns regarding access to a discrete and historically important fishing grounds and may improve stakeholder perceptions of the management process. As such, **Preferred Alternative 2** represents the most recent recommendation by rock shrimp fishermen and is expected to have the greatest social benefit, followed by **Alternative 3**, and **Alternative 1 (No Action)**. **Preferred Alternative 2** includes coordinates provided by industry, which shifted the proposed boundary even further offshore from known or suspected high relief habitat than presented in **Alternative 3**.

The establishment of an SFAA (**Preferred Alternative 2** and **Alternative 3**) would have minimal administrative impacts. The existing requirement of VMS in the rock shrimp portion of the shrimp fishery, including the requirement in Coral Amendment 8 for an even higher vessel location reporting rate when crossing the OHAPC boundary and quicker notification of violation of required minimum transit speed, enhances enforcement of the regulations and helps to ensure protection of the sensitive *Oculina* coral habitat within the OHAPC. These requirements would apply to allowable fishing within the proposed SFAAs.

Chapter 3. Affected Environment

This section describes the affected environment in the proposed project area. Amendment 10 to the Fishery Management Plan (FMP) for the Coral, Coral Reefs, and Live Hard Bottom Habitat of the South Atlantic Region (Coral FMP) addresses management measures to increase access to historic rock shrimp fishing grounds, while maintaining protection of the *Oculina* deep-water coral ecosystems. The action in this amendment is expected to have an impact on *Oculina* habitat and the deep-water shrimp fishery. Other species that may occur in the action area but are not expected to be impacted are some species managed under the FMP for the Snapper Grouper Fishery of the South Atlantic Region, the FMP for Coastal Migratory Pelagic Resources in the Gulf of Mexico (Gulf) and Atlantic Region, and the FMP for the Dolphin and Wahoo Fishery of the Atlantic. Information on the other fisheries can be found in the South Atlantic Fishery Management Council's (South Atlantic Council) Fishery Ecosystem Plan[1] (FEP; SAFMC 2009). 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 Oculina Coral Reef Habitat

The majority of the *Oculina* coral reefs are found in depths of 60 to 100 m in a zone 2 to 6 km wide along the eastern Florida shelf of the U.S. (Avent et al. 1977; Reed 1980). Much of the habitat mapped and characterized is within or adjacent to the Oculina Bank Habitat Area of Particular Concern (OHAPC), located 15 nm off Fort Pierce and extending northward towards Cape Canaveral, Florida. Biodiversity on *Oculina* reefs is high, and similar to that of shallow tropical coral reefs (Koenig 2001). Species in the snapper grouper complex, including gag, scamp, black sea bass and speckled hind, are closely associated with live and standing *Oculina* coral habitat (Reed et al 2007) (Reed et al 2013).

Categories of deep-water *Oculina* habitats include pinnacles or bioherms, isolated coral thickets on hard bottom, and rubble with isolated live colonies. The bioherms range in height from 3 to

[1] https://safmc.net/fishery-ecosystem-plan-ii-south-atlantic-habitats/

35 m and are capped with live and standing dead coral. The age of one mound was estimated to be between 1,000 to 1,500 years old based on core sampling and coral growth rates (1.6 cm per year; Reed 1981). Standing dead coral is common in each type of habitat (Reed et al. 2005). Coral thickets can be found on flat sandy bottom habitats and are common on low-relief hard bottom. They typically consist of 3 to 4 m linear colonies or groups of 1 to 2 m diameter colonies (Reed 1980). In addition, extensive areas of dead *Oculina* can form rubble habitat with isolated colonies of live coral. Reed et al. (2005) described two types of coral rubble habitat: 1) extensive areas of coral rubble/sediment matrix that provide little habitat for epifaunal growth, relative to standing live or dead coral; and 2) structured coral rubble habitat, but without the sediment matrix, which provides some habitat for epifauna, and is often associated with the flanks and peaks of the high-relief pinnacles. The dead coral rubble can result from natural processes such as bioerosion, disease, or temperature extremes, or from human impacts, e.g., fish and shrimp trawling, scallop dredging, anchoring, bottom longlines, and depth charges (Reed et al. 2005).

In 2005, remotely operated vehicle (ROV) transects on Oculina reefs observed black sea bass (*Centropristis striata*), which had not been seen on the reefs since the 1980s when they were abundant. In the 1980s, observed individuals were large and mature, but those observed in 2005 were small juveniles, suggesting that the species was possibly in initial stages of recovery in this location. Juvenile speckled hinds were also observed on the reefs for the first time since the 1980s. These findings support the HAPC's effectiveness to restore reef fish and their habitat (Harter et al. 2009).

The eastern edge of the Oculina Bank north of 28.5 N. was mapped in 2017 (Figures 2.1.2, 2.1.3, F-1, F-3, and F-4) to better characterize where coral habitat and soft bottom sediment occurred. However, other than use of conductivity, temperature, and depth electronic instrument casts in two locations (Figure F-2), no validation of habitat type, species use or visual observation was conducted. The 2011 NOAA *Pisces* cruise conducted multi-beam sonar mapping of two sites off Daytona and Titusville, Florida (Figures 4.1.1.1-4.1.1.8 and F-5) where remote operated vehicle (ROV) dives were also conducted. The sonar maps and ROV dives confirmed that the high-relief features of the NOAA regional charts were high-relief *Oculina* coral mounds, ranging from 15 to 20 m in height and composed of coral rubble, standing dead coral, and live coral (*Oculina varicosa*). Exposed limestone rock was present at the base of some mounds and 1-2 m relief ledges which also provide essential fish habitat to numerous commercially and recreationally important fish species including scamp, gag, snowy grouper, and red grouper. Dominant federally managed fish observed during the ROV video transects included scamp (common), gag, snowy grouper, red porgy (common), amberjack (abundant), and black sea bass (abundant). Dominant invertebrates included *Oculina varicosa* coral (10-40 cm colonies), gorgonian corals, black coral (abundant), sponges, starfish, sea urchins, and mollusks. The mounds appeared to have been impacted by years of bottom shrimp trawling as documented within the OHAPC (Appendix F). Southeastern United States Deep-Sea Corals dive report characterizing habitat and identifying species encountered is presented in Appendix F (Figures F-6, F-7, and F-8).

Additional detail and characterization of *Oculina* coral reef habitat is included by reference (Section 3.1.1, Amendment 8 to the Coral FMP, SAFMC 2013).

3.1.2 Rock Shrimp Habitat

A description of South Atlantic Council concerns and recommendations on protecting shrimp habitat is included in the FMP for the Shrimp Fishery of the South Atlantic Region (Shrimp FMP) (SAFMC 1993). Rock shrimp are distributed worldwide in tropical and temperate waters. They are found in the Gulf of Mexico, Cuba, the Bahamas, and the U.S. South Atlantic northward to Virginia (SAFMC 1993). Rock shrimp live mainly on sand bottom from a few meters to 183 m (600 ft), and occasionally deeper (SAFMC 1993). The center of abundance for rock shrimp in the South Atlantic region occurs off northeast Florida south to Jupiter Inlet (SAFMC 1996). Small quantities of rock shrimp are also found off North Carolina, South Carolina, and Georgia.

The bottom habitat on which rock shrimp thrive is thought to be limited (SAFMC 1996). Kennedy et al. (1977) determined that the depth limit of rock shrimp was most likely due to the decrease of suitable bottom habitat rather than to other physical parameters including salinity and temperature. Cobb et al. (1973) found the inshore distribution of rock shrimp to be associated with terrigenous and biogenic sand and only sporadically on mud. Rock shrimp also utilize hard bottom and coral, or more specifically, *Oculina* coral habitat areas (SAFMC 1996). This habitat was confirmed by research trawls which captured large amounts of rock shrimp in and around the OHAPC prior to its designation (Cobb et al. 1973).

Additional detail and characterization of rock shrimp habitat is included by reference (Section 3.1.3, Coral Amendment 8, SAFMC 2013).

3.1.3 Essential Fish Habitat

Essential fish habitat (EFH) is defined in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802(10)). Specific categories of EFH identified in the South Atlantic, which are utilized by federally-managed 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 for affected species is listed below.

<u>Coral</u>

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

- EFH for hermatypic stony corals includes rough, hard, exposed, stable substrate from Palm Beach County south through the Florida reef tract in subtidal to 30 meters (98 feet) depth, subtropical (15-35°C; 59-95°F), oligotrophic waters with high (30-35 ppt) salinity and turbidity levels sufficiently low enough to provide algal symbionts adequate sunlight penetration for photosynthesis. Ahermatypic stony corals are not light restricted and their EFH includes defined hard substrate in subtidal to outer shelf depths throughout the management area.

- EFH for Antipatharia (black corals) includes rough, hard, exposed, stable substrate, offshore in high (30-35 ppt) salinity waters in depths exceeding 18 meters (54 feet), not restricted by light penetration on the outer shelf throughout the management area.
- EFH for octocorals excepting the Order Pennatulacea (sea pens and sea pansies) includes rough, hard, exposed, stable substrate in subtidal to outer shelf depths within a wide range of salinity and light penetration throughout the management area.
- EFH for Pennatulacea (sea pens and sea pansies) includes muddy, silty bottoms in subtidal to outer shelf depths within a wide range of salinity and light penetration.

Shrimp

For rock shrimp, EFH consists of offshore terrigenous and biogenic sand bottom in depths of 59-597 ft (18-182 m) with highest concentrations occurring at 112-180 ft (34-55 m). This habitat is found from North Carolina through the Florida Keys. EFH includes the shelf current systems near Cape Canaveral, Florida, which provide major transport mechanisms affecting planktonic larval rock shrimp (Bumpus 1973). These currents keep larvae on the Florida Shelf and may transport them inshore in spring. In addition, the Gulf Stream is an EFH because it also provides a mechanism to disperse rock shrimp larvae.

Habitat essential to rock shrimp has not been further characterized beyond the above studies (Section 3.1.2). A list of species associated with rock shrimp benthic habitat was compiled from research trawling efforts (1955-1991) that captured harvestable levels of rock shrimp. In addition, Kennedy et al. (1977), during research efforts to sample the major distribution area of rock shrimp off the Florida east coast, compiled a list of crustacean and molluscan taxa associated with rock shrimp benthic habitat.

3.1.4 Habitat Areas of Particular Concern

The South Atlantic Council designated EFH-Habitat Areas of Particular Concern (EFH-HAPC) to emphasize subsets of EFH that warrant special protection (SAFMC 1998b). EFH-HAPCs on their own do not carry regulatory authority; however, the FMPs under which they were designated may include regulations that protect habitat from fishing impacts. EFH-HAPCs include general habitat types (e.g., submerged aquatic vegetation) and geographic locations (e.g., Charleston Bump). Criteria for EFH-HAPC consideration include importance, rarity, and sensitivity of the habitat (SAFMC 1998b).

Coral, Coral Reefs and Live Hard Bottom Habitat

Existing EFH-HAPCs for coral, coral reefs, and live/hard bottom include: The 10-Fathom Ledge, Big Rock, and The Point (North Carolina); Hurl Rocks and The Charleston Bump (South Carolina); Gray's Reef National Marine Sanctuary (Georgia); The Phragmatopoma (worm reefs) reefs off the central east coast of Florida; *Oculina* Bank off the east coast of Florida from Ft. Pierce to Cape Canaveral; nearshore (0-4 m; 0-12 ft) hard bottom off the east coast of Florida from Cape Canaveral to Broward County; offshore (5-30 m; 15-90 ft) hard bottom off the east coast of Florida from Palm Beach County to Fowey Rocks; Biscayne Bay, Florida; Biscayne National Park, Florida; the Florida Keys National Marine Sanctuary; Cape Lookout Coral HAPC, Cape Fear Coral HAPC, Blake Ridge Diapir Coral HAPC, and Stetson-Miami Terrace Coral HAPC, and Pourtalés Terrace Coral HAPC.

Shrimp

No EFH-HAPCs have been identified for rock shrimp; however, deep water habitat (e.g., expanded OHAPC) may serve as nursery habitat and protect the stock by providing a refuge for rock shrimp.

The potential impacts the proposed actions in this amendment may have on EFH are discussed in Chapter 4 of this document.

3.2 Biological and Ecological Environment

3.2.1 Species Affected by this Amendment

The species directly affected by the action proposed in this amendment is rock shrimp. Environmental effects of the action are discussed in Chapter 4.

Rock Shrimp

Life History

Rock shrimp, *Sicyonia brevirostris*, are very different in appearance from the three penaeid species (Figure 3.2.1.1). Rock shrimp can be easily separated from penaeid species by their thick, rigid, stony exoskeleton. The body of the rock shrimp is covered with short hair and the abdomen has deep transverse grooves and numerous tubercles.

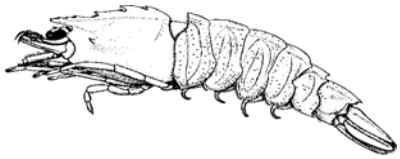

Figure 3.2.1.1. Rock shrimp, Sicyonia brevirostris.

Rock shrimp are found in the Gulf of Mexico, Cuba, the Bahamas, and in the U.S. South Atlantic northward to Virginia (SAFMC 1993). The center of abundance for rock shrimp in the South Atlantic region occurs off northeast Florida south to Jupiter Inlet. Rock shrimp live mainly on sand bottom from a few meters to 183 m (600 ft), and occasionally deeper (SAFMC 1993). The largest concentrations are found between 25 and 65 m (82 and 213 ft). Small quantities of rock shrimp are also found off North Carolina, South Carolina, and Georgia.

The only comprehensive research to date on rock shrimp off the east coast of Florida was by Kennedy et al. (1977). This section presents some of the more significant findings by Kennedy et al. (1977) regarding the biology of rock shrimp on the east coast of Florida. Recruitment to the area offshore of Cape Canaveral, Florida, occurs between April and August with two or more influxes of recruits entering within one season (Kennedy et al. 1977). Keiser (1976) described the distribution of rock shrimp in coastal waters of the southeastern U.S. Whitaker (1983) presented a summary of information on rock shrimp off South Carolina. Additional life history information on rock shrimp can be found in Volume II (PDF page 601) of the Fishery Ecosystem Plan[2] and Coral Amendment 8 (SAFMC 2013) and are incorporated here by reference.

Landings

The center of abundance and the concentrated commercial fishery for rock shrimp in the South Atlantic region occurs off northeast Florida south to Jupiter Inlet (SAFMC 1996). Although rock shrimp occasionally are landed from federal waters off North Carolina, South Carolina, and Georgia, they are not landed in quantities capable of supporting a sustainable commercial fishery

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

comparable to the fishery prosecuted in federal waters off Florida. Landings information is presented in Section 3.3.1.

3.2.2 Bycatch

The rock shrimp fishery is prosecuted by bottom trawls. Certified bycatch reduction devices (BRD) are required in each trawl that is rigged for fishing (SAFMC 2004). Turtle excluder devices (TED) are also required in the rock shrimp fishery. These devices reduce bycatch to varying degrees depending on the type of device and impacted species. The action in this amendment is not expected to result in significant changes in bycatch within the proposed areas since there is only a small amount of predicted fishing effort. Data from observer coverage in the rock shrimp fishery from 2011-2016 shows 37% of catch consisting of finfish and 17% consisting of other invertebrates (Figure 3.2.2.1). A total of 32 species were identified on observed rock shrimp trips (Scott-Denton et al. 2020).

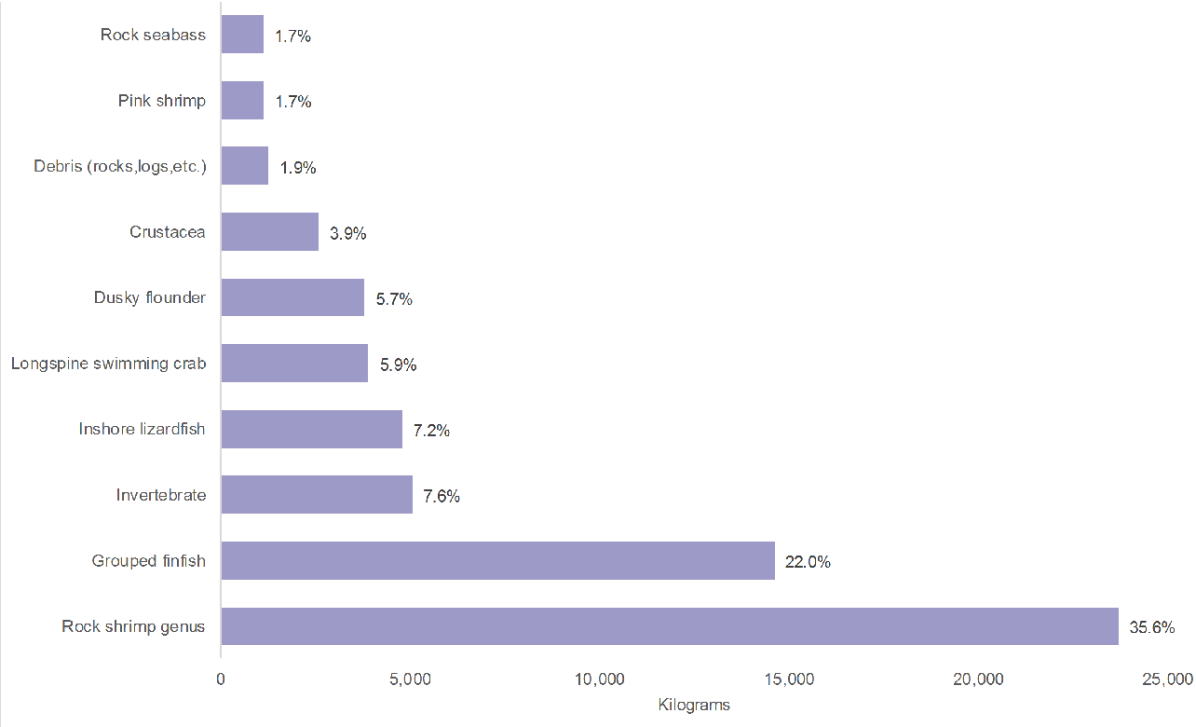

Figure 3.2.2.1. Species-level characterization in the South Atlantic rock shrimp fishery, based on mandatory observer coverage of the U.S. southeastern shrimp fishery from January 2011 through December 2016.

Source: Scott-Denton et al. 2020.

Little is known about the status of finfish (e.g., dusky flounder, inshore lizardfish, spot, and red goatfish) and invertebrate (e.g., iridescent swimming crab, longspine swimming crab, and blotched swimming crab) species present in rock shrimp trawl bycatch in the greatest numbers. None of these species have undergone (or are likely to undergo) formal stock assessments because most, with the exception of spot, are not targeted in commercial or recreational fisheries.

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 exclusive economic zone (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)[3] classifies U.S. commercial fisheries into three categories based on the number of incidental mortality or serious injury they cause to marine mammals.

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

On April 26, 2021, NMFS completed its reinitiation of ESA section 7 consultation and issued a new biological opinion on the implementation of the sea turtle conservation regulations under the ESA (applicable to shrimp trawling) and the authorization of the southeast U.S. shrimp fisheries in federal waters under the Magnuson-Stevens Act, which analyzed the effects on threatened and endangered species and designated critical habitat. The new opinion anticipates the southeast U.S. shrimp fisheries to interact, capture, and potentially result in mortalities of sea turtles, Atlantic and Gulf sturgeon, giant manta ray, and smalltooth sawfish. NMFS concluded that the activities addressed in the consultation are not likely to jeopardize the continued existence of any threatened or endangered species.

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

3.3 Economic Environment

A description of the rock shrimp stock affected by the actions considered in this amendment is provided in Section 3.2. Additional details and a description of the rock shrimp fishery and economic environment is included by reference (SAFMC 2011; 2013). The South Atlantic rock shrimp fishery consists of two major sectors: the harvesting sector and the dealer/processor sector. The following discussion provides summary statistics and selected characteristics for these sectors. Economic impacts of the fishery and shrimp imports are also presented.

3.3.1 Harvesting Sector

The harvesting sector is generally composed of composed of relatively large vessels that are predominantly active in federal waters, and almost always using otter trawl gear. Vessels harvesting rock shrimp from federal waters in the South Atlantic must have a federal permit. There are two types of federal permits in the South Atlantic rock shrimp fishery: 1) a rock shrimp limited access (RSLA) vessel permit, and 2) a rock shrimp Carolinas Zone (RSCZ) vessel permit. The RSLA permit is a limited access permit that allows vessels to harvest and possess rock shrimp from the South Atlantic EEZ. It is required to harvest or possess rock shrimp from the EEZ off the east coast of Florida and Georgia, where a directed fishery for rock shrimp is prosecuted. The RSCZ is an open access permit and is required to harvest or possess rock shrimp off of South Carolina and North Carolina unless the vessel has an RSLA permit. Rock shrimp are an incidentally harvested species off the Carolinas. The number of vessels with a valid RSLA permit has been stable from 2015 through 2019, while the number of vessels possessing a valid RSCZ permit has increased slightly (Table 3.3.1.1).

Table 3.3.1.1. Number of South Atlantic Rock Shrimp Permits from 2015-2019.

Year	RSLA	RSCZ
2015	103	126
2016	103	131
2017	103	142
2018	103	139
2019	103	140

Source: NMFS SERO Sustainable Fisheries (SF) Access permits database.

The actions and alternatives in this amendment would only affect active vessels with RSLA permits (i.e., inactive vessels with RSLA permits and vessels with RSCZ permits would not be affected). Thus, the following information focuses on active vessels with RSLA permits. For example, Table 3.3.1.2 excludes alleged landings of South Atlantic rock shrimp in the Florida Keys by state registered Florida boats from Florida Bay and nearshore waters that were harvested by gear other than otter trawls (e.g., roller frames) and were sold for aquarium trade or bait purposes, as these landings are not part of the managed fishery. Further, the data suggests that a few non-permitted vessels had incidental landings of rock shrimp in each year. These vessels all had South Atlantic penaeid (SPA) and/or Gulf shrimp moratorium (SPGM) permits in each year, as well as landings from those fisheries, and thus they are traditional shrimp vessels. However, these landings tend to be small, averaging less than 1,000 lbs (ww) each year. Assuming only legal harvest occurs in the future, these few vessels would not be expected to benefit from the actions and alternatives considered in this amendment.

Participation in the South Atlantic rock shrimp fishery by vessels with RSLA permits was highly variable from 2015 through 2019, ranging from a high of 26 vessels in 2017 to a low of 12 vessels in 2018 (Table 3.3.1.2). Thus, only 12-25% of the vessels with RSLA permits have been active in the fishery in recent years. Further, the average number of active permitted vessels during these years (19) is considerably below the average number of active vessels from 2003-2007 (126) as reported in South Atlantic Shrimp Amendment 7 (SAFMC 2008) and even further below the maximum number of vessels (150) the Council determined could sustainably operate, both biologically and economically, in the fishery as reported in South Atlantic Shrimp Amendment 5 (SAFMC 2002).

Table 3.3.1.2. Landings and revenue statistics for active vessels harvesting South Atlantic rock shrimp with an RSLA permit, 2015-2019.

Year	Number of Active Permitted Vessels	Statistic	South Atlantic rock shrimp landings (lbs ww)	South Atlantic rock shrimp revenue	Other Atlantic revenue	Gulf revenue	Total revenue	Percent of total revenue is rock shrimp
2015	22	Maximum	158,221	$266,170	$803,973	$572,646	$1,013,092	54.0
		Total	1,057,109	$1,714,878	$7,466,726	$3,231,558	$12,413,162	N/A
		Mean	48,050	$77,949	$339,397	$146,889	$564,235	14.0
2016	17	Maximum	77,500	$235,602	$819,012	$414,873	$950,212	45.6
		Total	298,228	$858,685	$6,520,753	$1,055,134	$8,434,572	N/A
		Mean	17,543	$50,511	$383,574	$62,067	$496,151	9.9
2017	26	Maximum	392,387	$775,263	$716,209	$590,559	$1,213,936	85.1
		Total	3,104,624	$5,730,705	$8,702,959	$4,113,093	$18,546,757	N/A
		Mean	119,409	$220,412	$334,729	$158,196	$713,337	30.0
2018	12	Maximum	240,316	$379,146	$765,643	$312,500	$1,050,590	56.5
		Total	955,478	$1,538,819	$4,256,076	$1,013,015	$6,807,910	N/A
		Mean	79,623	$128,235	$354,673	$84,418	$567,326	23.0
2019	20	Maximum	170,338	$352,543	$982,153	$318,965	$983,395	100.0
		Total	941,112	$1,897,856	$8,438,659	$862,157	$11,198,671	N/A
		Mean	47,056	$94,893	$421,933	$43,108	$559,934	22.4

*Maximum values are not always with respect to the same vessel. Source: personal communication, Atlantic Coastal Cooperative Statistics Program (ACCSP, March 17, 2021 and personal communication, SEFSC, Feb, 22, 2021).

From 2015 through 2019, landings and revenue from South Atlantic rock shrimp were also at their highest in 2017, at around 3.1 million pounds whole weight (mp ww) and $5.73 million (2019$), respectively, but were lowest in 2016 at just over 298,000 lbs ww and about $859,000. These estimates reflect the high degree of variability that has existed in this fishery with respect

to participation, landings, and revenue since its inception. In addition, average landings from 2015 through 2019 were 1,271,310 lbs ww, which is only 18.6% of the maximum sustainable yield (MSY) and optimum yield (OY) of 6,829,449 lbs ww for this fishery, as established in South Atlantic Shrimp Amendment 4 (SAFMC 1998b). Even the recent peak year landings of just over 3.1 mp ww in 2017 are only 45% of MSY and OY. Thus, the fishery has been consistently operating well below OY/MSY during this time.

Table 3.3.1.2 also illustrates that these vessels are highly dependent on revenue from species other than South Atlantic rock shrimp, which is one reason for the highly variable levels of participation, landings, and revenue in the fishery over time. While revenue from South Atlantic rock shrimp accounted for about 30% of their total revenue in 2017, it only accounted for about 10% of their total revenue in 2016. Over all five years, rock shrimp accounted for about 20% of these vessels' revenues on average. However, some vessels are much more dependent on revenue from South Atlantic rock shrimp, typically those with the highest landings from the fishery. It is common for 50% or more of these vessels' total revenues to come from South Atlantic rock shrimp landings.

Regardless of the year, most of their revenue comes from other Atlantic fisheries, with the vast majority coming from the Atlantic penaeid shrimp fisheries.[4] Of secondary importance is revenue from Gulf fisheries, the vast majority of which comes from the Gulf shrimp fishery. Thus, while still important to these vessels' operations, South Atlantic rock shrimp is typically only their 3rd most important source of revenue. Nonetheless, these vessels' total revenues appear to vary directly with revenue from South Atlantic rock shrimp landings, as average revenue from South Atlantic rock shrimp and total revenue per vessel were at their highest in 2017 ($220,412 and $713,337, respectively) and their lowest in 2016 ($50,511 and $496,151, respectively). The highest total revenue earned by a single vessel in a given year was about $1.21 million. Average revenue per vessel from the Atlantic penaeid shrimp fishery and Gulf shrimp fishery were also at their highest levels for these vessels in 2017, suggesting that economic performance between these shrimp fisheries is highly correlated, likely because they are affected by some of the same economic factors (e.g., fuel prices, macroeconomic conditions, and possibly shrimp imports).

