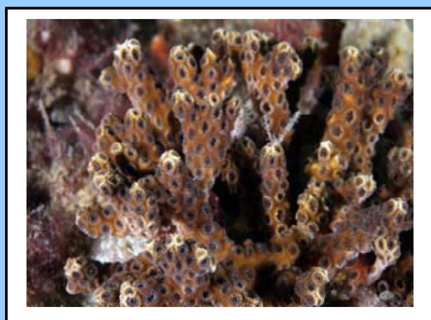
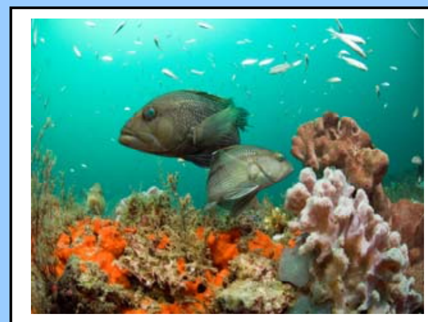
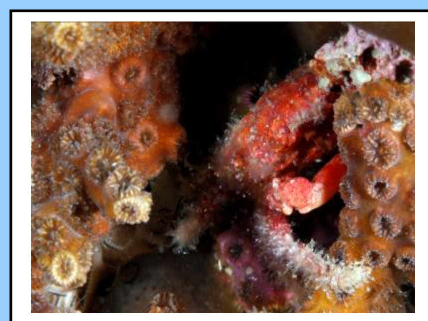
Coral Amendment 8



AMENDMENT 8

TO THE FISHERY MANAGEMENT PLAN FOR CORAL, CORAL REEFS, AND LIVE/HARDBOTTOM HABITATS of the SOUTH ATLANTIC REGION

Modifications to Habitat Areas of Particular Concern

Environmental Assessment **Regulatory Impact Review** **Fishery Impact Statement**

July 2013

Definitions of Abbreviations and Acronyms Used in the Amendment

ABC	acceptable biological catch
ACL	annual catch limits
AM	accountability measures
ACT	annual catch target
B	a measure of stock biomass in either weight or other appropriate unit
B_{MSY}	the stock biomass expected to exist under equilibrium conditions when fishing at F_{MSY}
B_{OY}	the stock biomass expected to exist under equilibrium conditions when fishing at F_{OY}
B_{CURR}	The current stock biomass
CPUE	catch per unit effort
EA	environmental assessment
EEZ	exclusive economic zone
EFH	essential fish habitat
F	a measure of the instantaneous rate of fishing mortality
$F_{30\%SPR}$	fishing mortality that will produce a static SPR = 30%
F_{CURR}	the current instantaneous rate of fishing mortality
F_{MSY}	the rate of fishing mortality expected to achieve MSY under equilibrium conditions and a corresponding biomass of B_{MSY}
F_{OY}	the rate of fishing mortality expected to achieve OY under equilibrium conditions and a corresponding biomass of B_{OY}
FEIS	final environmental impact statement
FMP	fishery management plan
FMU	fishery management unit
M	natural mortality rate
MARMAP	Marine Resources Monitoring Assessment and Prediction Program
MFMT	maximum fishing mortality threshold
MMPA	Marine Mammal Protection Act
MRFSS	Marine Recreational Fisheries Statistics Survey
MRIP	Marine Recreational Information Program
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSST	minimum stock size threshold
MSY	maximum sustainable yield
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OFL	overfishing limit
OY	optimum yield
RIR	regulatory impact review
SAFMC	South Atlantic Fishery Management Council
SEDAR	Southeast Data Assessment and Review
SEFSC	Southeast Fisheries Science Center
SERO	Southeast Regional Office
SIA	social impact assessment
SPR	spawning potential ratio
SSC	Scientific and Statistical Committee

Coral Amendment 8

Amends the Coral, Coral Reef, and Live/Hardbottom Fishery Management Plan of the South Atlantic with Environmental Assessment (EA), Regulatory Flexibility Act Analysis (RFAA), Regulatory Impact Review (RIR), and Fishery Impact Statement (FIS)

Proposed actions:	Modify Habitat Areas of Particular Concern (HAPC), including Oculina Bank HAPC, Stetson-Miami Terrace Coral HAPC, and Cape Lookout Coral HAPC. Transit through Oculina Bank HAPC.
Lead agency:	FMP Amendment – South Atlantic Fishery Management Council EA - National Marine Fisheries Service (NMFS)
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Scoping meetings held: January 24, 26, and January 30-February 2, 2012
Public Hearings held:

Abstract

Actions in Amendment 8 to the Fishery Management Plan for Coral, Coral Reefs, and Live/Hardbottom Habitats of the South Atlantic Region (Coral Amendment 8) address modifications to Habitat Areas of Particular Concern (HAPC) in the South Atlantic, and transit through the Oculina HAPC. The management unit for coral includes coral belonging to the Class Hydrozoa (fire corals and hydrocorals) and coral belonging to the Class Anthozoa (sea fans, whips, precious corals, sea pens and stony corals). Coral reefs constitute hardbottoms, deepwater banks, patch reefs and outer bank reefs as defined in the Coral, Coral Reefs and Live/Hardbottom Habitat Fishery Management Plan (FMP) (SAFMC 1982) and in the Code of Federal Regulations (50 CFR 622.2).

Discoveries of previously uncharacterized areas of deepwater coral resources have been brought forward by the South Atlantic Fishery Management Council's (South Atlantic Council) Coral Advisory Panel (AP). Recent scientific exploration has identified areas of high relief features and hardbottom habitat outside of the boundaries of existing HAPCs. During their 2011 October meeting, the Coral AP recommended the South Atlantic Council revisit the boundaries of the Oculina Bank HAPC, Stetson-Miami Terrace Coral HAPC (CHAPC), and the Cape Lookout CHAPC to incorporate areas of additional deepwater coral habitat that were previously uncharacterized. The South Atlantic Council reviewed the recommendations and associated Vessel Monitoring System analyses of rock shrimp fishing activity for expansion of these areas, and approved the measures for public scoping through Comprehensive Ecosystem-Based Amendment 3. The Coral, Habitat, Deepwater Shrimp and Law Enforcement APs have been working collectively to refine the recommendations since the public scoping process and provide input to the South Atlantic Council on these proposed management measures.

Coral Amendment 8 consists of regulatory actions that focus on deepwater coral ecosystem conservation. Actions consider alternatives that could:

- Expand boundaries of the Oculina Bank Habitat Area of Particular Concern (HAPC)
- Implement a transit provision through the Oculina Bank HAPC
- Expand the boundaries of the Stetson-Miami Terrace CHAPC
- Expand the boundaries of the Cape Lookout CHAPC

This Environmental Assessment has been prepared to analyze the effects of the actions considered in the amendment.

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Action 3. Expand Boundaries of Stetson-Miami Terrace CHAPC

Action 4. Expand Boundaries of Cape Lookout CHAPC

SUMMARY

of

Coral Amendment 8

to the Fishery Management Plan for Coral, Coral Reef, and Live/Hardbottom Habitats in the South Atlantic Region

Why is the South Atlantic Council taking Action?

Discoveries of previously uncharacterized areas of deepwater coral resources have been brought forward by the South Atlantic Fishery Management Council's (South Atlantic Council) Coral Advisory Panel (AP). Recent deepwater scientific exploration and research have identified areas of high relief features and hardbottom habitat outside of the boundaries of existing Habitat Areas of Particular Concern (HAPCs) **Appendices J-L**. During their 2011 October meeting, the Coral AP came forward with recommendations to the South Atlantic Council to revisit the boundaries of the Oculina Bank HAPC, Stetson-Miami Terrace and Cape Lookout Coral HAPCs to incorporate areas of additional deepwater coral habitat that were previously uncharacterized. The South Atlantic Council reviewed the recommendations and associated Vessel Monitoring System analyses of rock shrimp fishing activity for expansion of these areas, and approved the measures for public scoping through Comprehensive Ecosystem-Based Amendment 3. The Coral, Habitat, Deepwater Shrimp and Law Enforcement Advisory Panels have been working to refine recommendations since the public scoping process and provide input to the South Atlantic Council on these proposed management measures. During their June 2012 meeting, the South Atlantic Council split these actions from Comprehensive Ecosystem-Based Amendment 3 and provided guidance to further develop the measures through Coral Amendment 8. The South Atlantic Council took all of the APs' recommendations into consideration when selecting preferred alternatives during the June 2013 South Atlantic Council meeting.

Coral Amendment 8 consists of regulatory actions that focus on deepwater coral ecosystem conservation.

Purpose for Action

The ***purpose*** of Coral Amendment 8 is to increase protections for deepwater coral based on new information of deepwater coral resources in the South Atlantic.

Need for Action

The ***need*** for action in Coral Amendment 8 is to address recent discoveries of deepwater coral resources and protect deepwater coral ecosystems in the South Atlantic Council's jurisdiction from future activities that could compromise their condition.

What Are the Proposed Actions?

There are 4 actions being proposed in Coral Amendment 8. Each action has a range of alternatives, including a 'no action alternative' and a 'preferred alternative'.

Proposed Actions in Coral Amendment 8

1. Expand Boundaries of the Oculina Bank HAPC
2. Implement a Transit Provision through Oculina Bank HAPC
3. Expand Boundaries of the Stetson-Miami Terrace CHAPC
4. Expand Boundaries of the Cape Lookout CHAPC

What Are the Alternatives?

Proposed Actions in Coral Amendment 8

1. **Expand Boundaries of the Oculina Bank HAPC**
2. Implement a Transit Provision through Oculina Bank HAPC
3. Expand Boundaries of Stetson-Miami Terrace CHAPC
4. Expand Boundaries of Cape Lookout CHAPC

Action 1. Expand boundaries of the Oculina Bank HAPC

Alternative 1 (No Action). Do not modify the boundaries of the Oculina Bank HAPC

The existing Oculina Bank HAPC is delineated by the following boundaries: on the north by 28°30' N, on the south by 27°30' N., on the east by the 100-fathom (183-m) contour, and on the west by 80°00' W.; and two adjacent satellite sites: the first bounded on the north by 28°30' N., on the south by 28°29' N., on the east by 80°00' W., and on the west by 80°03' W.; and the second bounded on the north by 28°17' N., on the south by 28°16' N., on the east by 80°00 W., and on the west by 80°03' W.

Alternative 2. Modify the northern boundary of the Oculina Bank HAPC

Sub-Alternative 2a. Modify the northern boundary of the Oculina Bank HAPC from the current northern boundary of the Oculina HAPC (28° 30'N) to 29° 43.5'W. The west and east boundaries would follow close to the 70 meter and 100 meter depth contour lines, respectively, while annexing hard bottom features, as represented in the simplified polygon (**Figures S-1** and **S-2**). Sub-alternative 2a = 329 square miles

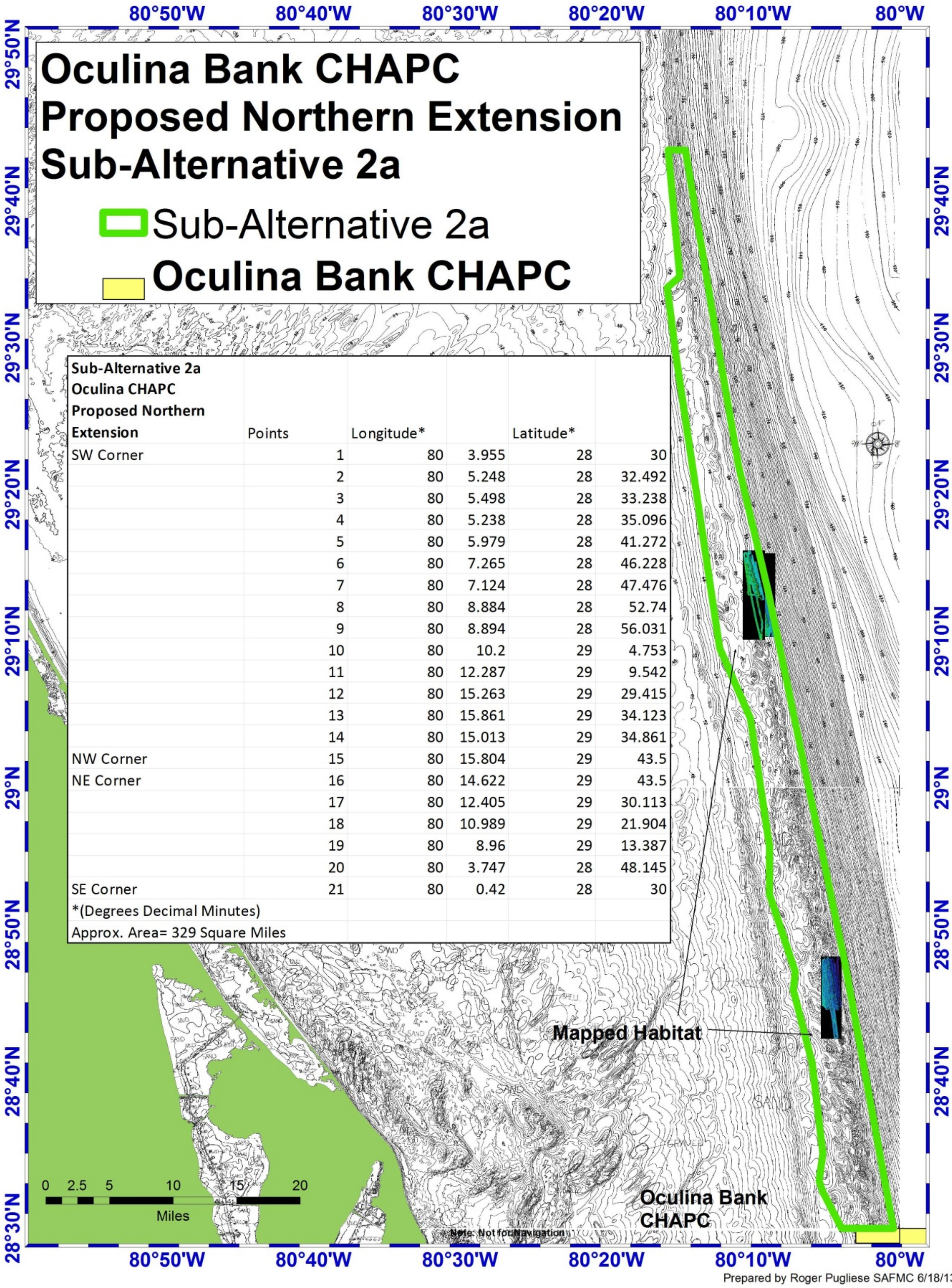
Preferred Sub-Alternative 2b. Deepwater Shrimp AP recommendation for northern extension.
The Deepwater Shrimp AP recommendation is to adjust the southern portion of the eastern boundary line of the proposed Oculina Bank HAPC northern extension identified in Sub-Alternative 2a. The adjustments are to move the boundary west to further reduce fishing tracks impacted. The revised polygon would reduce the rock shrimp VMS points (2-4 knots) for the available time series (2003-2013) to 4.2% from 5.5% in Alternative 2a. The replacement of two coordinates would further modify the western boundary and result in a slight reduction (0.09%) in the number of rock shrimp VMS points (2003-2013) (2-4 knots). (**Figures S-3** and **S-4**) Sub-alternative 2b = 267 square miles

IPT recommendation for language revisions to **Preferred Sub-Alternative 2b**:
Modify the Oculina Bank HAPC to move the northern boundary to 29° 43.5'N. The western boundary would follow close to the 70 meter contour while annexing hard bottom features with two coordinates replaced in the southern portion of the boundary to reduce rock shrimp fishing tracks impacted. The eastern boundary line of the proposed Oculina Bank HAPC northern extension identified in Sub-Alternative 2a would be shifted west to further reduce rock shrimp fishing tracks impacted. The alternative is

*represented in the simplified polygons **Figures S-3** and **S-4**. Sub-alternative 2b = 267 square miles*

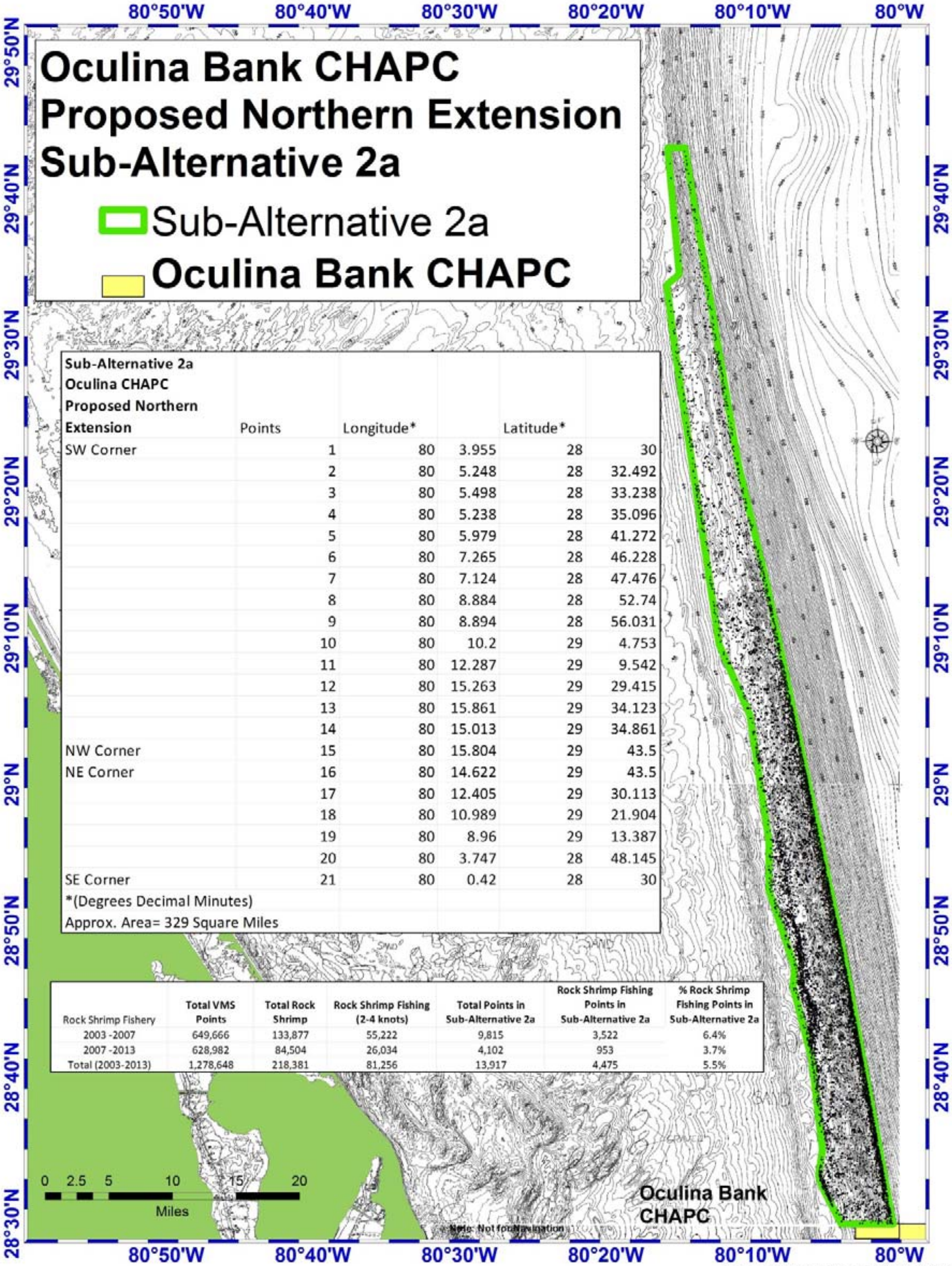
Preferred Alternative 3. Modify the western boundary of the Oculina Bank HAPC from 28° 4.5'N to the north boundary of the current Oculina HAPC (28° 30'N). The east boundary would coincide with the current western boundary of the Oculina HAPC (80° W). The west boundary could either use the 60 meter contour line, or the 80° 03'W longitude (**Figures S-5** and **S-6**). Alternative 3 = 76 square miles

Note: Coordinates for the CHAPC extension alternatives are found in **Appendix M**



Sub-Alternative 2a Oculina CHAPC Proposed Northern Extension	Points	Longitude*		Latitude*	
SW Corner	1	80	3.955	28	30
	2	80	5.248	28	32.492
	3	80	5.498	28	33.238
	4	80	5.238	28	35.096
	5	80	5.979	28	41.272
	6	80	7.265	28	46.228
	7	80	7.124	28	47.476
	8	80	8.884	28	52.74
	9	80	8.894	28	56.031
	10	80	10.2	29	4.753
	11	80	12.287	29	9.542
	12	80	15.263	29	29.415
	13	80	15.861	29	34.123
	14	80	15.013	29	34.861
NW Corner	15	80	15.804	29	43.5
NE Corner	16	80	14.622	29	43.5
	17	80	12.405	29	30.113
	18	80	10.989	29	21.904
	19	80	8.96	29	13.387
	20	80	3.747	28	48.145
SE Corner	21	80	0.42	28	30
*(Degrees Decimal Minutes)					
Approx. Area= 329 Square Miles					

Figure S-1. Action 1, Sub-Alternative 2a. Oculina Bank HAPC Proposed Northern Extension and Associated Habitat Mapping and Bathymetry.