An annual economic survey of federally-permitted shrimp vessels has been conducted each year since 2009, including for vessels with RSLA permits. Economic returns and other economic performance estimates are produced for all permitted vessels as well as for only those that are active in each particular fishery. As previously noted, economic performance in shrimp fisheries is highly variable from year to year. Thus, a single year will likely not be indicative of typical or average economic performance in these fisheries over time. Further, given the significant declines in the number of active vessels with RSLA permits over time, the sample size in each year has become smaller over time as well, potentially reducing the accuracy and representativeness of the estimates in a single year. Thus, estimates from a single year would likely not be indicative of typical or average economic performance in these fisheries over a period of time. Estimates for all years from 2015-2019 are not available yet. However, estimates from 2017 and 2018 combined (the years with the highest and lowest number of active

[4] According to recent landings data, the penaeid shrimp fishery now extends into waters off of Virginia, reasons for which deserve further investigation.

vessels with RSLA permits) were generated for the purposes of this amendment, specifically to demonstrate economic performance during this time. These estimates are provided in Table 3.3.1.3.

Vessels that target rock shrimp (active RSLA permitted vessels) typically have significantly higher annual gross revenues from fishing relative to vessels that primarily harvest penaeid shrimp (SAFMC 2020). In fact, the RSLA vessels' gross revenues tend to be significantly higher than the average federally-permitted Gulf of Mexico shrimp vessel (Liese 2018). In general, although vessels with higher gross revenues also have higher operating expenses, in this case, they also generated greater net cash flow, net revenue from operations, and economic returns. Compared to average economic performance for these vessels in 2011-2014 (SAFMC 2020), economic performance in 2017-18 was generally lower.

Table 3.3.1.3. Economic and financial characteristics of an average South Atlantic active shrimp vessel with an RSLA permit, averaged across 2017-2018.

Number of observations	23
Balance Sheet	
Assets	$781,778
Liabilities	$37,795
Equity	$743,984
Cash Flow	
Inflow	$721,206
Atlantic penaeid shrimp	$323,451
Atlantic rock shrimp	$142,217
Gulf shrimp (any)	$249,079
Non-shrimp seafood	$6,385
Non-fishing revenue	$75
Outflow	$615,923
Net cash flow	$105,283
Income Statement	
Revenue (commercial fishing operations)	$721,131
Cost of Operations	$639,287
Variable costs – Non-labor	43.4%
Variable costs – Labor	27.1%
Fixed costs	29.5%
Net revenue from operations	$81,844
Net revenue before tax (profit or loss)	$80,496
Returns	
Economic Return	10.5%
Return on Equity	10.8%

Source: C. Liese, pers. comm., March 30, 2021.

Specifically, contrary to the other economic performance indicators, equity (the difference between asset value and liabilities) in these vessels was significantly higher on average in 2017-

18 compared to 2011-2014, with equity increasing by about 45% on average due to a significant increase in the market value of these vessels in combination with a noticeable decline in liabilities. In addition to equity, the three most important estimates of economic returns are net cash flow, net revenue from operations, and economic return on asset value. Of these measures, net revenue from operations most closely represents economic profits to the owner(s). Net cash flow is total annual revenue minus the costs for fuel, other supplies, hired crew, vessel repair and maintenance, insurance, overhead, and loan payments. Net revenue from operations is total annual revenue minus the costs for fuel, other supplies, hired crew, vessel repair and maintenance, insurance, overhead, and the opportunity cost of an owner's time as captain as well as the vessel's depreciation. Economic return on asset value is calculated by dividing the net revenue from operations by the vessel value.

Unlike equity, net cash flow, net revenue from operations and the economic return on asset value were noticeably lower in 2017-18 compared to 2011-2014. Specifically, net cash flow decreased by about 19%, primarily because of higher costs but also because revenue from non-fishing activities decreased. Even though revenue from fishing was higher, net revenue from operations decreased by about 8% because operating costs increased more than fishing revenue. Economic return on asset value decreased by about 27% because of the significant increase in asset value combined with the decrease in net revenue from operations. Thus, in general, the average economic performance of the active RSLA fleet declined from 2011-2014 to 2017-2018.

3.3.2 Dealers and Processors

Table 3.3.2.1 provides selected characteristics for South Atlantic rock shrimp dealers from 2015-2019. During this time, the number of South Atlantic rock shrimp dealers was relatively stable, ranging from 10 in 2015 to 7 in 2016 and 2018. The value of rock shrimp purchases in certain years differs slightly from the information provided in Table 3.3.1.2 because Table 3.3.2.1 includes landings from the shrimp vessels that did not possess RSLA permits but did possess an SPA and/or SPGM permit. Because such landings are minimal in each year, the trend with respect to the value of rock shrimp landings is the same. However, important differences exist otherwise between rock shrimp vessels and rock shrimp dealers.

Table 3.3.2.1. Selected characteristics of South Atlantic rock shrimp dealers, 2015-2019.* Dollar values are in 2019 dollars.

Year	Number of Dealers	Statistic	South Atlantic rock shrimp purchases	Other purchases	Total purchases	Percent of total purchases is rock shrimp	Average price/lb (ww) rock shrimp
2015	10	Maximum	$698,821	$7,556,907	$8,226,807	35.5	
		Total	$1,723,068	$23,398,272	$25,121,340	N/A	$1.62
		Mean	$172,307	$2,339,827	$2,512,134	9.4	
2016	7	Maximum	$423,629	$7,333,159	$7,545,142	13.5	
		Total	$858,685	$21,941,858	$22,800,543	N/A	$2.88
		Mean	$122,669	$3,134,551	$3,257,220	4.0	
2017	9	Maximum	$2,136,969	$8,483,337	$10,117,846	47.1	
		Total	$5,733,086	$22,505,200	$28,238,286	N/A	$1.85
		Mean	$637,010	$2,500,578	$3,137,587	20.7	
2018	7	Maximum	$611,973	$8,515,678	$8,535,773	23.4	
		Total	$1,538,875	$29,316,576	$30,855,451	N/A	$1.61
		Mean	$219,839	$4,188,082	$4,407,922	8.2	
2019	8	Maximum	$806,622	$10,117,121	$10,666,948	25.8	
		Total	$1,898,388	$28,194,817	$30,093,205	N/A	$2.02
		Mean	$237,298	$3,524,352	$3,761,651	7.2	

*A South Atlantic rock shrimp dealer is a dealer that purchased rock shrimp harvested from South Atlantic waters. Maximum values are not always with respect to the same dealer. Source: personal communication, ACCSP, March 17, 2021.

As with rock shrimp vessels, the dependency of rock shrimp dealers on purchases of rock shrimp varies from year to year depending on the value of rock shrimp landings. Thus, while rock shrimp purchases accounted for almost 21% of these dealers' total seafood purchases in the recent peak year of 2017, they only accounted for about 4% in 2018 when landings were low. From 2015-2019, rock shrimp purchases accounted for about 10% of these dealers' total seafood purchases. Thus, on average, dealers are far less dependent on rock shrimp compared to vessels. But like some vessels, some dealers are relatively more dependent than other dealers, with rock shrimp purchases often accounting for 25% to as much as 47% of their total seafood purchases. Nonetheless, even these dealers are still relatively less dependent on rock shrimp compared to their vessel counterparts. These are typical findings in most fisheries as dealers have greater flexibility with respect to the species they purchase compared to vessels and the flexibility they have regarding the species they harvest (i.e., vessels are more specialized than dealers). This relative lack of dependency is also partly attributable to the economic size of their operations, as rock shrimp dealers' total seafood purchases are about 4-5 times greater than the average total revenue of a rock shrimp vessel.

Another example of dealers' flexibility, and thus ability to adjust to changes in landings, can be seen in these data. Specifically, dealers were able to take advantage of the increase in rock shrimp landings from 2016 to 2017, which was reflected by an increase in their total seafood purchases in 2017. However, when rock shrimp landings decreased significantly in 2018, these

dealers' total seafood purchases increased significantly. Given that Atlantic penaeid shrimp landings also decreased significantly in 2018, rock shrimp dealers clearly have alternative species they can purchase to maintain and even increase their seafood sales.

Table 3.3.2.1 also illustrates that, like other aspects of the South Atlantic rock shrimp fishery, the average ex-vessel price of rock shrimp is also highly variable from year to year, ranging from a low of $1.61/lb. (ww) in 2018 to a high of $2.88/lb. (ww) in 2016. Although a more in-depth analysis would be needed using more data and more detailed data, landings were lowest in 2016, suggesting that landings and prices may be indirectly related. Such relationships exist for specialized products (i.e., there are relatively few good substitutes) that are also highly localized in their production and consumption. That is not the case for penaeid shrimp, as they directly compete with imported shrimp. However, rock shrimp are a somewhat unique shrimp species with respect to appearance and taste, and directly comparable species are not imported. That said, even though South Atlantic rock shrimp landings decreased significantly in 2018, so did the average ex-vessel price. Further, although landings of rock shrimp in the Gulf were also at a recent high in 2017, average ex-vessel price in the Gulf was also at its recent high in 2017.[5] And when Gulf rock shrimp landings similarly declined in 2018, the average ex-vessel price also declined, as in the South Atlantic. Thus, other factors than total landings affect average ex-vessel price. Outside of imports, one likely factor is changes in the average size of shrimp from year to year. As with penaeid shrimp, smaller rock shrimp tend to command a lower ex-vessel price. Thus, if the average size of the landed shrimp declines, the average ex-vessel price will also decline, all other things being equal. More research is needed on changes in ex-vessel prices over time.

With respect to processors, it is not clear whether rock shrimp harvested from the South Atlantic are still being processed or where they are being processed. An examination of processor data in the South Atlantic indicated that no rock shrimp were processed in the South Atlantic from 2015-2019 (pers. comm., Office of Science and Technology, Feb. 11, 2021). Rock shrimp were processed in the Gulf during this time, but the amount processed was below the amount landed in the Gulf, which is not indicative of South Atlantic rock shrimp being processed in the Gulf as has been the case in the past (SAFMC 2008). Because the processor survey is voluntary in the Southeast Region, it is possible that data could be missing for companies that process South Atlantic rock shrimp. However, it is equally if not more plausible that rock shrimp dealers are selling rock shrimp directly to retail outlets (e.g., seafood markets and grocery stores) and restaurants, in which case they would not be processed. Further, because all processors are also dealers, potential processors of South Atlantic rock shrimp would be a subset of the rock shrimp dealers discussed previously. Although all of their processing activity and the total value of their processed product would not be accounted for in Table 3.3.2.1, the analysis does allow for the fact that those businesses could be indirectly affected by the actions and alternatives in this amendment.

[5] Data extracted on March 1, 2021 from https://www.fisheries.noaa.gov/foss/f?p=215:200::::::

3.3.3 Economic Impacts of the South Atlantic Rock Shrimp Fishery

The commercial harvest and subsequent sales and consumption of shrimp generates business activity as fishermen expend funds to harvest shrimp and consumers spend money on goods and services, such as shrimp purchased at a local seafood 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 jobs in local seafood markets, grocers, restaurants, and fishing supply establishments. In the absence of the availability of a given species for purchase, consumers would likely spend their money on substitute goods and services. As a result, the analysis presented below represents a distributional analysis only; that is, it only shows how economic impacts may be distributed through regional markets.

Economic impact models are used to determine the current economic impacts of an industry or sector, as reflected by these measures, as well as changes expected to occur if expenditures or gross revenues change in a particular industry or sector. Economic impacts are generally characterized in terms of jobs (full- and part-time), income impacts (wages, salaries, and self-employed income), output impacts (gross business sales), and value-added impacts, which represent the contribution made to the U.S. Gross Domestic Product (GDP), that accrue to the local, state, regional and the national economy as a result of expenditures or gross revenues. These impacts should not be added together because this would result in double counting. These results are based on average relationships developed through the analysis of many fishing operations that harvest many different species. Separate models to address individual species are not available. Estimates were derived using the model developed for and applied in NMFS (2018).[6]

In addition to these types of impacts, economic impact models can be used to determine the sources of the impacts. Each impact can be broken down into direct, indirect, and induced economic impacts. "Direct" economic impacts are the results of the money initially spent in the study area (e.g., country, region, state, or community) by the fishery or industry being studied. This includes money spent to pay for labor, supplies, raw materials, and operating expenses. The direct economic impacts from the initial spending create additional activity in the local economy, i.e., "indirect" economic impacts. Indirect economic impacts are the results of business-to-business transactions indirectly caused by the direct impacts. For example, businesses initially benefiting from the direct impacts will subsequently increase spending at other local businesses. The indirect economic impact is a measure of this increase in business-to-business activity, excluding the initial round of spending which is included in the estimate of direct impacts. "Induced" economic impacts are the results of increased personal income caused by the direct and indirect economic impacts. For example, businesses experiencing increased revenue from the direct and indirect impacts will subsequently increase spending on labor by hiring more employees, increasing work hours, raising salaries/wage rates, etc. In turn, households will increase spending at local businesses. The induced impact is a measure of this increase in household-to-business activity.

Average gross revenue from rock shrimp harvested from South Atlantic waters averaged about $2.35 million between 2015 and 2019 (2019 dollars). Estimates of the economic impacts generated as a result of this revenue are provided in Table 3.3.3.1. According to this

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

information, South Atlantic rock shrimp landings by vessels with RSLA permits generated employment, income, value added, and output (sales) impacts of 283 jobs, $8 million, $11.5 million, and $22.8 million, respectively.

Table 3.3.3.1. Economic impacts of the South Atlantic rock shrimp fishery. All monetary estimates are in thousands of 2019 dollars and employment is measured in full-time equivalent jobs.

Table 3.3.3.1. Economic impacts of the South Atlantic rock shrimp fishery. All monetary estimates are in thousands of 2019 dollars and employment is measured in full-time equivalent jobs.

	DIRECT	INDIRECT	INDUCED	TOTAL
Harvesters				
Employment impacts	40	8	9	56
Income impacts	977	276	481	1,735
Total value added impacts	1,042	989	831	2,862
Output impacts	2,350	2,284	1,597	6,232
Primary dealers/processors				
Employment impacts	11	4	7	22
Income impacts	414	382	361	1,157
Total value added impacts	441	487	679	1,608
Output impacts	1,333	1,004	1,328	3,665
Secondary wholesalers/distributors				
Employment impacts	3	1	3	6
Income impacts	134	40	141	315
Total value added impacts	143	67	241	451
Output impacts	359	131	469	959
Grocers				
Employment impacts	17	2	4	22
Income impacts	397	131	198	726
Total value added impacts	423	211	335	970
Output impacts	679	343	658	1,680
Restaurants				
Employment impacts	143	9	23	176
Income impacts	2,191	656	1,240	4,087
Total value added impacts	2,335	1,173	2,089	5,597
Output impacts	4,270	1,836	4,122	10,228
Harvesters and seafood industry				
Employment impacts	213	24	46	283
Income impacts	4,113	1,485	2,421	8,019
Total value added impacts	4,385	2,928	4,175	11,488
Output impacts	8,991	5,598	8,174	22,763

Source: Calculated by NMFS SERO using the model developed for and applied in NMFS (2018).

3.3.4 Imports

On average, between 2015 and 2019, the United States has imported more than 1.4 billion lbs (product weight) of shrimp products annually. The volume of shrimp imports steadily increased during this time, rising by almost 19%, with the largest increase occurring in 2017. The value of imported shrimp products averaged almost $6 billion (2019 dollars) annually between 2015 and 2019. Contrary to the trend in volume, the value of shrimp imports decreased after 2017, by more than 8%, from 2017 to 2019, suggesting a significant decline in the average price of imported shrimp during this time. Interestingly, the increase in the volume of imported shrimp and decline in the price of imported shrimp in 2018 and 2019 mirrors the decline in the average ex-vessel price of rock shrimp, suggesting that imports may be affecting the ex-vessel price of rock shrimp. Table 3.3.4.1 provides annual pounds and value of shrimp imports and the share of imports by country of origin.

Table 3.3.4.1. Annual pounds and value of shrimp imports and share of imports by country, 2015-2019.

	2015	2016	2017	2018	2019
Pounds of shrimp imports (product weight, million pounds)	1,291,512	1,330,305	1,463,800	1,532,623	1,539,491
Value of shrimp imports (millions $, nominal)	$5,435	$5,705	$6,545	$6,236	$6,006
Value of shrimp imports (millions $, 2019$)	$5,823	$6,047	$6,807	$6,343	$6,006
Share of Imports by Country					
India	23.4	26.2	33.2	35.5	40.4
Indonesia	20.2	19.4	18.1	19.5	18.9
Vietnam	12.1	12.0	9.7	9.9	9.7
Ecuador	11.7	10.3	8.8	8.4	9.2
Thailand	13.8	14.5	12.4	8.9	7.9
Mexico	5.9	5.2	5.2	5.4	5.1
China*	3.5	4.1	5.1	4.5	1.8
All others	9.4	8.3	7.5	7.9	7.0

Source: Pounds of Shrimp Imports (GOM Data Management, pers. comm., Feb. 24, 2021). Values and market share by country (Office of Science and Technology, pers. comm., April 5, 2021). *Does not include imports from Hong Kong, Taipei, or Macao.

The distribution of market share between countries exporting shrimp to the United States, as measured by value, has changed significantly over time. Thailand was the primary country of origin for shrimp products imported into the United States between 2007 and 2012, and in fact typically accounted for about one-third of all imports during that time. Vietnam and Indonesia were the next largest exporting countries to the United States, but still only accounted for about 20% of shrimp imports during that time. However, the market share of imports between countries changed dramatically in 2012 and 2013 as Thailand's imports decreased significantly due to a breakout of Early Mortality Syndrome. As imports of shrimp from Thailand decreased, other countries took advantage of the situation by increasing their exports of shrimp to the

United States and, as a result, have increased their market share in recent years. Most notably, although India only represented 5% of the market back in 2007, it has essentially captured the market share Thailand used to have and represented more than 40% of the import market as of 2019. Although Indonesia was able to maintain its market share at around 19% from 2015 through 2019, the market shares for most other major exporting countries (Vietnam, Ecuador, Thailand, and China) have declined during this time.

3.4 Social Environment

This section provides the background for the proposed action, which is evaluated in Chapter 4. Rock shrimp permits by state and vessels with landings of rock shrimp by state are included to provide information on the geographic distribution of fishing involvement. Descriptions of the top communities involved in commercial rock shrimp are included, as well as all communities with vessels with rock shrimp landings. Community level data are presented 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. Additional detailed information about communities in the following analysis can be found on the SERO's Community Snapshots website.[7]

3.4.1 Permits

As of April 7, 2021, there were 101 federally permitted commercial South Atlantic rock shrimp vessels (valid and renewable RSLA permits, NMFS SERO permit office). Most South Atlantic rock shrimp permits are issued to individuals in Alabama (32.7% of South Atlantic rock shrimp vessels), Florida (25.7%), and North Carolina (21.8%, NMFS SERO Permits Office, April 7, 2021). Residents of Georgia, South Carolina, and other states (Mississippi, New Jersey, Texas, and Virginia) also hold commercial rock shrimp permits, but these states represent a smaller percentage of the total number of issued permits.

South Atlantic rock shrimp permits are held by individuals with mailing addresses in 43 communities (NMFS SERO Permits Office, April 7, 2021). Communities with the most commercial rock shrimp permits are located in Alabama, North Carolina, Florida, Mississippi, and Georgia (Table 3.4.1.1). Communities with most of South Atlantic rock shrimp permits are not confined to this region. Several communities located in the Gulf are among the top communities with South Atlantic rock shrimp permits. These Gulf vessels are likely participants who seasonally migrate to South Atlantic waters, particularly during boom years of the fishery and have done so since the mid-1990s. The communities with the most rock shrimp permits are Bayou La Batre, Alabama (13.9% of rock shrimp permits), Oriental, North Carolina (9.9%), and Jacksonville, Florida (7.9%).

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

Table 3.4.1.1. Top communities by number of South Atlantic rock shrimp permits.

State	Community	Rock Shrimp Permits (RSLA)
AL	Bayou La Batre	14
NC	Oriental	10
FL	Jacksonville	8
AL	Irvington	6
MS	Pascagoula	4
NC	Swan Quarter	4
AL	Coden	3
AL	Mobile	3
FL	Fernandina	3
GA	Brunswick	3
NC	Hobucken	3

Source: SERO Permit Office, April 7, 2021.

3.4.2 Vessels with Landings

A large portion of federally permitted rock shrimp vessels are not active in the fishery. From 2015 to 2019, the annual number of federally permitted rock shrimp vessels ranged from 136 to 125 vessels (RSLA permits, SERO Permits Office). However, during the same time period a total of 48 unique vessels landed rock shrimp (Personal communication, ACCSP, March 17, 2021, and personal communication SEFSC, February 22, 2021).

Vessels with landings were matched to federal permit data in order to link vessels to a particular community. The primary mailing address of the permit holder was used to determine the community and state. The address associated with some permits changed over time because the permit was transferred; therefore, some vessels are included more than one time in the following analysis if there was more than one community of residence for permitted individual during the time period. Approximately nine vessels with landings could not be matched with an address and are not included; therefore, the following analysis includes a total of 39 vessels.

The majority of rock shrimp vessels with landings reported addresses in Florida (43.6% of rock shrimp vessels with landings), Alabama (20.5%), and North Carolina (20.5%, personal communication, ACCSP, March 17, 2021; personal communication SEFSC, February 22, 2021; and SERO Permits Office, 2015-2019). Residents of Georgia and other states (Mississippi and Virginia) also made landings of rock shrimp, but these states represent a smaller percentage of the total number of vessels with landings of rock shrimp.

Vessels with landings of South Atlantic rock shrimp were linked to individuals with mailing addresses in 21 communities (Table 3.4.2.1). The communities with the most vessels with rock shrimp landings are Jacksonville, Florida (17.9% of vessels with rock shrimp landings), Oriental, North Carolina (15.4%), and Mobile, Alabama (7.7%, personal communication, ACCSP, March

17, 2021; personal communication SEFSC, February 22, 2021; and SERO Permits Office, 2015-2019).

Table 3.4.2.1. All communities with vessels with landings of South Atlantic rock shrimp in order of number of vessels by community, 2015-2019.

State	Community
FL	Jacksonville
NC	Oriental
AL	Mobile
FL	Fernandina
FL	Panama City
FL	Southport
FL	Youngtown
GA	Brunswick
AL	Bayou La Batre
AL	Citronelle
AL	Fairhope
AL	Irvington
AL	Theodore
FL	Atlantic Beach
FL	Cape Canaveral
GA	Richmond Hill
MS	Pascagoula
MS	Vancleave
NC	Maggie Valley
NC	New Bern
VA	Hampton

Source: Personal communication, ACCSP, March 17, 2021; personal communication SEFSC, February 22, 2021; and SERO Permits Office.

3.4.3 Regional Quotient

The descriptions of communities include information about the top communities based on a "regional quotient" (RQ) of commercial landings for rock shrimp. The RQ is the proportion of landings out of the total landings of that species for that region and that year, and is a relative measure.

Figure 3.4.3.1 includes the top rock shrimp communities by regional quotient landings in pounds from 2015 to 2019. Communities from the South Atlantic and Gulf are included because landings of rock shrimp from South Atlantic waters could be landed at dealers in Gulf states. Communities are presented in order of their summed total landings for all years. The top rock shrimp communities are located in Florida, Alabama, Georgia, and North Carolina. The top three rock shrimp communities (Titusville, Mayport, and Jacksonville) are located along the east

coast of Florida, and are in relatively close proximity to the OHAPC. A variation in annual landings and the location of those landings is evident in Figure 3.4.3.1.

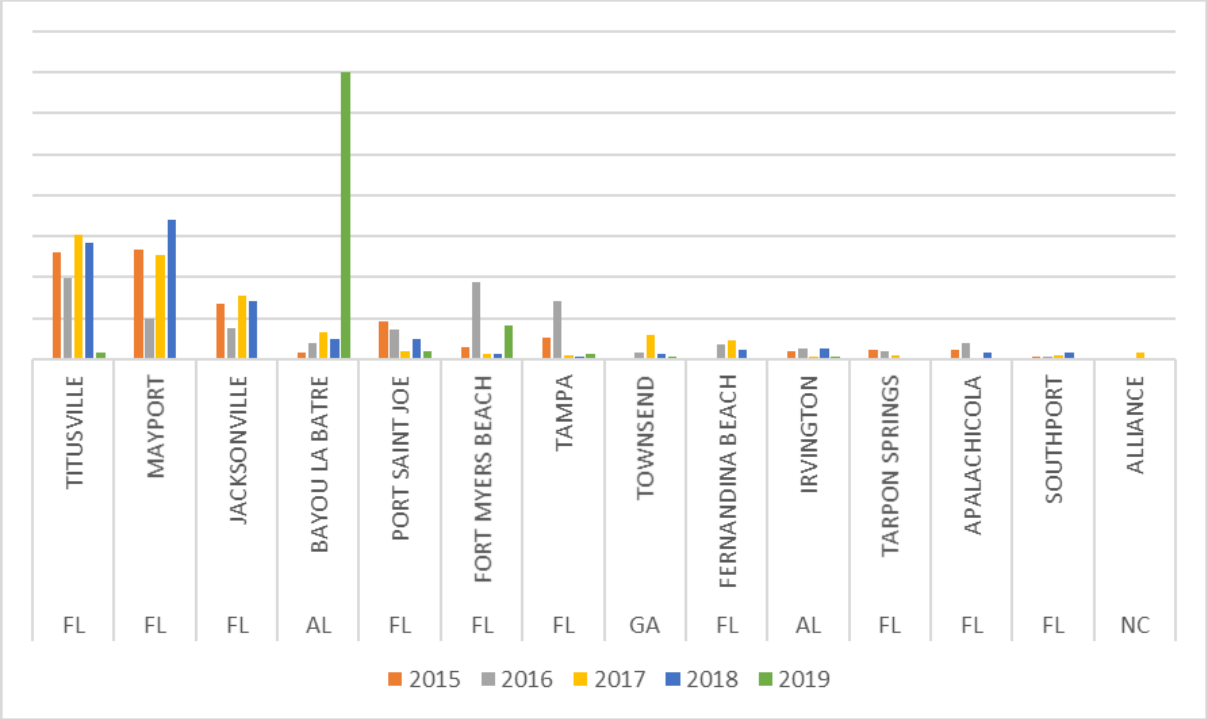

Figure 3.4.3.1. Top communities by pounds RQ of rock shrimp (2015-2019). The actual RQ values (y-axis) are omitted from the figure to maintain confidentiality. Communities are presented in order of their summed total landings for all years.

Source: SERO, Community ALS 2015-2019.

3.4.4 Environmental Justice

Executive Order (E.O.) 12898 (1994) 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, which is referred to as "environmental justice" (EJ). In addition, and specifically with respect to subsistence consumption of fish and wildlife, federal agencies are required to collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. The main focus of E.O. 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…"

Information is available concerning communities overall status with regard to minorities and poverty (e.g., census data). To help assess whether any EJ concerns may be present within regional communities, a suite of indices was 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.

Figures 3.4.4.1 and 3.4.4.2 provide the social vulnerability of the top commercial rock shrimp communities. Two communities exceed the threshold of one standard deviation above the mean for all three indices, Bayou La Batre, Alabama, and Brunswick, Georgia. Two other communities exceed the threshold of one standard deviation above the mean for any of the indices (Pascagoula, Mississippi, and Hobucken, North Carolina). These communities would be the most likely to exhibit vulnerabilities to social or economic disruption due to regulatory change.

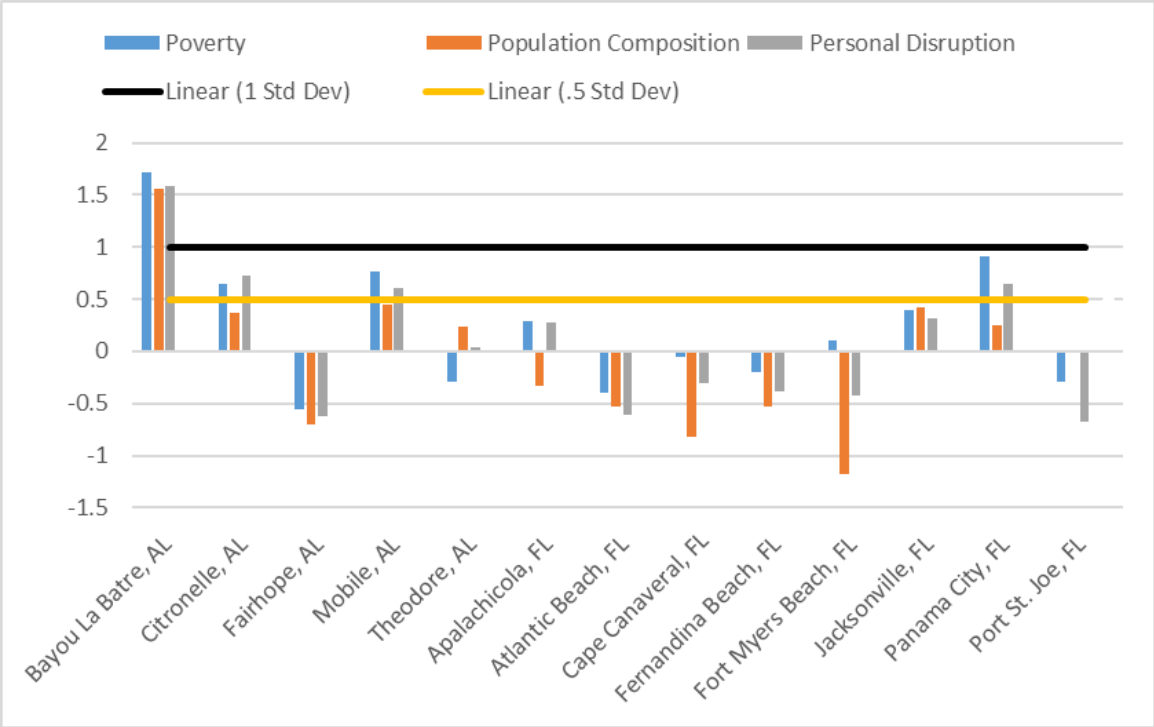

Figure 3.4.4.1. Social vulnerability indices for top rock shrimp communities.

Source: SERO, Community Social Vulnerability Indicators Database 2018.

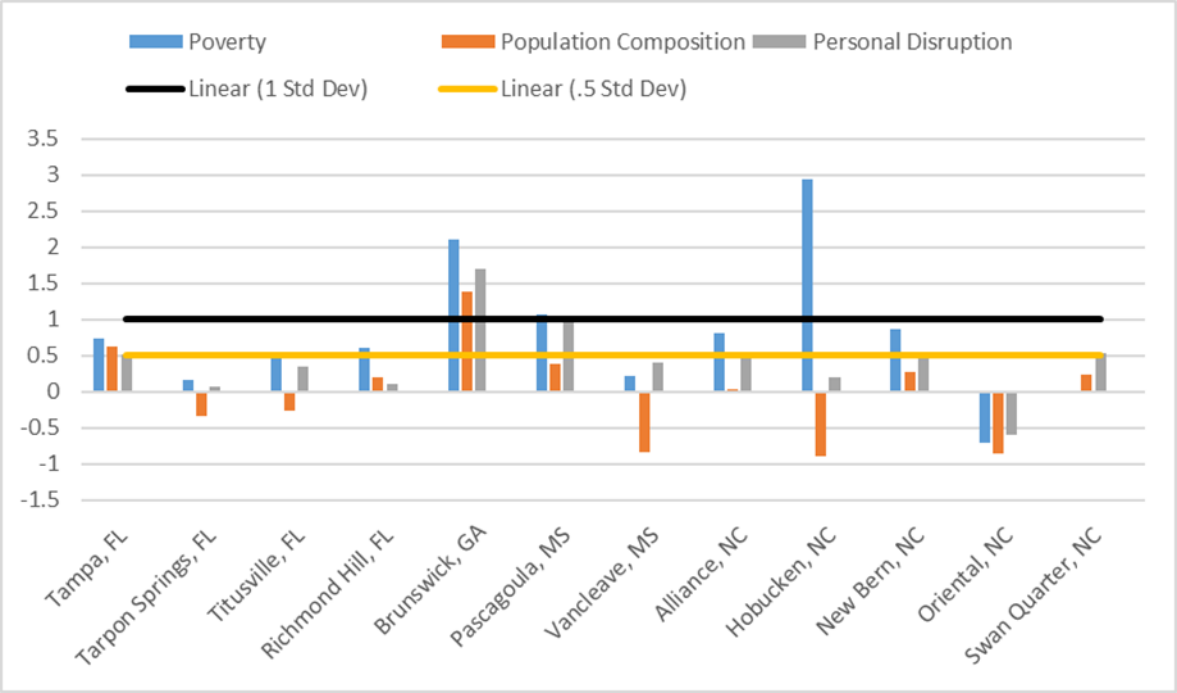

Figure 3.4.4.2. Social vulnerability indices for top rock shrimp communities continued.

Source: SERO, Community Social Vulnerability Indicators Database 2018.

People in these communities may be affected by fishing regulations in two ways: participation and employment. Although these communities may have the greatest potential for EJ concerns, complete data are not available on the race and income status for those involved in the local fishing industry (employment), or for their dependence on rock shrimp specifically (participation). Although no EJ issues have been identified in this amendment, 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 South Atlantic Council is responsible for conservation and management of fishery resources in federal waters of the U.S. South Atlantic. These waters extend from 3 to 200 mi offshore from the seaward boundary of North Carolina, South Carolina, Georgia, and east coast of Florida to Key West. The South Atlantic Council has thirteen voting members: one from NMFS; one each from the state fishery agencies of North Carolina, South Carolina, Georgia, and Florida; and eight public members appointed by the Secretary. On the South Atlantic Council, there are two public members from each of the four South Atlantic States. Non-voting members include representatives of the U.S. Fish and Wildlife Service, U.S. Coast Guard (USCG), State Department, and Atlantic States Marine Fisheries Commission (ASMFC). The South Atlantic 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 South Atlantic 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 South Atlantic Council uses its Scientific and Statistical Committee (SSC) to review the data and science being used in assessments and fishery management plans/amendments. In addition, the regulatory process is in accordance with the Administrative Procedure Act, in the form of "notice and comment" rulemaking.

3.5.2 State Fishery Management

The state governments of North Carolina, South Carolina, Georgia, and Florida have the authority to manage fisheries that occur in waters extending three nautical miles from their respective shorelines. North Carolina's marine fisheries are managed by the Marine Fisheries Division of the North Carolina Department of Environmental Quality. The Marine Resources Division of the South Carolina Department of Natural Resources 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 South Atlantic 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. Establish a shrimp fishery access area along the eastern edge of the northern extension of the Oculina Bank Habitat Area of Particular Concern.

Alternatives*

1 (No Action). Don't establish a shrimp fishery access area.

2. Establish a shrimp fishery access area that is 22 mi^2 along the eastern edge of the northern extension of the Oculina Bank Habitat Area of Particular Concern.

3. Establish a shrimp fishery access area that is 32 mi^2 along the eastern edge of the northern extension of the Oculina Bank Habitat Area of Particular Concern.

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

4.1.1 Biological Effects

Expected Effects to managed species and Essential Fish Habitat

Alternative 1 (No Action) would not establish a shrimp fishery access area (SFAA) along the northern extension of the Oculina Bank Habitat Area of Particular Concern (OHAPC) and would retain the existing protections through the entire northern extension of the OHAPC. The existing regulations protect high relief coral mounds, low relief coral habitat, and establish conservation of the full extent of the deep-water *Oculina* coral ecosystem in the South Atlantic region.

Preferred Alternative 2 and **Alternative 3** would establish SFAAs of 22 mi^2 and 32 mi^2, respectively, and would increase the allowable fishing area to rock shrimp fishermen. The proposed areas are based on discrete historic trawling where they could fish for rock shrimp when rock shrimp are available. However, use of all other bottom tending gear and anchoring would remain prohibited within the SFAA. The presence of rock shrimp in the proposed areas is highly variable and past fishing effort in the northern extension of the OHAPC and proposed SFAAs was historically low, averaging less than 1.8% of total number of vessel monitoring system (VMS) fishing points, which are used as a proxy for fishing activity.

Preferred Alternative 2 and **Alternative 3** could result in negative direct and indirect biological impacts to the deep-water coral habitat within the proposed SFAAs as they would allow intermittent bottom trawling for rock shrimp. Habitat mapping conducted in the area resulted in maps at a 5 to 10 meter (m) resolution, which is insufficient to detect a one-meter in diameter coral colony or low relief hard bottom. No high relief habitat is present in **Preferred Alternative 2** (Figures 4.1.1.1 through 4.1.1.4) or **Alternative 3** (Figures 4.1.1.5 through 4.1.1.8). Although no recent visual surveys have been conducted, it is possible that low relief hard bottom (composed of 1 to 2 feet (ft) in relief ledges), coral rubble, and coral recruits on hard bottom and rubble are present in this area.

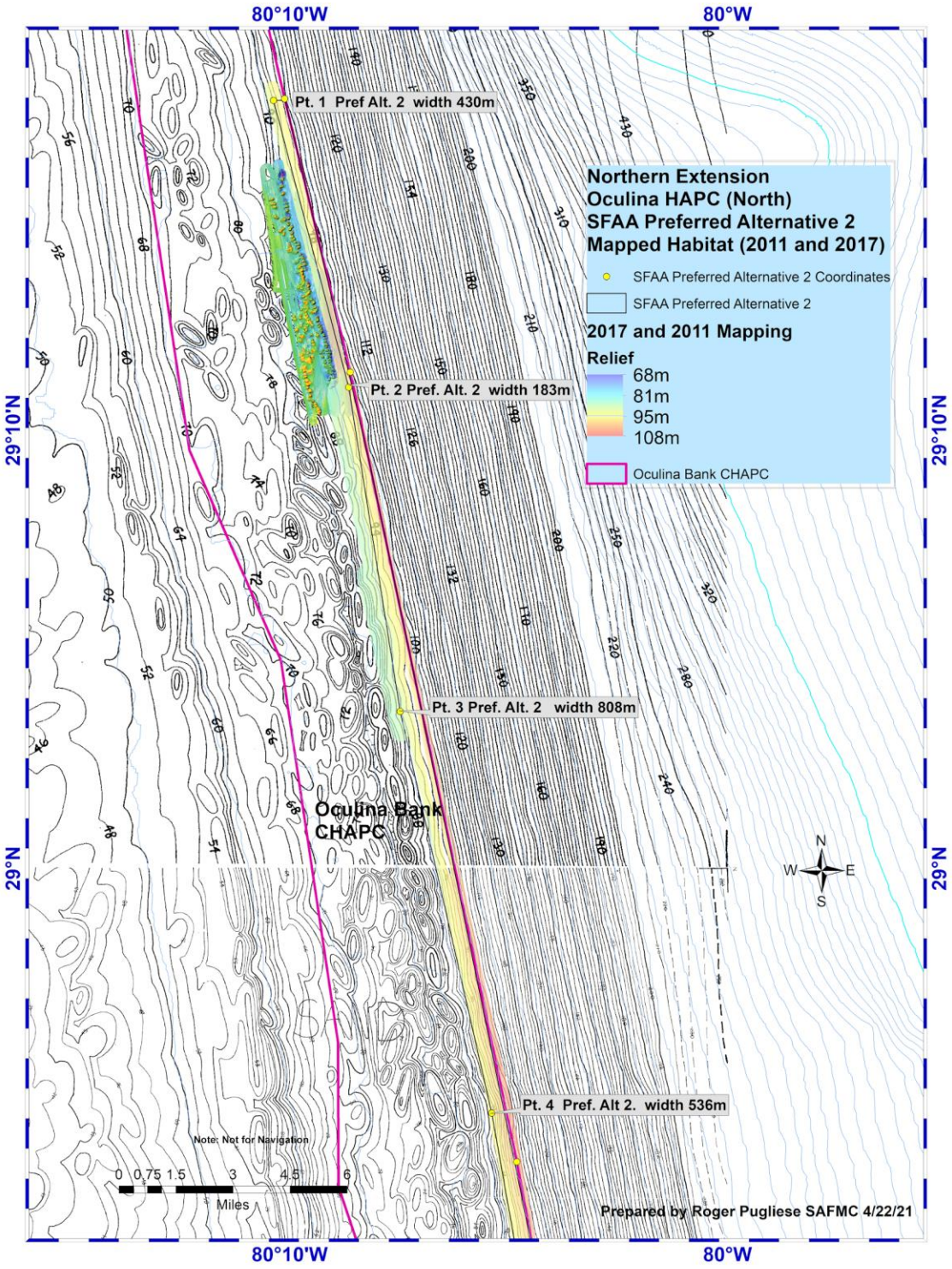

Figure 4.1.1.1. Northern extension of the OHAPC (North) including the proposed SFAA (**Preferred Alternative 2**) and habitat mapped in 2017 during the Southeast Deep Coral Initiative (SEDCI) expedition and during the 2011 Pisces expedition.

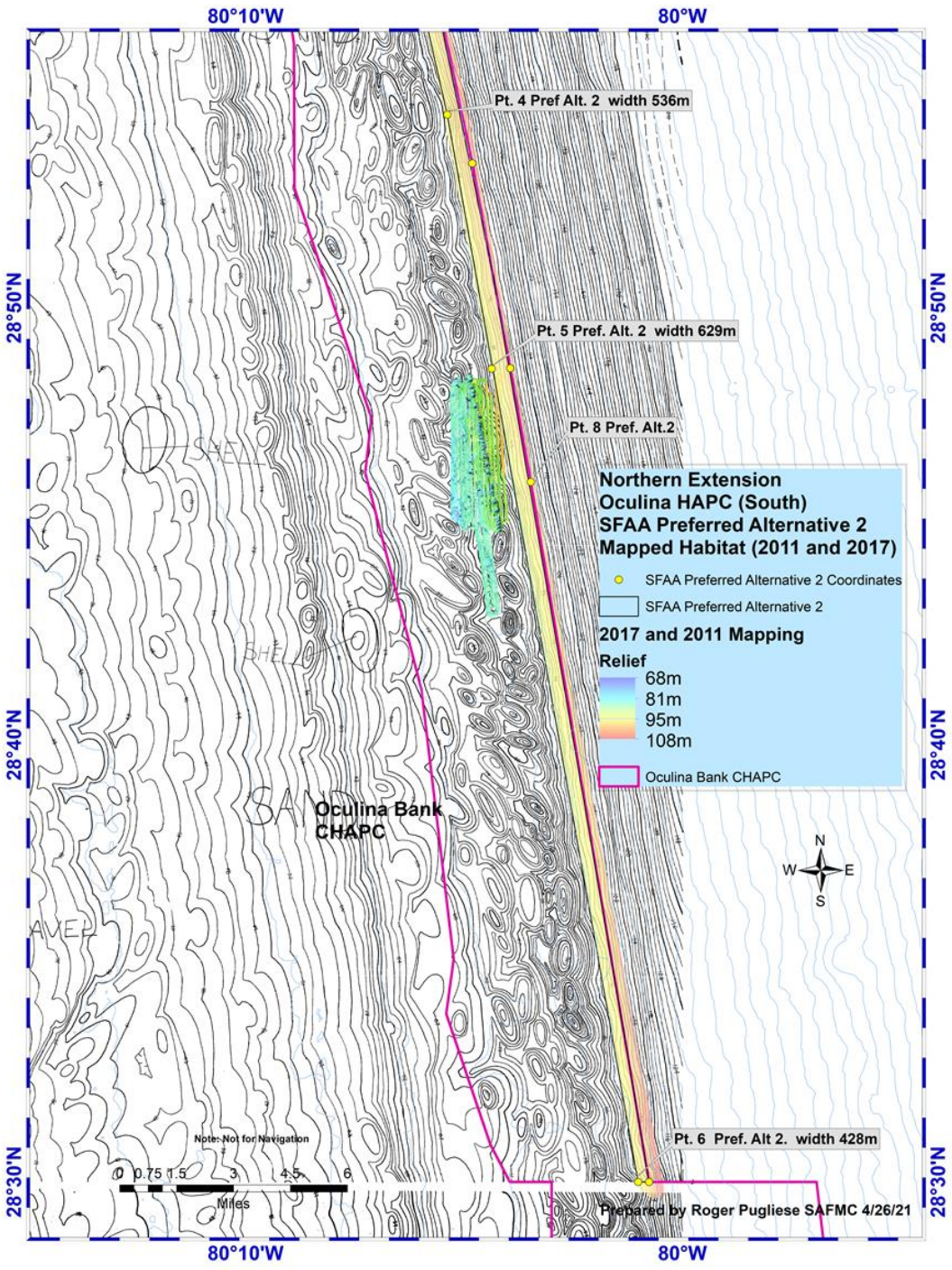

Figure 4.1.1.2. Northern extension of the OHAPC (South) including the proposed SFAA (**Preferred Alternative 2**) and habitat mapped in 2017 during the SEDCI expedition and during the 2011 Pisces expedition.

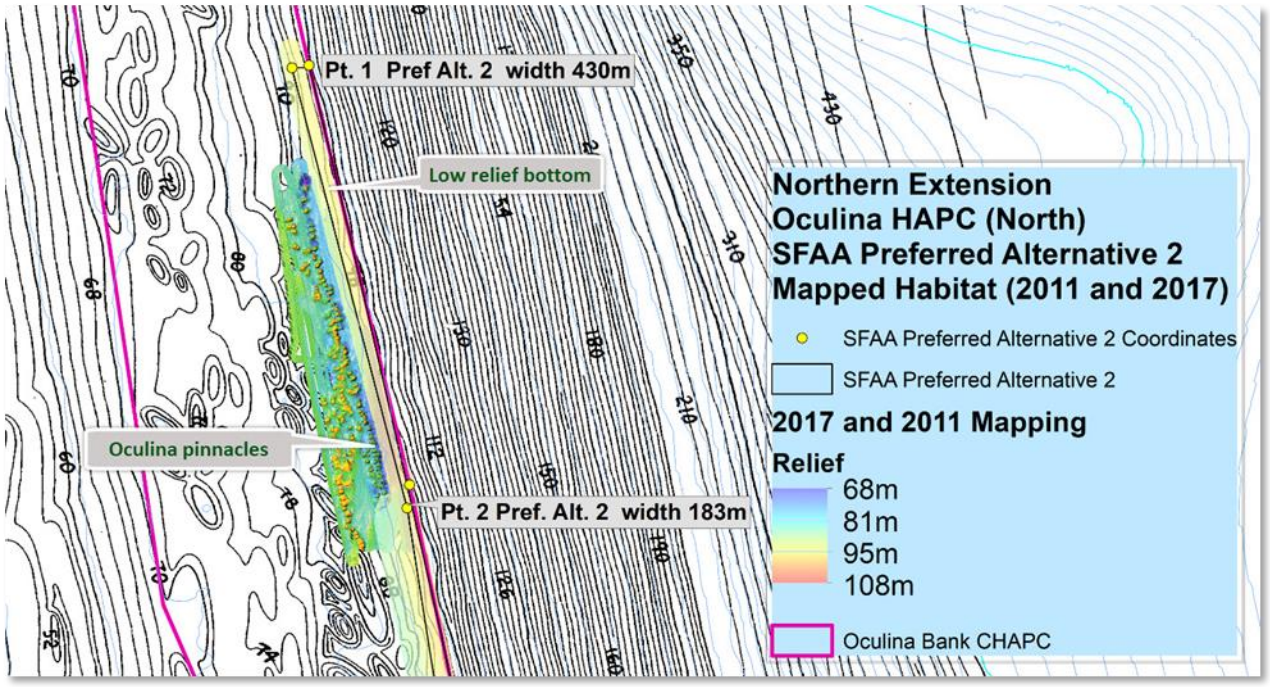

Figure 4.1.1.3. Magnified view of mapped low relief bottom in the northern portion of **Preferred Alternative 2** in relationship to mapped high relief Oculina pinnacle habitat distributed west.

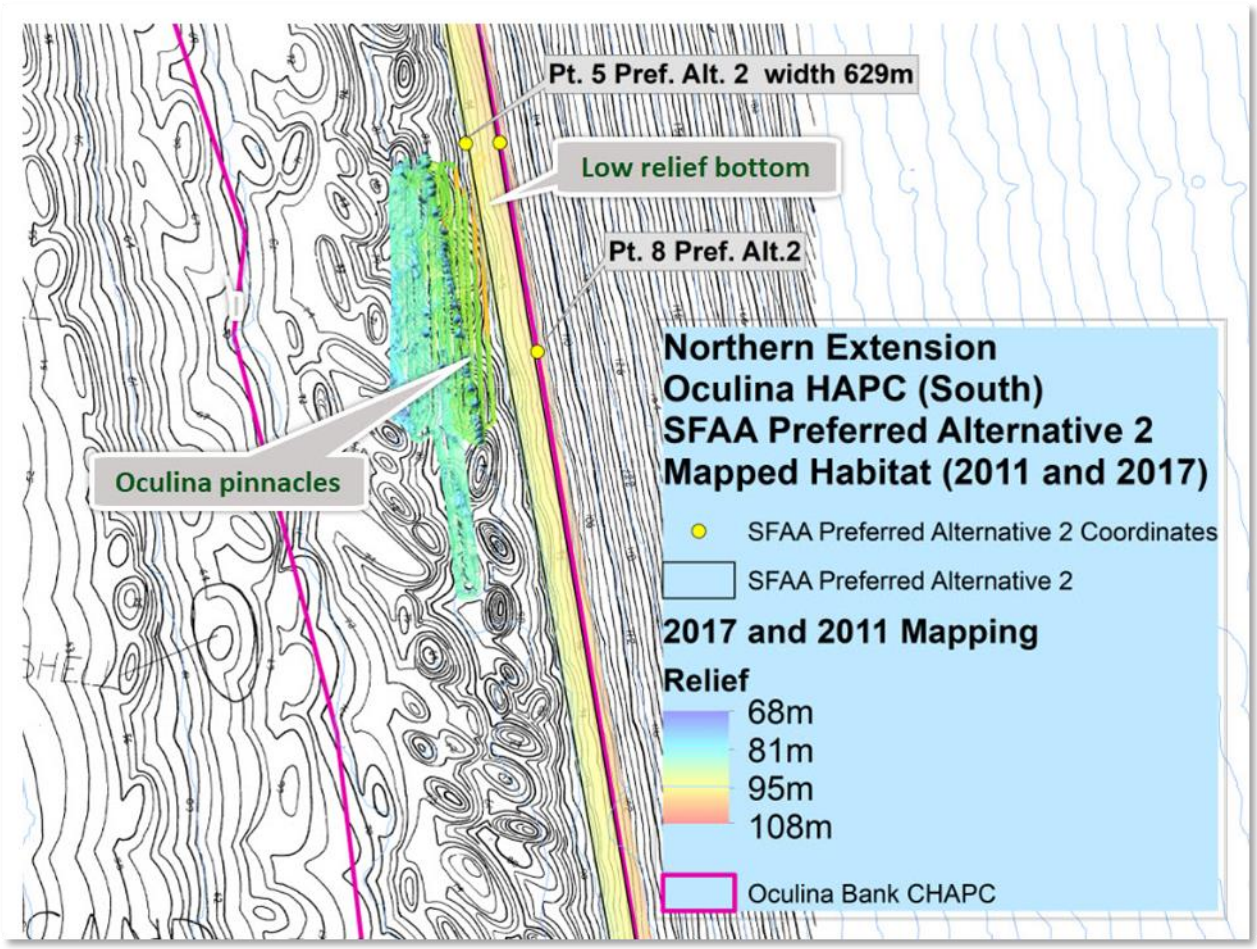

Figure 4.1.1.4. Magnified view of mapped low relief bottom in the southern portion of **Preferred Alternative 2** in relationship to mapped high relief Oculina pinnacle habitat distributed west.

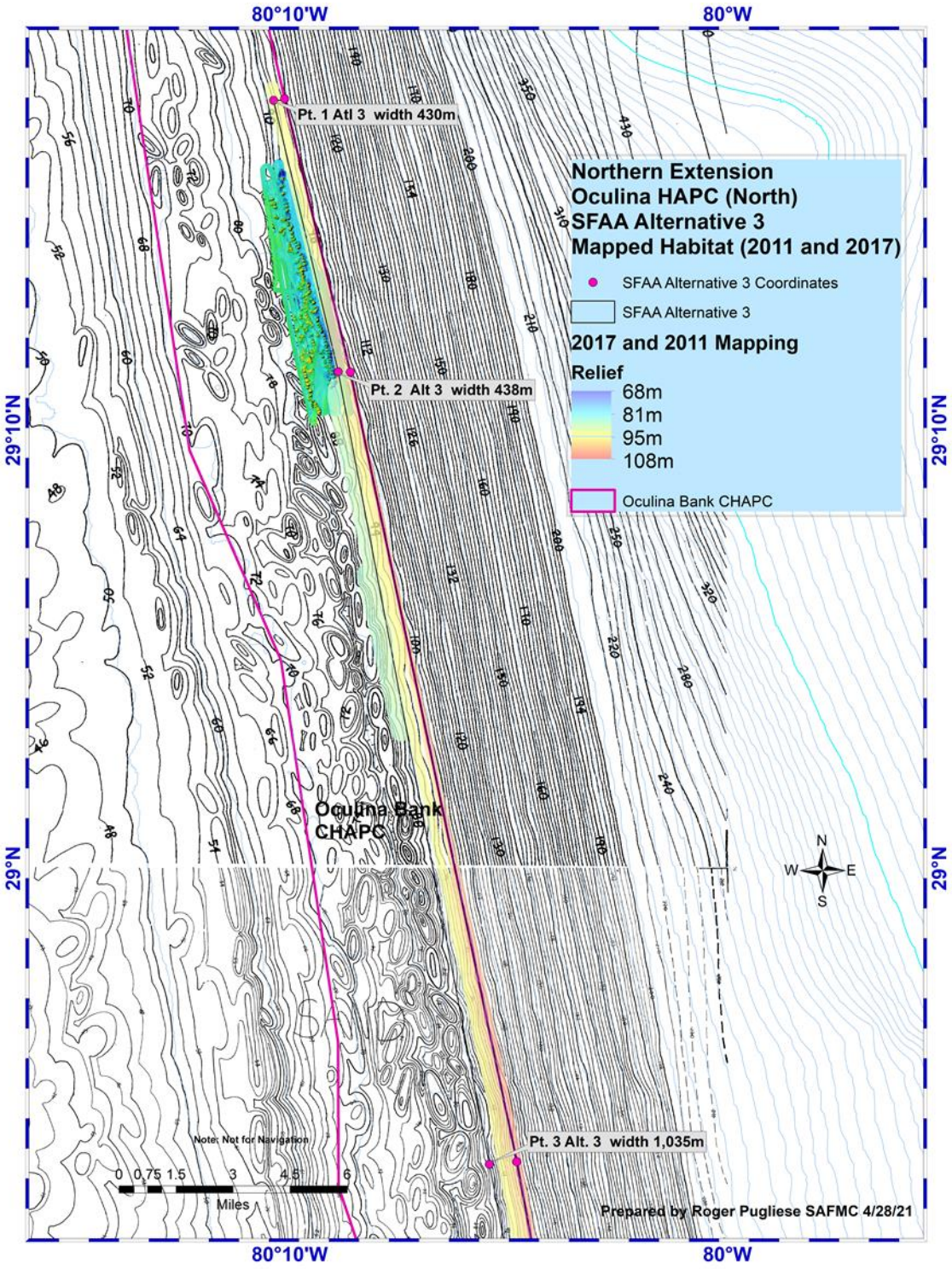

Figure 4.1.1.5. Northern extension of the OHAPC (North) including the proposed SFAA (**Alternative 3**) and habitat mapped in 2017 during the SEDCI expedition and during the 2011 Pisces expedition.