Sub-Alternative 2a Oculina CHAPC Proposed Northern Extension	Points	Longitude*		Latitude*	
SW Corner	1	80	3.955	28	30
	2	80	5.248	28	32.492
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	13	80	15.861	29	34.123
	14	80	15.013	29	34.861
NW Corner	15	80	15.804	29	43.5
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	17	80	12.405	29	30.113
	18	80	10.989	29	21.904
	19	80	8.96	29	13.387
	20	80	3.747	28	48.145
SE Corner	21	80	0.42	28	30
*(Degrees Decimal Minutes)					
Approx. Area= 329 Square Miles					

Rock Shrimp Fishery	Total VMS Points	Total Rock Shrimp	Rock Shrimp Fishing (2-4 knots)	Total Points in Sub-Alternative 2a	Rock Shrimp Fishing Points in Sub-Alternative 2a	% Rock Shrimp Fishing Points in Sub-Alternative 2a
2003 -2007	649,666	133,877	55,222	9,815	3,522	6.4%
2007 -2013	628,982	84,504	26,034	4,102	953	3.7%
Total (2003-2013)	1,278,648	218,381	81,256	13,917	4,475	5.5%

Figure S-2. Action 1, Sub-Alternative 2a. Oculina Bank HAPC Proposed Northern Extension and VMS.

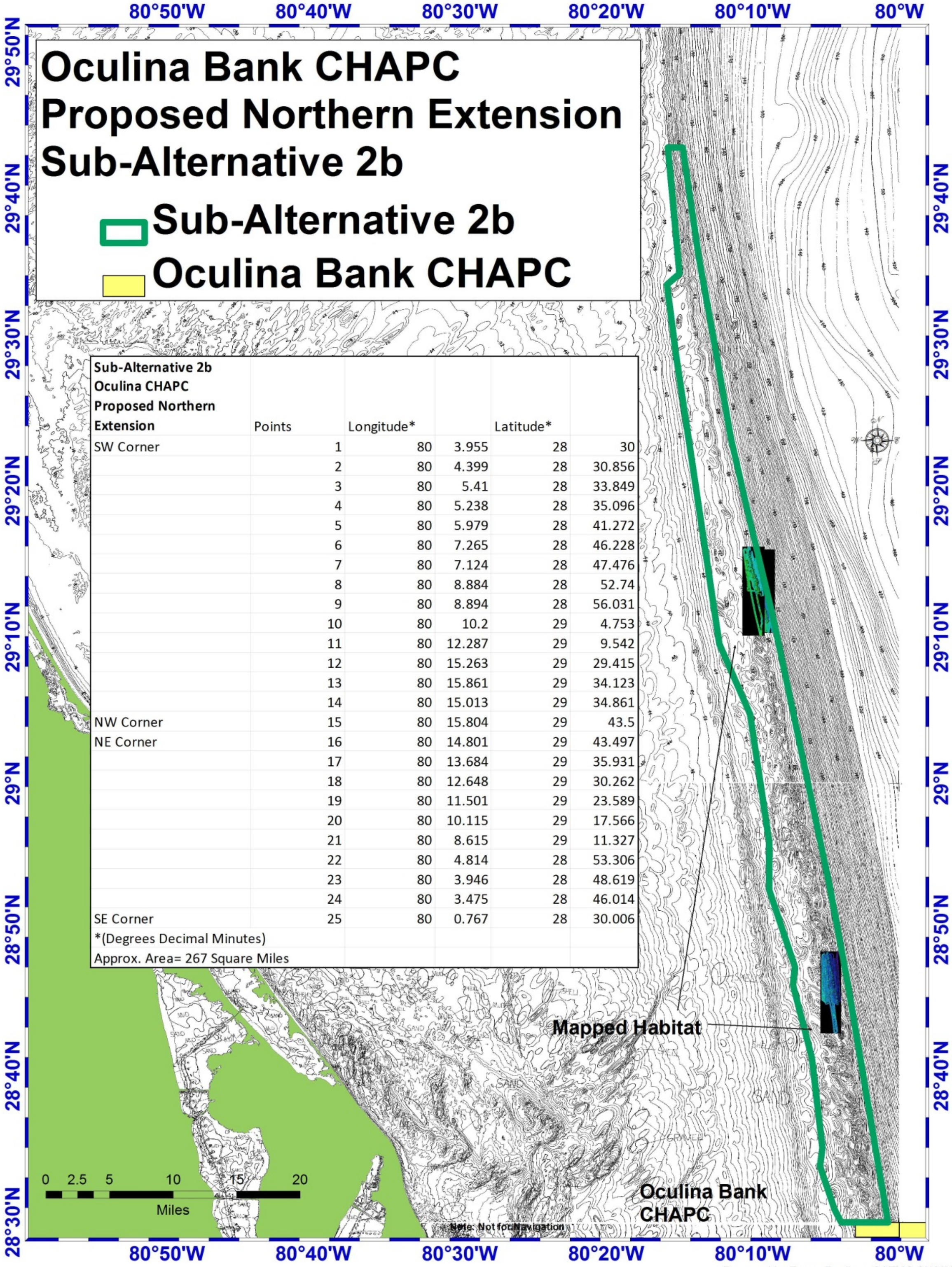
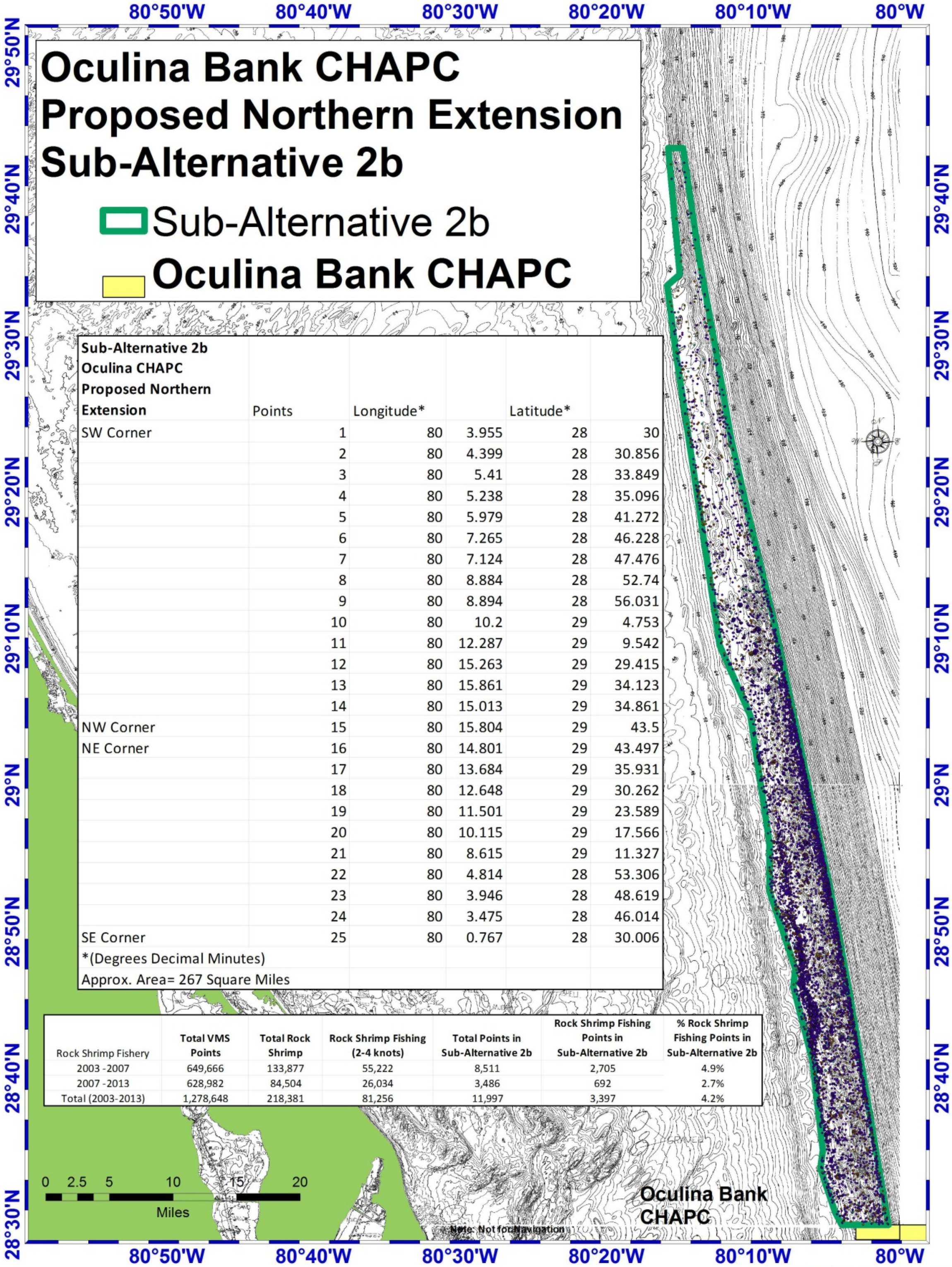


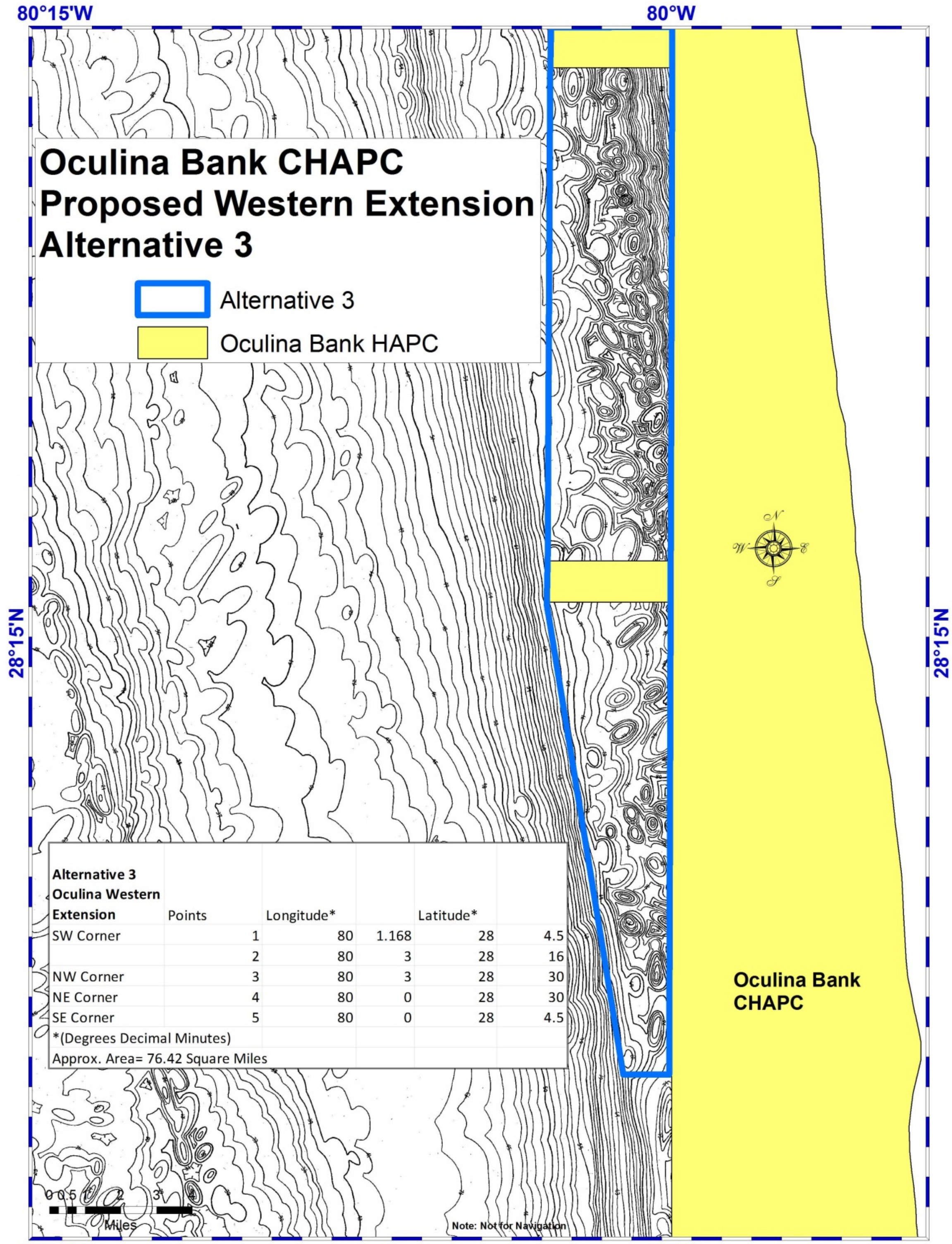
Figure S-3. Action 1, Sub-Alternative 2b. Oculina Bank HAPC Proposed Northern Extension and Associated Habitat Mapping and Bathymetry.



Sub-Alternative 2b Oculina CHAPC Proposed Northern Extension	Points	Longitude*		Latitude*	
SW Corner	1	80	3.955	28	30
	2	80	4.399	28	30.856
	3	80	5.41	28	33.849
	4	80	5.238	28	35.096
	5	80	5.979	28	41.272
	6	80	7.265	28	46.228
	7	80	7.124	28	47.476
	8	80	8.884	28	52.74
	9	80	8.894	28	56.031
	10	80	10.2	29	4.753
	11	80	12.287	29	9.542
	12	80	15.263	29	29.415
	13	80	15.861	29	34.123
	14	80	15.013	29	34.861
NW Corner	15	80	15.804	29	43.5
NE Corner	16	80	14.801	29	43.497
	17	80	13.684	29	35.931
	18	80	12.648	29	30.262
	19	80	11.501	29	23.589
	20	80	10.115	29	17.566
	21	80	8.615	29	11.327
	22	80	4.814	28	53.306
	23	80	3.946	28	48.619
	24	80	3.475	28	46.014
SE Corner	25	80	0.767	28	30.006
*(Degrees Decimal Minutes)					
Approx. Area= 267 Square Miles					

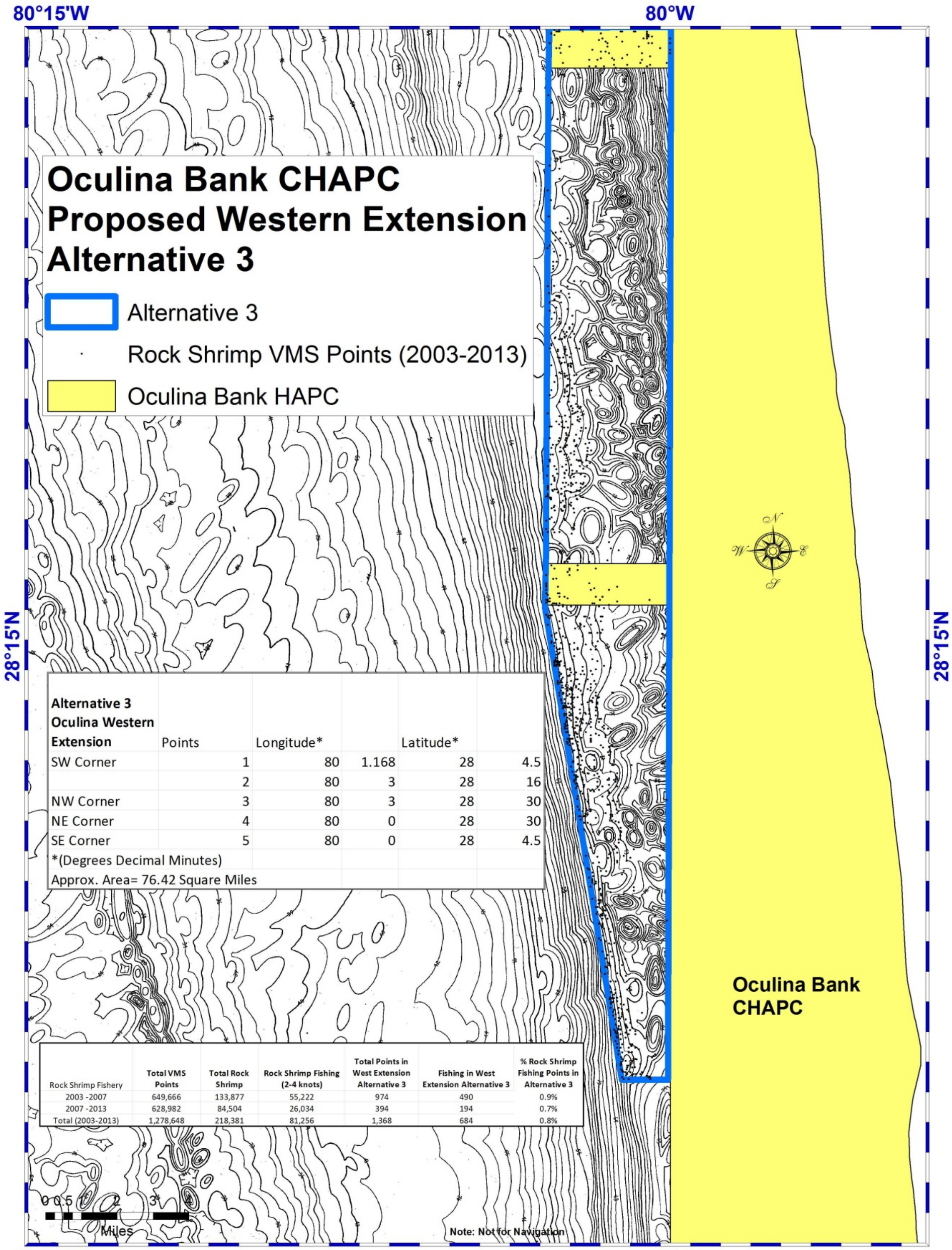
Rock Shrimp Fishery	Total VMS Points	Total Rock Shrimp	Rock Shrimp Fishing (2-4 knots)	Total Points in Sub-Alternative 2b	Rock Shrimp Fishing Points in Sub-Alternative 2b	% Rock Shrimp Fishing Points in Sub-Alternative 2b
2003 -2007	649,666	133,877	55,222	8,511	2,705	4.9%
2007 -2013	628,982	84,504	26,034	3,486	692	2.7%
Total (2003-2013)	1,278,648	218,381	81,256	11,997	3,397	4.2%

Figure S-4. Action 1, Sub-Alternative 2b. Oculina Bank CHAPC Proposed Northern Extension and VMS.



Alternative 3 Oculina Western Extension	Points	Longitude*		Latitude*	
SW Corner	1	80	1.168	28	4.5
	2	80	3	28	16
NW Corner	3	80	3	28	30
NE Corner	4	80	0	28	30
SE Corner	5	80	0	28	4.5
*(Degrees Decimal Minutes)					
Approx. Area= 76.42 Square Miles					

Figure S-5. Action 3, Alternative 3. Oculina Bank HAPC Proposed Western Extension and Associated Habitat and Bathymetry.



Alternative 3 Oculina Western Extension	Points	Longitude*		Latitude*	
SW Corner	1	80	1.168	28	4.5
	2	80	3	28	16
NW Corner	3	80	3	28	30
NE Corner	4	80	0	28	30
SE Corner	5	80	0	28	4.5
*(Degrees Decimal Minutes)					
Approx. Area= 76.42 Square Miles					

Rock Shrimp Fishery	Total VMS Points	Total Rock Shrimp	Rock Shrimp Fishing (2-4 knots)	Total Points in West Extension Alternative 3	Fishing in West Extension Alternative 3	% Rock Shrimp Fishing Points in Alternative 3
2003 -2007	649,666	133,877	55,222	974	490	0.9%
2007 -2013	628,982	84,504	26,034	394	194	0.7%
Total (2003-2013)	1,278,648	218,381	81,256	1,368	684	0.8%

Figure S-6. Action 1, Alternative 3. Oculina Bank HAPC Proposed Western Extension and Rock Shrimp VMS (2003-2013).

Table S-1. Rock Shrimp Fishing Associated with Oculina Bank HAPC proposed northern extension Sub-Alternative 2a and Sub-Alternative 2b (Rock Shrimp VMS: 2003-2013).

Rock Shrimp Fishery	Total VMS Points	Total Rock Shrimp	Rock Shrimp Fishing (2-4 knots)	Total Points in Sub-Alternative 2a	Rock Shrimp Fishing Points in Sub-Alternative 2a	% Rock Shrimp Fishing Points in Sub-Alternative 2a
2003 -2007	649,666	133,877	55,222	9,815	3,522	6.4%
2007 -2013	628,982	84,504	26,034	4,102	953	3.7%
Total (2003-2013)	1,278,648	218,381	81,256	13,917	4,475	5.5%
Rock Shrimp Fishery	Total VMS Points	Total Rock Shrimp	Rock Shrimp Fishing (2-4 knots)	Total Points in Sub-Alternative 2b	Rock Shrimp Fishing Points in Sub-Alternative 2b	% Rock Shrimp Fishing Points in Sub-Alternative 2b
2003 -2007	649,666	133,877	55,222	8,511	2,705	4.9%
2007 -2013	628,982	84,504	26,034	3,486	692	2.7%
Total (2003-2013)	1,278,648	218,381	81,256	11,997	3,397	4.2%

Table S-2. Rock shrimp fishing associated with Oculina Bank HAPC proposed western extension Alternative 3 (Rock Shrimp VMS: 2003-2013).

Rock Shrimp Fishery	Total VMS Points	Total Rock Shrimp	Rock Shrimp Fishing (2-4 knots)	Total Points in West Extension Alternative 3	Fishing in West Extension Alternative 3	% Rock Shrimp Fishing Points in Alternative 3
2003 -2007	649,666	133,877	55,222	974	490	0.9%
2007 -2013	628,982	84,504	26,034	394	194	0.7%
Total (2003-2013)	1,278,648	218,381	81,256	1,368	684	0.8%

Summary of Effects

Biological: Under **Alternative 1 (No Action)** gear prohibitions that are currently restricted in the existing Oculina Bank HAPC would continue to be prohibited. Prohibited gear within the Oculina HAPC includes bottom longline, bottom trawl, dredge, pot or trap as well as the use of an anchor, anchor and chain, or grapple and chain. Within Oculina Bank HAPC fishing for or possessing rock shrimp or *Oculina* coral is also prohibited. **Alternative 2** and associated **sub-alternatives** and **Preferred Alternative 3** propose increasing the size of the Oculina Bank HAPC and extending the prohibitions to a larger area. As the size of the Oculina Bank HAPC is increased, the biological benefit increases for the coral in the area, including *Oculina*; the species that use the bottom substrate as habitat; and for the rock shrimp populations in the HAPC. Further, biological benefits would be expected for snapper grouper species in the proposed areas since fishing for snapper grouper species while at anchor or with bottom longline would be prohibited. These activities would not have a direct biological impact on dolphin wahoo or coastal migratory pelagic species as gear used to target these species does not impact bottom habitat, and fishing for those species would be allowed in the expanded area. The golden crab fishery operates within allowable gear areas, which are not located in the proposed Oculina Bank HAPC.

Economic: The additional areas proposed in **Alternatives 2** and **3 (Preferred)** would not be protected from bottom longlines; trawls (mid-water and bottom); dredge, pots, or traps; or use of anchor and chain, or use of grapple and chain by all fishing vessels. As a result, the commercial fisheries for rock shrimp and snapper grouper could experience long-term negative economic impacts from potential loss of habitat due to lack of protection of these areas. The various sub-alternatives under **Alternative 2** and **Preferred Alternative 3** could have negative short-term economic impacts on the rock shrimp and snapper grouper fisheries.

The ex-vessel value of the reduction in rock shrimp landings (indicates potential loss to the vessel) would incur greatest direct negative economic effect under **Alternative 2a**, at $472,600, followed by **Preferred Alternative 2b** at $193,549, and then **Preferred Alternative 3** at $39,400.

The commercial fisheries for rock shrimp and snapper grouper in general, are expected to benefit in the long-term from an overall healthier ecosystem resulting from protection of corals and habitat and from increased stock levels. Protecting this habitat described in **Action 1** is expected to result in overall positive net economic benefits to society. With regard to the recreational sector, the anchoring prohibition that would be effect in **Action 1, Alternatives 2** and **3 (Preferred)** (including sub-alternatives) would not impact fishing activities for the fisheries that do not anchor (e.g., trolling for billfish, dolphin, wahoo, tuna; drifting for snapper grouper species; etc.) and impacts on these recreational activities would be minimal. Most fishing vessels would not be able to anchor effectively in the depths proposed under **Alternatives 2** and **3 (Preferred)**. Thus, the action of establishing the CHAPCs and prohibiting anchoring of fishing vessels within them would have only a small negative impact on the recreational sector.

Social: **Alternative 1 (No Action)** would have minimal social effects because the fleet is already harvesting in open areas and prohibited from working in the closed areas. **Alternative 2** (and sub-alternatives) and **Preferred Alternative 3** would impact the rock shrimp fleet, royal red shrimp fleet, and possibly the snapper grouper fishery by closing some historic, present and potential future fishing grounds. Additionally, if a transit provision is not established, travel costs could negatively affect some operations. If the cost to travel to or from the fishing grounds is too high due to expanded closed areas under **Alternative 2** (and sub-alternatives) and **Preferred Alternative 3**, a business may choose to no longer participate in the rock shrimp fishery. The size and the location of the closed areas are the two most significant factors that would be expected to negatively impact fishermen. Larger areas (such as **Sub-Alternative 2a**) could have more impact than smaller proposed areas (such as **Preferred Sub-Alternative 2b**) if the location is in an area where harvest is occurring.

Administrative: Administrative impacts would be incurred through the rule making process, outreach and enforcement. The impacts associated with enforcement would differ between the alternatives based on the size of the closed area. It is expected the larger the expansion of the HAPC the more enforcement would be needed. Most of the administrative impacts associated with these alternatives relate to at-sea enforcement.

Action 2. Implement a Transit Provision through the Oculina Bank HAPC

Alternative 1 (No Action). Do not implement a transit provision through Oculina Bank HAPC. Currently, possession of rock shrimp in or from the area on board a fishing vessel is prohibited.

Alternative 2. Allow for transit through the Oculina Bank HAPC. When transiting the Oculina Bank, gear must be stowed in accordance with CFR Section 622.183(a)(1)(ii). Vessels must maintain a minimum speed of 5 knots while in transit through the Oculina HAPC. In the event minimal speed is not sustainable, vessel must communicate to appropriate contact.

Preferred Alternative 3. Allow for transit through the Oculina Bank HAPC with possession of rock shrimp on board. When transiting through the HAPC, vessels must maintain a minimum speed of not less than 5 knots, determined by a ping rage acceptable by law enforcement (i.e. 5 minutes), with gear appropriately stowed (stowed is defined as doors and nets out of water).

Proposed Actions in Coral Amendment 8

1. Expand Boundaries of the Oculina Bank HAPC
2. **Implement a Transit Provision through Oculina Bank HAPC**
3. Expand Boundaries of the Stetson-Miami Terrace CHAPC
4. Expand Boundaries of the Cape Lookout CHAPC

Summary of Effects

Biological: The establishment of a transit provision would not result in biological effects within the Oculina Bank HAPC. A transit provision has been established in the South Atlantic for other fisheries through closed areas to allow for easier access to traditional fishing grounds. Establishing a transit provision through Oculina Bank HAPC may have negative biological benefits for the shrimp stocks that are on the eastern side of Oculina Bank HAPC as fishing vessels will have easier access to them. Without a transit provision, the trip to those fishing grounds would be long and not cost effective to fishermen, providing an indirect protection to those shrimp populations. The transit provision will not have any biological impact on snapper grouper, dolphin wahoo, coastal migratory pelagic or golden crab species as it pertains only to the rock shrimp fishery.

Economic: The intent of **Action 2** is to lessen the economic effects on rock shrimp fishermen should the Council choose to implement **Action 1**, **Sub-alternative 2a**, **Preferred Sub-alternative 2b,** or **Preferred Alternative 3**, any of which would extend the size of the Oculina Bank HAPC northwards and westward.

Rock shrimp fishermen would receive some relief from the expected negative economic effects (associated with Action 1 alternatives) under **Action 2, Alternative 2** or **Preferred Alternative 3**. Either of these alternatives would allow fishermen to transit through the entire Oculina Bank HAPC with gear stowed and transiting at a minimum speed of 5 knots. This would be a positive, direct economic benefit for these fishermen as they will use less fuel and take less time to get to their fishing grounds. **Preferred Alternative 3** has the same transit provisions as **Alternative 2**, however **Preferred Alternative 3** requires vessels to have aboard a VMS system that would have the ability to have a higher ping rate than many vessels in the fleet currently have. Currently, there are 79 vessels in the rock shrimp fleet that have VMS. Of those, 22 have older units purchased when the fishery was required to implement them in 2003. Those units will need to be upgraded. None of the units would be eligible for reimbursement by the NMFS OLE VMS Fund. The 22 vessels needing to upgrade their units would have to pay for the installation, maintenance, and increased communications charges associated with having a VMS (**Table 4-10**). Assuming all 22 vessels needing to upgrade their units choose the lowest price Thrane unit at $2,495 each, the cost of the units is expected to be $54,890. The additional cost of installation would be approximately $6,600, for a total minimum cost of $61,490 to upgrade to the least expensive necessary hardware. The total cost of hardware and software upgrades required to allow transit under **Preferred Alternative 3** for all vessels in the fleet is estimated to be $72,890.

Some, if not all, of the increased cost of upgrading hardware and software, plus increased communications charges in order to transit through the Oculina Bank HAPC would be offset by not being required to transit around the HAPC to get to fishing grounds. Allowing transit ought to increase the amount of time on a trip spent fishing, as well as save on fuel and other vessel maintenance costs.

Social: If additional closed areas are established under **Action 1,** some negative impacts on the fishing vessels and crew may be reduced with a transit provision. The transit provision in **Alternative 2** and **Preferred Alternative 3** would be beneficial to shrimp vessels by reducing the risk of negative impacts due to increased travel time and costs when traveling around a closed area to outer fishing grounds. **Preferred Alternative 3** would be expected to help reduce negative impacts from **Action 1** on individual fishermen, fishing businesses, and the communities of Mayport and Titusville.

Administrative: There would be minor administrative impacts associated with the transit provision. Administrative impacts associated with enforcement would be greatest for these action alternatives. If modifications are made to the transit regulations, administrative impacts would increase on the agency during the development and implementation phase. **Alternative 2** would allow for a transit provision that is modified from other transit provisions in order to address unique circumstances of the fishery. **Preferred Alternative 3** would require the vessel to maintain a speed of 6 knots as indicated by an increased ping rate of the VMS. Depending on the frequency of transit, this might lead to a slight increase in the impacts associated with monitoring by law enforcement.

Action 3. Expand boundaries of the Stetson-Miami Terrace CHAPC

Alternative 1. (No Action) Do not expand the boundaries of the Stetson-Miami CHAPC.

The existing Stetson-Miami Terrace CHAPC is delineated by the coordinates identified in CFR §622.224(c)(1)(iii).

Alternative 2. Modify the southern southeast boundary of the Stetson-Miami Terrace CHAPC western extension in a manner that releases the flatbottom region to the extent possible while maintaining protection of coral habitat (**Figure S-7**). Alternative 2 = 490 square miles

Alternative 3. Modify the Coral AP recommendation for expanding the Stetson-Miami Terrace CHAPC to include area of mapped habitat within the expansion, and exclude areas of royal red fishery activity based on VMS data (**Figure S-8**). Alternative 3 = 653 square miles

Proposed Actions in Coral Amendment 8

1. Expand Boundaries of the Oculina Bank HAPC
2. Implement a Transit Provision through Oculina Bank HAPC
3. **Expand Boundaries of the Stetson-Miami Terrace CHAPC**
4. Expand Boundaries of the Cape Lookout CHAPC

Preferred Alternative 4. The recommendation is a back-up preferred Alternative for the proposed extension of the Stetson-Miami Terrace CHAPC. The back-up recommendation includes Alternative 2 as proposed with inclusion of a new Shrimp Fishery Access Area for drift-haul back as represented in Figure S-9. With the inclusion of a new Shrimp Fishery Access Area in Alternative 2, royal red shrimp fishing, or VMS points (2-4 knots) (2003-2013) would be further reduced to 0.1% from 0.7% for Alternative 2 alone. **(Figure S-9)**
Alternative 4 = 490 square miles

IPT recommendation for language revisions to **Preferred Alternative 4**:
Preferred Alternative 4. *Modify the southern southeast boundary of the Stetson-Miami Terrace CHAPC western extension in a manner that releases the flatbottom region to the extent possible while maintaining protection of coral habitat. Allow for a Shrimp Fishery Access Area to be used as a gear haul back/drift zone as shown in* ***Figure S-9.*** *Alternative 4 = 490 square miles*

Note: Coordinates for the CHAPC extension alternatives are found in **Appendix M**

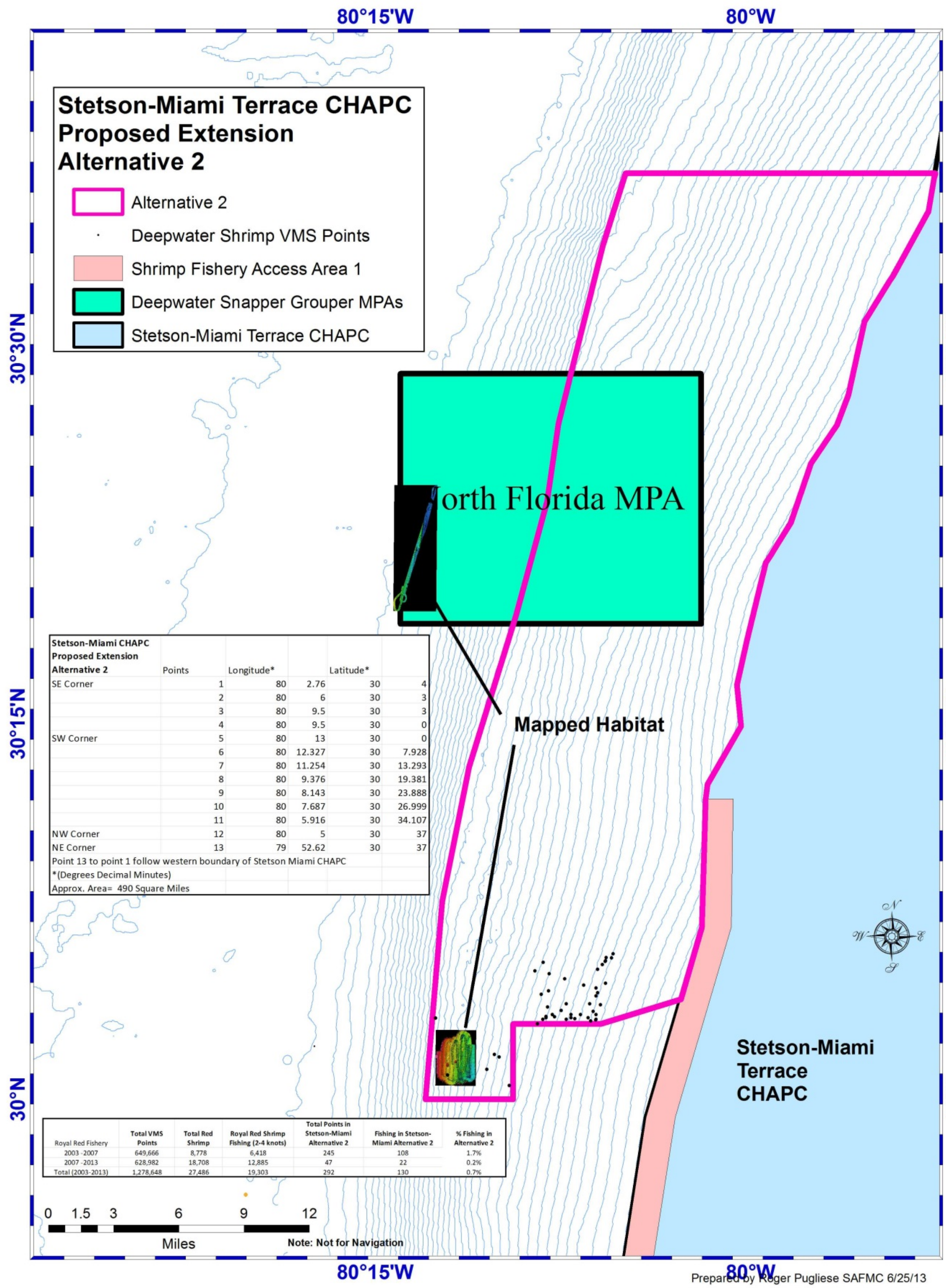
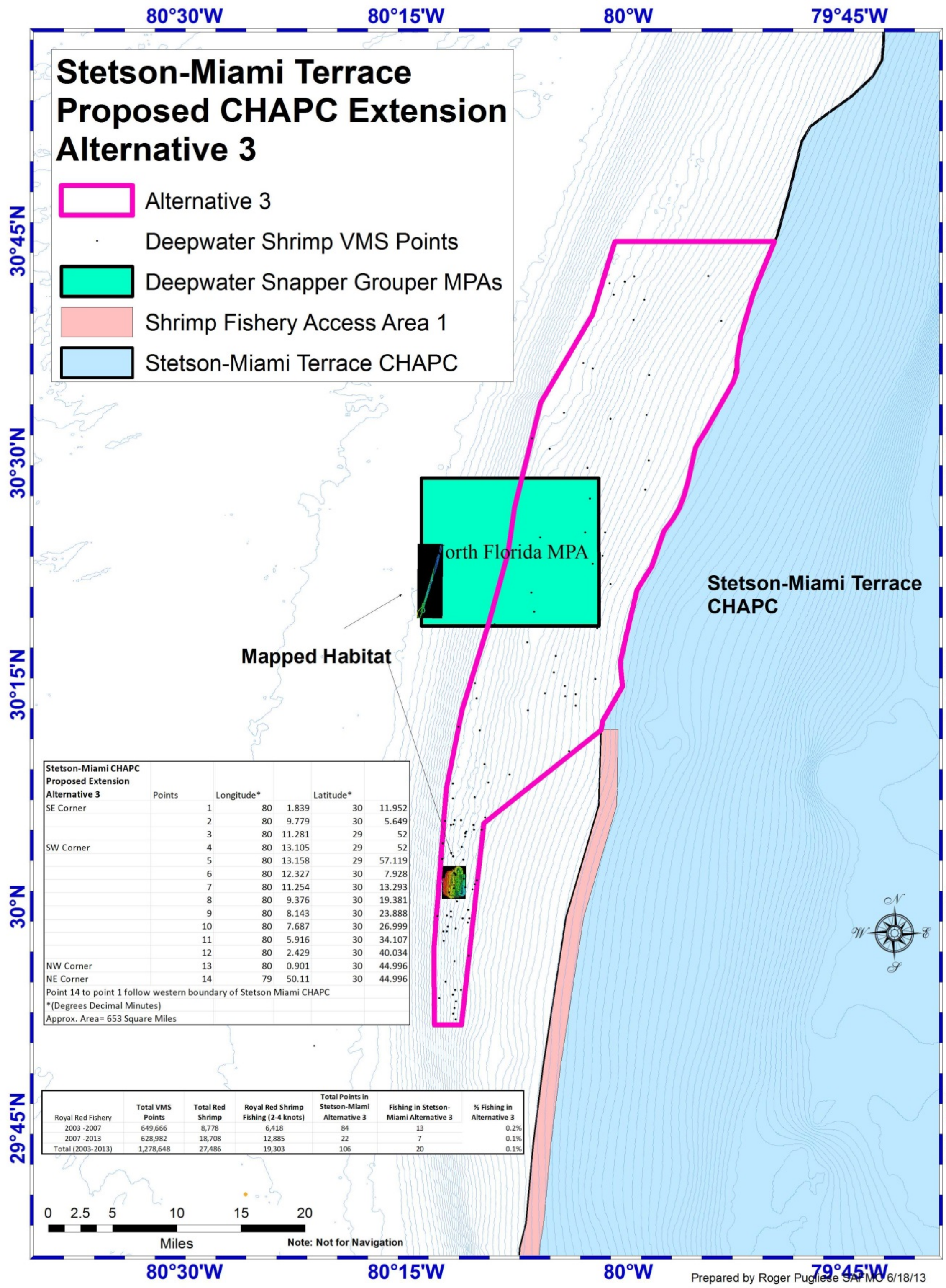