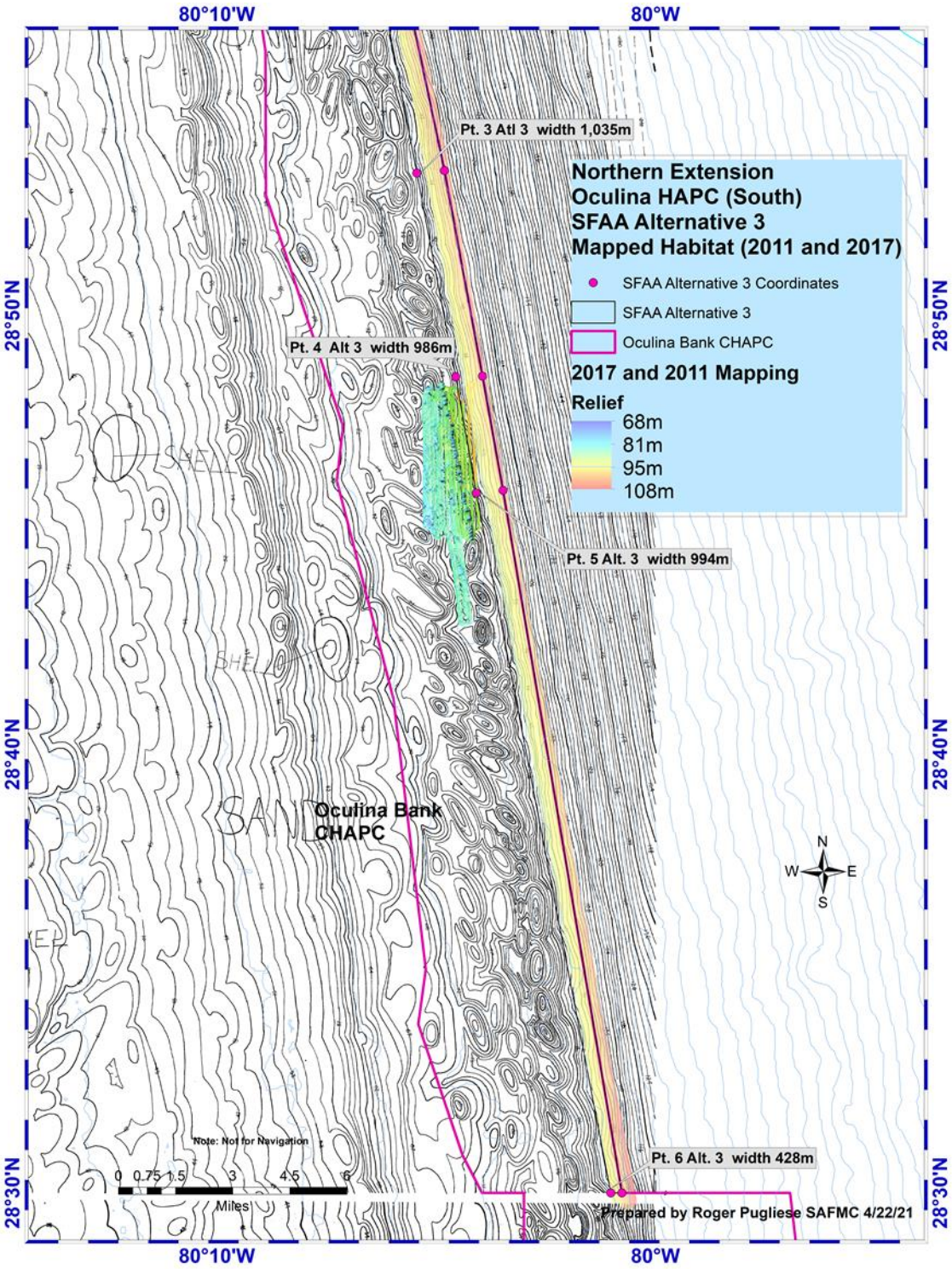

Figure 4.1.1.6. Northern extension of the OHAPC (South) including the proposed SFAA (**Alternative 3**) and habitat mapped in 2017 during the SEDCI expedition and during the 2011 Pisces expedition.

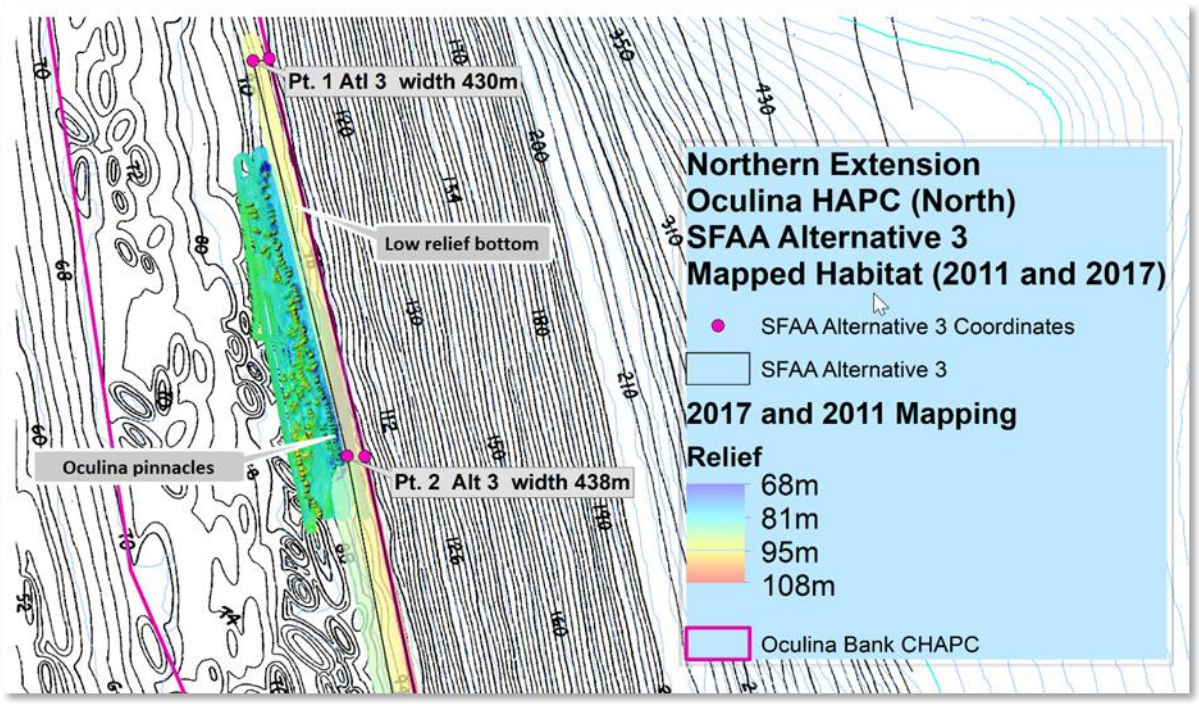

Figure 4.1.1.7. Magnified view of mapped low relief bottom in the northern portion of **Alternative 3** in relationship to mapped high relief Oculina pinnacle habitat distributed west.

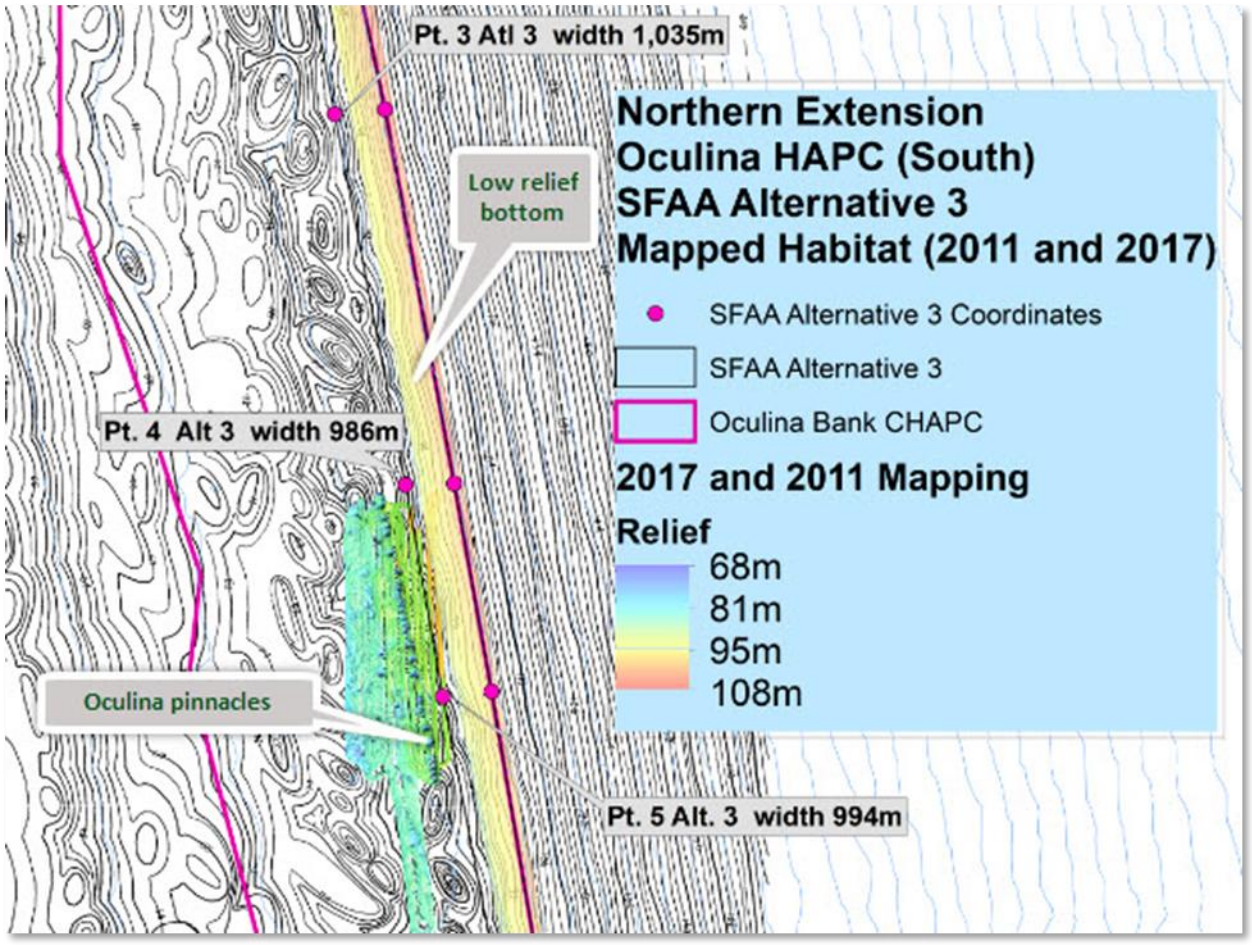

Figure 4.1.1.8. Magnified view of mapped low relief bottom in the southern portion of **Alternative 3** in relationship to mapped high relief Oculina pinnacle habitat distributed west.

Direct effects

Deep-sea coral reefs worldwide have experienced direct and indirect effects of trawling, primarily from physical damage from nets and doors. Changes in benthic community abundance and composition can result from this damage, in addition to degraded species diversity and the loss of corals and sponges which play a keystone role in providing habitat for a large number of other organisms (Fosså et al. 2002; Gage et al. 2005). Although shrimp fishermen affirm that they avoid hard bottom habitat when trawling to avoid snags and gear loss, and rock shrimp prefer sand bottom, numerous instances of gear impacts to corals have been documented in the OHAPC. During the 1980s and 1990s, bottom trawling within the *Oculina* ecosystem, primarily for rock shrimp and brown shrimp, was the primary cause of major habitat destruction (Reed et al. 2007; Figure 4.1.1.9).

Figure 4.1.1.9. Discarded shrimp trawl net (Sebastian Pinnacles, 80-m depth), modified from Figure 3 in Reed (2006).

Fishermen are most likely to fish in areas where shrimp were previously caught; areas already impacted by past trawling activity on the low relief bottom. These areas could also be exhibiting signs of recovery as trawled low relief hard bottom or standing dead coral rubble provides habitat for coral recruitment and coral growth subsequent to trawling events. Nearly all of the coral recruits observed in the last 10 years in the OHAPC have been growing on coral rubble and are contributing to the restoration of ecological services lost in the area from past trawling events. A single coral colony measuring 1-foot in diameter can host up to 2,000 animals, namely crabs, shrimp, mollusks, and echinoderms (comments to SAFMC on Coral Amendment 10, June 11, 2021). Cobb et al. (1973) found the inshore distribution of rock shrimp to be associated with terrigenous and biogenic sand and only sporadically on mud. However, rock shrimp also utilize hard bottom and coral, or more specifically, *Oculina* coral habitat areas (SAFMC 1996). This habitat was confirmed by scientific sampling which captured large amounts of rock shrimp in and around the OHAPC prior to its designation and prior to significant exploitation and development of the directed fishery (Cobb et al. 1973).

The degree and likelihood of potential direct biological impacts from bottom tending fishing gear on coral habitat as a result of **Preferred Alternative 2** and **Alternative 3** are unknown due to the paucity of habitat mapping and habitat characterization available for this area. While no high relief mounds are present, low-relief hard bottoms and coral rubble could be providing substrate available for coral recruitment and recovery from previous trawling events. Although rock shrimp occurrence in the proposed areas is variable, and fishing is expected to occur in areas impacted from previous trawling, any recovery of ecosystem services that has occurred since the last trawling event would be lost.

Direct physical impacts to habitats located within the OHAPC could result from the implementation of **Preferred Alternative 2** and **Alternative 3** from typical shrimp fishing gear configuration (Figure 4.1.1.10).

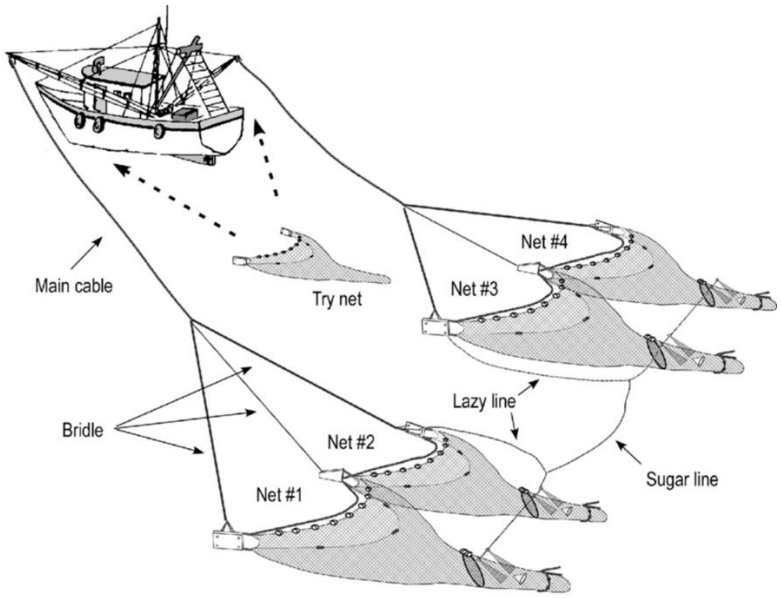

Figure 4.1.1.10. Typical gear configuration for U.S. southeastern shrimp vessels equipped with four nets.

Source: Scott-Denton et al. 2012.

The length of the proposed SFAA (**Preferred Alternative 2** and **Alternative 3**) is approximately 89,500 m. If a boat is 80 ft in length, a single outrigger is approximately 30 ft in length. A boat pulling 4 nets (quad 4) will have the outside drag outside the rigger, as the dummy door trails directly behind the tip of the outrigger connected to the main cable. If the nets have a head rope length of 55 ft and a door height of 4 ft, then approximately 38.5 ft (70% of the headrope length) and 4 ft (door height, roughly 10% of the headrope extension) door would extend beyond the outrigger due to gear configuration (Figure 4.1.1.11).

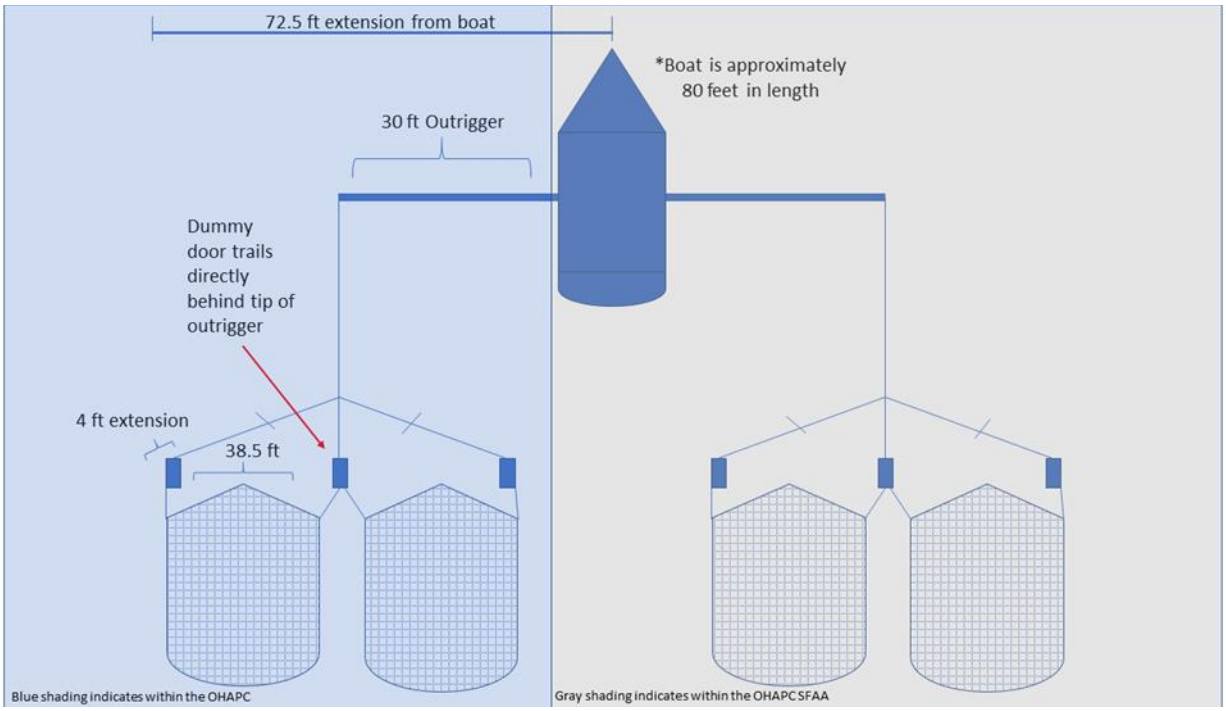

Figure 4.1.1.11. Depiction of a four-rig shrimp fishing vessel with four identical nets. A head rope (float line) width of 55 ft, would result in an estimated 70% spread. Doors are typically 10 ft in length and 4 ft wide (see www.fao.org/3/ac740t/AC740T05.htm#ch5.4/).

Two scenarios were developed to help understand the potential physical impacts on coral habitat in the OHAPC.

- Scenario 1: Fishing the western edge of the SFAA could result in the gear placement approximately 72.5 ft (22.1 m) inside the OHAPC. In this scenario, approximately 0.8 square mile (1,977,950 m^2) of OHAPC could be impacted by physical damage from the gear (22.1 m x 89,500 m).
- Scenario 2: If the vessel and the outriggers were within the SFAA, but not the nets, a gear extension beyond that boundary line for the outside net could occur approximately 42.5 ft (12.8 m). In this scenario, 42.5 ft of bottom disturbing gear could extend within the OHAPC and 0.4 square miles of OHAPC could be impacted by physical damage from the gear (12.8 m x 89,500 m = 1,145,600 m^2)

Indirect effects

Indirect effects to coral could result through influx of suspended benthic sediments created while trawling the bottom. A current meter was deployed in the Oculina Bank for 289 days in 1978-79. Results show surface currents are usually strong and northerly from the Gulf Stream; however, bottom currents were more variable with strong east-west, north, and south components (Hoskin et al. 1987). Average near bottom current speed was 8.6 cm sec^{-1} but occasionally was in excess of 8.6 cm sec^{-1} (Hoskin et al. 1987).

Increased sedimentation can cause smothering and burial of coral polyps, shading, tissue necrosis, population explosions of bacteria in coral mucus, and generally reduces recruitment, survival, and settlement of coral larvae (Erftemeijer et al. 2012). Coral recruits are particularly

susceptible to sedimentation and an increase in fine sediment can significantly reduce coral recruit survival (Fourney and Figueiredo 2017).

The sediments on shelf-edge *Oculina* reefs are relatively fine and have a higher composition of muds (14.4% mud) compared to sediments in shallow coral reef counterparts (Hoskin et al. 1987). In addition, areas east of the high relief *Oculina* mounds have a higher (29%) average percentage of muds (Hoskin et al. 1987). Fine sediments tend to have greater negative effects on corals than coarse sediments. Coral experts and members of the South Atlantic Fishery Management Council's (South Atlantic Council) Coral Advisory Panel (AP) and Habitat and Ecosystem AP indicated that establishing a protective (possibly 1,000 m) buffer between known coral habitat and fishing grounds would be prudent to prevent adverse impacts to coral colonies (explained further in Chapter 5). However, research has not established exactly what the optimal buffer distance should be. Miller et al. (2016) found suspended particles can travel and impact coral over 700 m from active dredging operations, which was also the farthest they looked. The spatial extent of impacts from dredging can be variable, and in a severe case, water quality impacts have been detected up to 20 km away from the dredging activity when oceanographic features included unidirectional flow during the project (Fisher et al. 2015). Approximate distances from the western boundary of **Preferred Alternative 2** to the *Oculina* pinnacles mapped in 2011 are 750 m west of Pt. 5, 700 m west of Pt. 8, and 310 m west of Pt. 2 (Figures 4.1.1.3 and 4.1.1.4). Approximate distances from the western boundary of **Alternative 3** to the *Oculina* pinnacles mapped in 2011 are 750 m west of Pt. 4, 386 m west of Pt. 5 and 115 m west of Pt. 2 (Figures 4.1.1.7 and 4.1.1.8). Depending on direction and magnitude of water currents in the affected area, shrimp trawls could create similar sediment plumes during fishing operations and the plumes could be transported to coral habitats.

Of note, since 2014, Florida's shallow water coral reefs have been experiencing the most widespread and lethal coral disease outbreak in the world. The current case definition (2018)[8] assigns the name Stony Coral Tissue Loss Disease (SCTLD) and characterizes *Oculina varicosa* as "low susceptibility." This disease outbreak is unprecedented in terms of the large geographic range, duration of the outbreak, number of species affected (22 species), high rates of transmission and mortality, and considerably high prevalence within certain species. Hundreds of millions of corals have died from this outbreak so far, including all known colonies of pillar coral (*Dendrogyra cylindrus*), listed as threatened under the Endangered Species Act (ESA), in southeast Florida, Biscayne National Park, and the Upper Keys (Neely 2020). The disease has since spread to other Caribbean reefs in at least 10 nations (http://www.agrra.org/where-is-this-occurring/). Sediment plumes can create enabling conditions for coral diseases to thrive. For example, researchers in the Great Barrier Reef found a significant, positive relationship between overall coral disease prevalence and the length of time that a reef was exposed to sediment plumes (Pollock et al. 2014). In addition, Voss and Richardson (2006) observed increased incidence of coral disease at sites with higher sedimentation in the Bahamas, but the authors drew no firm conclusions on causation. Additionally, Williams et al. (2010) found a statistical relationship between the presence of Porites growth anomalies (technically considered a disease)

[8] SCTLD Case Definition. 2018. Florida Coral Disease Response Research & Epidemiology Team. Accessed: July 19, 2021. https://floridadep.gov/sites/default/files/Copy%20of%20StonyCoralTissueLossDisease_CaseDefinition%20final%2010022018.pdf.

and turbidity in Hawaii. Accordingly, NOAA developed a *Strategy for Stony Coral Tissue Loss Disease Response and Prevention* that includes expanding the capacity for research and data collection in mesophotic reef ecosystems (https://www.coris.noaa.gov/activities/sctld_strategy/welcome.html).

Potential negative biological impacts to the affected environment relative to **Alternative 1 (No Action)** would be greatest under **Alternative 3** (largest proposed allowable fishing area) followed by **Preferred Alternative 2**.

Expected Effects to Protected Species

The action in this amendment would not significantly modify the way in which the fishery is prosecuted in terms of gear types. Historical fishing effort in the proposed areas was low and future fishing effort is anticipated to be similar to historical effort. Therefore, there are no additional impacts on ESA-listed species or designated critical habitats anticipated as a result of this action (see Section 3.2.3 for a more detailed description of ESA-listed species and critical habitat in the action area).

4.1.2 Economic Effects

Alternative 1 (No Action) would continue to disallow additional fishing access to rock shrimp vessels within the northern extension of the OHAPC; however, since this area is currently closed to bottom trawl gear, there would not be a change in economic benefits. **Alternative 1 (No Action)** would result in foregone landings of rock shrimp and thus foregone economic benefits associated with these landings compared to **Preferred Alternative 2** and **Alternative 3**.

Preferred Alternative 2 would result in net economic benefits by allowing vessels fishing for rock shrimp with bottom trawl gear to potentially increase landings of rock shrimp through access to an approximate 22 mi^2 area in which rock shrimp harvest was allowed prior to implementation of Coral Amendment 8 in 2015. Based on historical VMS data, the use of this area would likely vary from year to year. However, participants in the rock shrimp portion of the shrimp fishery have reported, and historical VMS data indicate, that rock shrimp were historically caught in the proposed access area. Increases in catches of rock shrimp would be expected to increase gross revenue and producer surplus,[9] thus resulting in net economic benefits. Given the likely variability in usage of the area, as well as the exhibited variability in overall participation in the regional rock shrimp portion of the shrimp fishery (Table 3.3.1.2), these economic effects cannot be quantified. Additionally, if landings of rock shrimp increase, these landings are a relatively small component of the overall market for shrimp given the magnitude of shrimp imports (Section 3.3.4). Thus, higher landings of rock shrimp would not be expected to change ex-vessel or consumer prices and therefore there is no anticipated change in consumer surplus. The economic effects of **Alternative 3** would likely be similar to those described for **Preferred Alternative 2**, but economic benefits under **Alternative 3** would be

[9] Producer surplus (PS) is the difference between the amount a producer is paid for a unit of a good and the minimum amount the producer would accept to supply that unit (i.e., marginal cost). Total PS in a market or industry is measured by the difference between total gross revenue and total variable costs. PS is a measure of net economic benefits to producers.

comparatively higher since this alternative would allow access to an additional 10 mi^2 of fishing grounds.