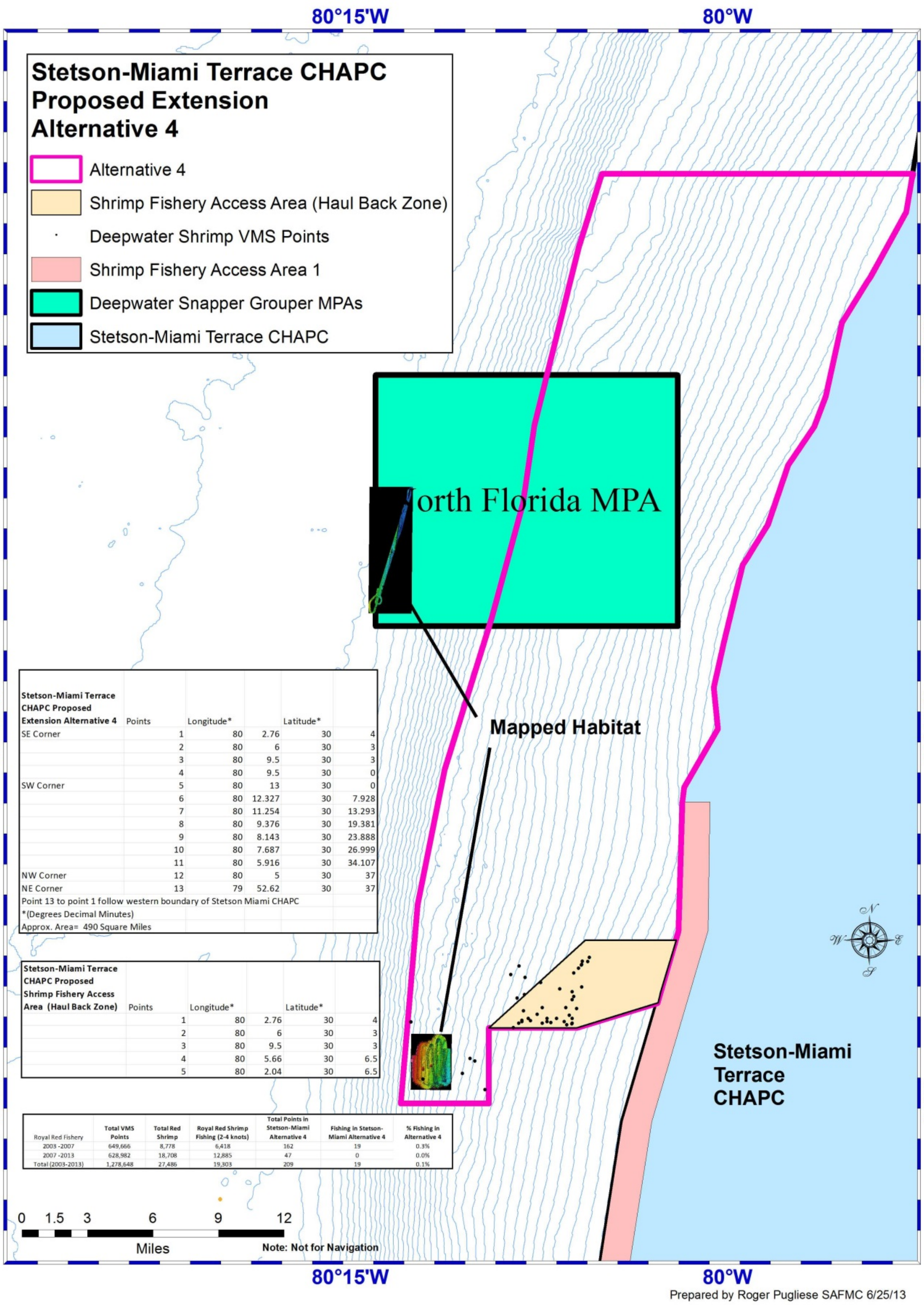
Figure S-7. Action 3, Alternative 2. Proposed Western Extension of Stetson-Miami Terrace CHAPC Mapped Habitat and Rock Shrimp VMS (2003-2013).



Stetson-Miami CHAPC Proposed Extension Alternative 3	Points	Longitude*		Latitude*	
SE Corner	1	80	1.839	30	11.952
	2	80	9.779	30	5.649
	3	80	11.281	29	52
SW Corner	4	80	13.105	29	52
	5	80	13.158	29	57.119
	6	80	12.327	30	7.928
	7	80	11.254	30	13.293
	8	80	9.376	30	19.381
	9	80	8.143	30	23.888
	10	80	7.687	30	26.999
	11	80	5.916	30	34.107
	12	80	2.429	30	40.034
NW Corner	13	80	0.901	30	44.996
NE Corner	14	79	50.11	30	44.996
Point 14 to point 1 follow western boundary of Stetson Miami CHAPC					
*(Degrees Decimal Minutes)					
Approx. Area= 653 Square Miles					

Royal Red Fishery	Total VMS Points	Total Red Shrimp	Royal Red Shrimp Fishing (2-4 knots)	Total Points in Stetson-Miami Alternative 3	Fishing in Stetson-Miami Alternative 3	% Fishing in Alternative 3
2003 -2007	649,666	8,778	6,418	84	13	0.2%
2007 -2013	628,982	18,708	12,885	22	7	0.1%
Total (2003-2013)	1,278,648	27,486	19,303	106	20	0.1%

Figure S-8. Action 3, Alternative 3. Proposed Western Extension of Stetson-Miami Terrace CHAPC Mapped Habitat and Rock Shrimp VMS (2003-2013).



Stetson-Miami Terrace CHAPC Proposed Extension Alternative 4	Points	Longitude*		Latitude*	
SE Corner	1	80	2.76	30	4
	2	80	6	30	3
	3	80	9.5	30	3
	4	80	9.5	30	0
SW Corner	5	80	13	30	0
	6	80	12.327	30	7.928
	7	80	11.254	30	13.293
	8	80	9.376	30	19.381
	9	80	8.143	30	23.888
	10	80	7.687	30	26.999
	11	80	5.916	30	34.107
NW Corner	12	80	5	30	37
NE Corner	13	79	52.62	30	37
Point 13 to point 1 follow western boundary of Stetson Miami CHAPC					
*(Degrees Decimal Minutes)					
Approx. Area= 490 Square Miles					

Stetson-Miami Terrace CHAPC Proposed Shrimp Fishery Access Area (Haul Back Zone)	Points	Longitude*		Latitude*	
	1	80	2.76	30	4
	2	80	6	30	3
	3	80	9.5	30	3
	4	80	5.66	30	6.5
	5	80	2.04	30	6.5

Royal Red Fishery	Total VMS Points	Total Red Shrimp	Royal Red Shrimp Fishing (2-4 knots)	Total Points in Stetson-Miami Alternative 4	Fishing in Stetson-Miami Alternative 4	% Fishing in Alternative 4
2003 -2007	649,666	8,778	6,418	162	19	0.3%
2007 -2013	628,982	18,708	12,885	47	0	0.0%
Total (2003-2013)	1,278,648	27,486	19,303	209	19	0.1%

Figure S-9. Action 3, Alternative 4. Proposed Extension of Stetson-Miami Terrace CHAPC Mapped Habitat and Rock Shrimp VMS 2003-2013.

Table S-3. Royal Red fishing associated with Stetson-Miami Terrace CHAPC Alternatives 2, 3 and 4 (Deepwater Shrimp VMS: 2003-2013).

Royal Red Fishery	Total VMS Points	Total Red Shrimp	Royal Red Shrimp Fishing (2-4 knots)	Total Points in Stetson-Miami Alternative 2	Fishing in Stetson-Miami Alternative 2	% Fishing in Alternative 2
2003 -2007	649,666	8,778	6,418	245	108	1.7%
2007 -2013	628,982	18,708	12,885	47	22	0.2%
Total (2003-2013)	1,278,648	27,486	19,303	292	130	0.7%
Royal Red Fishery	Total VMS Points	Total Red Shrimp	Royal Red Shrimp Fishing (2-4 knots)	Total Points in Stetson-Miami Alternative 3	Fishing in Stetson-Miami Alternative 3	% Fishing in Alternative 3
2003 -2007	649,666	8,778	6,418	84	13	0.2%
2007 -2013	628,982	18,708	12,885	22	7	0.1%
Total (2003-2013)	1,278,648	27,486	19,303	106	20	0.1%
Royal Red Fishery	Total VMS Points	Total Red Shrimp	Royal Red Shrimp Fishing (2-4 knots)	Total Points in Stetson-Miami Alternative 4	Fishing in Stetson-Miami Alternative 4	% Fishing in Alternative 4
2003 -2007	649,666	8,778	6,418	162	19	0.3%
2007 -2013	628,982	18,708	12,885	47	0	0.0%
Total (2003-2013)	1,278,648	27,486	19,303	209	19	0.1%

Summary of Effects

Biological: Alternative 1 (No Action) would not modify coordinates for the Stetson Miami Terrace CHAPC. Within the CHAPCs, the use of bottom longline, bottom trawl, mid-water trawl, dredge, anchor, pot or trap, anchor and chain and grapple and chain is prohibited. **Alternatives 2, 3,** and **4 (Preferred)** would extend theses prohibitions to the expansion area of the Stetson-Miami Terrace HAPC. Therefore, the larger the expansion of the Stetson-Miami Terrace HAPC, the greater the biological effects to species found in the area. **Alternative 2** would provide greater biological benefits to species caught within the expanded area than **Alternative 1 (No Action)**. **Alternative 3** would provide greater biological benefits to all species caught within the expanded area with the exception of royal red species. None of the alternatives would any biological impact on dolphin wahoo or coastal migratory pelagic species as the typical gear used for these species do not impact bottom habitat. Fishing for snapper grouper species would be allowed as long as there was no anchoring or bottom longline gear. However, fishing for snapper grouper species in the proposed expansion areas of the Stetson-Miami Terrace is uncommon and no biological impact on those species is expected. The golden crab fishery operates within allowable gear areas, which are not affected by the proposed expansion of the Stetson-Miami Terrace CHAPC.

Alternative 2 and **Alternative 3** would be expected to result in positive biological impacts to the deepwater coral habitat in these areas as it would extend the prohibitions on bottom damaging gear. Given the slow growth of deepwater corals, any impacts would be expected to result in long-term biological losses of deepwater coral habitat as well as the species that utilize this habitat. Under these alternatives, habitats within the Stetson-Miami Terrace proposed CHAPC expansion would be protected from damaging fishing gear such as bottom longline, anchoring, trawling (bottom and mid-water) which would have positive biological impacts on the species in the area. **Preferred Alternative 4** is similar to **Alternative 2** in that it would modify the coordinates to expand the CHAPC by 490 square miles. However, it would also provide royal red shrimp fishermen area zone within which they can haul back gear without drifting into an area where their gear is prohibited. This haul back zone may encourage fishermen to fish in the area giving a slight negative impact on the royal red populations. However, fishing effort in the area is historically low and the impact is not expected to be significant.

Economic: The royal red shrimp fishery is known to operate in the proposed Stetson-Miami Terrace CHAPC expansion. Based on the VMS points as a percent of fishing that occurred in the alternative areas, **Action 3** would result in some minor loss of ex-vessel income to the royal red shrimp fleet. **Alternative 2** is expected to result in average annual losses of $1,752. **Alternative 3** would result in expected average annual losses of $557. Like **Alternative 1 (No Action)**, **Preferred Alternative 4** is not expected to have any direct economic effects.

Social: **Alternative 1 (No Action)** would likely have minimal social effects (negative and positive) because this would maintain access to shrimp and snapper grouper harvest areas that would be reduced under **Alternative 2** or **Alternative 3**. Because **Preferred Alternative 4** would also establish the Shrimp Fishery Access Area based on information of fishing grounds of the royal red shrimp vessels, negative impacts on the deepwater shrimp fleets and associated businesses and communities could be reduced or removed. The expected economic impacts under **Alternatives 2** and **3** would likely be avoided with the establishment of the Shrimp Fishery Access Area in **Preferred Alternative 4** (see **Section 4.3.2**), which would also contribute to minimized impact on the fishermen, businesses, and associated communities.

Administrative: The expansion of the Stetson Miami Terrace CHAPC (**Alternative 2-Alternative 4**) would have minimal administrative impacts. Administrative impacts would be incurred through the rule making process, outreach and enforcement. The administrative impacts would differ between the alternatives in the amount of area they cover. It is expected the larger the expansion of the CHAPC the more enforcement would be needed. Most of the administrative impacts associated with these alternatives relate to at-sea enforcement.

Action 4. Expand boundaries of the Cape Lookout CHAPC

Proposed Actions in Coral Amendment 8

1. Expand Boundaries of the Oculina Bank HAPC
2. Implement a Transit Provision through Oculina Bank HAPC
3. Expand Boundaries of Stetson-Miami Terrace CHAPC
4. **Expand Boundaries of Cape Lookout CHAPC**

Alternative 1. (No Action) Do not modify the boundaries of the Cape Lookout CHAPC.

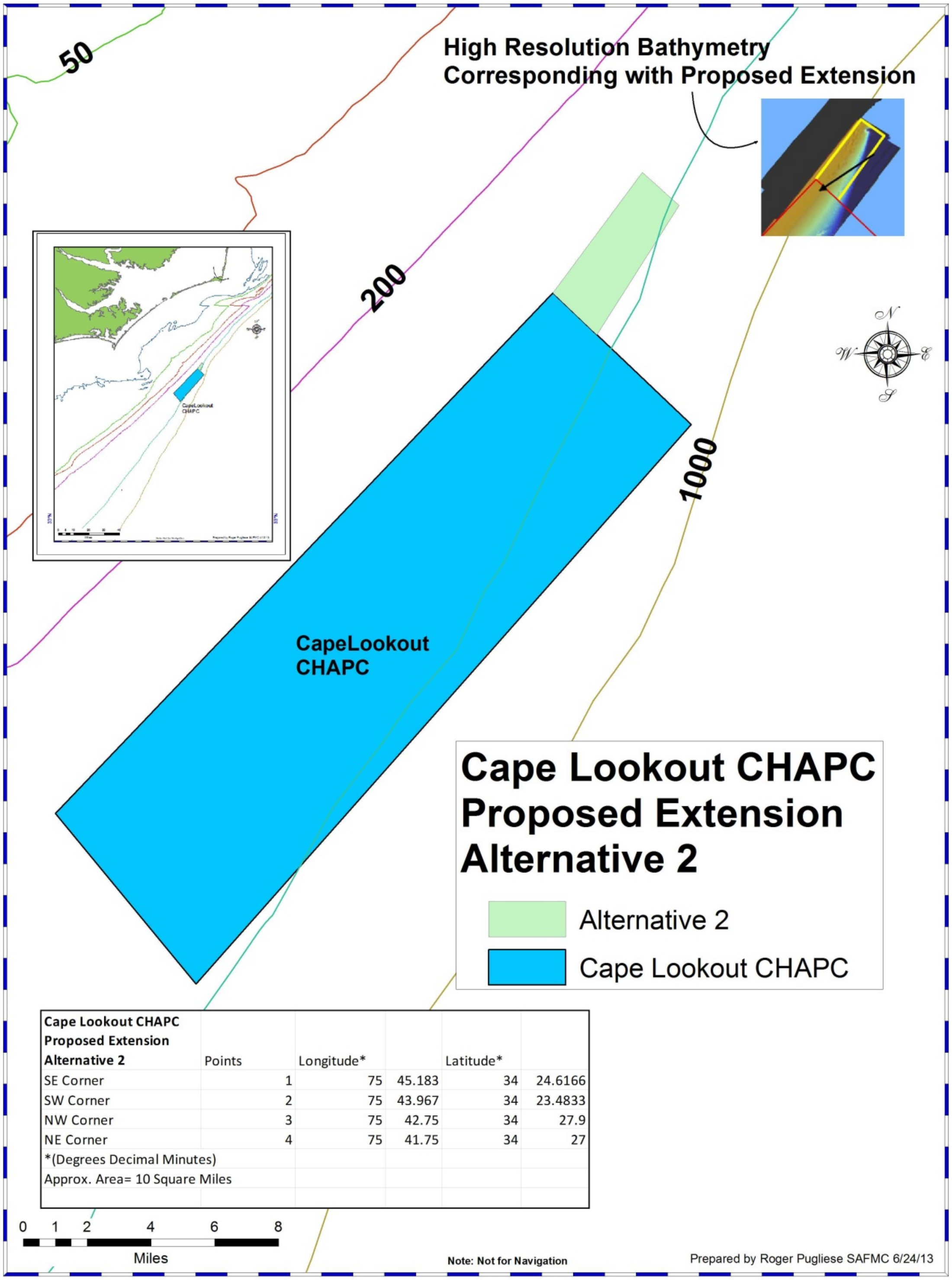
The existing Cape Lookout CHAPC is identified by the following coordinates:

Latitude	Longitude
34°24'37"	75°45'11"
34°10'26"	75°58'44"
34°05'47"	75°54'54"
34°21'02"	75°41'25"

Preferred Alternative 2. Extend the northern boundary to encompass the area identified by the following coordinates (**Figure S-10**) (Alternative 2 = 10 square miles):

Latitude	Longitude
34°24.6166'	75°45.1833'
34°23.4833'	75°43.9667'
34°27.9'	75°42.75'
34°27.0'	75°41.5'

Note: Coordinates for the CHAPC extension alternatives are found in **Appendix M**



Cape Lookout CHAPC Proposed Extension Alternative 2	Points	Longitude*		Latitude*	
SE Corner	1	75	45.183	34	24.6166
SW Corner	2	75	43.967	34	23.4833
NW Corner	3	75	42.75	34	27.9
NE Corner	4	75	41.75	34	27
*(Degrees Decimal Minutes)					
Approx. Area= 10 Square Miles					

Figure S-10. Action 4, Alternative 2. Cape Lookout CHAPC Proposed Extension and Mapped Habitat.

<u>Summary of Effects</u>

Biological: Under **Alternative 1 (No Action)**, the same prohibitions currently restricted within the CHAPC would apply. Within the CHAPCs, the use of bottom longline, bottom trawl, mid-water trawl, dredge, anchor, pot or trap, anchor and chain and grapple and chain is prohibited. **Preferred Alternative 2** proposes to expand the original Cape Lookout CHAPC along the northern boundary by approximately 10 square miles. This expansion would benefit important deepwater coral ecosystems that have been identified in the area. The specific coordinates have been proposed based on new information of occurrence of deepwater *Lophelia* corals in the area.

Alternative 2 (Preferred) would not have any biological impact on dolphin wahoo or coastal migratory pelagic as the typical gear used for these species does not impact bottom habitat. Fishing for snapper grouper species would be allowed as long as there was no anchoring or use of bottom longline gear. The size of the proposed expansion of the Cape Lookout CHAPC in **Preferred Alternative 2** is very small (roughly 8 square kilometers) and landings data are not available at a fine enough resolution to perform analysis (pers. comm., Nick Farmer, NMFS SERO, July 9, 2013). However, fishing for snapper grouper species in the proposed expansion area is uncommon and little biological impact on those species is expected. Fishing for deepwater shrimp species does not occur within the proposed area. The golden crab fishery operates within allowable gear areas, which are not affected by the proposed expansion of the Cape Lookout CHAPC.

Economic: The size of the proposed closure from **Preferred Alternative 2** is very small (roughly 8 square kilometers) and landings data are not available at a fine enough resolution to perform analysis (pers. comm., Nick Farmer, NOAA Fisheries SERO, July 9, 2013).

Alternative 1 (No Action) would likely have minimal economic effects because this would maintain access to current harvest areas. The proposed extension of the Cape Lookout CHAPC under **Preferred Alternative 2** could have minimal direct negative economic effects particularly on the snapper grouper fleet if historic fishing grounds are no longer available.

Social: Alternative 1 (**No Action**) would likely have minimal negative social effects because no current or potential fishing grounds would be closed. The proposed extension of the Cape Lookout CHAPC under **Preferred Alternative 2** could have negative social effects on the royal red and rock shrimp fleet if historic fishing grounds are no longer available, or if the closed area affected travel to and from harvest areas. The small size of the expansion proposed under **Preferred Alternative 2** would also be expected to result in less social impact than a larger area.

Administrative: The expansion of the Cape Lookout CHAPC (**Preferred Alternative 2**) would have a minimal administrative impact. Administrative impacts would be through the rule making process, outreach and enforcement. The administrative impacts would differ between the alternatives in the amount of area they cover. It is expected the larger the expansion of the Cape Lookout CHAPC the more enforcement will be needed. Most of the administrative impacts associated with these alternatives relate to at-sea enforcement.

Chapter 1. Introduction

1.1 What Actions Are Being Proposed?

Fishery managers are proposing changes to regulations through Coral Amendment 8. Actions included in Coral Amendment 8 would expand protection of deepwater coral resources that have been designated as Habitat Areas of Particular Concern (HAPC) and Coral Habitat Areas of Particular Concern (CHAPCs).

1.2 Who is Proposing the Actions?

The South Atlantic Fishery Management Council (South Atlantic Council) is proposing the actions contained within this document. The South Atlantic Council recommends management measures and submits them to the National Marine Fisheries Service (NMFS) who ultimately approves, disapproves, or partially approves, and implements the actions in the amendment on behalf of the Secretary of Commerce. NMFS is an agency in the National Oceanic and Atmospheric Administration within the Department of Commerce.

South Atlantic Fishery Management Council

- Is 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
- Manages the waters from 3 to 200 miles off the coasts of North Carolina, South Carolina, Georgia, and Florida
- Develops management plans and recommends regulations to NOAA Fisheries Service for implementation

1.3 Where is the Project Located?

Management of the federal fisheries in the South Atlantic covers the area between 3-200 nautical miles (nm) (**Figure 1-1**). This management is conducted under the fishery management plans (FMP) developed by the South Atlantic Council. Actions in this document would amend the FMP for Coral and Coral Reefs of the South Atlantic.

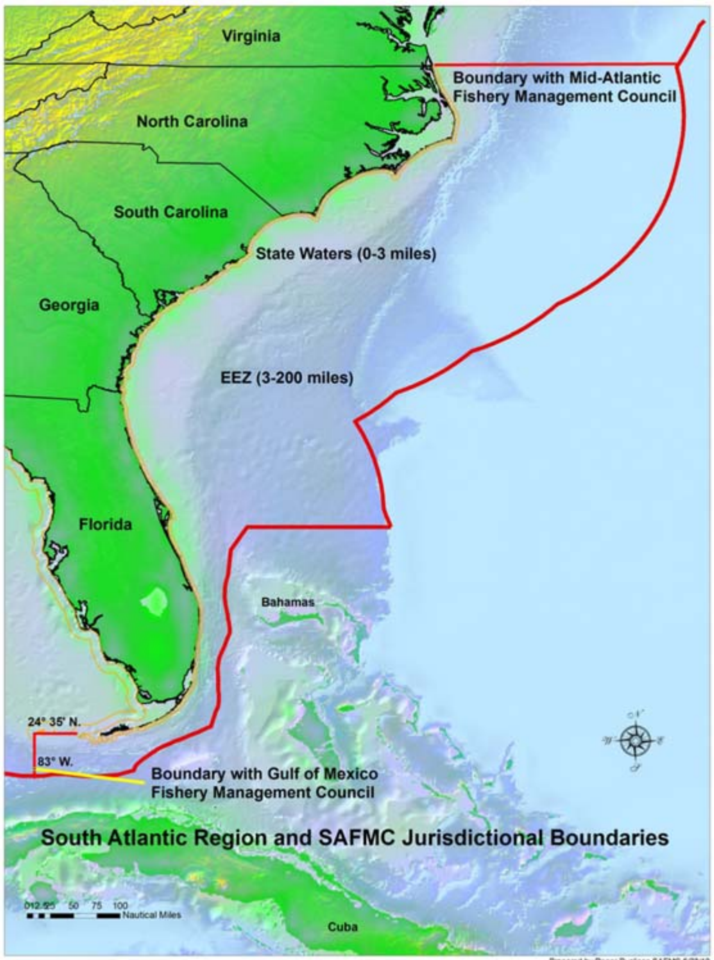


Figure 1-1. Jurisdictional boundaries of the South Atlantic Council.

1.4 Why is the South Atlantic Council Considering Action?

Recent studies (Reed 2011, Appendix J and Brooke and Ross, 2012, Appendix L) have indicated pinnacles and mounds of deepwater coral ecosystems in the South Atlantic Region. The South Atlantic Council has a history of protecting these important habitats. In 1984, the South Atlantic Council designated a 92-nm^2 portion of the Oculina Bank as the Oculina HAPC. Additionally, the South Atlantic Council prohibited the use of bottom trawls, bottom longlines, dredges, fish traps, and fish pots within the HAPC to mitigate the threat of fishing gear to Oculina coral. These actions were taken through the FMP for Coral and Coral Reefs (SAFMC 1982), prepared jointly by the Gulf of Mexico Fishery Management Council and the South Atlantic Councils. Deepwater CHAPCs were implemented through the Comprehensive Ecosystem Based Amendment 1 (CE-BA 1) (2010c).

Purpose for Action

The ***purpose*** of Coral Amendment 8 is to increase protections for deepwater coral based on new information of deepwater coral resources in the South Atlantic.

Need for Action

The need for action in Coral Amendment 8 is to address recent discoveries of deepwater coral resources and protect deepwater coral ecosystems in the South Atlantic Council's jurisdiction from activities that could compromise their condition.

Chapter 2. Proposed Actions

> ***Proposed Actions in Coral Amendment 8***
>
> 1. Expand Boundaries of the Oculina Bank HAPC
> 2. Implement a Transit Provision through Oculina Bank HAPC
> 3. Expand Boundaries of the Stetson-Miami Terrace CHAPC
> 4. Expand Boundaries of the Cape Lookout CHAPC

This section contains the proposed actions being considered to meet the purpose and need. Each action contains a range of alternatives, including the no action (status-quo). Alternatives the South Atlantic Council considered but eliminated from detailed study during the development of this amendment are described in **Appendix A**.

2.1 Action 1. Expand Boundaries of the Oculina Bank HAPC

Alternative 1. (No Action) Do not revise boundaries of the Oculina Bank HAPC

The existing Oculina Bank HAPC is delineated by the following boundaries: on the north by 28°30' N, on the south by 27°30' N., on the east by the 100-fathom (183-m) contour, and on the west by 80°00' W.; and two adjacent satellite sites: the first bounded on the north by 28°30' N., on the south by 28°29' N., on the east by 80°00' W., and on the west by 80°03' W.; and the second bounded on the north by 28°17' N., on the south by 28°16' N., on the east by 80°00 W., and on the west by 80°03' W.

Alternative 2. Modify the northern boundary of the Oculina Bank HAPC.

> **Sub-alternative 2a.** Modify the northern boundary of the Oculina Bank HAPC from the current northern boundary of the Oculina HAPC (28° 30'N) to 29° 43.5'W. The west and east boundaries would follow close to the 70 meter and 100 meter depth contour lines, respectively, while annexing obvious hard bottom features as represented in the simplified polygon. Sub-alternative 2a = 329 square miles
>
> **Preferred Sub-alternative 2b.** The Deepwater Shrimp AP recommendation is to adjust the southern portion of the eastern boundary line of the proposed Oculina Bank HAPC northern extension identified in Alternative 2a. The adjustments are to move the boundary west to further reduce fishing tracks impacted. The revised polygon would reduce the rock shrimp VMS points (2-4 knots) for the available time series (2003-2013) to 4.2% from 5.5% in Alternative 2a. The replacement of two coordinates would further modify the western boundary and result in a slight reduction (0.09%) in the number of rock shrimp VMS points (2003-2013) (2-4 knots). Sub-alternative 2b = 267 square miles
>
> IPT recommendation for language revisions to **Preferred Sub-Alternative 2b**:
> *Modify the Oculina Bank HAPC to move the northern boundary to 29° 43.5'N. The western boundary would follow close to the 70 meter contour while annexing hard bottom features with two coordinates replaced in the southern portion of the boundary to reduce rock shrimp fishing tracks impacted. The eastern boundary line of the proposed*

*Oculina Bank HAPC northern extension identified in Alternative 2a would be shifted west to further reduce rock shrimp fishing tracks impacted. The alternative is represented in the simplified polygons **Figures S-3** and **S-4**. Sub-alternative 2b = 267 square miles*

Preferred Alternative 3. Modify the western boundary of the Oculina Bank HAPC from 28° 4.5'N to the north boundary of the current Oculina HAPC (28° 30'N). The east boundary would coincide with the current western boundary of the Oculina HAPC (80° W). The west boundary could either use the 60 meter contour line, or the 80° 03'W longitude. Alternative 3 = 76 square miles

Note: Coordinates for the Oculina HAPC extension alternatives are found in **Appendix M**

Comparison of Alternatives

Biological: Under **Alternative 1 (No Action)** gear prohibitions that are currently restricted in the existing Oculina Bank habitat area of particular concern (HAPC) would continue to be prohibited. Prohibited gear within the Oculina HAPC includes bottom longline, bottom trawl, dredge, pot or trap as well as the use of an anchor, anchor and chain, or grapple and chain. Within the Oculina Bank HAPC, fishing for or possessing rock shrimp is also prohibited. **Alternative 2** and associated sub-alternatives and Preferred **Alternative 3** propose increasing the size of the Oculina Bank HAPC and extending the gear prohibitions to the expanded area. These prohibitions would include the use of bottom longline, bottom trawl, dredge, pot or trap as well as the use of an anchor, anchor and chain, or grapple and chain. As the size of the Oculina Bank HAPC is increased, the biological benefit increases for the coral in the area, including *Oculina*; as well as the species that use the bottom substrate as habitat; and for the rock shrimp populations in the HAPC. Increasing the size of the Oculina Bank HAPC may provide a refuge for other important species in the area, such as snapper grouper populations by prohibiting bottom longline activity as well as anchoring.

Economic: Alternative 1 (No Action) would not expand the boundaries of the Oculina Bank HAPC. The additional areas proposed in **Alternatives 2** and **3 (Preferred)** would not be protected from bottom longlines; trawls (mid-water and bottom); dredge, pots, or traps; or use of anchor and chain, or use of grapple and chain by all fishing vessels. As a result, the commercial sector could experience long-term negative economic impacts from potential loss of habitat for commercial species due to lack of protection of these areas. The various sub-alternatives under **Alternative 2** and **Preferred Alternative 3** could have negative short-term economic impacts on the rock shrimp and snapper grouper fisheries.

The ex-vessel value of the reduction in rock shrimp landings (indicates potential loss to the vessel) would incur greatest direct negative economic effect under **Alternative 2a**, at $472,600, followed by **Preferred Alternative 2b** at $193,549, and then **Preferred Alternative 3** at $39,400.

The commercial sector in general in general is expected to benefit in the long-term from an overall healthier ecosystem resulting from protection of corals and habitat and from increased stock levels. Protecting this habitat described in **Action 1** is expected to result in overall positive net economic benefits to society.

With regard to recreational sector, the anchoring prohibition that would be effect in **Action 1, Alternatives 2** and **3** (including sub-alternatives) would not impact fishing activities for the fisheries that do not anchor (e.g., trolling for billfish, dolphin, wahoo, tuna, etc.; drifting for snapper grouper) and impacts on these recreational activities would be minimal. Most fishing vessels would not be able to anchor effectively in the depths proposed under **Alternatives 2** and **3 (Preferred)**. Thus, the action of expanding the Oculina HAPC and prohibiting anchoring of fishing vessels within it would have only a small negative impact on the recreational sector.

Social: **Alternative 1 (No Action)** would have minimal social effects on the rock shrimp and royal red fishermen because the fleet is already harvesting in open areas and prohibited from working in the closed areas. **Alternative 2** (and sub-alternatives) and **Preferred Alternative 3** would impact the rock shrimp fleet, royal red shrimp fleet and possibly other commercial fisheries by closing some historic, present and potential future fishing grounds. Additionally, if a transit provision is not established, travel costs could negatively affect some operations. If the cost to travel to or from the fishing grounds is too high due to expanded closed areas under **Alternative 2** (and sub-alternatives) and **Preferred Alternative 3**, a business may choose to no longer participate in the shrimp fishery. The size and the location of the closed areas are the two most significant factors that would be expected to negatively impact fishermen. Larger areas (such as **Sub-Alternative 2a**) could have more impact than smaller proposed areas (such as **Preferred Sub-Alternative 2b**) if the location is in an area where harvest is occurring.

Administrative: Administrative impacts would be incurred through the rule making process, outreach and enforcement. The impacts associated with enforcement would differ between the alternatives based on the size of the closed area. It is expected the larger the expansion of the HAPC the more enforcement will be needed. Most of the administrative impacts associated with these alternatives relate to at-sea enforcement.

Table 2-1. Summary of effects under **Action 1**.

Alternatives	Biological Effects	Socioeconomic/Administrative Effects
Alternative 1 (No Action)	Status Quo	Status Quo
Sub-Alternative 2a	Positive effects on coral, shrimp and snapper grouper species	Minimal effects
Preferred Sub-Alternative 2b	Positive effects on coral, shrimp and snapper grouper species	Minimal effects
Preferred Alternative 3	Positive effects on coral, shrimp and snapper grouper species	Minimal effects

2.2 Action 2. Implement a transit provision through the Oculina Bank HAPC

Alternative 1 (No Action). Do not implement a transit provision through Oculina Bank HAPC. Currently, possession of rock shrimp in or from the area on board a fishing vessel is prohibited.

Alternative 2. Allow for transit through the Oculina Bank HAPC. When transiting the Oculina Bank, gear must be stowed in accordance with CFR Section 622.183(a)(1)(ii). Vessels must maintain a minimum speed of 5 knots while in transit through the Oculina HAPC. In the event minimal speed is not sustainable, vessel must communicate to appropriate contact.

Preferred Alternative 3. Allow for transit through the Oculina Bank HAPC with possession of rock shrimp on board. When transiting through the HAPC, vessels must maintain a minimum speed of not less than 5 knots, determined by a ping rage acceptable by law enforcement (i.e. 5 minutes), with gear appropriately stowed (stowed is defined as doors and nets out of water).

Comparison of Alternatives

Biological: Transit provisions have been established in the South Atlantic for other fisheries to allow for easier access to traditional fishing grounds through closed areas. Establishing a transit provision through Oculina Bank HAPC may have negative biological benefits for the rock shrimp stocks that are on the eastern side of Oculina Bank HAPC as fishing vessels would be able to access them easier than they have in the past. Without a transit provision, the trip to those fishing grounds would be long and not cost effective to fishermen, providing an indirect protection to those shrimp populations. A transit provision for the dolphin and wahoo, coastal migratory pelagics, snapper grouper and golden crab is not needed as the regulations do not currently prevent them from transiting the area.

The intent of **Action 2** is to lessen the economic effects on rock shrimp fishermen should the South Atlantic Council choose to implement **Action 1**, **Sub-alternative 2a**, **Preferred Sub-alternative 2b,** or **Preferred Alternative 3**, any of which would expand the size of the Oculina Bank HAPC northwards and westward.

Rock shrimp fishermen would receive some relief from the expected negative economic effects (associated with Action 1 alternatives) under **Action 2, Alternative 2** or **Preferred Alternative 3**. Either of these alternatives would allow fishermen to transit through the entire Oculina Bank HAPC with gear stowed and transiting at a minimum speed of 5 knots. This would be a positive, direct economic benefit for these fishermen as they would use less fuel and take less time to get to their fishing grounds. **Preferred Alternative 3** has the same transit provisions as **Alternative 2**, however **Preferred Alternative 3** requires vessels to have aboard a vessel monitoring system (VMS) system that would have the ability to have a higher ping rate than many vessels in the fleet currently have. Currently, there are 79 vessels in the rock shrimp fleet that have VMS. Of those, 22 have older units purchased when the fishery was required to implement them in 2003.

Those units would need to be upgraded. None of the units would be eligible for reimbursement by the NMFS OLE VMS Fund. The 22 vessels needing to upgrade their units would have to pay for the installation, maintenance, and increased communications charges associated with having a VMS (**Table 4-10**). Assuming all 22 vessels needing to upgrade their units choose the lowest price Thrane unit at $2,495 each, the cost of the units is expected to be $54,890. The additional cost of installation would be approximately $6,600, for a total minimum cost of $61,490 to upgrade to the least expensive necessary hardware. The total cost of hardware and software upgrades required to allow transit under **Preferred Alternative 3** for all vessels in the fleet is estimated to be $72,890.

Some, if not all, of the increased cost of upgrading hardware and software, plus increased communications charges to transit through the Oculina Bank HAPC would be offset by not being required to transit around the HAPC to get to fishing grounds. Allowing transit should increase the amount of time on a trip spent fishing, as well as provide savings on fuel and other vessel maintenance costs.

Social: If additional closed areas are established under **Action 1,** some negative impacts on the fishing vessels and crew may be reduced with a transit provision, as discussed in **Section 4.1.3**. The transit provision in **Alternative 2** and **Preferred Alternative 3** would be beneficial to shrimp vessels by reducing the risk of negative impacts due to increased travel time and costs when traveling around a closed area to outer fishing grounds. **Preferred Alternative 3** would be expected to help reduce negative impacts from **Action 1** on individual fishermen, fishing businesses, and the communities of Mayport and Titusville (see **Section 3.4.3**.)

Administrative: There would be minor administrative impacts associated with a transit provision through Oculina Bank HAPC. Administrative impacts associated with enforcement would be greatest for these action alternatives. If modifications are made to the transit regulations, administrative impacts would increase on the agency during the development and implementation phase. **Preferred Alternative 3** would require the vessel to maintain a speed of 6 knots as indicated by an increased ping rate on the VMS. Depending on the frequency of transit, this might lead to a slight increase in the impacts associated with monitoring of VMS by law enforcement. There would be administrative impacts associated with ensuring that all VMS units are capable of the increasing ping rate and supplying VMS units to those which need to be replaced.

Table 2-2. Summary of effects under **Action 2.**

Alternatives	Biological Effects	Socioeconomic/Administrative Effects
Alternative 1 (No Action)	Status Quo	Status Quo
Alternative 2	Negative impacts on rock shrimp populations.	Positive economic and social.
Preferred Alternative 3	Negative impacts on rock shrimp populations.	More positive than Alterantive 2. Adminstrative impacts increase slightly.

2.3 Action 3. Expand boundaries of the Stetson-Miami Terrace CHAPC

Alternative 1. (**No Action**) Do not revise the boundaries of the Stetson-Miami Terrace CHAPC.

The existing Stetson-Miami Terrace CHAPC is delineated by the coordinates identified in CFR §622.224(c)(1)(iii).