The economic effects on individual vessel owners from **Preferred Alternative 2** and **Alternative 3** would depend on each vessel owner's profit maximization strategy, their dependence on rock shrimp, their seasonal fishing behavior, and their propensity to fish for rock shrimp in the new area compared to existing open areas. Some vessel owners may benefit from additional rock shrimp landings, while others may not. These types of individual vessel level effects cannot be determined with available models. On average, 19 vessels with a valid limited access Commercial Vessel Permit for Rock Shrimp (South Atlantic Exclusive Economic Zone) harvested rock shrimp from the South Atlantic annually from 2015 through 2019 (Table 3.3.1.2).

Net economic benefits for commercial rock shrimp vessels would be highest under **Alternative 3**, followed by **Preferred Alternative 2**, and **Alternative 1 (No Action)**. In general, rock shrimp dealers are indirectly affected whenever gross revenues to commercial fishing vessels are expected to change as a result of a change in landings (e.g., increases in gross revenues from increased landings are expected to indirectly benefit dealers and vice versa). This would occur due to increased sales and associated increased producer surplus for dealers. Thus, the ranking of net economic benefits to dealers would be the same as for commercial fishing vessels. On average, 8 dealers purchased rock shrimp from the South Atlantic annually from 2015 through 2019 (Table 3.3.2.1).

4.1.3 Social Effects

In general, closed areas can have negative social effects on fishermen if important fishing grounds are no longer open to harvest. Fishermen would need to fish other areas to maintain operations, which may result in user conflicts or overcrowding issues. Additionally, increased economic costs associated with travel to other fishing grounds could affect crew employment opportunities on vessels. Long-term social benefits may be associated with the long-term biological benefits of closed areas if the closures are appropriately selected and include a periodic evaluation of effectiveness. Closing some areas may have broad social benefits by protecting more coral areas and may contribute to improved fishery resources.

Alternative 1 (No Action) would likely result in minimal social effects because the fleet is already harvesting in open areas and prohibited from working in the closed areas. The economic benefit of establishing an SFAA for the rock shrimp fleet would not occur under **Alternative 1 (No Action)** and changes in fishing behavior or fishing opportunities would not be expected. Maintaining closed areas where substantial deep-water coral exists may prevent any future impacts from fishing activities that could have negative biological effects on the habitat. As discussed in Section 4.1.1, the SFAAs proposed in **Preferred Alternative 2** and **Alternative 3** are expected to result in some negative biological impacts to the deep-water coral habitat resulting from increased trawling in the area.

Preferred Alternative 2 and **Alternative 3** would impact the rock shrimp fleet by opening some historic fishing grounds. The size and the location of the SFAAs are the two factors that would be expected to positively impact fishermen. Larger areas (**Alternative 3**) could have more benefit than smaller proposed areas (**Preferred Alternative 2**) if the location is in an appropriate area. **Preferred Alternative 2** and **Alternative 3** are based on coordinates presented by rock

shrimp fishermen during public comment in March 2014 and March 2013, respectively. During the May 2014 Deep-water Shrimp Advisory Panel (AP) meeting, the AP Chair indicated VMS data verified rock shrimp fishing in the proposed areas in 2013 and 2014 and a concentration of fishing as represented by VMS data in previous years. The AP Chair also noted the rock shrimp portion of the shrimp fishery is transitory and effort changes based on upwelling conditions and shifting species compositions. **Preferred Alternative 2** represents the most recent recommendation and is supported by the South Atlantic Council's Deep-Water Shrimp AP. Additionally, **Preferred Alternative 2** and **Alternative 3** directly address stakeholder concerns regarding access to historically important fishing grounds and may improve stakeholder perceptions of the management process. **Preferred Alternative 2** and **Alternative 3** are expected to have greater social benefit than **Alternative 1 (No Action)**. The social effects of **Preferred Alternative 2** and **Alternative 3** are expected to be similar, though **Preferred Alternative 2** may have slightly higher social benefit because it represents the most recent recommendation by rock shrimp fishermen.

4.1.4 Administrative Effects

Alternative 1 (No Action) would not change the administrative environment from its current condition. The establishment of an SFAA (**Preferred Alternative 2** and **Alternative 3**) would have minimal administrative impacts. The existing requirement of VMS in the rock shrimp portion of the shrimp fishery, including the requirement in Coral Amendment 8 for an even higher vessel location reporting rate when crossing the OHAPC boundary and quicker notification of violation of required minimum transit speed, enhances enforcement of the regulations and helps to ensure protection of the sensitive *Oculina* coral habitat within the OHAPC. These requirements would apply to allowable fishing within the proposed SFAAs. Administrative impacts would be incurred through the rulemaking process, outreach, and enforcement. The administrative impacts could differ between the alternatives relative to the amount of area they cover. However, because the proposed SFAAs are small and are not substantially different in size, expected enforcement costs would be similar. Most of the administrative impacts associated with these alternatives relate to at-sea enforcement.

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

5.1 Action 1. Establish a shrimp fishery access area along the eastern edge of the northern extension of the Oculina Bank Habitat Area of Particular Concern.

5.1.1 Deep-Water Shrimp Advisory Panel Comments and Recommendations

Alternatives*

1 (No Action). Don't establish a shrimp fishery access area.

2. Establish a shrimp fishery access area that is 22 mi² along the eastern edge of the northern extension of the Oculina Habitat Area of Particular Concern.

3. Establish a shrimp fishery access area that is 32 mi² along the eastern edge of the northern extension of the Oculina Habitat Area of Particular Concern.

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

The South Atlantic Fishery Management Council's (South Atlantic Council) Deep-water Shrimp Advisory Panel (AP) discussed this amendment at their November 10, 2020, meeting via webinar and had the following (predominately individual) comments:

- The proposed shrimp fishery access area (SFAA) includes an area rock shrimp fishermen historically fished, and since they are using vessel monitoring systems (VMS), the buffer between the high relief coral habitat and proposed SFAA boundary could be reduced to give them access to this area.
- An industry representative provided coordinates used in the proposed SFAA indicating it was an important area.
- The eastern boundary of the northern extension of the Oculina Bank Habitat Area of Particular Concern (OHAPC) was important fishing grounds considering the variability of where rock shrimp are available to the fishery from year to year.
- The area is extremely variable from year to year and therefore, it is hard to assign a monetary value or productivity value.
- Multiple AP members stated their support for re-opening the proposed SFAA.
- Fishermen responded to a question from Coral AP members on the positioning of the boat versus the trawl indicating they always know precisely where the rigs are relative to the vessel. Fishermen are requesting additional allowable fishing area stating their intent is not to destroy any habitat and they acknowledge its benefit to harvesting rock shrimp.
- According to fishermen, fishing in 300 feet (ft) of water results in 1,000 ft of cable out, and the rigs are approximately 500 ft straight down behind the boat.
- Fishermen indicate they 1) often drag very close to obstructions; 2) know how to keep equipment safe and not damage bottom habitat; and 3) want to fish in areas where there is no coral.

- Dragging takes place east of and parallel to the pinnacles, so sediment should drop back down onto the bottom and not cause any detriment to habitat.

MOTION[10]: To adopt the 2014 coordinates eastern boundary of the northern extension of the OHAPC developed by industry and staff as a SFAA as represented in Alternative 2a. SFAA boundaries based on coordinates presented by fishermen as part of March 2014 public comment.

5.1.2 Coral AP Comments and Recommendations

The South Atlantic Council's Coral AP discussed this amendment at their November 10, 2020, meeting via webinar and had the following (predominately individual) comments:

- Additional public comments were received prior to the meeting articulating the need for an adequate buffer.
- There is a need to have a sufficient protective buffer in place to protect the corals from sediments that become suspended in the water column because of the fishing gear interaction with the mud bottom.
- The muds are composed of clays and very small particles that can become suspended in the water column for considerable distances and sediment plumes can travel up to 20 km.
- Allowing fishing gear interactions within 100 to 2,000 m would be putting corals at risk.
- Low relief could include hard bottom communities that are providing essential fish habitat for deep-water species managed under the Fishery Management Plan (FMP) for the Snapper Grouper Fishery of the South Atlantic Region.
- It was recommended that the protective buffer would help protect the coral pinnacles and also low relief hard bottom.
- Fishing less than 1,000 m from the coral habitat is too close, however work has not been done to know exactly what the optimal distance should be.
- A margin of error is needed to account for uncertain current flow and intensity to prevent indirect sediment plume impacts.
- Mapping is limited and funding is scarce to map the *Oculina* banks.
- Members supported establishing a substantial buffer of possibly 1,000 m from the known habitat as an approach that would address and account for uncertainty as directed by the Magnuson-Stevens Fishery Conservation and Management Act.
- It is important to protect the whole *Oculina* coral ecosystem from the impact of fishing and having a substantial buffer around that ecosystem would accomplish that goal.
- Creating marine protected areas that are too small results in fishing right up to the edge and not providing protections to fish populations.
- Use numbers for relief on maps instead of low and high to provide greater context and more information.
- When measuring/evaluating distances between the new proposed SFAA boundary and where the reef resources are, horizontal lines shouldn't be drawn from the pinnacle base where we know there is still living habitat important for snowy grouper and other important snapper

[10] This motion recommends the current **Preferred Alternative 2** as the preferred.

grouper species in that area and should be drawn from the extent of the reef resources including low relief habitat.

- There is uncertainty about the location of the rig on the bottom. National Marine Fisheries Service data indicate that the ratio of scope to depth for shrimp trawlers is, typically somewhere between 3 to 4.3 ratio in these depths and these kinds of currents. So, taking a conservative estimate means that the horizontal distance between the boat and the rig can be anywhere from about 230 m to 510 m.
- Concern was raised over the distance between the location of the boat versus the rig. If there were track points on the rigs at all times, they could be identified, and the precision would be increased.
- Based on hydrodynamic drag, if you had the prominent direction of the current exactly parallel to the high relief feature, the reef feature causes drag which is going to create eddies that would spin off on the left or western side. If a sediment plume was created, that would cause entrainment of particles up onto the reef even if you were dragging off in the soft bottom east of the reef.
- Protecting areas around the base of the pinnacles is important because growth of damaged *Oculina* on the banks is slow, very spotty and low and when it does come back, it tends to be on the marginal areas or base around the main pinnacles.
- When you reduce a species down to the extent that the *Oculina* in the banks have been reduced, it is going to take time to recover since you don't have the population to produce the larvae to bring it back quickly.
- The AP indicated the present boundary provided a buffer and approved a motion supporting the no action alternative.

MOTION[11]: Consider Option 1 status quo. (Do not develop an action to address the issue).

5.1.3 Habitat and Ecosystem AP Comments and Recommendations

The South Atlantic Council's Habitat and Ecosystem AP discussed this amendment at their October 22, 2020, meeting via webinar and had the following (predominately individual) comments:

- Generally expressed concerns regarding modification of the existing boundary.
- Given the proximity to the OHAPC boundary, the low percentage of historical effort in the area, and the fact that there is some "low relief" coral habitat in the area, questioned the need to open the area.
- Need to define low relief and to put the area in proper context.
- Some members advocated supporting the fishing industry given the historical extent of fishing in the area, narrow width of the proposal and the desire to provide a buffer zone adjacent to coral pinnacles.
- Secure VMS data for before and after the establishment of the OHAPC. If the area was reopened, and therefore represented "new" ground for fishing, it could be heavily used.

[11] This motion recommends **Alternative 1 (No Action)** as the preferred.

- Look at the effort data, perhaps consider narrowing the area in those areas which were lightly fished.
- While socioeconomic concerns are not the purview of the Habitat AP, they should at least consider them.
- Request to keep AP informed with regard to any South Atlantic Council action on this item, and especially with respect to future opportunities to put additional conservation measures in place for the additional area of continuous coral pinnacles.

5.1.4 Law Enforcement AP Comments and Recommendations

The Law Enforcement AP was given a brief update on this amendment at their February 1, 2021, meeting and provided no comments.

5.1.5 Scientific and Statistical Committee Comments and Recommendations

The Scientific and Statistical Committee received a briefing on Coral Amendment 10 and were requested to provide comments via email. No comments were received.

5.1.6 Public Comments and Recommendations

Summary of scoping comments:
Scoping hearings for Amendment 10 were held via webinar on February 8-9, 2021. No public comments were received. One member of the public (non-South Atlantic Council or other agency staff) attended.

Summary of public hearing comments:
Public hearings for Amendment 10 were held via webinar on May 12 and May 13, 2021. No public comment was received on May 12.
Comments received during the Public Hearing Webinar on May 13:

- One commenter supported the action in the amendment and felt the Council had done a good job developing the amendment.
- One commenter indicated the preferred alternative included traditional bottom which has been fished and is verified by the many VMS fishing points occurring in the area over the years.
- area under consideration has been fished and was just something that came up late when Coral Amendment 8 was first put into place.
- One commenter noted fishermen requested the Council revisit the area and appreciate the fact that we are revisiting it with a good, preferred alternative.
- One commenter noted opening up an area for a shrimp fishery only defeats the purpose of conservation and your role to protect environment and fishery.
- A commenter was concerned that the Council was playing into the hands of the commercial industry and will set a precedence and did not support the action.

Additional Public Comments:
Comments were received during Council meetings in 2021 and online:
https://safmc.wufoo.com/reports/2021-june-council-meeting-public-comment-report/

- Several commenters noted currents are strong and variable affecting sediment movement given the high percentage of bottom mud suspension and transport.
- Most commenters do not support trawling access to portions of OHAPC.
- Commenters indicated Oculina was slow growing delicate coral susceptible to trawling.
- Several commenters commended the Council for previous conservation action.
- Some commenters indicated most mapping in *Oculina* is low resolution and no visual survey in area.
- Many commenters view bottom trawling as the primary threat and has significantly impacted the *Oculina* coral habitat used by Council managed snapper and grouper species.
- Some commenters supported preserving the remaining *Oculina* coral reefs only existing off Florida noting the short-term value to Florida commercial fishery was outweighed by value of coral reef systems over time.
- Many commenters noted Oculina habitat is important as a nursery, for spawning, juvenile fish and for feeding by managed species.
- One commenter thought fish could return if there was additional surveillance and enforcement.
- One commenter noted the southeast edge of northern Oculina expansion in Coral Amendment 8 took away important rock shrimp fishing grounds that were historically used.
- A commenter felt the area was inaccurately undervalued and was considered insignificant to the rock shrimp fishery which is not true with the area at times being a very valuable asset to the shrimp fishery.
- One commenter thought the action may impact coral or sponges with potential drug value.
- A commenter stated *Oculina* habitat harbors many species yet to be studied.
- A few commenters expressed concern that the action could set a bad precedent.
- Several commenters indicated corals and reefs contain numerous other potential marine sources of bioactive molecules with therapeutic potential.
- A commenter stated fishermen demonstrated from their records traditional historic trawl areas existed along the eastern edge of the northern extension of the OHAPC before VMS and was verified by VMS for later years.
- Some commenters stated the ecosystem is various habitats not just high relief mounds.
- Several commenters indicated reefs are hotspots for biodiversity.
- A commenter stated the area was important to sustaining seafood supplies.
- One commenter supported creating buffers around marine protected areas because accidents happen.
- A commenter noted the action would impact fishing tourism in Florida.
- Some commenters felt the action would add to other stressors climate change and ocean acidification.
- Several commenters supported providing a buffer to reduce sedimentation from offshore trawling, bycatch of foraging fish and limit mistakes in trawl deployment and tracking.
- A few commenters indicated recovery probably will happen on marginal edges on coral rubble.

- Several commenters were concerned the area was narrow with limited margin for mistake.
- Some commenters were concerned that the ecosystem is made up of various habitats not just high relief mounds.
- Area important to sustaining seafood supplies.
- One commenter supported creating artificial reefs for commercial use only.
- A commenter recommended there be help developing commercial fisheries for alternative species and live rock.

5.1.7 DRAFT South Atlantic Council's Rationale

To be completed after the September 2021 Council meeting

Chapter 6. Cumulative Effects

While this environmental assessment (EA) is being prepared using the 2020 Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) Regulations, the cumulative effects discussed in this section meet the two-part standard for "reasonable foreseeability" and "reasonably close causal connection" required by the new definition of effects or impacts. Below is the five-step cumulative effects analysis that identifies criteria that must be considered in an EA.

6.1 Affected Area

The immediate impact area would be the federal 200-mile limit of the Atlantic off the coast of northern Florida, which is within the South Atlantic Fishery Management Council's (South Atlantic Council) area of jurisdiction. The ranges of affected species are described in Chapter 3 of this amendment. For the proposed action found in Amendment 10 to the Fishery Management Plan (FMP) for Coral, Coral Reefs, and Live Hard Bottom Habitat of the South Atlantic Region (Coral FMP), the effects analyses include data from 2015 through 2019. Additionally, this cumulative effects analysis includes an analysis of actions and events dating back to 1982 when the original Coral FMP was implemented, and through what is expected to take place in the reasonably foreseeable future.

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

Fishery managers implemented the first significant regulations pertaining to coral species in 1982 through the Coral FMP (SAFMC 1982), including prohibiting trawling within the Oculina Bank Habitat Area of Particular Concern (HAPC). 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 *Oculina* coral habitat and the rock shrimp portion of the shrimp fishery can be found in Appendix G and H (History of Management).

Past Actions

Coral FMP (SAFMC 1982) established the Oculina Bank HAPC (OHAPC).

Amendment 4 to the Coral FMP, included in the Comprehensive Essential Fish Habitat (EFH) Amendment (SAFMC 1998), expanded the OHAPC to an area bounded to the west by 80°W., to the north by 28°30' N., to the south by 27°30' N., and to the east by the 100 fathom (600 feet) depth contour. Within the OHAPC area, no person may: 1) use a bottom longline, bottom trawl, dredge, pot, or trap; 2) if aboard a fishing vessel, anchor, use an anchor and chain, or use a grapple and chain; or 3) fish for rock shrimp or possess rock shrimp in or from the area on board a fishing vessel.

Amendment 6 to the Coral FMP, included in the Comprehensive Ecosystem-Based Amendment 1 (CE-BA 1; SAFMC 2009), established deep-water Coral HAPCs (CHAPCs), prohibited the

use of bottom tending gear in these areas, and established Shrimp Fishery Access Areas within the Stetson-Miami Terrace CHAPC.

Amendment 8 to the Coral FMP (SAFMC 2013) expanded the Stetson-Miami Terrace Deep-water Coral HAPC, the Cape Lookout Deep-water Coral HAPC, and the OHAPC; and implemented a transit provision through the OHAPC.

Present Actions
Effects from the action in this amendment are discussed in Chapter 4.

Reasonably Foreseeable Future Actions
As continued exploration along the eastern boundaries of deep-water CHAPCs continues and additional coral ecosystems are discovered, the South Atlantic Council, depending on potential threats, may consider action under the Coral FMP to expand existing boundaries to provide additional protection as new research is compiled and reviewed.

Expected Impacts from Past, Present, and Future Actions
The intent of Amendment 10 is to address a request from rock shrimp fishermen to improve access to the rock shrimp resource. When combined with the impacts of past, present, and future actions affecting the rock shrimp resource, minor cumulative impacts are likely to accrue. The action in this amendment is not expected to result in significant cumulative adverse biological or socio-economic effects to the rock shrimp 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 shrimp 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 coral 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 this amendment would compound or exacerbate the ongoing effects of climate change.

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.

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

The proposed action would establish an SFAA in the northern extension of the OHAPC. The action is expected to result in unknown negative biological impacts to the deep-water coral habitat in the SFAA as it would allow intermittent bottom trawling for rock shrimp. Past cumulative impacts to the overall Oculina Bank ecosystem occurred from fishing gear interactions and resulted in 100% loss of live coral at multiple sites (Reed et al. 2007). In the 1970s, Oculina reefs hosted large spawning aggregations of grouper and snapper. By the early 1990s, commercial and recreational fishing caused a dramatic decline in fish populations while bottom trawling for rock shrimp fishing had destroyed large portions of *Oculina* habitat. Comparisons of photographic transects of *Oculina* habitat from 1975-1977 dives and 2001 dives show that severe or complete loss of standing coral habitat on several reefs occurred during this time due to trawling activity (Reed et al. 2007).

While fishing effort in the proposed area was historically low, the magnitude of the potential impact is unknown. In addition, no high relief habitat was mapped in the area and fishermen are expected to fish in areas where they previously harvested rock shrimp. Thus this area is already impacted from previous trawling on associated low relief habitat that may include low relief hard bottoms and coral rubble, which serves as recruitment habitat for *Oculina* corals. Indirect effects to coral could result through influx of suspended benthic sediments created while trawling the bottom. The action would result in net economic and social benefits by allowing vessels fishing

for rock shrimp with bottom trawl gear to potentially increase landings of rock shrimp through access to the SFAA. The proposed management action is 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 action in this amendment, in combination with past, present, and future actions have been determined to be significant.

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 exclusive economic zone (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 action would not cause loss or destruction of these national marine sanctuaries (NMS) because the action is not expected to result in appreciable changes to current fishing practices and the action area is outside of NMS. Additionally, the proposed action is not likely to change the way in which the rock shrimp portion of the shrimp fishery is prosecuted; therefore, the action is not expected to result in adverse impacts on health or human safety beyond the status quo.

6.5 Monitoring and Mitigation

The effects of the proposed actions are, and would continue to be, monitored through collection of data by NMFS, economic and social analyses, and other scientific observations. Vessels that participate in the rock shrimp fishery are monitored through vessel monitoring systems (VMS). Current monitoring requirements for the Oculina Bank, specifically transit provisions and increased VMS ping rates to 5 minutes when detected inside the OHAPC, would be applied to the proposed SFAA. These VMS would improve enforcement and mitigate fishing effort within the OHAPC, outside of the proposed SFAA. While VMS cannot replace at-sea enforcement by aircraft, vessels, and boarding teams, the technology complements existing capability and allows enforcement to target violators, thereby increasing enforcement efficiency. The proposed action relates 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
Myra Brouwer	SAFMC	Deputy Director for Management
Kevin Craig	SEFSC	Biologist
Rick DeVictor	SERO/SF	South Atlantic Branch Chief
Joelle Godwin	SERO/SF	Technical Writer and Editor
Alisha Gray	SERO/SF	Data Analyst
John Hadley	SAFMC	Economist
Frank Helies	SERO/SF	Fishery Biologist/IPT Lead
Jocelyn Karazsia	SERO/HCD	Fishery Biologist
Dennis Klemm	SERO/PR	Fishery Biologist
Christopher Liese	SEFSC	Economist
Christina Package-Ward	SERO/SF	Social Scientist
Roger Pugliese	SAFMC	Habitat and Ecosystem Scientist/ IPT Lead
Monica Smit-Brunello	NOAA GC	General Counsel
Mike Travis	SERO/SF	Economist
Matthew Walia	SERO/OLE	Compliance Liaison Analyst
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. 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. Amendment 10 to the Fishery Management Plan for the Coral, Coral Reefs, and Live Bottom Habitat of the South Atlantic Region (Amendment 10) complies with the provisions of the APA through the South Atlantic Fishery Management Council's (South Atlantic Council) extensive use of public meetings, requests for comments, and consideration of comments. The proposed rule associated with this amendment will have a request for public comments, which complies with the APA, and upon publication of the final rule, unless the rule falls within an APA exception, there will be a 30-day wait period before the regulations are effective.

1.2 Information Quality Act (IQA)

The IQA (Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-443)) which took effect October 1, 2002, directed the Office of Management and Budget (OMB) to issue government-wide guidelines that "provide policy and procedural guidelines to federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information disseminated by federal agencies." OMB directed each federal agency to issue its own guidelines, establish administrative mechanisms allowing affected persons to seek and obtain correction of information that does not comply with OMB guidelines, and report periodically to OMB on the number and nature of complaints. The NOAA Section 515 Information Quality Guidelines require a series of actions for each new information product subject to the IQA. Amendment 10 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 South Atlantic 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 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.

1.6 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.

1.7 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.

1.8 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.

1.9 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.

1.10 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 B. 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 the 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 commercial rock shrimp fishery in the South Atlantic.

Problems and Objectives

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

Description of the Fisheries

A description of the commercial rock shrimp fishery in the South Atlantic is provided in Section 3.3 of this amendment and is incorporated herein by reference.

Effects of Management Measures

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 South Atlantic Fishery Management Council (South Atlantic Council) preferred alternative relative to the no action alternative (i.e., the status quo).

Preferred Alternative 2 would result in net economic benefits by allowing vessels fishing for rock shrimp with trawl gear to potentially increase landings of rock shrimp through access to an approximate 22 m^2 area in which rock shrimp harvested was allowed prior to implementation of Coral Amendment 8 in 2015. Based on historical vessel monitoring system (VMS) data, the use of this area would likely vary from year to year. However, participants in the fishery have reported and historical VMS data indicate that rock shrimp were historically caught in the proposed access area. Increases in catches of rock shrimp would be expected to increase gross revenue and producer surplus (PS)[12] in the fishery, thus resulting in net economic benefits.

[12] PS is the difference between the amount a producer is paid for a unit of a good and the minimum amount the producer would accept to supply that unit (i.e., marginal cost). Total PS in a market or industry is measured by the difference between total gross revenue and total variable costs. PS is a measure of net economic benefits to producers.

Given the likely variability in usage of the area, as well as the exhibited variability in overall participation in the regional rock shrimp portion of the shrimp fishery, these economic effects cannot be quantified. Additionally, if landings of rock shrimp increase, these landings are a relatively small component of the overall market for shrimp given the magnitude of shrimp imports (Section 3.3.4). Thus, higher landings of rock shrimp would not be expected to change ex-vessel or consumer prices and therefore there is no anticipated change in consumer surplus.

The economic effects on individual vessel owners from **Preferred Alternative 2** would depend on each vessel owner's profit maximization strategy, their dependence on rock shrimp, their seasonal fishing behavior, and their propensity to fish for rock shrimp in the new area compared to existing open areas. Some vessel owners may benefit from additional rock shrimp landings, while others may not. These types of individual vessel level effects cannot be determined with available models. On average, 19 vessels with a valid limited access Commercial Vessel Permit for Rock Shrimp (South Atlantic Exclusive Economic Zone) harvested rock shrimp from the South Atlantic annually from 2015 through 2019.

Net economic benefits for commercial rock shrimp vessels would be higher under **Preferred Alternative 2** than **Alternative 1 (No Action)**. In general, rock shrimp dealers are indirectly affected whenever gross revenues to commercial fishing vessels are expected to change as a result of a change in landings (e.g., increases in gross revenues from increased landings are expected to indirectly benefit dealers and vice versa). This would occur due to increased sales and associated increased PS for dealers. Thus, the comparison of net economic benefits to dealers would be the same as for commercial fishing vessels. On average, 8 dealers purchased rock shrimp from the South Atlantic annually from 2015 through 2019.

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	$49,320
NMFS administrative costs of document preparation, meetings, and review	$18,331
TOTAL[13]	$67,651

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.

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

Net Benefits of Regulatory Action

The estimated non-discounted public costs resulting from the regulation are $67,651 (2019 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. No other economic costs are expected as a result of this regulatory action. As discussed qualitatively in above even though they cannot be quantified, notable economic benefits are expected. It is reasonable to expect that these benefits would likely outweigh the quantified public cost of regulations, particularly if examined over several years. Based on these qualitative and quantitative analyses, it is likely that this regulatory action would 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 C. Regulatory Flexibility Analysis

Introduction

The purpose of the Regulatory Flexibility Act (RFA) is to establish a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes to fit regulatory and informational requirements to the scale of businesses, organizations, and governmental jurisdictions subject to 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 such proposals are given serious consideration. 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 effects of various alternatives contained in the regulatory action and to ensure the agency considers alternatives that minimize the expected economic effects on small entities while meeting the goals and objectives of the applicable statutes (e.g., the Magnuson-Stevens Fishery Conservation and Management Act [Magnuson-Stevens Act]).