Alternative 2. Modify the southern southeast boundary of the Stetson-Miami Terrace CHAPC western extension in a manner that releases the flatbottom region to the extent possible while maintaining protection of coral habitat. Alternative 2 = 490 square miles

Alternative 3. Modify the Coral AP recommendation for expanding the Stetson-Miami Terrace CHAPC to include area of mapped habitat within the expansion, and exclude areas of royal red fishery activity based on VMS data. Alternative 3 = 653 square miles

Preferred Alternative 4. The recommendation is a back-up preferred Alternative for the proposed extension of the Stetson-Miami Terrace CHAPC. The back-up recommendation includes Alternative 2 as proposed with inclusion of a new Shrimp Fishery Access Area for drift-haul back as represented in **Figure 4-10**. With the inclusion of a new Shrimp Fishery Access Area in Alternative 2, royal red shrimp fishing, or VMS points (2-4 knots) (2003-2013) would be further reduced to 0.1% from 0.7% for Alternative 2 alone. Alternative 4 = 490 square miles

IPT recommendation for language revisions to **Preferred Alternative 4**:
Preferred Alternative 4. Modify the southern southeast boundary of the Stetson-*Miami Terrace CHAPC western extension in a manner that releases the flatbottom region to the extent possible while maintaining protection of coral habitat. Allow for a Shrimp Fishery Access Area to be used as a gear haul back/drift zone as shown in* ***Figure S-9.*** *Alternative 4 = 490 square miles*

Note: Coordinates for the CHAPC extension alternatives are found in **Appendix M**

Comparison of Alternatives

Biological: Alternative 1 (No Action) would not modify coordinates for the Stetson Miami Terrace CHAPC. Within the CHAPCs, the use of bottom longline, bottom trawl, mid-water trawl, dredge, anchor, pot or trap, anchor and chain and grapple and chain is prohibited. **Alternatives 2, 3,** and **4 (Preferred)** would extend theses prohibitions to the expansion area of the Stetson-Miami Terrace HAPC. Therefore, the larger the expansion of the Stetson-Miami Terrace HAPC, the greater the biological effects to species found in the area. **Alternative 2** would provide greater biological benefits to species caught within the expanded area than **Alternative 1 (No Action)**. **Alternative 3** would provide greater biological benefits to all species caught within the expanded area with the exception of royal red species.

None of the alternatives would have much direct biological impact on dolphin wahoo or coastal migratory pelagic species as the typical gear used for these species do not impact bottom habitat. Fishing for snapper grouper species would be allowed as long as there was no anchoring or bottom longline gear. However, fishing for snapper grouper species in the proposed expansion areas of the Stetson-Miami Terrace is uncommon and no biological impact on those species is expected. The golden crab fishery operates within allowable gear areas, which are not affected by the proposed expansion of the Stetson-Miami Terrace CHAPC.

Alternative 2 and **Alternative 3** would be expected to result in positive biological impacts to the deepwater coral habitat in these areas as it would extend the prohibitions on bottom damaging gear. Given the slow growth of deepwater corals, any impacts would be expected to result in long-term biological losses of deepwater coral habitat as well as the species that utilize this habitat. Under these alternatives, habitats within the Stetson-Miami Terrace proposed CHAPC expansion would be protected from damaging fishing gear such as bottom longline, anchoring, trawling (bottom and mid-water) which would have positive biological impacts on the species in the area.

Preferred Alternative 4 is similar to **Alternative 2** in that it would modify the coordinates to expand the CHAPC by 490 square miles. It would also provide royal red shrimp fishermen a zone within which they can haul back gear without drifting into an area where their gear would be prohibited. This haul back zone may encourage fishermen to fish in the area giving a slight negative impact on the royal red populations. However, fishing effort in the area is historically low and the impact is not expected to be significant.

Economic: The royal red shrimp fishery is known to operate in the proposed Stetson-Miami Terrace CHAPC expansion. Based on the VMS points as a percent of fishing that occurred in the alternative areas, Action 3 will result in some minor loss of ex-vessel income to the royal red shrimp fleet. Alternative 2 is expected to result in average annual losses of $1,752. **Alternative 3** would result in expected average annual losses of $557. Like **Alternative 1 (No Action)**, **Preferred Alternative 4** is not expected to have any direct economic effects.

Social: Alternative 1 (No Action) would likely have minimal social effects (negative and positive) because this would maintain access to shrimp and snapper grouper harvest areas that would be reduced under **Alternative 2** or **Alternative 3**. Because **Preferred Alternative 4** would also establish the Shrimp Fishery Access Area based on information of fishing grounds of the royal red shrimp vessels, negative impacts on the deepwater shrimp fleets and associated businesses and communities could be reduced or removed. The expected economic impacts under **Alternatives 2** and **3** would likely be avoided with the establishment of the Shrimp Fishery Access Area in **Preferred Alternative 4** (see Section 4.3.2), which would also contribute to minimized impact on the fishermen, businesses, and associated communities.

Administrative: The expansion of the Stetson-Miami Terrace CHAPC (**Alternative 2 - Alternative 4**) would have minimal administrative impacts. Administrative impacts would be incurred through the rule making process, outreach and enforcement. The administrative impacts would differ between the alternatives in the amount of area they cover. It is expected the larger the expansion of the CHAPC the more enforcement would be needed. Most of the administrative impacts associated with these alternatives relate to at-sea enforcement.

Table 2-3. Summary of effects under **Action 3**.

Alternatives	Biological Effects	Socioeconomic/Administrative Effects
Alternative 1 (No Action)	Status Quo	Status Quo
Alternative 2	Positive for deepwater corals and species that utilize that habitat.	Slight negative impact on rock shrimp fishermen due to reduction in fishing area, although the rock shrimp fishery does not have much of a history in that area.
Alternative 3	Larger positive impact for deepwater corals and species that utilize that habitat.	Slight negative impact on rock shrimp fishermen due to reduction in fishing area, although the rock shrimp fishery does not have much of a history in that area.
Preferred Alternative 4	Positive for deepwater corals and species that utilize that habitat.	Slight negative impact on rock shrimp fishermen due to reduction in fishing area, although there would be an allowance for a haul back zone which would give fisherman ability to fish in the area.

2.4 Action 4. Expand boundaries of the Cape Lookout CHAPC

Alternative 1 (**No Action**). Do not modify the boundaries of the Cape Lookout CHAPC.

The existing Cape Lookout CHAPC is identified by the following coordinates:

Latitude	Longitude
34°24’37”	75°45’11”
34°10’26”	75°58’44”
34°05’47”	75°54’54”
34°21’02”	75°41’25”

Preferred Alternative 2. Extend the northern boundary to encompass the area identified by the following coordinates (Alternative 2 = 10 square miles):

Latitude	Longitude
34°24.6166’	75°45.1833’
34°23.4833’	75°43.9667’
34°27.9’	75°42.75’
34°27.0’	75°41.5’

Note: Coordinates for the CHAPC extension alternatives are found in **Appendix M**

Comparison of Alternatives

Biological: Under **Alternative 1 (No Action)**, the same prohibitions currently restricted within the CHAPC would apply. Within the CHAPCs, the use of bottom longline, bottom trawl, mid-water trawl, dredge, anchor, pot or trap, anchor and chain and grapple and chain is prohibited. **Preferred Alternative 2** proposes to expand the original Cape Lookout CHAPC along the northern boundary by approximately 10 square miles. This expansion would benefit deepwater coral ecosystems and has been proposed based on new information of occurrence of deepwater *Lophelia* corals in the area. **Alternative 2 (Preferred)** would not have any biological impact on dolphin wahoo or coastal migratory pelagic as the typical gear used for these species does not impact bottom habitat. Fishing for snapper grouper species would be allowed as long as there was no anchoring or use of bottom longline gear. The size of the proposed expansion of the Cape Lookout CHAPC in **Preferred Alternative 2** is very small (roughly 8 square kilometers) and landings data are not available at a fine enough resolution to perform analysis (pers. comm., Nick Farmer, NMFS SERO, July 9, 2013). However, fishing for snapper grouper species in the proposed expansion area is uncommon and little biological impact on those species is expected. Fishing for deepwater shrimp species does not occur within the proposed area. The golden crab fishery operates within allowable gear areas, which are not affected by the proposed expansion of the Cape Lookout CHAPC.

Economic: The size of the proposed closure from **Preferred Alternative 2** is very small (roughly 8 square kilometers) and landings data are not available at a fine enough resolution to perform analysis (pers. comm., Nick Farmer, NMFS SERO, July 9, 2013).

Alternative 1 (No Action) would likely have minimal economic effects because this would maintain access to current harvest areas. The proposed extension of the Cape Lookout CHAPC under **Preferred Alternative 2** could have minimal direct negative economic effects particularly on the snapper grouper fleet if historic fishing grounds are no longer available.

Social: **Alternative 1 (No Action)** would likely have minimal negative social effects because no current or potential fishing grounds would be closed. The proposed extension of the Cape Lookout CHAPC under **Preferred Alternative 2** could have negative social effects on the royal red and rock shrimp fleet if historic fishing grounds are no longer available, or if the closed area affected travel to and from harvest areas. The small size of the expansion proposed under **Preferred Alternative 2** would also be expected to result in less social impact than a larger area.

Administrative: The expansion of the Cape Lookout CHAPC (**Preferred Alternative 2**) would have a minimal administrative impact. Administrative impacts would be felt through the rule making process, outreach and enforcement. The administrative impacts would differ between the alternatives in the amount of area they cover. It is expected the larger the expansion of the Cape Lookout CHAPC the more enforcement would be needed. Most of the administrative impacts associated with these alternatives relate to at-sea enforcement.

Table 2-4. Summary of effects under **Action 4**.

Alternatives	Biological Effects	Socioeconomic/Administrative Effects
Alternative 1 (No Action)	Status Quo	Status Quo
Preferred Alternative 2	Positive impact on deepwater corals and species which utilize that habitat.	Minimal economic, social and adminstraive impacts from the status quo.

Chapter 3. Affected Environment

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

- **Habitat environment** (Section 3.1)

  Examples include coral reefs and sea grass beds

- **Biological environment** (Section 3.2)

  Examples include populations of golden tilefish, corals, turtles

- **Human environment** (Sections 3.3 & 3.4)

  Examples include fishing communities and economic descriptions of the fisheries

- **Administrative environment** (Section 3.5)

  Examples include the fishery management process and enforcement activities

3.1 Habitat Environment

Coral Amendment 8 addresses management measures to protect deepwater coral ecosystems, including *Oculina* and *Lophelia*. Chapter 3 details the biological environment for the species that will be most affected by this amendment.

Detailed information on the life history of the other species affected by this amendment through the data collection action can be found in previous amendments and the habitat and biological environment can be found in the Fishery Ecosystem Plan (FEP) (SAFMC 2009b).

The actions in this amendment are expected to have an impact on deepwater shrimp fisheries and the snapper grouper fisheries. Other fisheries that may occur in the action area but are not expected to be impacted are the coastal migratory pelagics, dolphin and wahoo, and golden crab. The affected environment for the potentially affected fisheries are described in **Sections 3.1.2** and **3.1.3**. Information on the other fisheries can be found in the Fishery Ecosystem Plan (SAFMC 2009b).

3.1.1 Deepwater Coral Reef Habitat

Deepwater coral reefs are common off the southeastern U.S. within the exclusive economic zone. These habitats include high-relief, hardbottom features at numerous sites on the Blake Plateau from North Carolina southward through the Straits of Florida. A limited number of sites have been mapped to a high resolution and even fewer reefs have been characterized in detail (Reed et al. 2006). However, there is increasing evidence that deepwater corals are important fish habitat (Costello et al. 2005) and hotspots of increased biodiversity. Similar to shallow tropical coral reefs, deepwater coral reefs support important ecosystem functions. Like their shallow-water counterparts, deepwater coral habitats are affected by human activities (e.g., fishing pressure, marine debris, fishing gear interactions). Contrary to shallow-water corals, deepwater corals are located in aphotic zones which are deeper than light can penetrate and allow for photosynthesis. Major damage from trawling activities has been documented on deepwater *Oculina* and *Lophelia* reefs in the northeastern Atlantic (Rogers 1999; Fossa et al. 2002; Koenig et al. 2005; Reed et al. 2007) and to a lesser degree off the southeastern U.S. (Ross et al. 2012a).

Two types of azooxanthellate (lacking symbiotic algae) corals form deepwater reefs along the Florida coast: *Oculina varicosa* and *Lophelia pertusa*. Other dominant azooxanthellate, colonial scleractinian (stony or hard) corals on deepwater reefs in the southeastern U.S. include *Enallopsammia profunda, Madrepora oculata*, and *Solenosmilia variabilis* (Reed 2002a,b). Several solitary coral species are also common (Cairns 1979, 2000) along with many species of bamboo octocorals (Family Isididae), black corals (Order Antipatharia), and calcified hydrozoans (Family Stylasteridae). In addition, these deepwater reefs provide substrate and habitat for other sessile macrofauna including octocorals (gorgonians) and sponges, which in turn provide habitat for a not well-studied, but biologically rich and diverse community of associated fishes, crustaceans, mollusks, echinoderms, polychaete and sipunculan worms, and other macrofauna (Reed et al. 2006).

Deepwater *Oculina* reefs are unique to Florida with the only known reefs located off the east coast. *Lophelia* reefs are also present in this area, but their distribution is broader (Reed et al. 2005). Deepwater corals are likely controlled (in part) by their upper temperature limits (Ross et al. 2012a). While *Oculina* and *Lophelia* reefs occur at disparate depths, 60 to 100 m and 500 to 800 m, respectively, they are notably similar in morphology. They are also similar in mound structure, which is composed of layers of coral debris and sediment. In addition, both form topographic high-relief mound features (termed bioherm or lithoherm) that are capped with living coral thickets (Reed et al. 2005). Bioherms are deepwater coral banks that over centuries have formed a mound of unconsolidated sediment and coral debris (Reed 2002a,b), whereas lithoherms are high-relief, lithified carbonate mounds (Neumann and Ball 1970).

Both *Oculina* and *Lophelia* reefs occur in regions of strong currents (Florida Current, Gulf Stream). In addition, *Oculina* reefs are periodically exposed to nutrient-rich, coldwater upwelling temperatures of 7.4 to 10 °C, which is similar to the mean temperatures of the *Lophelia* reefs in this region. However, the associated fauna are noticeably different between *Oculina* and *Lophelia* reefs. For example, Reed et al. (2006) identified 38 taxa of Porifera (sponges) and 41 Cnidaria (corals and anemones) from the *Lophelia* reefs, but no massive sponges or gorgonians were common to the *Oculina* bioherms. Live coral coverage is generally low on the majority of both *Lophelia* and *Oculina* reefs in this region (1% to 10%); however, cover varies from nearly 100% living coral on a few reefs to of 100% dead coral rubble on other reefs.

3.1.1.1 *Oculina varicosa* reef habitat characterization

The majority of the *Oculina* 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 United States (Avent et al. 1977; Reed 1980). Much of the habitat that has been mapped and characterized is within or adjacent to the Oculina Bank HAPC, located 15 nautical miles off Fort Pierce and extending northward towards Cape Canaveral. However, in 1982 Reed discovered a mound located approximately 55 km north of the Oculina HAPC, located offshore of New Smyrna Beach (Reed et al. 2005) (described in **3.1.2**).

Categories of deepwater *Oculina* habitats include pinnacles or bioherms, isolated coral thickets on hardbottom, and rubble with isolated live colonies. The bioherms range in height from 3 to 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 yr; 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 hardbottom. 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 global warming, or from human impacts, e.g., fish and shrimp trawling, scallop dredging, anchoring, bottom longlines, and depth charges (Reed et al. 2005).

Reed (1980) describes several sites within the Oculina Bank HAPC. One of the most notable sites, referred to as Jeff's Reef, is also the southernmost known intact *Oculina* reef. Jeff's Reef is an isolated bank, approximately 300 m in width, with a minimum depth of 64 m at the crest and maximum depth of 81 m at the base that contains three parallel east-west ridges that are capped with live coral 1 to 2 m in height. The south face has a steep slope (30 to 45°) and is covered with contiguous *Oculina* that measures 1 to 2 m in height; whereas the north slope is less steep (<25°) and has more rubble and scattered colonies that are 0.5 to 2.0 m in diameter. In some areas along the bank, the colonies establish east-west rows, which are 2 to 3 m in width, and form step-like terraces up the slope of the bank. In addition to the high-relief *Oculina* banks and low-relief coral thickets, Reed (1980) further described over 50 sites within the Oculina Bank HAPC that had sparsely scattered live *Oculina* colonies from 0.25 to 2.0 m in diameter.

In addition to the natural habitats, restoration modules were deployed in the Experimental *Oculina* Research Reserve (EORR) from 1996 to 2001. In total, 281 large and 450 small modules were deployed over a 315 square km area in various configurations. Some of the modules were deployed with coral transplants, which have survived. Additionally, recruitment of new colonies had been observed on the older modules (Brooke et al. 2004).

Much of the *Oculina* habitat had been severely degraded or destroyed since the 1980s. Reed et al. (2005) described evidence of habitat damage, particularly in northern areas. In 1976, one site off Cape Canaveral was described as having up to 100% cover of live coral. Observations from this same site in 2001 revealed that the coral thickets on the mound had been reduced to rubble except for a few scattered intact coral colonies at the base. The coral structure on parts of Chapman's Reef and Steeple Pinnacle had been damaged, and Sebastian Pinnacles and Twin Peaks were covered with small pieces of coral rubble (Brooke et al. 2004). Other signs of habitat damage included visual sightings of trawlers in closed areas, fishing lines and bottom longlines wrapped around coral colonies and remnants of bottom trawl nets that appear to be recent, damaged artificial reef modules, and trawl tracks in the rubble noted near the damaged restoration modules. Changes in fish communities have also occurred during this same time frame. The dominant species shifted from grouper species, particularly scamp (*Mycteroperca phenax*), to small non-fishery species, such as red barbier (*Hemanthius vivanus*) and roughtongue bass (*Holanthius martinicensis*) (Koenig et al. 2000). Spawning aggregations of gag (*M. microlepis*) and scamp previously observed on Jeff's and Chapman's Reef had either disappeared completely or been reduced to a few small individuals (Brooke et al. 2004).

The deep shelf-edge *Oculina* reefs form natural spawning grounds for species managed under the SAFMC snapper-grouper fishery management plan, including commercially important populations of gag and scamp. They also serve as nursery grounds for snowy grouper (*Epinephelus niveatus*), and feeding grounds for these and many other commercial fish species including black sea bass (*Centropristis striata*), red grouper (*E. morio*), speckled hind (*E. drummondhayi*), Warsaw grouper (*E. nigritus*), amberjack (*Seriola* spp.), red porgy (*Pagrus pagrus*), and red snapper (*Lutjanus campechanus*) (Gilmore and Jones 1992). Biodiversity, grouper densities, and percentage of intact coral have been documented to be higher inside the Oculina Bank HAPC compared to outside (Harter et al. 2009).

3.1.1.2 *Lophelia pertusa* reef habitat

Compared to deepwater *Oculina* reefs, *Lophelia* reefs are cosmopolitan, occurring not only along the southeastern U.S. continental slope, but also in the Gulf of Mexico, off Nova Scotia, in the northeastern Atlantic, the Mediterranean Sea, the Indian Ocean, and in parts of the Pacific Ocean over a depth range of 50 to 2,170 m (Cairns 1979; Rogers 1999). Although more extensive surveys are needed, *Lophelia* reefs appear to populate the southeastern U.S. continental slope in great abundance (Stetson et al. 1962; Paull et al. 2000; Reed 2002b). The southeastern U.S. and Gulf of Mexico are estimated to have the most extensive deep coral areas in the U.S. (Hain and Corcoran 2004).

The structure-building coral, *L. pertusa*, has a morphology similar to *Oculina*, forming massive bushy colonies. It is fragile and susceptible to physical destruction (Fossa et al. 2002). Most *Lophelia* habitats in the southeast U.S. are in depths from about 370 to at least 900 m (Reed and Ross 2005). *Lophelia* habitats can occur in small scattered colonies attached to hardbottom substrates. In addition, they form complex, high profile features (bioherms and lithoherms) that can range in height from 8 to 168 m. The ridges and reef mounds accelerate bottom currents which are favorable to attached filter-feeders. Thus, the growing reef alters local currents, enhancing the environment for continued coral growth and faunal recruitment (Genin et al. 1986). Along the sides and around the bases of these banks are rubble zones of dead coral pieces which may extend large distances away from the mounds (Reed and Ross 2005).

Reed and Ross (2005) described the known deepwater *Lophelia* habitats in the southeast U.S., including the North Carolina *Lophelia* Reefs, Stetson Reefs, Savannah Lithoherms, East Florida *Lophelia* Pinnacles, Miami Terrace, and Pourtales Terrace. The North Carolina *Lophelia* Reefs appear to be the northernmost deepwater reefs on the southeastern U.S. slope. The Stetson Reefs, located offshore of Charleston, South Carolina, contain over 200 coral mounds with *L. pertusa* and *E. profunda* as the dominant coral species. The Savannah Lithoherms contain numerous mounds that range in height from 30 to 60 m. The East Florida *Lophelia* Pinnacles extend from southern Georgia south to Jupiter, Florida). In 2004, nearly 300 deepwater reefs were identified in this area (Reed et al. 2005). The Miami Terrace provides high-relief rocky hardbottom habitats, and along the eastern edge, a 90 m tall escarpment is capped with live *Lophelia* coral, stylasterid hydrocoral, bamboo coral, black coral, and various sponges and octocorals. The Pourtales Terrace runs parallel to the Florida Keys and provides extensive, high-relief, hardbottom habitat and bioherms covered with live coral. In addition, numerous sinkholes occur on the outer edge of the Terrace with bottoms 600 m deep and up to 600 m in diameter.

A total of 146 species of benthic invertebrates has been identified from six deepwater reef sites off the southeastern U.S. (Reed 2004). The dominant benthic species include 70 Porifera (sponges) and 58 Cnidaria (corals and anemones). In total, at least 67 fish species have been identified from these deepwater reef sites (Reed 2004; Ross and Quattrini 2009; Reed et al. 2005). Species that are common to most deepwater reef sites include the blackbelly rosefish (*Helicolenus dactylopterus*), morid cod (*Laemonema melanurum*), red bream (*Beryx* *decadactylus*), Atlantic roughy (*Hoplostethus occidentalis*), conger eel (*Conger oceanicus*), and wreckfish (*Polyprion americanus*). Additional sampling of the deeper *Lophelia* reefs may greatly add to this faunal list.

3.1.1.3 Habitat characterization of *Oculina varicosa* habitat within expansion areas under consideration for SAFMC management action

In 1982, Reed discovered pinnacles (14 to 20 m tall) as far north as 28°59.2'N, 80°06.6'W (located east of New Smyrna Beach) at depths from 79 to 84 m. These *Oculina* reefs extend at least 55 km north of the current Oculina Bank HAPC. At that time, these reefs were the northernmost known *Oculina* pinnacles that had been discovered. The pinnacles were described as having more exposed rock than the pinnacles south of Cape Canaveral, with also having scattered thickets of live *Oculina* (Reed et al. 2005).

In 2011, Reed gave a presentation to the SAFMC on two new areas of high-relief *Oculina* coral mounds and hardbottom habitats that had been discovered outside, but adjacent to, the current boundaries of the Oculina Bank HAPC. The locations of these sites were originally identified from NOAA regional bathymetric charts (Cape Canaveral 85, Titusville 84, New Smyrna 83, and Daytona 82) and later verified in 2011 (as described in the next paragraph) with multibeam sonar and ground-truthed with Remotely Operated Vehicles (ROV) and submersible video surveys. One area extends from the northern boundary of the Oculina Bank HAPC up to St. Augustine. The second area is to the west of the current boundary, primarily between the Oculina Bank HAPC satellite areas (Reed and Farrington 2011).

These areas were examined during a recent research cruise (June 2011, funded by NOAA's Deep Sea Coral Program and Harbor Branch Oceanographic Institute's Cooperative Institute for Ocean Exploration, Research, and Technology). The sonar maps and ROV dives confirmed that the high-relief features of the NOAA regional charts were high-relief *Oculina* coral mounds. Reed (2011) characterized these areas as similar habitat to those *Oculina* reefs within the Oculina Bank HAPC with individual mounds that are 15 to 20 m in height, a maximum depth of 92 m, and a minimum depth of 64 m at the peaks. It is estimated that over 100 mounds exist in this area. Other observations include gentle slopes (10 to 45°) covered with coral rubble, standing dead coral, and sparse live *Oculina* coral colonies. Exposed limerock (hardbottom) with 1 to 2 m relief ledges was observed at the base of some mounds. Between the mounds and west of the main reef track, the substrate is mostly soft sediment but patchy rock pavement (hardbottom) habitat and coral rubble is also present.

This cruise also documented *Oculina* coral mounds and hardbottom habitat west of the current Oculina Bank HAPC boundary. Multibeam sonar maps made earlier in 2002 and 2005 revealed numerous (dozens) high-relief coral mounds and hardbottom habitat that are west of the western Oculina Bank HAPC boundary, primarily between the two satellite areas (Reed et al. 2005). A few of these mounds are comprised mostly of coral rubble, with live and standing dead *Oculina* (Harter et al. 2009). The dominant fish fauna in these areas included scamp and snowy grouper. Gag, greater amberjack (*Seriola dumerili*), and black seabass were also observed, in addition to a tilefish (*Lopholatilus chamaeleonticeps* or *Caulolatilus microps*) burrow (Reed 2011).

3.1.1.4 Habitat characterization of *Lophelia pertusa* habitat within expansion areas under consideration off Jacksonville for SAFMC management action

In 2010, live colonies of *Lophelia* were discovered in unusually shallow depths (180 to 250 m) during ROV surveys off northeast Florida. Prior to this discovery, small colonies of *Lophelia* had been seen in depths of approximately 300 m off the southeastern U.S., but no substantial amounts had been reported in depths < 370 m. The bottom temperatures (7-10° C) were colder than expected at these shallow depths, and more similar to temperatures encountered at 400 to 600 m. Common deepwater fauna not only occurred at this site, but were much more abundant and larger than observed elsewhere. Typical hardbottom macroinvertebrates included octocorals, stony corals, black corals, and golden crab (*Chaceon fenneri*). The most common fishes recorded here were blackbelly rosefish, morid cod, a synaphobranchid eel (*Dysommina rugosa*), and small serranids (*Anthias* spp.) (Ross et al. 2012a).

This *Lophelia* habitat is unique at this shallow depth and largely driven by the abundance of hardbottom habitat and its proximity to the Gulf Stream. In this area, the Gulf Stream is directed away from the coast, which creates an upwelling of deep water and consequently a long-term primary productivity envelope. These oceanographic features create an environment suitable for supporting a deepwater *Lophelia* community. The presence of bioherms and abundant coral rubble, the well-developed coldwater sessile community, and the abundance of associated fauna suggest that this site is a long-term feature, rather than short-term opportunistic colonization (Ross et al. 2012a).

The extent to which this habitat may be subject to bottom-damaging activities is not well known. However, Ross et al. (2012a) observed discarded fishing gear, indicating to some extent that the area is a known fishing ground.

3.1.1.5 Habitat characterization of *Lophelia pertusa* habitat within expansion areas under consideration off Cape Lookout for SAFMC management action

Cape Lookout is a coral bank system composed of two distinct areas located approximately 75 km southeast of Cape Lookout, North Carolina. This area appears to be the northernmost deepwater coral habitat on the southeastern U.S. slope. Within the CHAPC, individual mounds capped with *Lophelia* can reach up to 100 m in height and exhibit slopes of 60°. The sides of these mounds are covered with small to large (up to 5 m in height) bushes of living and dead *Lophelia*. Low-profile hardbottom habitats and extensive zones of coral rubble are also within this area (Ross and Quattrini 2009).

The expansion area was mapped with multibeam sonar opportunistically during a research cruise that transited through the area. The multibeam map depicts numerous low-relief mounds that are located north of the CHAPC. Ross et al. (2012b) described two museum records of *Lophelia* off Cape Lookout. The northernmost record was collected from the newly discovered low-profile mounds.

3.1.2 Snapper Grouper Habitat

Predominant snapper grouper offshore fishing areas are located in live bottom and shelf-edge habitats, where water temperatures range from 11º to 27º C (52º to 81º F) due to the proximity of the Gulf Stream, with lower shelf habitat temperatures varying from 11º to 14º C (52º to 57º F). Water depths range from 16 to 27 meters (54 to 90 feet) or greater for live-bottom habitats, 55 to 110 meters (180 to 360 feet) for the shelf-edge habitat, and from 110 to 183 meters (360 to 600 feet) for lower-shelf habitat areas.

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

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

Artificial reef structures are also utilized to attract fish and increase fish harvests; however, research on artificial reefs is limited and opinions differ as to whether or not these structures promote an increase of ecological biomass or merely concentrate fishes by attracting them from nearby, natural un-vegetated areas of little or no relief.

The distribution of coral and live hard bottom habitat as presented in the Southeast Marine Assessment and Prediction (SEAMAP) Bottom Mapping Project is a proxy for the distribution of the species within the snapper grouper complex. The method used to determine hard bottom habitat relied on the identification of reef obligate species including members of the snapper grouper complex. The Florida Fish and Wildlife Research Institute (FWRI), using the best available information on the distribution of hard bottom habitat in the south Atlantic region, prepared ArcView maps for the four-state project. These maps, which consolidate known distribution of coral, hard/live bottom, and artificial reefs as hard bottom, are available on the South Atlantic Fishery Management Council's (South Atlantic Council) Internet Mapping System website: http://ocean.floridamarine.org/efh_coral/ims/viewer.htm.

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

3.1.3 Shrimp Habitat

A description of council concerns and recommendations on protecting shrimp habitat is included in the Shrimp FMP (SAFMC 1993a). Rock shrimp are distributed worldwide in tropical and temperate waters. They are found in the Gulf of Mexico, Cuba, the Bahamas, and the Atlantic Coast of the U.S. up to Virginia (SAFMC 1993a). 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 1996a). Small quantities of rock shrimp are also found off North Carolina, South Carolina, and Georgia. The largest concentrations are in areas where water depth is 111-180 feet (34-55 m). Although rock shrimp occasionally are landed from EEZ waters off North Carolina, South Carolina, and Georgia, they are not landed in quantities capable of supporting a sustainable commercial fishery comparable to the fishery prosecuted in the EEZ off Florida.

The bottom habitat on which rock shrimp thrive is thought to be limited (SAFMC 1996a). Kennedy et al. (1977) determined that the deepwater 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 1996a).

White shrimp range from Fire Island, New York, to St. Lucie Inlet on the Atlantic Coast of Florida, and from the Ochlochonee River on the Gulf Coast of Florida to Ciudad Campeche, Mexico. Along the Atlantic Coast of the U.S., the white shrimp is more common off South Carolina, Georgia, and northeast Florida. White shrimp are generally concentrated on the continental shelf where water depths are 89 feet (27 m) or less, although occasionally they are found much deeper (up to 270 feet) (SAFMC 1996a).

Brown shrimp occur from Martha's Vineyard, Massachusetts to the Florida Keys and northward into the Gulf to the Sanibel grounds. The species reappears near Apalachicola Bay and occurs around the Gulf Coast to northwestern Yucatan. Although brown shrimp may occur seasonally along the Mid-Atlantic States, breeding populations apparently do not occur north of North Carolina. The species may occur in commercial quantities in areas where water depth is as great as 361 feet (110 m), but they are most abundant in areas where the water depth is less than 180 feet (55 m) (SAFMC 1996a).

Pink shrimp occur from southern Chesapeake Bay to the Florida Keys and around the coast of the Gulf of Mexico to Yucatan south of Cabo Catoche. Maximum abundance is reached off southwestern Florida and the southeastern Golfo de Campeche. Along the Atlantic coast of the U.S. pink shrimp are of major commercial significance only in North Carolina and the Florida Keys. Pink shrimp are most abundant in areas where water depth is 36-121 feet (11-37 m) although in some areas they may be abundant where water depth is as much as 213 feet (65 m) (SAFMC 1996a).

3.1.4 Essential Fish Habitat

Coral

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

A. 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.

B. 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.

C. 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.

D. 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.

Refer to Volume II of the FEP: Habitat and Species (SAFMC in prep.) for a more detailed description of habitat utilized by the managed species.

Habitat characterization of *Oculina varicosa* habitat within expansion areas under consideration for SAFMC management action

In 1982, Reed discovered pinnacles (14 to 20 m tall) as far north as 28°59.2'N, 80°06.6'W (located east of New Smyrna Beach) at depths from 79 to 84 m. These *Oculina* reefs extend at least 55 km north of the current Oculina Bank HAPC. At that time, these reefs were the northernmost known *Oculina* pinnacles that had been discovered. The pinnacles were described as having more exposed rock than the pinnacles south of Cape Canaveral, with also having scattered thickets of live *Oculina* (Reed et al. 2005).

In 2011, Reed gave a presentation to the South Atlantic Council's Coral Advisory Panel on two new areas of high-relief *Oculina* coral mounds and hardbottom habitats that had been discovered outside, but adjacent to, the current boundaries of the Oculina Bank HAPC. The locations of these sites were originally identified from NOAA regional bathymetric charts (Cape Canaveral 85, Titusville 84, New Smyrna 83, and Daytona 82) and later verified in 2011 (as described in the next paragraph) with multibeam sonar and ground-truthed with Remotely Operated Vehicles (ROV) and submersible video surveys. One area extends from the northern boundary of the Oculina Bank HAPC up St. Augustine. The second area is to the west of the current boundary, primarily between the Oculina Bank HAPC satellite areas (Reed and Farrington, 2011).

These areas were examined during a recent research cruise (June 2011, funded by NOAA's Deep Sea Coral Program and Harbor Branch Oceanographic Institute's Cooperative Institute for Ocean Exploration, Research, and Technology). The sonar maps and ROV dives confirmed that the high-relief features of the NOAA regional charts were high-relief *Oculina* coral mounds. Reed (2011) characterized these areas as similar habitat to those *Oculina* reefs within the Oculina Bank HAPC with individual mounds that are 15 to 20 m in height, a maximum depth of 92 m, and a minimum depth of 64 m at the peaks. It is estimated that over 100 mounds exist in this area. Other observations include gentle slopes (10 to 45°) covered with coral rubble, standing dead coral, and sparse live *Oculina* coral colonies. Exposed limerock (hardbottom) with 1 to 2 m relief ledges was observed at the base of some mounds. Between the mounds and west of the main reef track, the substrate is mostly soft sediment but patchy rock pavement (hardbottom) habitat and coral rubble is also present.

This cruise also documented *Oculina* coral mounds and hardbottom habitat west of the current Oculina Bank HAPC boundary. Multibeam sonar maps made earlier in 2002 and 2005 revealed numerous (dozens) high-relief coral mounds and hardbottom habitat that are west of the western Oculina Bank HAPC boundary, primarily between the two satellite areas (Reed et al. 2005). A few of these mounds are comprised mostly of coral rubble, with live and standing dead *Oculina* (Harter et al. 2009). The dominant fish fauna in these areas included scamp and snowy grouper. Gag, greater amberjack (*Seriola dumerili*), and black seabass were also observed, in addition to a tilefish (*Lopholatilus chamaeleonticeps* or *Caulolatilus microps*) burrow (Reed and Farrington 2011).

Shrimp

For rock shrimp, EFH consists of offshore terrigenous and biogenic sand bottom 59-597 feet (18-182 m) deep with highest concentrations occurring at 112-180 feet (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.

The bottom habitat on which rock shrimp thrive is probably limited. Kennedy et al. (1977) determined the deep-water limit of rock shrimp was likely due to the decrease of suitable bottom habitat rather than to other physical parameters such as salinity and temperature. Cobb et al. (1973) found the inshore distribution of rock shrimp was associated with terrigenous and biogenic sand substrates and only sporadically with mud. Rock shrimp also utilize hard bottom and coral or more specifically Oculina coral habitat areas. This habitat was confirmed by research trawls which captured large amounts of rock shrimp in and around the Oculina Bank HAPC prior to its designation.

Habitat essential to rock shrimp has not been further characterized beyond the above studies. 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.

For penaeid shrimp, EFH includes inshore estuarine nursery areas, offshore marine habitats used for spawning and growth to maturity, and all interconnecting water bodies as described in the Habitat Plan (SAFMC 1998b). Inshore nursery areas include tidal freshwater, estuarine, and marine emergent wetlands (e.g., intertidal marshes); tidal freshwater forested areas; mangroves; tidal freshwater, estuarine, and marine submerged aquatic vegetation (e.g., seagrass); and subtidal and intertidal non-vegetated flats. This habitat is found from North Carolina through the Florida Keys.

Snapper Grouper

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

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

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

3.1.3.1 Habitat Areas of Particular Concern

Coral

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

Shrimp

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

Snapper Grouper

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

Areas that meet the criteria for EFH-HAPCs include habitats required during each life stage (including egg, larval, postlarval, juvenile, and adult stages). In addition to protecting habitat from fishing related degradation though fishery management plan (FMP) regulations, the South

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

3.2 Biological and Ecological Environment

The reef environment in the South Atlantic management area affected by actions in this amendment is defined by two components (**Figure 3-1**). Each component will be described in detail in the following sections.

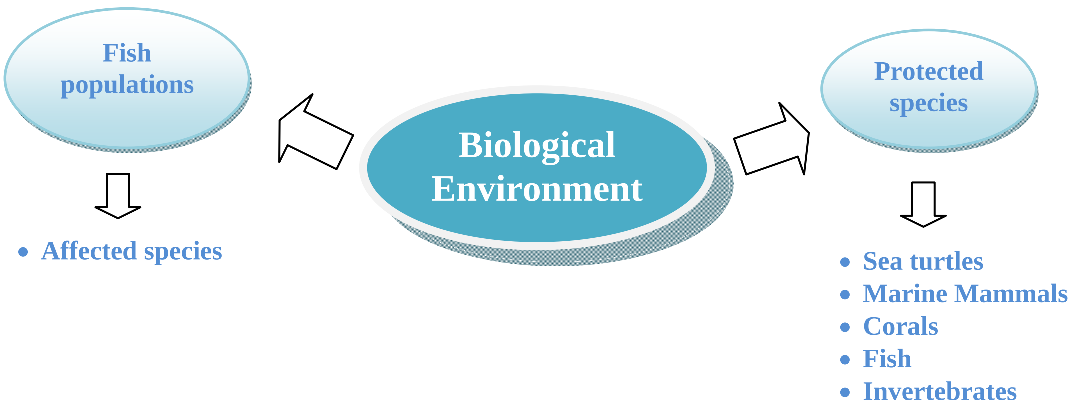


Figure 3-1. Two components of the biological environment described in this amendment

3.2.1 Fish Populations

The waters off the South Atlantic coast are home to a diverse population of fish. The South Atlantic Council manages the shrimp, coastal migratory pelagic, dolphin wahoo, golden crab and snapper grouper fisheries within the action area of this amendment.

Although located within the action area, this amendment will not have an impact on coastal migratory pelagics, dolphin wahoo. Coastal migratory pelagics and dolphin and wahoo are not fished with bottom tending gear and so the restrictions proposed by this amendment will not impact those fisheries. Golden crab does use bottom tending gear but is currently able to fish within golden crab allowable gear zones and the actions proposed in this amendment do not modify those zones.

The actions in the amendment will directly impact the rock shrimp and royal red fisheries. The snapper grouper fishery may be impacted by this amendment because there is some anchoring and bottom longline activity that occurs in the proposed expanded areas of the Oculina Bank HAPC and the Stetson-Miami Terrace CHAPC. These impacts are discussed in Chapter 4.

3.2.2 Deepwater Shrimp

Rock shrimp and royal red shrimp are directly impacted by the actions in this amendment. Fishermen harvesting rock shrimp in the South Atlantic also target royal red shrimp. The latter is currently not a South Atlantic Council-managed species. Hence, descriptions of both the rock shrimp and royal red shrimp resource are offered here.

Rock Shrimp

Description and distribution

Rock shrimp, *Sicyonia brevirostris*, (**Figure 3-2**) are very different in appearance from the three penaeid species. 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.

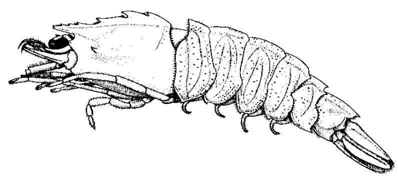


Figure 3-2. Rock shrimp, *Sicyonia brevirostris*.