With certain exceptions, the RFA requires agencies to conduct an initial regulatory flexibility analysis (IRFA) for each proposed rule. The IRFA is designed to assess the effects various regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those effects. An IRFA is primarily conducted to determine whether the proposed regulatory action would have a significant economic effect on a substantial number of small entities. In addition to analyses conducted for the Regulatory Impact Review (RIR), the IRFA provides: 1) a description of the reasons why action by the agency is being considered; 2) a succinct statement of the objectives of, and legal basis for, the proposed regulatory action; 3) a description and, where feasible, an estimate of the number of small entities to which the proposed regulatory action will apply; 4) a description of the projected reporting, record-keeping, and other compliance requirements of the proposed regulatory action, including an estimate of the classes of small entities which will be subject to the requirements of the report or record; 5) an identification, to the extent practicable, of all relevant federal rules, which may duplicate, overlap, or conflict with the proposed rule; and 6) a description of any significant alternatives to the proposed regulatory action which accomplish the stated objectives of applicable statutes and would minimize any significant economic effects of the proposed regulatory action on small entities.

In addition to the information provided in this section, additional information on the expected economic effects of the proposed action is included in the RIR (Appendix B).

Statement of the need for, objectives of, and legal basis for the rule

A discussion of the reasons why action by the agency is being considered is provided in Chapter 1.4. The purpose of this proposed regulatory action is to establish a shrimp fishery access area along the eastern edge of the northern extension of the Oculina Bank Habitat Area of Particular Concern (HAPC) where holders of a valid limited access Commercial Vessel Permit for Rock Shrimp (South Atlantic exclusive economic zone [EEZ]) (RSLA) would be able to fish for and possess rock shrimp. The objectives of this proposed regulatory action are to help achieve optimum yield in the rock shrimp portion of the South Atlantic shrimp fishery and increase economic and social benefits to rock shrimp fishermen by increasing access to historic rock

shrimp fishing grounds, while maintaining protection of the *Oculina* deep water coral ecosystems. The Magnuson-Stevens Act serves as the legal basis for the proposed regulatory action.

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

This proposed regulatory action would allow vessels with a valid RSLA permit to harvest and possess rock shrimp in the eastern edge of the northern extension of the Oculina Bank HAPC (OHPAC). Thus, this proposed regulatory action is expected to directly regulate all vessels with a valid or renewable RSLA permit.

From 2015 through 2019, the average number of vessels with a valid RSLA permit per year was 103. During this time, the average number of vessels with a valid RSLA permit that harvested rock shrimp from the South Atlantic EEZ (i.e., were active in the fishery) was 19, with a maximum of 26 vessels harvesting rock shrimp from the South Atlantic EEZ in 2017. As of April 7, 2021, there were 101 vessels with a valid or renewable RSLA permit. Thus, this proposed regulatory action is assumed to directly regulate 101 vessels with valid or renewable RSLA permits, though it would only be expected to directly benefit the 26 vessels that have harvested rock shrimp from the South Atlantic EEZ in recent years.

Although the National Marine Fisheries Service (NMFS) possesses complete ownership data for businesses and vessels that participate in other industries, ownership data regarding businesses that possess RSLA permits is incomplete. Therefore, it is not currently feasible to accurately determine affiliations between these particular businesses. Because of the incomplete ownership data, for purposes of this analysis, it is assumed each of these vessels is independently owned by a single business, which is expected to result in an overestimate of the actual number of businesses directly regulated by this proposed action. Thus, this proposed regulatory action is estimated to directly regulate 101 businesses in the commercial South Atlantic rock shrimp fishing industry. All monetary estimates in the following analysis are in 2019 dollars.

In 2017 and 2018, for vessels with a valid RSLA permit that were active in the South Atlantic rock shrimp fishery, total gross revenue per vessel was about $781,778 on average per year. Approximately $142,217 came from South Atlantic rock shrimp landings on average, or about 18% of total gross revenue per year. Most trips that harvest rock shrimp also harvest penaeid shrimp, and most vessels also harvest penaeid shrimp on separate trips in the South Atlantic. Average annual gross revenue per vessel from South Atlantic penaeid shrimp landings was $323,451, or about 41% of these vessels' total gross revenue per year. Many vessels are also relatively dependent on revenue from the Gulf of Mexico shrimp fishery, which accounted for $249,079, or about 32% of these vessels' total gross revenue per year. Based on economic return estimates for these vessels in 2017 and 2018 (C. Liese, pers. comm., March 30, 2021), net cash flow per vessel is estimated to be $105,283 per year on average, or 13.5% of total gross revenue per year, while net revenue from commercial fishing operations is estimated to be $81,844 per year on average, or 10.5% of total gross revenue per year. From 2015 through 2019, the maximum total gross revenue earned by a single vessel (business) was approximately $1.21 million.

On December 29, 2015, NMFS issued a final rule establishing a small business size standard of $11 million in annual gross receipts (revenue) for all businesses primarily engaged in the commercial fishing industry (NAICS code 11411) for RFA compliance purposes only (80 FR 81194, December 29, 2015). In addition to this gross revenue standard, a business primarily involved in commercial fishing is classified as a small business if it is independently owned and operated, and is not dominant in its field of operations (including its affiliates). Based on the information above, all businesses directly regulated by this proposed regulatory action are determined to be small businesses for the purpose of this analysis.

Description of the projected reporting, record-keeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for the preparation of the report or records

This proposed regulatory action would not establish any new reporting or record-keeping requirements.

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

No duplicative, overlapping, or conflicting federal rules have been identified.

Significance of economic effects on small entities

Substantial number criterion

This proposed regulatory action, if implemented, would be expected to directly regulate all 101 businesses with a valid or renewable RSLA permit. All directly regulated businesses have been determined, for the purpose of this analysis, to be small entities. Based on this information, the proposed regulatory action is expected to affect a substantial number of small businesses.

Significant economic effects

The outcome of "significant economic impact" can be ascertained by examining two factors: disproportionality and profitability.

Disproportionality: Do the regulations place a substantial number of small entities at a significant competitive disadvantage to large entities?

All entities directly regulated by this regulatory action have been determined to be small entities. Thus, the issue of disproportionality does not arise in the present case.

Profitability: Do the regulations significantly reduce profits for a substantial number of small entities?

This proposed regulatory action would establish a shrimp fishery access area along the eastern edge of the northern extension of the OHAPC where holders of a valid RSLA permit would be able to fish for and possess rock shrimp. The proposed shrimp fishery access area is an approximate 22 square mile area in which rock shrimp harvest was allowed prior to implementation of Coral Amendment 8 in 2015. Participants in the fishery have reported and vessel monitoring system (VMS) data from years prior to 2015 confirm that rock shrimp were

historically caught in the proposed access area. VMS data also indicate that use of the area varied from year to year. However, the composition of the active, permitted fleet has changed since vessels were allowed to harvest rock shrimp from this proposed access area. Given the change in fleet composition, variability in the size of the active, permitted fleet, and historical variability in use of the area, the economic effects of allowing currently permitted vessels to harvest rock shrimp from the proposed access area cannot be quantified. However, it is reasonable to assume that allowing these vessels to harvest rock shrimp from this area once again would lead to an increase in rock shrimp landings and gross revenue, and thereby increase profit for these vessels.

Based on the information above, a significant reduction in profits for a substantial number of small entities is not expected as a result of the proposed regulatory action.

Description of significant alternatives to the proposed action and discussion of how the alternatives attempt to minimize economic impacts on small entities

This proposed regulatory action, if implemented, is not expected to reduce the profits of any small businesses directly regulated by this action. As a result, the issue of significant alternatives is not relevant.

Appendix D. Essential Fish Habitat and Ecosystem Based Fishery Management

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

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires federal fishery management Councils and the National Marine Fisheries Service (NMFS) to designate essential fish habitat (EFH) for species managed under federal fishery management plans (FMP). Federal regulations that implement the EFH program encourage fishery management Councils and NMFS also to designate subsets of EFH as a way to highlight priority areas within EFH for conservation and management. These subsets of EFH are called EFH-Habitat Areas of Particular Concern (EFH-HAPCs or HAPCs) and are designated based on ecological importance, susceptibility to human-induced environmental degradation, susceptibility to stress from development, or rarity of the habitat type. Information supporting EFH and EFH-HAPC designations was updated (pursuant to the EFH Final Rule) in Fishery Ecosystem Plan (FEP) II.

South Atlantic Council EFH User Guide
(https://safmc.net/download/SAFMCEFHUsersGuideNov20.pdf)
The EFH Users Guide developed during the FEP II development process is available through the FEP II Dashboard (see following sections) and provides a comprehensive list of the designations of EFH and EFH-HAPCs for all species managed by the South Atlantic Fishery Management Council (South Atlantic Council) and the clarifications identified during FEP II development. As noted above, additional detailed information supporting the EFH designations appears in FEP, FEP II, and in individual FMPs, and general information on the EFH provisions of the Magnuson-Stevens Act and its implementing regulations (50 CFR 900 Subparts J and K) can be found at https://www.fisheries.noaa.gov/region/southeast#habitat. These sources should be reviewed for information on the components of EFH assessments, steps to EFH consultations, and other aspects of EFH program operation.

South Atlantic Council EFH Policy and EFH Policy Statements

Policy for Protection and Restoration of EFH
South Atlantic Council Habitat and Environmental Protection Policy
In recognizing that species are dependent on the quantity and quality of their essential habitats, it is the policy of the South Atlantic Council to protect, restore, and develop habitats upon which fisheries species depend; to increase the extent of their distribution and abundance; and to improve their productive capacity for the benefit of present and future generations. For purposes of this policy, "habitat" is defined as the physical, chemical, and biological parameters that are necessary for continued productivity of the species that is being managed. The objectives of the South Atlantic Council policy will be accomplished through the recommendation of no net loss or significant environmental degradation of existing habitat. A long-term objective is to support and promote a net-gain of fisheries habitat through the restoration and rehabilitation of the productive capacity of habitats that have been degraded, and the creation and development of

productive habitats where increased fishery production is probable. The South Atlantic Council will pursue these goals at state, Federal, and local levels. The South Atlantic Council shall assume an aggressive role in the protection and enhancement of habitats important to fishery species, and shall actively enter Federal, decision making processes where proposed actions may otherwise compromise the productivity of fishery resources of concern to the South Atlantic Council.

South Atlantic Council *EFH Policy Statements*

Considerations to Reduce or Eliminate the Impacts of Non-Fishing Activities on EFH

In addition to implementing regulations to protect habitat from degradation due to fishing activities, the South Atlantic Council in cooperation with NMFS, actively comments on non-fishing projects or policies that may impact fish habitat. The South Atlantic Council established a Habitat Protection and Ecosystem Based Management Advisory Panel (AP) and adopted a comment and policy development process. Members of the AP serve as the South Atlantic Council's habitat contacts and professionals in the field and have guided the South Atlantic Council's development of the following Policy Statements:

- EFH Policy Statement on South Atlantic Climate Variability and Fisheries (December 2016)
- EFH Policy Statement on South Atlantic Food Webs and Connectivity (December 2016)
- Protection and Restoration of EFH from Marine Aquaculture (June 2014)
- Protection and Enhancement of Marine Submerged Aquatic Vegetation (June 2014)
- Protection and Restoration of EFH from Beach Dredging and Filling, Beach Re-nourishment and Large Scale Coastal Engineering (March 2015)
- Protection and Restoration of EFH from Energy Exploration, Development, Transportation and Hydropower Re-Licensing (December 2015)
- Protection and Restoration of EFH from Alterations to Riverine, Estuarine and Nearshore Flows (June 2014)
- Policies for the Protection of South Atlantic Marine & Estuarine Ecosystems from Non-Native and Invasive Species (June 2014)
- Policy Considerations for Development of Artificial Reefs in the South Atlantic Region and Protection of Essential Fish Habitat (September 2017)

Habitat Conservation and Fishery Ecosystem Plans

The South Atlantic Council, views habitat conservation as the foundation in the move to Ecosystem Based Fishery Management (EBFM) in the region. The South Atlantic Council has been proactive in advancing habitat conservation through extensive gear restrictions in all South Atlantic Council FMPs and by directly managing habitat and fisheries affecting those habitats through two FMPs, the FMP for Coral, Coral Reefs and Live/Hard Bottom Habitat of the South Atlantic Region (Coral FMP) and the FMP for the Sargassum Fishery of the South Atlantic Region. The FMP for the Dolphin and Wahoo Fishery in the Atlantic represents a proactive FMP which established fishery measures and identified EFH in advance of overfishing or habitat impacts from the fisheries.

Building on the long-term conservation approach, the South Atlantic Council facilitated the evolution of the Habitat Plan into the first FEP to provide a clear description and understanding of the fundamental physical, biological, and human/institutional context of ecosystems within

which fisheries are managed and identify information needed and how that information should be used in the context of FMPs. Developing a South Atlantic FEP required a greater understanding of the South Atlantic ecosystem, including both the complex relationships among humans, marine life, the environment and essential fish habitat and a more comprehensive understanding of the biological, social, and economic impacts of management necessary to initiate the transition from single species management to EBFM in the region. To support the move towards EBFM, the South Atlantic Council adopted broad goals: (1) maintaining or improving ecosystem structure and function; (2) maintaining or improving economic, (3) social, and cultural benefits from resources; and (4) maintaining or improving biological, economic, and cultural diversity.

Ecosystem Approach to Conservation and Management of Deep-water Ecosystems
The South Atlantic Council's Habitat and Environmental Protection AP and Coral AP supported an ecosystem approach and proactive efforts to identify and protect deep-water coral ecosystems in the South Atlantic region. Through Comprehensive Ecosystem-Based Amendment 1, Comprehensive Ecosystem-Based Amendment 2, and Coral Amendment 8, the South Atlantic Council established and expanded deep-water coral HAPCs (CHAPCs) and co-designated them as EFH-HAPCs to protect the largest continuous distribution (>23,000 square miles) of pristine deep-water coral ecosystems in the world from fishing and non-fishing activities.

FEP II Development
The South Atlantic Council developed FEP II, in cooperation with NMFS, as a mechanism to incorporate ecosystem principles, goals, and policies into the fishery management process, including consideration of potential indirect effects of fisheries on food web linkages when developing harvest strategies and management plans. South Atlantic Council policies developed through the process support data collection, model and supporting tool development, and implementation of FEP II. FEP II and the FEP II Implementation Plan provide a system to incorporate of ecosystem considerations into the management process.

FEP II was developed employing writing and review teams established from the South Atlantic Council's Habitat Protection and Ecosystem Based Management AP, and experts from state, federal, NGOs, academia and other regional organizations and associations. Unlike the original Plan, FEP II is a living continually developing online information system presenting core sections and sections with links to documents or other online systems with detailed updated information on species, habitat, fisheries and research. For example, FEP II provides both concise summaries of South Atlantic Council-managed species with links to detailed information served through the South Atlantic Ecospecies online species information system cooperatively developed with Florida Fish and Wildlife Research Institute (FWRI). The system provides online access to detailed information on habitat, life history, the fishery and management. A core part of the FEP II development process involved engaging the South Atlantic Council's Habitat Protection and Ecosystem Based Management AP and regional experts in developing new sections and ecosystem- specific policy statements to address South Atlantic food webs and connectivity and South Atlantic climate variability and fisheries. In addition, standing essential fish habitat policy statements were updated and a new artificial reef habitat policy statement was approved. In combination, these statements advance habitat conservation and the move to EBFM in the region. They also serve as the basis for further policy development, consideration

in habitat and fish stock assessments and future management of fisheries and habitat. They also support a more comprehensive view of conservation and management in the South Atlantic and identify long-term information needs, available models, tools, and capabilities that will advance EBFM in the region.

FEP II Dashboard

The FEP II Dashboard and associated online tools provide a clear description of the fundamental physical, biological, human, and institutional context of South Atlantic ecosystems within which fisheries are managed. The FEP II Digital Dashboard layout and online links follow are below:

- Introduction
- South Atlantic Ecosystem
- South Atlantic Habitats
- Managed Species
- Social and Economic
- Essential Fish Habitat
- SAFMC Managed Areas
- Research & Monitoring
- SAFMC Tools

NOAA EBFM Activities Supporting FEP II

NOAA EBFM Policy and Road Map

To support the move to EBFM, NMFS developed an agency-wide EBFM Policy and Road Map (available through Ecosystem page of the FEP II Dashboard http://safmc.net/fishery-ecosystem-plan-ii-south-atlantic-ecosystem/) that outlines a set of principles to guide actions and decisions over the long-term to: implement ecosystem-level planning; advance our understanding of ecosystem processes; prioritize vulnerabilities and risks of ecosystems and their components; explore and address trade-offs within an ecosystem; incorporate ecosystem considerations into management advice; and maintain resilient ecosystems.

FEP II Implementation Plan Structure and Framework

The Implementation Plan (http://safmc.net/download/SAFMC-FEP-II-Implementation-Plan-March-2018.pdf) is structured to translate approved policy statements of the South Atlantic Council into actionable items. The plan encompasses chapters beginning with an introduction to the policy statement, a link to the complete policy statement, and a table which translates policies and policy components into potential action items. The actions within the plan are recommendations for activities that could support the South Atlantic Council's FEP II policies and objectives.

FEP II Two Year Roadmap

The FEP II Two Year Roadmap (http://safmc.net/download/SAFMC-FEP-II-Two-Year-Roadmap-March-2018.pdf) draws from the Implementation Plan and presents three to five priority actions for each of the nine approved policy statements of the South Atlantic Council which would be initiated or completed over the next two years. The Roadmap provides

"Potential Partners" and other potential regional collaborators, a focused list of priority actions they could cooperate with the South Atlantic Council on to advance policies supporting the move to EBFM in the South Atlantic region.

Monitoring/Revisions to FEP II Implementation Plan
FEP II and this supporting Implementation Plan are considered active and living documents. The Implementation Plan will be reviewed and updated periodically. During their spring meeting in 2021 and every three years following, the Habitat Protection and Ecosystem Based Management AP will engage regional experts as needed, to determine whether additional actions addressing council policies should be added to the implementation plan. The South Atlantic Council's Habitat Protection and Ecosystem Based Management Committee will review, revise and refine those recommendations for South Atlantic Council consideration and approval for inclusion into the implementation plan.

Regional Habitat and Ecosystem Partners

The South Atlantic Council, with the Habitat Protection and Environmental Based Management AP as the foundation, collaborates with regional partners to create a comprehensive habitat and ecosystem network in the region to enhance habitat conservation and EBFM.

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

Southeast Coastal and Ocean Observing Regional Association (SECOORA)
The Southeast Coastal Ocean Observing Regional Association (SECOORA) is the coastal ocean observing system for the Southeast U.S. SECOORA is one of 11 regional coastal observing systems that comprise the NOAA-led United States Integrated Ocean Observing System (U.S. IOOS®). SECOORA's mission is to observe, understand, and increase awareness of our coastal ocean; promoting knowledge, economic, and environmental health through strong regional partnerships. Guided by their members, users, regional ocean experts, managers, and other stakeholders, SECOORA collects data and creates tools that support human populations, coastal economies and a healthy, sustainable environment. The SECOORA observing system is comprised of multiple data products, moored and coastal stations, high-frequency radars, and a

glider observatory. The SECOORA footprint spans the eastern side of Gulf of Mexico to South Atlantic Bight and is connected by the Loop Current-Florida Current-Gulf Stream continuum. The SECOORA Strategic Plan (2016-2020) was developed by the Board in 2015 and guides tasks for the next 4 years. SECOORA supports projects that are important to stakeholders in the southeast. SECOORA talks to users and produces oceanographic observations, models, web tools, applications, and products based on their needs. Data are available on the portal http://secoora.org/data/. Each project SECOORA supports is linked to one of four focus areas: Marine Operations, Coastal Hazards, Ecosystems, and Climate Variability.

The South Atlantic Council is a voting member and South Atlantic Council staff serves on the Board of Directors to guide and direct priority needs for observation and modeling to support fisheries oceanography and integration into stock assessments through SEDAR.

Collaboration facilitates SECOORAs ability to: refine current or water column designations of EFH and EFH-HAPCs (e.g., Gulf Stream and Florida Current); provide oceanographic models linking benthic, pelagic habitats, and food webs; provide oceanographic input parameters for ecosystem mode; integrate OOS information into SEDAR process in the South Atlantic; facilitate OOS system collection of data and other research necessary to support the South Atlantic Council's conservation of habitat and use of area-based management tools in the South Atlantic Region including designation of EFH and EFH-HAPC and establishment of Marine Protected Areas, Deep-water CHAPCs, Special Management Zones, Spawning Special Management Zones and Allowable Gear Areas; characterize connectivity of habitats and managed areas; highlight the OOS program in the South Atlantic FEP II Dashboard; and provide access to OOS products to facilitate model and tool development and provide researchers access to data or products including those collected/developed by South Atlantic OOS partners. The South Atlantic Council is also collaborating with SECOORA to advance the coordination, techniques and data integration for biodiversity and environmental observations in support of region-specific decision making and implement a sustainable National Marine Biodiversity Observation Network (Marine Biodiversity Observation Network).

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

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

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

South Atlantic Landscape Conservation Cooperative
The South Atlantic Council participates as Steering Committee member for the South Atlantic Landscape Conservation Cooperative (SALCC), an applied conservation science partnership focused on the South Atlantic region that informs on-the-ground strategic conservation efforts at landscape scales. LCC partners included Department of Interior (DOI) agencies, other federal agencies, states, tribes, non-governmental organizations, universities, and others. The DOI Southeast Climate Services Center (CSC) had the LCCs in the region as their primary clients. One of the initial charges of the CSCs is to downscale climate models for use at finer scales.

The SALCC developed a Strategic Plan and a regional blueprint to address the rapid changes in the South Atlantic including climate change, urban growth, and increasing human demands on resources which are reshaping the landscape. Integration of connectivity, function, and threats to river, estuarine and marine systems supporting South Atlantic Council-managed species is supported by the SALCC and enhanced by the South Atlantic Council being a voting member of its Steering Committee. In addition, the South Atlantic Council's Webservices present spatial representations of EFH, managed areas, regional fish and fish habitat distribution, and fishery operation information which was drawn on as a critical part of the collaboration with the SALCC Conservation Planning Atlas and the Regional Conservation Blueprint. While the LCCs are no longer funded, the South Atlantic Conservation Blueprint continues to be refined and serves as the technical foundation for the Southeast Conservation Adaptation Strategy (SECAS).

Southeast Conservation Adaptation Strategy: http://secassoutheast.org/
SECAS unites the conservation community around a shared, long-term vision for the future to consider dramatic changes sweeping the Southeastern United States including urbanization, competition for water resources, extreme weather events, sea-level rise, and climate change which pose unprecedented challenges for sustaining our natural and cultural resources. Through SECAS, diverse partners are working together to design and achieve a connected network of lands and waters that supports thriving fish and wildlife populations and improved quality of life for people across the Southeastern United States and the Caribbean. The primary product of SECAS is the Southeast Conservation Blueprint SECAS Blueprint. http://secassoutheast.org/blueprint.html. The Blueprint stitches together smaller sub-regional plans into one unifying map that identifies important areas for conservation and restoration.

Regional Ecosystem Modeling in the South Atlantic

South Atlantic Ecopath with Ecosim Model
The South Atlantic Council worked cooperatively with the University of British Columbia and the Sea Around Us project to develop a straw-man and preliminary food web models (Ecopath with Ecosim) to characterize the ecological relationships of South Atlantic species, including those managed by the South Atlantic Council. This effort helped the South Atlantic Council and cooperators identify available information and data gaps while providing insight into ecosystem

function. More importantly, the model development process provided a vehicle to identify research necessary to better define populations, fisheries, and their interrelationships. While individual efforts were underway in the South Atlantic, only with significant investment of resources through other programs was a comprehensive regional model further developed.

A subsequent collaboration building on the previous Ecopath model developed through the Sea Around Us project for the South Atlantic Bight focused on simulating forage fish population changes that could result from environmental or oceanographic variation associated with climate change effect and how it could potentially affect managed species.

As part of the FEP II development process a new generation South Atlantic ecosystem modeling effort funded by the SALCC, was conducted to engage a broader scope of regional partners. This effort facilitated development of a new generation Ecopath with Ecosim (EwE) model which will ultimately provide evaluation tools for the SSC and South Atlantic Council and inform other regional conservation planning efforts.

The new South Atlantic EwE model provides a more complete view of the system and supports potential future evaluations that may be possible with the model. With the model complete and tuned to the available data it can be used to address broad strategic issues, and explore "what if" scenarios that could then be used to address tactical decision-making questions such as provide ecosystem context for single species management, address species assemblage questions, and address spatial questions using Ecospace.

A modeling team comprised of FWRI staff, South Atlantic Council staff and other technical experts as needed, will coordinate with members of the original Ecosystem Modeling Workgroup to maintain and further refine the South Atlantic Model. The South Atlantic Ecospecies online species information system will be the long-term repository for the processed inputs and outputs associated with the South Atlantic model. Online access to the EcoSpecies system is available through the FEP II Dashboard through individual links under Managed Species Section http://safmc.net/uncategorized/safmc-managed-species/ and through the Tools Section http://safmc.net/fishery-ecosystem-plan-ii-tools/ The direct link to the system is http://saecospecies.azurewebsites.net/.

Tools to support EBFM in the South Atlantic Region

The South Atlantic Council developed a Habitat Conservation and Ecosystem Management Section of the website http://safmc.net/fishery-ecosystem-plan-ii-introduction/which provides access to the FEP II Digital Dashboard and associated tools. Florida's FWRI maintains and distributes GIS data, imagery, and documents relevant to habitat conservation and ecosystem-based fishery management in their jurisdiction. Over the last several years, FWRI has created web services and applications using the ArcGIS for Server (AGS) software. AGS enables collaboration among various federal, state and local agencies to evaluate and analyze fisheries-related information in a new way. By transitioning to the AGS platform, the South Atlantic Council enhanced their online suite of tools to support fisheries management in their region. The South Atlantic Council has continued its collaboration with FWRI in the evolution to Web Services provided through the regional South Atlantic Habitat and Ecosystem Atlas (http://ocean.floridamarine.org/safmc_atlas/) and the South Atlantic Digital Dashboard

(http://ocean.floridamarine.org/safmc_dashboard/). The online systems provide access to the following Services:

South Atlantic Fisheries Webservice: (http://ocean.floridamarine.org/SA_Fisheries/)
The service provides access to species distribution and spatial presentation of regional fishery independent data from the Southeast Area Monitoring and Assessment Program (South Atlantic) SEAMAP-SA, the Marine Resources Monitoring, Assessment, and Prediction program (MARMAP), and NOAA Southeast Fishery-Independent Survey (SEFIS).

South Atlantic EFH Webservice: (http://ocean.floridamarine.org/sa_efh/)
The EFH service provides access to spatial representation of EFH and EFH-HAPCs for South Atlantic Council-managed species and Highly Migratory Species.

South Atlantic Managed Areas Service:
(http://ocean.floridamarine.org/safmc_managedareas/).
The Managed Area service provides access to spatial presentations of South Atlantic Council and other managed areas in the region. A new data layer of gear restrictions to include in the Managed Areas map service. Restrictions for black sea bass pots, fish traps, roller rigs, octocoral harvest, spiny lobster closed areas, golden crab closed areas, pelagic sargassum harvest, and longline prohibited areas are provided.

South Atlantic EcoSpecies Online Species Information System:
(http://saecospecies.azurewebsites.net/)
FWRI works with the South Atlantic Council to provide support relevant to habitat conservation and ecosystem-based fishery management in the South Atlantic Council's jurisdiction. The system provides species life history and habitat information to flexibly fill the needs of the South Atlantic Council and other regional users. The updated and refined system provides the South Atlantic Council with the foundation from which to attain a more comprehensive understanding of habitat and biology of species, fisheries information, social and economic impacts of management, and ecological consequences of conservation and management. The system was further refined with information supporting EFH designations, annual catch limits, and accountability measures associated with all South Atlantic Council-managed species, added and additional refinement of structure and function further enhancing the systems capabilities and utility. In addition, new habitat information based on life history stage was imported into the database and a link to a User's Guide (http://safmc.net/download/EcoSpecies-WebUser-Manual-3-17.pdf) was added. The project in 2019 will continue to update and refine the online data system. Updates included in this phase of the project address the need by the South Atlantic Council to refine and update species information for future 5-year EFH reviews and to highlight and expand accessibility and availability of detailed species, habitat, and fishery information for FEP II to further support the move to Ecosystem-Based Fishery Management.

South Atlantic Artificial Reefs Web Application:
(http://myfwc.maps.arcgis.com/apps/webappviewer/index.html?id=f3c6ac59ee5f49e59f1ae5c96c5bc76b). This application provides a regional view of artificial reefs locations, contents and eventually imagery associated with programs in the southeastern U.S. overseen by individual states (Florida, Georgia, South Carolina, North Carolina).

South Atlantic ACCSP Web Map and Application:
A new ArcGIS Online web map displays Atlantic Coastal Cooperative Statistics Program (ACCSP) Statistical Areas with related ACCSP non-spatial tables of non-confidential data binned into 5-year time steps to better represent catch and values of Council-managed species across time. The web map provides an easy interface to view landings of a statistical area over time. FWRI also created an ACCSP web application for users to query by species for each time step or query by ACCSP Statistical Areas. The ACCSP web application is powered by the web map to display charts of landings and values for ACCSP Statistical Areas. The related table widgets summarize the fields for "live_pounds" and "dollar_values" by species and time step.

South Atlantic Council Habitat and Ecosystem Digital Dashboard Enhancements:
To further enhance the South Atlantic Council's Digital Dashboard and enhance linkages with regional partners mapping and characterizing habitats and documenting species use of habitats in the South Atlantic Region, a live link to the *Okeanos Explorer* while on cruise was added to the Projects page and a link to the Atlantic Coastal Fish Habitat Partnership (ACFHP) was added to the Partners page.

Ecosystem-Based Action, Future Challenges and Needs

The South Atlantic Council has implemented ecosystem-based principles through several existing fishery management actions including establishment of deep-water Marine Protected Areas for the Snapper Grouper fishery, proactive harvest control rules on species (e.g., dolphin and wahoo) which are not overfished, implementing extensive gear area closures which in most cases eliminate the impact of fishing gear on EFH, and use of other spatial management tools including Special Management Zones and Spawning Special Management Zones. Through development of the Comprehensive Ecosystem-Based Amendments, the Council has taken an ecosystem approach to protecting deep-water ecosystems while providing for traditional fisheries for the Golden Crab and Royal Red shrimp in areas where they do not impact deep-water coral habitat. The stakeholder-based process tapped into an extensive regional Habitat and Ecosystem network. Support tools facilitate South Atlantic Council deliberations and with the help of regional partners, are being refined to address long-term habitat conservation and EBFM needs.

One of the greatest challenges to enhance habitat conservation and EBFM in the region is funding high priority research, including comprehensive benthic mapping and ecosystem model and management tool development. In addition, collecting detailed information on fishing fleet dynamics including defining fishing operation areas by species, species complex, and season, as well as catch relative to habitat is critical for assessment of fishery, community, and habitat impacts and for South Atlantic Council use in place-based management measures. Additional resources need to be dedicated to expanding regional coordination of modeling, mapping, characterization of species use of habitats, and full funding of regional fishery independent surveys (e.g., MARMAP, SEAMAP, and SEFIS) which are linking directly to addressing high priority management needs. The FEP II Implementation Plan includes Appendix A to highlight research and data needs excerpted from the SEAMAP 5 Year Plan because they represent short and long-term research and data needs that support EBFM and habitat conservation in the South Atlantic Region.

Development of ecosystem information systems to support South Atlantic Council management should build on existing tools (e.g., Regional Habitat and Ecosystem GIS and Arc Services) and provide resources to regional cooperating partners for expansion to address long-term South Atlantic Council needs. NOAA should support and build on the regional coordination efforts of the South Atlantic Council as it transitions to a broader management approach. Resources need to be provided to collect information necessary to update information supporting FEP II, which support refinement of EFH designations and spatial representations and future EBFM actions. These are the highest priority needs to support habitat conservation and EBFM, the completion of mapping of near-shore, mid-shelf, shelf edge, and deep-water habitats in the South Atlantic region and refinement in the characterization of species use of habitats.

Appendix E. Fishery Impact Statement

The Magnuson-Stevens Fishery Conservation and Management Act requires a Fishery Impact Statement (FIS) be prepared for all amendments to fishery management plans (FMP). The FIS contains an assessment of the expected and potential biological, economic, and social effects of the conservation and management measures on: 1) fishery participants and their communities; 2) participants in the fisheries conducted in adjacent areas under the authority of another Council; and 3) the safety of human life at sea. Detailed discussion of the expected effects for all proposed changes is provided in Chapters 1 and 2. The FIS provides a summary of these effects.

Actions Contained in Amendment 10 to the FMP for Coral, Coral Reefs, and Live Bottom Habitat of the South Atlantic Region (Amendment 10)

Amendment 10 would expand access to a historic rock shrimp fishing area within the Oculina Bank Coral Habitat Area of Particular Concern (OHAPC) through establishment of a shrimp fishery access area (SFAA). **Preferred Alternative 2** would establish an SFAA that is 22 mi^2 in area along the eastern edge of the northern extension of the OHAPC and allow a shrimp vessel with a valid commercial South Atlantic Rock Shrimp limited access permit to bottom trawl within the established area.

Assessment of Biological Effects

Preferred Alternative 2 could result in negative direct and indirect biological impacts to the deep-water coral habitat within the proposed SFAA as it would allow intermittent bottom trawling for rock shrimp. The degree and likelihood of potential direct biological impacts from bottom tending fishing gear on coral habitat as a result of **Preferred Alternative 2** are unknown due to the paucity of habitat mapping and habitat characterization available for this area. While no high relief mounds are present, low-relief hard bottoms and coral rubble could be providing substrate available for coral recruitment and recovery from previous trawling events. Although rock shrimp occurrence in the proposed area is variable, and fishing is expected to occur in areas impacted from previous trawling, any recovery of ecosystem services that has occurred since the last trawling event would be lost.

Indirect effects to coral could result through influx of suspended benthic sediments created while trawling the bottom. Increased sedimentation can cause smothering and burial of coral polyps, shading, tissue necrosis, population explosions of bacteria in coral mucus, and generally reduces recruitment, survival, and settlement of coral larvae. Coral recruits are particularly susceptible to sedimentation and an increase in fine sediment can significantly reduce coral recruit survival. Depending on direction and magnitude of water currents in the affected area, shrimp trawls could create sediment plumes during fishing operations and the plumes could be transported to coral habitats.

Assessment of Economic Effects

Preferred Alternative 2 would result in net economic benefits by allowing vessels fishing for rock shrimp with bottom trawl gear to potentially increase landings of rock shrimp through access to an approximate 22 mi^2 area. Increases in catches of rock shrimp would be expected to

increase gross revenue and producer surplus. Given the likely variability in usage of the area, as well as the exhibited variability in overall participation in the regional rock shrimp portion of the shrimp fishery, these economic effects cannot be quantified. Additionally, if landings of rock shrimp increase, these landings are a relatively small component of the overall market for shrimp given the magnitude of shrimp imports. Thus, higher landings of rock shrimp would not be expected to change ex-vessel or consumer prices and therefore there is no anticipated change in consumer surplus.

Assessment of the Social Effects

Preferred Alternative 2 would directly address stakeholder concerns regarding access to historically important fishing grounds and may improve stakeholder perceptions of the management process, thus this proposed action would be expected to positively impact fishermen.

Assessment of Effects on Safety at Sea

The establishment of an SFAA (**Preferred Alternative 2**) is not expected to result in direct impacts to safety at sea. The proposed action would not force vessels to participate in the rock shrimp portion of the shrimp fishery under adverse weather or ocean conditions. The existing requirement of VMS would provide real-time vessel location in the case of emergencies.

Appendix F. Mapping in Oculina Bank Habitat Area of Particular Concern - Northern Extension

2017 Multi-beam Mapping Survey

The total area of seafloor mapped during the 2017 expedition was 480 km^2 off the south side of Florida and the Oculina Bank mapped during leg 2 (Figure F-1). The area mapped during leg 1 was mostly at depths ranging between 200-300 m, and included a continuous ridge feature at approximately 250 m depth that should be explored in the future. The area mapped on leg 2 was mostly at depths shallower than 150 m, and showed some relief in close proximity of the existing Oculina Bank Habitat Area of Particular Concern (OHAPC).

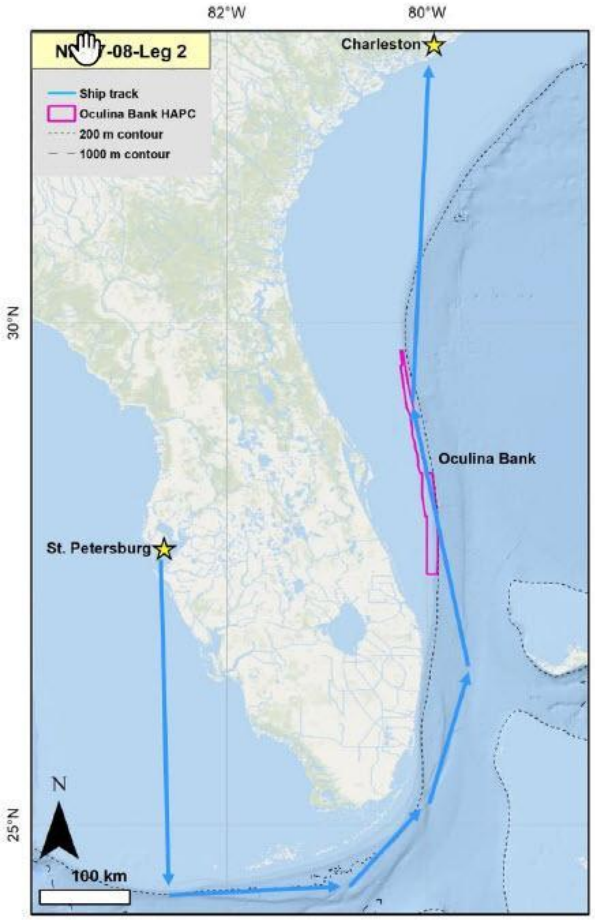

Figure F-1. Map showing the operational area of leg 2 of expedition NF-17-08 aboard NOAA Ship *Nancy Foster* that surveyed deep-sea coral ecosystems in the South Atlantic Bight.
Source: Expedition Report: 2017 Southeast Deep Coral Initiative (SEDCI) expedition aboard NOAA Ship *Nancy Foster* (NF-17-08: August 12-31, 2017).

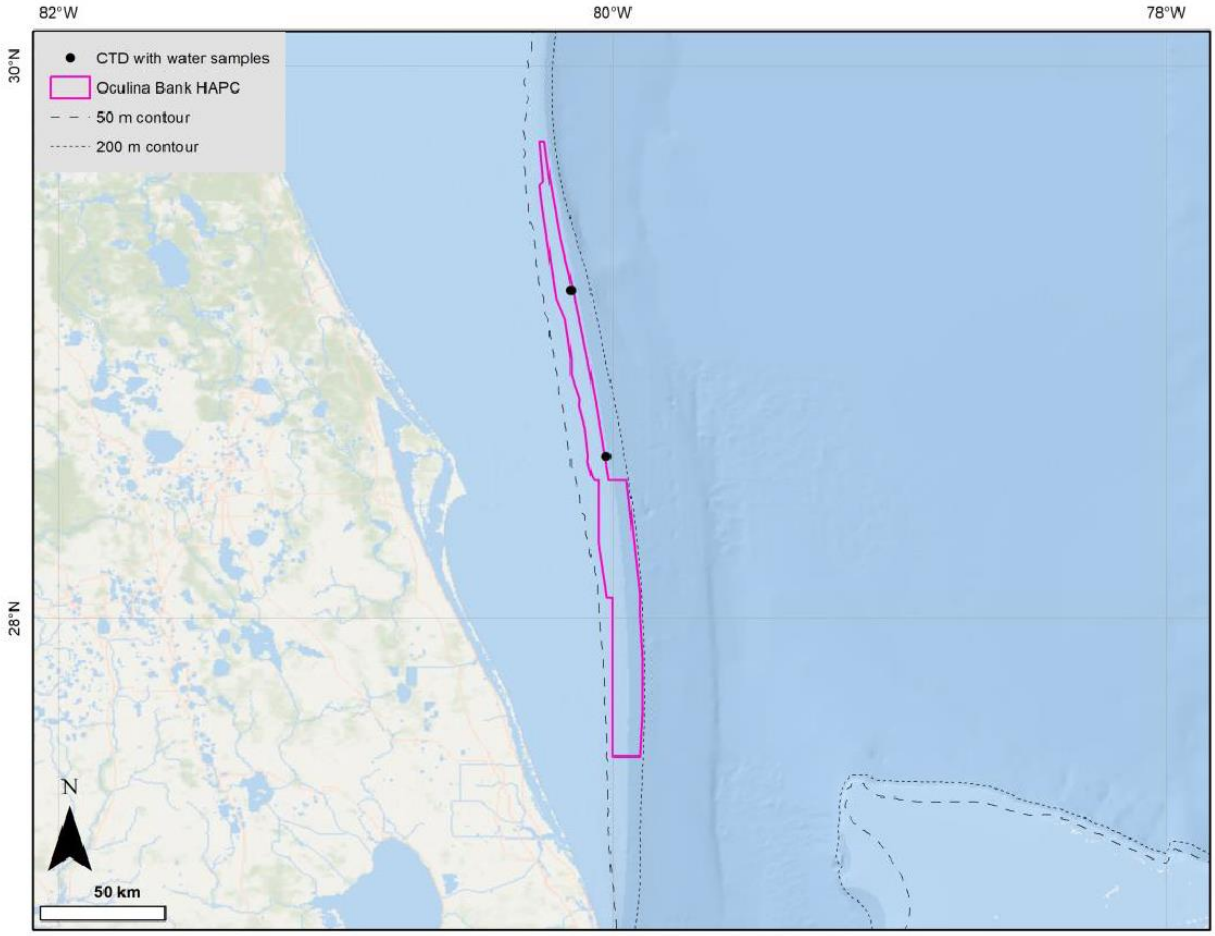

Figure F-2. Map showing the locations of CTD casts conducted during (top) leg 1, and (bottom) leg 2 of NF-17-08. Note that the map does not include the five CTD casts conducted during leg 2 using the underway CTD system.
Source: NOAA 2018.

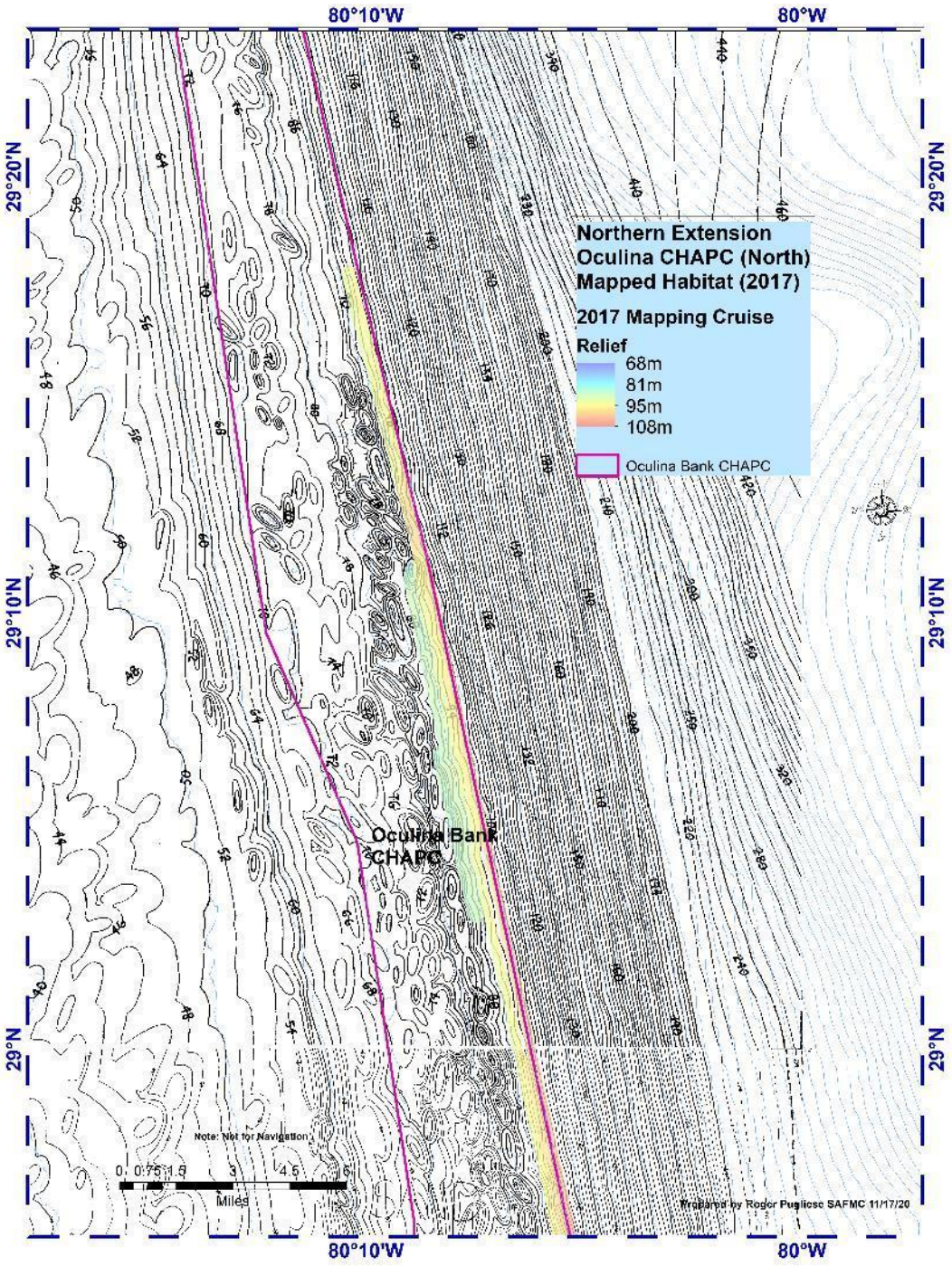

Figure F-3. Benthic habitat mapped in 2017 along eastern edge of the OHAPC (North) during SEDCI expedition aboard NOAA Ship *Nancy Foster* (NF-17-08: August 12-31, 2017).
Source: Roger Pugliese, SAFMC staff, Data Source- NOAA 2018.

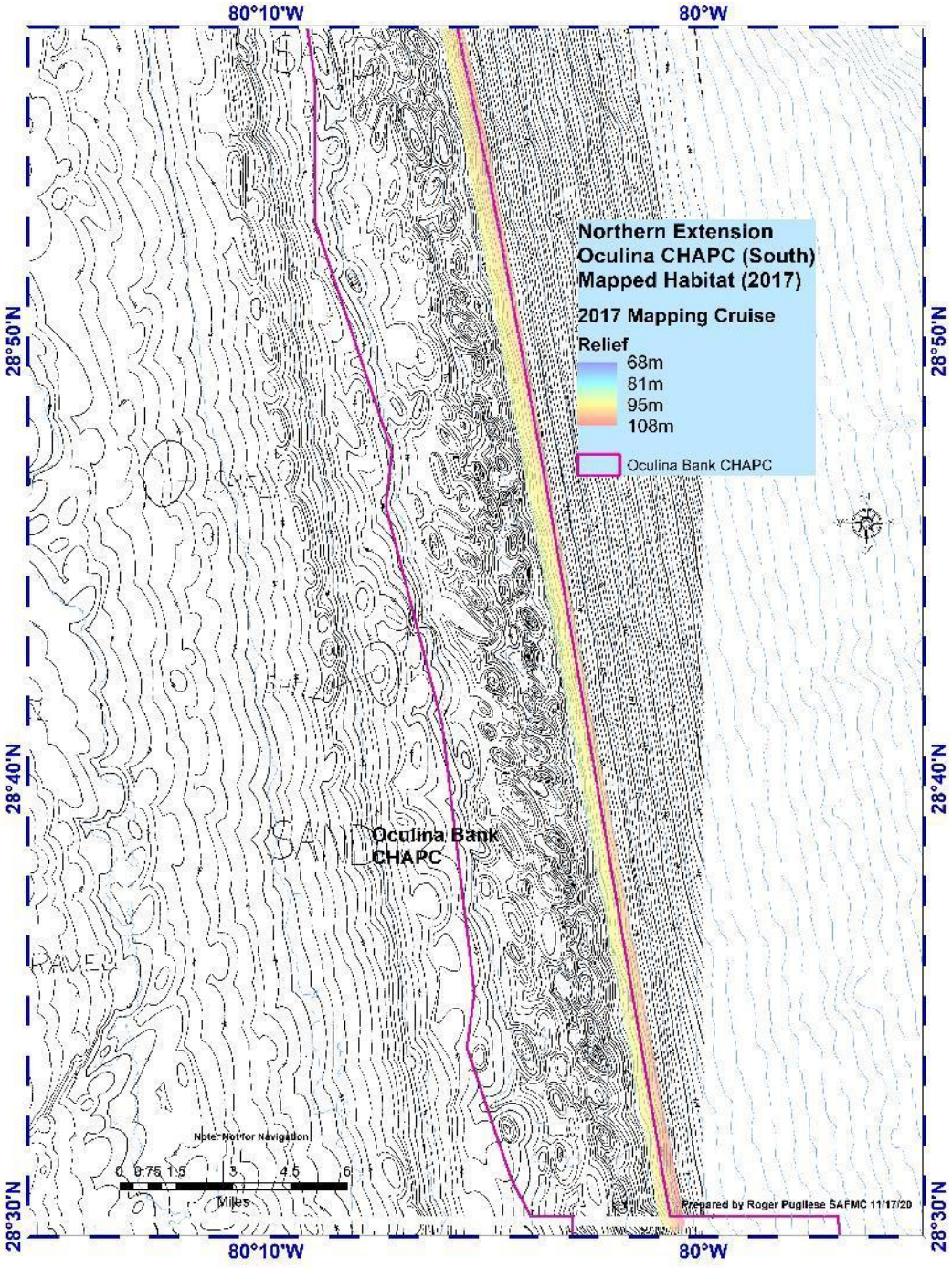

Figure F-4. Benthic habitat mapped in 2017 along eastern edge of the OHAPC (South) during SEDCI expedition aboard NOAA Ship *Nancy Foster* (NF-17-08: August 12-31, 2017).
Source: Roger Pugliese, SAFMC staff, Data Source- NOAA 2018.

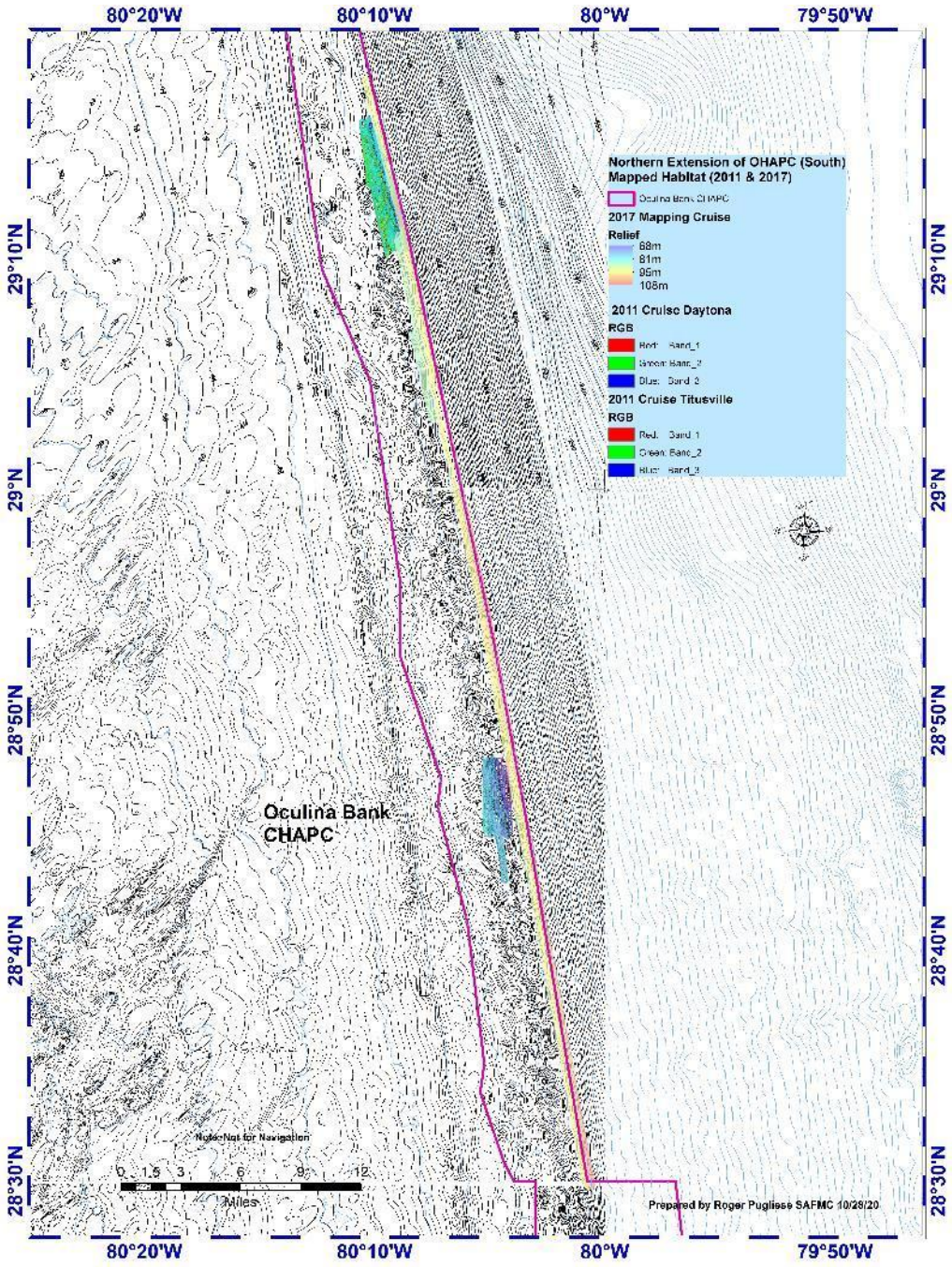

Figure F-5. The Northern Extension of the OHAPC mapping from the SEDCI expedition aboard NOAA Ship *Nancy Foster* and two multi-beam mapping sites off Daytona and Titusville regions where ROV dives were conducted during the 2011 NOAA *Pisces* cruise.
Source: Roger Pugliese, SAFMC staff, Data Source- NOAA 2011.

Habitat Description of Pinnacle Habitat Mapped and Characterized West of the Eastern Boundary of the OHAPC Northern Extension- 2011 NOAA Pisces Research Cruise

Source: Excerpt from Coral Amendment 8 Appendices – A Proposal for Extension of the Boundaries of the Oculina Coral HAPC.

In June 2011, using the NOAA Ship *Pisces* NOAA's Deep Sea Coral Program and HBOI's Cooperative Institute for Ocean Exploration, Research, and Technology conducted a survey in deep-water and shelf-edge reef sites along eastern Florida. The two multi-beam areas were randomly selected off Daytona and Titusville, Florida areas; the multi-beam survey was conducted overnight and followed up the next day with ROV dives using a ROV from NOAA's Southwest Fisheries Science Center that was outfitted with video and digital still cameras. Quantitative video and photographic transects were conducted during 4-hour dives to document the habitat and fauna. The sonar maps and ROV dives confirmed that the high-relief features of the NOAA regional charts were in fact high-relief *Oculina* coral mounds.

These ROV dives are described in SEADESC reports below (Figures F-6, F-7, and F-8) and show individual mounds to be conical shaped or elongated with E-W oriented ridges. The individual mounds are 15-20 m in height; maximum depth is 92 m and minimum depth is 64 m at the peaks. The slopes are gentle 10-45 degrees and covered with coral rubble, standing dead coral and sparse live *Oculina varicosa* coral colonies. The dead coral rubble and standing coral (both live and dead) provide habitat to a dense variety of benthic invertebrates and fish, most likely similar to that reported from the OHAPC. At the base of some mounds is exposed limestone rock and 1-2 m relief ledges which also provide essential fish habitat to numerous commercially and recreationally important fish species including scamp, gag, snowy, and red groupers.

Between the mounds and west of the main reef track is mostly soft sediment but also coral rubble and patchy rock pavement habitat. East of the main reef track the base of the mounds flatten out between 90 and 100 m into the muddy Florida-Hatteras slope. Coral rubble may extend 10s of meter east of the mounds. Dominant fish observed during the ROV video transects included scamp (common), gag grouper, snowy grouper, red porgy (common), amberjack (abundant), black seabass (abundant), tilefish, red hogfish, tattler, cubbyu, blue angelfish, bank butterfly, morays, roughtongue bass, bigeye, scorpionfish, batfish, wrasses. Dominant invertebrates include *Oculina varicosa* coral (10-40 cm colonies), gorgonian corals, black coral (abundant), sponges, starfish, sea urchins, and mollusks. Unfortunately, the mounds appear to have been impacted by years of bottom shrimp trawling as documented within the OHAPC.

Dive Number: NOAA SW Fisheries Phantom ROV 11-156A **Location:** Daytona Oculina Pinnacles, site 1

Dive Data:

Minimum Bottom Depth (m):	70	**Total Transect Length (m):**	2524
Maximum Bottom Depth (m):	90	**Surface Current (kn):**	.25
On Bottom (Time- GMT):	13:34	**On Bottom (Lat/Long):**	29°14.1116'N, 80°09.8650'W
Off Bottom (Time- GMT):	17:53	**Off Bottom (Lat/Long):**	29°14.5875'N, 80°09.9818'W

Physical (bottom); Temp (°C): 14.1 **Salinity:** 35.8 **Visibility (m):** 18 **Current (kn):** 0

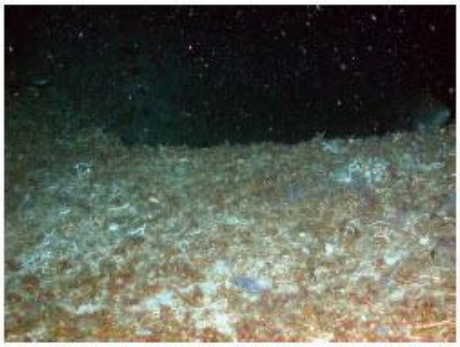

Figure 1: *Oculina* rubble habitat (Image: DSCN7160)

Figure 2: *Oculina varicosa* (Image: DSCN7584)

Notes (Objectives, Site Description, Habitat, Fauna):

Objective: Survey *Oculina* coral mounds and ground truth sonar survey in area outside *Oculina* HAPC and never surveyed previously. Target site- *Oculina* mound (from *Pisces* multibeam): 29° 14.17'N, 80° 9.802'W; 70-90 m.

Dive Events: Surveyed seven *Oculina* mounds at the northern end of the *Pisces* Daytona sonar survey area. Prior to dive had to switch to different ROV and umbilical with standard definition camera. The *Phantom* ROV's top parallel lasers are calibrated at 20 cm, bottom lasers 61cm.

Site Description/Habitat/Fauna: *Pisces* shipboard multibeam surveyed for first time an area of deep-sea *Oculina* coral mounds along the shelf edge break, ~40 nmi north of the *Oculina* HAPC. The sonar survey off Daytona covered 5.7 x 0.8 nmi, discovering >100 mounds, 15-20 m relief, forming a very dense linear pattern oriented NNW-SSE. Individual mounds are conical to E-W oriented ridges, 150-450 m wide at the base, and with base depths of 85-90 m, and peaks 70-75 m. Mounds are *Oculina* bioherms; 70-100% coral rubble and mud on slopes (10-45°) and peaks, with scattered live and dead standing colonies of *Oculina varicosa* (white, azooxanthellate); most colonies ~10-30 cm diameter. The peaks are generally E-W ridges covered with coral rubble and patches of abundant standing dead coral. Near the base of some mounds is exposed rock pavement and 1-2 m ledges. Valleys between the mounds is mostly soft sediment, sandy mud, and shell hash. Dominant fauna: Fish- scamp (common), few gag and snowy grouper, red porgy, amberjack, tilefish burrow, black seabass, bank butterfly, blue angel, moray, roughtongue bass, bigeye, scorpionfish, batfish, wrasses, Ogcocephalidae; Sponges- Demospongiae, barrel sponge; Cnidaria- *Oculina varicosa* (Ivory tree coral), *Telesto*, Plexauridae, *Titanideum*, *Condylactis gigantea*, Cerianthidae, Antipatharia; Polychaeta- Sabellidae; Echinoderms- *Eucidaris tribuloides*, *Centrostephanus*, *Narcissia trigonaria*, *Astroporpa annulata*.

Figure F-6. 2011 NOAA Ship *Pisces* Daytona area SEADESC dive report characterizing habitat and identifying species encountered.

Dive Number: NOAA SW Fisheries Phantom ROV 11-156B **Location:** Daytona Oculina Pinnacles, site 2, southern end

Dive Data:

Minimum Bottom Depth (m):	70	**Total Transect Length (m):**	1338
Maximum Bottom Depth (m):	92	**Surface Current (kn):**	.75
On Bottom (Time- GMT):	19:45	**On Bottom (Lat/Long):**	29°10.8294'N, 80°09.1835'W
Off Bottom (Time- GMT):	21:47	**Off Bottom (Lat/Long):**	29°11.2590'N, 80°08.9894'W

Physical (bottom); Temp (°C): 14.1 **Salinity:** 35.81 **Visibility (m):** 12 **Current (kn):** 0

Figure 1: *Oculina* rubble habitat with demosponge and Cidaroida urchins (Image: DSCN7708)

Figure 2: Snowy grouper (*Epinephelus niveatus*) (Image: DSCN7826)

Notes (Objectives, Site Description, Habitat, Fauna):

Objective: Survey *Oculina* coral mounds and ground truth sonar survey in area outside *Oculina* HAPC and never surveyed previously. Target site- *Oculina* mound (from *Pisces* multibeam): 29° 10.948'N, 80° 9.0585'W; 70-90 m.

Dive Events: ROV transect surveyed four *Oculina* mounds at the southern end of the *Pisces* Daytona sonar survey area. One colony (15 cm) of *Oculina varicosa* was collected with a by-catch of two crabs.

Site Description/Habitat/Fauna: ROV ground truthed that the mounds are *Oculina* bioherms; ~70-100% coral rubble and mud on slopes (10-45o) and peaks, with scattered live and dead standing colonies of *Oculina varicosa* (white, azooxanthellate); most colonies ~10-30 cm diameter. Individual mounds are E-W oriented ridges with base depths of 85-90 m, and peaks 70-75 m. The peaks are covered with coral rubble and patches of abundant standing dead coral. Near the base of some mounds is exposed rock pavement and 1-2 m ledges. Valleys between the mounds is mostly soft sediment, sandy mud, and shell hash. Dominant fauna: Fish- snowy grouper, dozens of greater amberjack, black seabass, bank butterfly, bigeye, roughtongue bass; Cnidaria- *Oculina varicosa* (Ivory tree coral), dense burrowing anemones Cerianthidae, *Virgularia*, *Stichopathes*, hydroids; Echinoderms- *Ophioderma devaneyi*, dense congregations of black long-spined urchins *Centrostephanus*, *Arbacia punctulata*, *Eucidaris tribuloides*.

Figure F-7. 2011 NOAA Ship *Pisces* Daytona area SEADESC dive report characterizing habitat and identifying species encountered.

Dive Number: NOAA SW Fisheries Phantom ROV 11-157A

Location: North Canaveral Oculina Mounds - Site 1; Reed Site DR 14

Dive Data:

Minimum Bottom Depth (m):	64	**Total Transect Length (m):**	3747
Maximum Bottom Depth (m):	88	**Surface Current (kn):**	0.8-1.5
On Bottom (Time- GMT):	16:11	**On Bottom (Lat/Long):**	28°45.2923'N, 80°03.9855'W
Off Bottom (Time- GMT):	21:41	**Off Bottom (Lat/Long):**	28°46.4133'N, 80°04.4582'W

Physical (bottom); Temp (°C): 13.3 **Salinity:** 35.7 **Visibility (m):** 15 **Current (kn):** .3-.6

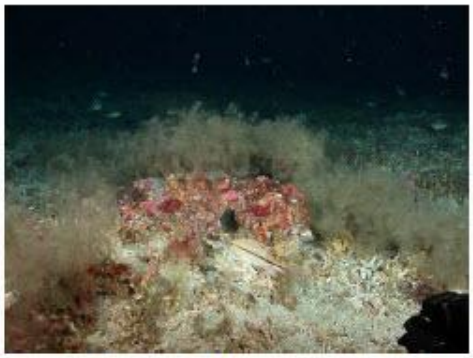

Figure 1: *Oculina* rubble habitat (Image: DSCN8040)

Figure 2: Snowy grouper (*Epinephelus niveatus*) and *Tanacetipathes* (Image: DSCN8268)

Notes (Objectives, Site Description, Habitat, Fauna):

Objective: Survey *Oculina* coral mounds and ground truth sonar survey in area outside *Oculina* HAPC. Target site- *Oculina* mound (from *Pisces* multibeam): 28° 45.497'N, 80° 04.283'W, 64-88 m. Only one submersible dive has been made in this area in 1982 on Reed Peak DR-14 (JSL I-1209).

Dive Events: ROV transect crossed ten *Oculina* coral mounds on a northerly heading. One colony of black coral (15 cm) was collected: *Tanacetipathes* sp. with six associated animals.

Site Description/Habitat/Fauna: *Pisces* shipboard multibeam surveyed for first time an area of deep-sea *Oculina* coral mounds along the shelf edge break, ~15 nmi north of the *Oculina* HAPC. The sonar survey off Titusville covered ~3.2 x 1.0 nmi, discovering ~35 10-20 m-tall mounds oriented in a linear pattern parallel to the shoreline NNW-SSE. Individual mounds are oval with an E-W oriented ridge at the peak; the peaks range from 64-75 m depth and the bases 80-88 m. Individual mound slopes and peaks are nearly 100% coral rubble with sparse small (10-40 cm) live *Oculina varicosa* coral colonies; the peaks appear hummocky with 20-cm tall patches of standing dead coral. The northern bases of the mounds have exposed rock boulders and 1 m ledges. Some of the dead coral appears to be coated with black fuzz, possibly cyanobacteria(?). Dominant fauna: Fish- snowy grouper, scamp, gag grouper, red porgy (common), black seabass (abundant), bigeye, bank butterfly, scorpaenids, roughtongue bass, cubbyu, red hogfish, tattler, leopard toadfish, toadfish, greater amberjack; Cnidaria- *Oculina varicosa* (Ivory tree coral), *Stichopathes*, Plexauridae, *Nidalia*, hydroids, Cerianthidae, Antipatharia; Echinoderms- *Centrostephanus*, *Eucidaris tribuloides*, *Ophioderma devanyi*, *Astroporpa annulata*. Video of trawl door.

Figure F-8. 2011 NOAA Ship *Pisces* off Titusville area SEADESC dive report characterizing habitat and identifying species encountered.

Appendix G. Coral History of Management

The following is a summary of management actions for plans amended through the Fishery Management Plan (FMP) for Coral, Coral Reefs and Live/Hard bottom Habitats of the South Atlantic Region (Coral FMP)). Other summaries of South Atlantic Fishery Management Council (South Atlantic Council) actions and history of management for other Fishery Management Plans are available online at www.safmc.net.

The Fishery Management Plan for Coral, Coral Reefs, and Live/Hard bottom Habitat of the South Atlantic Region

Management of coral resources was originally established with the joint Gulf of Mexico Fishery Management Council (Gulf Council) and South Atlantic Council Coral FMP (GMFMC & SAFMC 1982). The Coral FMP's intent was to optimize the benefits generated from the coral resource while conserving the coral and coral reefs. Specific management objectives addressed through the FMP were to: (1) develop scientific information necessary to determine feasibility and advisability of harvest of coral; (2) minimize, as appropriate, adverse human impacts on coral and coral reefs; (3) provide, where appropriate, special management for Coral Habitat Areas of Particular Concern (CHAPCs); (4) increase public awareness of the importance and sensitivity of coral and coral reefs; and (5) provide a coordinated management regime for the conservation of coral and coral reefs.

The Coral FMP implemented the following management measures for coral and coral reefs: (1) disallowed any level of foreign fishing and established the domestic annual harvest to equal the optimum yield (OY); (2) prohibited the taking of stony corals and sea fans or the destruction of these corals and coral reefs anywhere in the exclusive economic zone (EEZ) of the Gulf and South Atlantic Councils' area of jurisdiction; (3) established that stony corals and sea fans taken incidentally in other fisheries must be returned to the water in the general area of capture as soon as possible (with the exception of the groundfish, scallop, or other similar fisheries where the entire unsorted catch is landed, in which case stony corals and sea fans may be landed but not sold); (4) established that the Councils may notify the Secretary of Commerce of the threat of widespread or localized depletion from overharvest of one or more species of octocorals and recommend specific actions; (5) established a permit system for the use of chemicals for the taking of fish or other organisms that inhabit coral reefs; (6) established a permit system for taking prohibited corals for scientific and educational purposes; and (7) identified Habitat Areas of Particular Concern (HAPC) and established time and area restrictions in HAPCs.

Amendment 1 (GMFMC & SAFMC 1990) implemented the following regulations: (1) included octocorals in the management unit as a controlled species; (2) implemented a combined octocoral quota for the Gulf of Mexico and South Atlantic EEZ of 50,000 individual colonies; stated the OY for coral reefs, stony corals, and sea fans to be zero; (4) included a definition of overfishing; (5) established a permit system to take octocorals; (6) provided reporting requirements for those taking corals under federal permit; (7) included a section on vessel safety considerations; and (8) revised the section on habitat.

Amendment 2 (GMFMC & SAFMC 1994) included the following regulations: (1) defined live rock and added it to the Coral FMP management unit (live rock is defined as living marine organisms or an assemblage thereof attached to a hard substrate including dead coral or rock); (2) redefined allowable octocorals to mean erect, non-encrusting species of the subclass Octocorallia, except the prohibited sea fans, including only the substrate covered by and within one inch of the holdfast; (3) revised management measures to address bycatch of octocorals; (4) provided for different management in the jurisdictional areas of the two Councils by promulgating a separate set of management measures and regulations for the South Atlantic; (5) prohibited all wild live rock harvest north of Dade County, Florida, and prohibited chipping throughout the jurisdiction of the South Atlantic Council; (6) capped harvest of wild live rock to 485,000 pounds annually until January 1, 1996, when all wild live rock harvest was prohibited; (7) allowed and facilitated aquaculture of live rock in the EEZ and required live rock harvest federal permits; and (8) required a federal permit for harvest and possession of prohibited corals and prohibited live rock from the EEZ for scientific, educational, and restoration purposes.

Amendment 3 (SAFMC 1995) implemented the following: (1) established a live rock aquaculture permit system for the South Atlantic EEZ; (2) prohibited octocoral harvest north of Cape Canaveral to prevent expansion of the fishery to areas where octocorals constitute a more significant portion of the live/hard bottom habitat; and (3) prohibited anchoring of all fishing vessels in the Oculina Bank HAPC.

Amendment 4 to the South Atlantic Coral FMP, included in the Comprehensive Essential Fish Habitat (EFH) Amendment (SAFMC 1998), expanded the Oculina Bank HAPC to an area bounded to the west by 80°W., to the north by 28°30' N., to the south by 27°30' N., and to the east by the 100 fathom (600 feet) depth contour. Amendment 4 expanded the Oculina Bank HAPC to include the area closed to rock shrimp harvest. The expanded Oculina Bank HAPC is 60 nautical miles long by about 5 nautical miles wide although the width tracks the 100 fathom (600 ft) depth contour rather than a longitude line. Within the expanded Oculina Bank HAPC area, no person may:

1. Use a bottom longline, bottom trawl, dredge, pot, or trap.
2. If aboard a fishing vessel, anchor, use an anchor and chain, or use a grapple and chain.
3. Fish for rock shrimp or possess rock shrimp in or from the area on board a fishing vessel.

Amendment 5 to the Coral FMP, included in the Comprehensive Sustainable Fisheries Act Amendment (SAFMC 1998c), extended the OY definition to include harvest allowances under live rock aquaculture permits.

Amendment 6 to the Coral FMP, included in the Comprehensive Ecosystem-Based Amendment 1 (CE-BA 1; SAFMC 2009), established deep-water Coral HAPCs (CHAPCs) and prohibited the use of bottom tending gear in these areas, established "Shrimp Fishery Access Areas" within the Stetson-Miami Terrace CHAPC and established "Allowable Golden Crab Fishing Areas" within the Stetson-Miami Terrace and Pourtalés Terrace CHAPCs. The CE-BA 1 also provided spatial information on designated EFH in the South Atlantic Council's Habitat Plan (SAFMC 1998).

Amendment 7 to the Coral FMP, included in the CE-BA 2 (SAFMC 2011), implemented the following management measures: redefined the management unit for octocorals in the South

Atlantic to include the EEZ waters off North Carolina, South Carolina and Georgia; specified an annual catch limit of 0 for octocorals under management in the South Atlantic; limited the harvest and possession of snapper grouper and coastal migratory pelagic species in Special Management Zones off South Carolina to the recreational bag limit; revised sea turtle release gear requirements for the snapper grouper fishery; and amended the Snapper Grouper, Coral and *Sargassum* FMPs to designate EFH and EFH-HAPCs.

Amendment 8 to the Coral FMP (SAFMC 2013) expanded the Stetson-Miami Terrace Deep-water Coral HAPC, the Cape Lookout Deep-water Coral HAPC, and the Oculina Bank HAPC; and implemented a transit provision through the Oculina Bank HAPC.

Appendix H. Shrimp History of Management

The following is a summary of management actions for plans amended through the Fishery Management Plan (FMP) for the Shrimp Fishery of the South Atlantic Region (Shrimp FMP). Other summaries of South Atlantic Fishery Management Council (South Atlantic Council) actions and history of management for other fishery management plans are available online at www.safmc.net.

Shrimp FMP (SAFMC 1993) provided South Atlantic states with the ability to request concurrent closure of the exclusive economic zone (EEZ) adjacent to their closed state waters following severe winter cold weather and to eliminate fishing mortality on over-wintering white shrimp following severe winter cold kills. It also established a buffer zone extending seaward from shore 25 nautical miles, inside of which no trawling would be allowed with a net having less than four-inch stretch mesh during an EEZ closure. Vessels trawling inside this buffer zone cannot have a shrimp net aboard (i.e., a net with less than four-inch stretch mesh) in the closed portion of the EEZ. Modifications to the original transit provisions were made in Amendment 11 to the FMP. The plan provided an exemption for the royal red and rock shrimp fisheries to allow the rock shrimp fishery to be prosecuted with minimal disruption during a closure of federal waters for protection of white shrimp.

Amendment 1 (SAFMC 1996a) addressed measures pertaining to the rock shrimp fishery in the South Atlantic EEZ. Rock shrimp was added to the management unit. Trawling for rock shrimp was prohibited east of 80° W. longitude between 27° 30' N. latitude and 28° 30' N. latitude in depths less than 100 fathoms to limit the impact of the rock shrimp fishery on essential bottom fish habitat, including the fragile coral species existing in the Oculina Bank Habitat Area of Particular Concern (OHAPC). This prohibition enhanced existing federal regulations for coral and snapper grouper by protecting essential live/hard bottom habitat including *Oculina* coral and the OHAPC from trawl-related damage. To address the need for better data, the National Marine Fisheries Service (NMFS) was directed to require dealers to submit reports to accurately account for harvest of rock shrimp in the South Atlantic.

Amendment 2 (SAFMC 1996b) added pink shrimp to the management unit, defined overfishing and optimum yield (OY) for brown and pink shrimp, required the use of certified bycatch reduction devices (BRD) in all penaeid shrimp trawls in the South Atlantic EEZ (the large mesh extended funnel and the fisheye) and established a framework for BRD certification specifying BRD certification criteria and testing protocol.

Amendment 3 was included in the South Atlantic Council's Comprehensive Amendment Addressing Essential Fish Habitat in Fishery Management Plans of the South Atlantic Region (SAFMC 1998a), which addressed the habitat requirements of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), as amended in 1996. Amendment 3 also established Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPC) for penaeid shrimp in the South Atlantic. Areas that meet the criteria for EFH-HAPCs for penaeid shrimp include all coastal inlets, all state-designated nursery habitats of particular importance to shrimp, and state-identified overwintering areas. In addition, Amendment 3 called for

implementation of a voluntary vessel monitoring system (VMS) in the rock shrimp fishery. The voluntary pilot program was intended to provide information concerning the future use of transponders in the rock shrimp fishery. This voluntary program was not implemented because of logistical issues associated with the evolving VMS technologies at the time.

Amendment 4 was included in the South Atlantic Council's Comprehensive Amendment Addressing Sustainable Fishery Act Definitions and Other Required Provisions in Fishery Management Plans of the South Atlantic Region (SAFMC 1998c), which addressed the Sustainable Fisheries Act requirements of the Magnuson-Stevens Act, as amended in 1996. Amendment 4 included reporting requirements as specified in the Atlantic Coastal Cooperative Statistics Program (ACCSP). It was established that the South Atlantic Council staff would work with NOAA General Counsel to determine the appropriate procedure to remove all the varied data reporting requirements in individual FMPs and reference one comprehensive data reporting document. The Shrimp FMP was also amended to include available information on fishing communities (detailed discussion in the SFA Comprehensive Amendment; SAFMC 1998c).

Amendment 5 (SAFMC 2002) established a rock shrimp limited access program, required a vessel operator's permit, established a minimum mesh size for the tail bag of a rock shrimp trawl (at least 40 meshes of 1 and 7/8 inch stretched mesh above the 2 inch rings) and required use of an approved vessel monitoring system in the limited access rock shrimp fishery.

Operator permits - effective May 16, 2003: "For a person to be an operator of a vessel fishing for rock shrimp in the South Atlantic EEZ or possessing rock shrimp in or from the South Atlantic EEZ, or to be an operator of a vessel that has a valid permit for South Atlantic rock shrimp, such person must have and carry on board a valid operator permit and one other form of personal identification that includes a picture (driver's license, passport, etc.). At least one person with a valid operator's permit for the South Atlantic rock shrimp fishery must be aboard while the vessel is at sea or offloading."

Limited access endorsement - effective July 15, 2003: "For a person aboard a vessel to fish for or possess rock shrimp in the South Atlantic EEZ off Georgia or off Florida, a limited access endorsement for South Atlantic rock shrimp must be issued to the vessel and must be on board. A vessel is eligible for an initial limited access endorsement if the owner owned a vessel with a Federal permit for South Atlantic rock shrimp on or before December 31, 2000 and landed at least 15,000 pounds of South Atlantic rock shrimp in any one of the calendar years 1996 through 2000 from a vessel he/she owned."

VMS - effective October 14, 2003: Vessels that were issued a limited access endorsement for South Atlantic rock shrimp must have a NMFS-approved, operating VMS on board when on a trip in the South Atlantic. An operating VMS includes an operating mobile transmitting unit on the vessel and a functioning communication link between the unit and NMFS as provided by a NMFS-approved communication service provider.

Amendment 6 (SAFMC 2004) (1) transferred authority to make appropriate revisions to the BRD Testing Protocol to NMFS; (2) specified a reduction in the total weight of finfish of at least

30% for new BRDs to be certified; (3) adopted the ACCSP Release, Discard and Protected Species Module as the preferred methodology to monitor and assess bycatch and until this module is fully funded, require the use of a variety of sources to assess and monitory bycatch including, observers, logbooks, state cooperation, grants, and federal shrimp permits; (4) required BRDs on all rock shrimp trips in the South Atlantic; (5) required federal penaeid shrimp permits; (6) revised status determination criteria for penaeid shrimp; and (7) revised status determination criteria for rock shrimp.

Amendment 7 (SAFMC 2008) (1) eliminated the landing requirement for rock shrimp limited access endorsements, reinstated rock shrimp endorsements lost due either to not meeting the landing requirement in one of four consecutive calendar years or not renewing the endorsement on time; (2) renamed the permit/endorsement system to minimize confusion; (3) required verification of a VMS to renew, reinstate or transfer a limited access endorsement; and (4) required economic data be provided by federal shrimp permit holders.

Comprehensive Ecosystem-Based Amendment 1 (CE-BA 1) including **Shrimp Amendment 8** (SAFMC 2009) protected specific areas of sensitive habitat, deemed Coral Habitat Areas of Particular Concern (CHAPC) that house an invaluable array of deep-water coral species living in waters ranging from 400 meters (1200 ft) to 700 meters (2300 ft) deep. The parameters defined within the amendment aim to shield these areas from impacts associated with bottom-tending fishing practices while preserving the crab and shrimp fisheries in the area. Therefore, actions to establish "Allowable Golden Crab Fishing Areas" and "Shrimp Fishery Access Areas" within two of the proposed CHAPCs were included to ensure the continued existence of these fisheries and the communities they support.

Amendment 11 (SAFMC 2020) modified the transit and gear stowage measures for the cold weather closed areas and eliminated the requirement to stow gear below deck. A vessel may transit South Atlantic cold weather closed areas while possessing brown shrimp, pink shrimp, or white shrimp provided the vessel is in transit and fishing gear is appropriately stowed. Transit means non-stop progression through the area with fishing gear appropriately stowed. Gear appropriately stowed means trawl doors in the rack (cradle), nets in the rigging and tied down, and try net on the deck.