Recruitment to the area offshore of Cape Canaveral 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 United States. Whitaker (1983) presented a summary of information on rock shrimp off South Carolina. 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.

Rock shrimp are found in the Gulf of Mexico, Cuba, the Bahamas, and the Atlantic Coast of the U.S. to Virginia (SAFMC 1993). 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. Rock shrimp live mainly on sand bottom from a few meters to 183 m (600 feet), and occasionally deeper (SAFMC 1993). The largest concentrations are found between 25 and 65 meters (82 and 213 feet).

Although rock shrimp are also found off North Carolina, South Carolina, and Georgia and are occasionally landed in these states, no sustainable commercially harvestable quantities of rock shrimp comparable to the fishery prosecuted in the EEZ off Florida are being exploited. Rock shrimp are included in the fishery management unit (FMU) of the Shrimp FMP of the South Atlantic Region.

Reproduction

Rock shrimp are dioecious (separate sexes). Female rock shrimp attain sexual maturity at about 17 millimeter (0.6 inches) carapace length (CL), and all males are mature by 24 millimeters (0.9 inches) CL. Seasonal temperature initiates maturation. Rock shrimp have ovaries that extend from the anterior end of the cephalothorax to the posterior end of the abdomen.

Rock shrimp, as with most shrimp species, are highly fecund. Fecundity most probably, as with penaeids, increases with size. In rock shrimp, copulation is believed to take place between hard-shelled individuals. The spawning season for rock shrimp is variable with peak spawning beginning between November and January and lasting 3 months (Kennedy *et al.* 1977). Individual females may spawn three or more times in one season. Peak spawning activity seems to occur monthly and coincides with the full moon (Kennedy *et al.* 1977).

Development, growth and movement patterns

Kennedy *et al.* (1977) found rock shrimp larvae to be present year round with no trend relative to depth, temperature, salinity, and length or moon phase. The development from egg to postlarvae takes approximately one month. Subsequently the development from postlarvae to the smallest mode of recruits takes two to three months.

For rock shrimp the development from egg to postlarvae takes approximately one month. Subsequently, the development from postlarvae to the smallest mode of recruits takes two to three months. The major transport mechanism affecting planktonic larval rock shrimp is the shelf current systems near Cape Canaveral, Florida (Bumpus 1973). These currents keep larvae on the Florida Shelf and may transport them inshore during spring. Recruitment to the area offshore of Cape Canaveral occurs between April and August with two or more influxes of recruits entering within one season (Kennedy *et al.* 1977).

Rates of growth in rock shrimp are variable and depend on factors such as season, water temperature, shrimp density, size, and sex. Rock shrimp grow about 2 to 3 millimeters CL (0.08-0.1 inches) per month as juveniles and 0.5 - 0.6 millimeters CL (0.02 inches) per month as adults (Kennedy *et al.* 1977).

Density is thought to also affect growth of rock shrimp. In 1993, the industry indicated that rock shrimp were abundant but never grew significantly over 36/40, the predominant count that was harvested during July and August of that year. During years of low densities, the average size appears to be generally larger.

Since rock shrimp live between 20 and 22 months, natural mortality rates are very high, and with fishing, virtually the entire year class will be dead at the end of the season. The intense fishing effort that exists in today's fishery, harvests exclusively the incoming year class. Three year classes were present in sampling conducted between 1973 and 1974 by Kennedy *et al.* (1977). Fishing mortality in combination with high natural mortality and possibly poor environmental conditions may be high enough to prevent any significant escapement of adults to constitute a harvestable segment of the population. The better than average rock shrimp production in the

1996 season possibly resulted from better environmental conditions more conducive to rock shrimp reproduction and spawning.

Ecological relationships

Along the Florida Atlantic coast, the predominant substrate inside of 200 m depth is fine to medium sand with small patches of silt and clay (Milliman 1972). Juvenile and adult rock shrimp are bottom feeders. Rock shrimp are most active at night (Carpenter 2002). Stomach contents analyses indicated that rock shrimp primarily feed on small bivalve mollusks and decapod crustaceans (Cobb *et al.* 1973). Kennedy *et al.* (1977) found the relative abundance of particular crustaceans and mollusks in stomach contents of rock shrimp corresponding to their availability in the surrounding benthic habitat. The diet of rock shrimp consists primarily of mollusks, crustaceans, and polychaete worms. Also included are nematodes and foraminiferans. Ostracods, amphipods, and decapods made up the bulk of the diet, with lesser amounts of tanaidaceans, isopods, cumaceans, gastropods, and other bivalves also present (Kennedy *et al.* 1977).

Kennedy *et al.* (1977) characterized rock shrimp habitat and compiled a list of crustacean and molluscan taxa associated with rock shrimp benthic habitat. The bottom habitat on which rock shrimp thrive is limited and thus limits the depth distribution of these shrimp. Cobb *et al.* (1973) found the inshore distribution of rock shrimp to be associated with terrigenous and biogenic sand substrates and only sporadically on mud. Rock shrimp also utilize hardbottom and coral, more specifically *Oculina,* habitat areas. This was confirmed with research trawls capturing large amounts of rock shrimp in and around the Oculina Bank HAPC prior to its designation.

Abundance and status of stocks

For stocks such as rock shrimp, information from which to establish stock status determination criteria is limited to measures of catch. Nevertheless, with the changes to the permitting system and new reporting requirements established in Amendment 7 to the Shrimp Plan (SAFMC 2008c), better information is collected on the effort and catch in this fishery. Data should be reviewed periodically to determine if better inferences can be drawn to address $B_{MSY.}$ Additionally, any time that annual catch levels trigger one of the selected thresholds, new effort should be made to infer B_{MSY} or a reasonable proxy.

Stock status determination criteria for rock shrimp were calculated from catch estimates as reported in Amendment 1 of the Shrimp Plan (SAFMC 1996a) during the period 1984-1996 (**Table 3-1**).

Table 3-1. Landings (pounds) data used to calculate the current MSY value for rock shrimp in the South Atlantic.

Year	Landings
1986	2,514,895
1987	3,223,692
1988	1,933,097
1989	3,964,942
1990	3,507,955
1991	1,330,919
1992	2,572,727
1993	5,297,197
1994	6,714,761

Note: Data for the period 1986 to 1994 are taken from Shrimp Amendment 1 (SAFMC 1996a).

Maximum Sustainable Yield -- Because rock shrimp live only 20 to 22 months, landings fluctuate considerably from year to year depending primarily on environmental factors. Although there is a good historical time series of catch data, the associated effort data were not considered adequate to calculate a biologically realistic value for MSY. Nevertheless, two standard deviations above the mean total landings was considered to be a reasonable proxy for MSY (SAFMC 1996a). The MSY proxy for rock shrimp, based on the state data from 1986 to 1994, is 6,829,449 pounds heads on (SAFMC 1996a).

Optimum Yield -- OY is equal to MSY. The intent is to allow the amount of harvest that can be taken by U.S. fishermen without reducing the spawning stock below the level necessary to ensure adequate reproduction. This is appropriate for an annual crop like rock shrimp when recruitment is dependent on environmental conditions rather than female biomass. A relatively small number of mature shrimp can provide sufficient recruits for the subsequent year's production (SAFMC 1996a).

Overfished Definition -- The South Atlantic rock shrimp resource is overfished when annual landings exceed a value two standard deviations above mean landings during 1986 to 1994 (mean=3,451,132 pounds., s.d. =1,689,159), or 6,829,449 pounds heads on (SAFMC 1996a). In other words, the stock would be overfished if landings exceeded MSY. The status of rock shrimp stocks in the South Atlantic are not considered overfished at this time. High fecundity enables rock shrimp to rebound from a very low population size in one year to a high population size in the next when environmental conditions are favorable (SAFMC 1996a).

Overfishing Definition -- There is no designation of overfishing for rock shrimp. The overfished definition, which is based on landings (and fishing effort) in excess of average catch is, in essence, an overfishing definition.

For further information on rock shrimp, see Shrimp Amendment 7 (SAFMC 2008c).

Royal Red Shrimp

Description and distribution

Royal red shrimp, *Pleoticus robustus* (**Figure 3-3**) are members of the family Solenoceridae, and are characterized by a body covered with short hair and a rostrum with the ventral margin toothless. Color can range from orange to milky white. Royal red shrimp are found on the continental slope throughout the Gulf of Mexico and South Atlantic area from Cape Cod to French Guiana. In the South Atlantic they are found in large concentrations primarily off northeast Florida. They inhabit the upper regions of the continental slope from 180 meters (590 feet) to about 730 meters (2,395 feet), but concentrations are usually found at depths of between 250 meters (820 feet). Royal red shrimp are not burrowers but dig grooves in the substrate in search of small benthic organisms (Carpenter 2002). They have been commercially harvested in a relatively limited capacity. Royal red shrimp are not included in the Fishery Management Unit for the Shrimp FMP of the South Atlantic because no management measures were being proposed for the species when the FMP was developed.

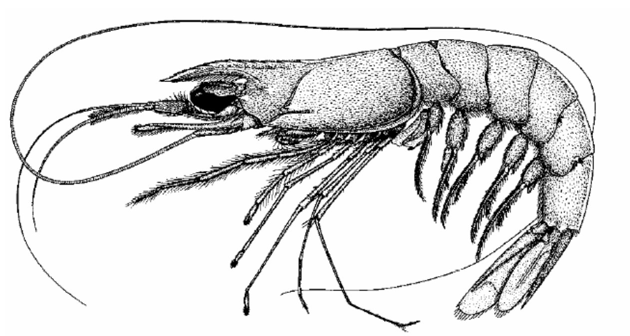


Figure 3-3. Royal red shrimp, *Pleoticus robustus.*
(Perez-Farfante 1969)

Reproduction

Anderson and Lindner (1975), in a study off the east coast of Florida, stated that males mature at 125 millimeters (5 inches) total length (TL), while females mature at 155 millimeters (6 inches) TL. Based on examination of ovaries they determined that peak spawning off that area is during winter and spring, although some spawning occurs throughout the year. Mating is similar to penaeid shrimp, with the male placing a relatively large spermatophore on the female's thelycum (Perez-Farfante 1977).

Development, growth and movement patterns

Larvae of this species are unknown (Anderson and Lindner 1975), although several developmental stages have been described for the closest related species, *Pleoticus muelleri*, which occurs in much shallower depths off Brazil and Argentina (Scelzo and Boschi 1975). Anderson and Lindner (1975) collected no shrimp smaller than 55 millimeters (2 inches) TL, and concluded that royal red shrimp do not fully recruit to fishing gear until age 2. They surmised that this species can live up to 5 years. Movement appears restricted to the above mentioned depth ranges.

Ecological relationships

Other than bottom type preferences mentioned above, little published information exists on ecological relationships. Gut content studies on the shrimp and identification of potential predators in their habitat could elucidate trophic relationships.

Abundance and status of stocks

Other than the study by Anderson and Lindner (1975), little fishery-independent information exists on *Pleoticus robustus* in the south Atlantic, therefore abundance must be estimated from reported fisheries landings. Landings in this region have averaged approximately 225,000 pounds over the last 5 years. Concerns over overfishing a relatively long-lived species have led to conservative catch limits in the Gulf of Mexico fishery (GMFMC 1995), and similar constraints should be observed in the south Atlantic, until estimates of abundance and sustainable yield can be made.

3.2.3 Snapper Grouper

The snapper grouper fishery management unit currently contains 73 species of fish, many of them neither "snappers" nor "groupers".   These species live in depths from a few feet (typically as juveniles) to hundreds of feet. As far as north/south distribution, the more temperate species tend to live in the upper reaches of the South Atlantic management area (black sea bass, red grouper) while the tropical variety's core residence is in the waters off south Florida waters, Caribbean Islands, and northern South America (black grouper, mutton snapper).

These are reef-dwelling species that live amongst each other. These species rely on the reef environment for protection and food. There are several reef tracts that follow the southeastern coast. The fact that these fish populations congregate together dictates the nature of the fishery (multi-species) and further forms the type of management regulations proposed in this amendment.

Snapper grouper species commonly taken with red grouper could be affected by actions in this amendment. Snapper grouper species most likely to be affected by the proposed actions include many species that occupy the same habitat at the same time. Therefore, snapper grouper species are likely to be caught when regulated since they will be incidentally caught when fishermen target other co-occurring species.

3.2.4 Protected Species

There are 31 different species of marine mammals that may occur in the EEZ of the South Atlantic region. All 31 species are protected under the Marine Mammal Protection Act (MMPA) and six are also listed as endangered under the ESA (i.e., sperm, sei, fin, blue, humpback, and

North Atlantic right whales). In addition to those six marine mammals, five species of sea turtle, the smalltooth sawfish, five distinct population segments (DPSs) of Atlantic sturgeon, and two *Acropora* coral species (elkhorn [*Acropora palmata*] and staghorn [*A. cervicornis*]) are protected under the ESA. Portions of designated critical habitat for North Atlantic right whales and *Acropora* corals also occur within the South Atlantic Council's jurisdiction. Descriptions of the life history characteristics of the protected species can be found in the FEP (SAMFC 2009b) and in Comprehensive ACL Amendment (SAFMC 2011c), and are herein incorporated by reference.

Table 3-2. Species listed as endangered or threatened under the ESA, along with any designated critical habitat(s) in the action area. A review of the species' biology, population status, distribution, and on-going threats is provided in order to evaluate potential effects of the fishery and proposed action(s) on the listed species, as required by Section 7 of the ESA.

Potentially Affected ESA-Listed Species Under NOAA Fisheries Service's Purview		
Marine mammals	Scientific Name	Status
Blue whale	*Balaenoptera musculus*	Endangered
Humpback whale	*Megaptera novaeangliae*	Endangered
Fin whale	*Balaenoptera physalus*	Endangered
North Atlantic right whale	*Eubalaena glacialis*	Endangered
Sei whale	*Balaenoptera borealis*	Endangered
Sperm whale	*Physeter macrocephalus*	Endangered
Sea Turtles	Scientific Name	Status
Green sea turtle	*Chelonia mydas*	Endangered/Threatened *
Hawksbill sea turtle	*Eretmochelys imbricata*	Endangered
Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Loggerhead sea turtle	*Caretta caretta*	Threatened**
Kemp's ridley sea turtle	*Lepidochelys kempii*	Threatened
Invertebrates		
Elkhorn coral	*Acropora palmata*	Threatened
Staghorn coral	*Acropora cervicornis*	Threatened
Fish	Scientific Name	Status
Smalltooth sawfish	*Pristis pectinata*	Endangered ***
Atlantic sturgeon	*Acipenser oxyrinchus*	Endangered/Threatened ****
Critical Habitat		
Elkhorn and staghorn coral		
North Atlantic right whale		
*Green sea turtles in U.S. waters are listed as threatened except for the Florida breeding population, which is listed as endangered. **The Northwest Atlantic distinct population segment (DPS). ***The United States DPS. *** The New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs are listed as endangered; the Gulf of Maine DPS is listed as threatened.		
Potentially Affected ESA-Listed Species Under U.S. Fish and Wildlife Service (USFWS) Purview		
Birds	Scientific Name	Status
Bermuda Petrel	*Pterodrama cahow*	Endangered
Roseate Tern	*Sterna dougallii*	Endangered*****
***** North American populations federally listed under the ESA: endangered on Atlantic coast south to NC, threatened elsewhere.		

ESA-Listed Sea Turtles
Green, hawksbill, Kemp‘s ridley, leatherback, and the NW Atlantic DPS of loggerhead sea turtles are all highly migratory and travel widely throughout the South Atlantic. The following sections are a brief overview of the general life history characteristics of the sea turtles found in the South Atlantic region. Several volumes exist that cover more thoroughly the biology and ecology of these species (i.e., Lutz and Musick (eds.) 1997, Lutz *et al.* (eds.) 2002).

Green sea turtle hatchlings are thought to occupy pelagic areas of the open ocean and are often associated with *Sargassum* rafts (Carr 1987, Walker 1994). Pelagic stage green sea turtles are thought to be carnivorous. Stomach samples of these animals found ctenophores and pelagic snails (Frick 1976, Hughes 1974). At approximately 20 to 25 centimeters (8-10 inches) carapace length, juveniles migrate from pelagic habitats to benthic foraging areas (Bjorndal 1997). As juveniles move into benthic foraging areas a diet shift towards herbivory occurs. They consume primarily seagrasses and algae, but are also know to consume jellyfish, salps, and sponges (Bjorndal 1980, 1997; Paredes 1969; Mortimer 1981, 1982). The diving abilities of all sea turtles species vary by their life stages. The maximum diving range of green sea turtles is estimated at 110 meters (360 feet) (Frick 1974), but they are most frequently making dives of less than 20 meters (65 feet) (Walker 1994). The time of these dives also varies by life stage. The maximum dive length is estimated at 66 minutes with most dives lasting from 9 to 23 minutes (Walker 1994).

The **hawksbill’s** pelagic stage lasts from the time they leave the nesting beach as hatchlings until they are approximately 22-25 centimeters (8-10 inches) in straight carapace length (Meylan 1988, Meylan and Donnelly 1999). The pelagic stage is followed by residency in developmental habitats (foraging areas where juveniles reside and grow) in coastal waters. Little is known about the diet of pelagic stage hawksbills. Adult foraging typically occurs over coral reefs, although other hard-bottom communities and mangrove-fringed areas are occupied occasionally. Hawksbills show fidelity to their foraging areas over several years (van Dam and Diéz 1998). The hawksbill‘s diet is highly specialized and consists primarily of sponges (Meylan 1988). Gravid females have been noted ingesting coralline substrate (Meylan 1984) and calcareous algae (Anderes Alvarez and Uchida 1994), which are believed to be possible sources of calcium to aid in eggshell production. The maximum diving depths of these animals are not known, but the maximum length of dives is estimated at 73.5 minutes. More routinely, dives last about 56 minutes (Hughes 1974).

Kemp’s ridley hatchlings are also pelagic during the early stages of life and feed in surface waters (Carr 1987, Ogren 1989). Once the juveniles reach approximately 20 centimeters (8 inches) carapace length they move to relatively shallow (less than 50 meters; 164 feet.) benthic foraging habitat over unconsolidated substrates (Márquez-M. 1994). They have also been observed transiting long distances between foraging habitats (Ogren 1989). Kemp‘s ridleys feeding in these nearshore areas primarily prey on crabs, though they are also known to ingest mollusks, fish, marine vegetation, and shrimp (Shaver 1991). The fish and shrimp Kemp‘s ridleys ingest are not thought to be a primary prey item but instead may be scavenged opportunistically from bycatch discards or from discarded bait (Shaver 1991). Given their predilection for shallower water, Kemp‘s ridleys most routinely make dives of 50 m or less

(Soma 1985, Byles 1988). Their maximum diving range is unknown. Depending on the life stage Kemp‘s ridleys may be able to stay submerged anywhere from 167 minutes to 300 minutes, though dives of 12.7 minutes to 16.7 minutes are much more common (Soma 1985, Mendonca and Pritchard 1986, Byles 1988). Kemp‘s ridleys may also spend as much as 96% of their time underwater (Soma 1985, Byles 1988).

Leatherbacks are the most pelagic of all ESA-listed sea turtles and spend most of their time in the open ocean although they will enter coastal waters and are seen over the continental shelf on a seasonal basis to feed in areas where jellyfish are concentrated. Leatherbacks feed primarily on cnidarians (medusae, siphonophores) and tunicates. Unlike other sea turtles, leatherbacks‘ diets do not shift during their life cycles. Because leatherbacks‘ ability to capture and eat jellyfish is not constrained by size or age, they continue to feed on these species regardless of life stage (Bjorndal 1997). Leatherbacks are the deepest diving of all sea turtles. It is estimated that these species can dive in excess of 1000 meters (Eckert *et al.* 1989) but more frequently dive to depths of 50 to 84 meters (Eckert *et al.* 1986). Dive times range from a maximum of 37 minutes to more routines dives of 4 to 14.5 minutes (Standora *et al.* 1984, Eckert *et al.* 1986, Eckert *et al.* 1989, Keinath and Musick 1993). Leatherbacks may spend 74% to 91% of their time submerged (Standora *et al.* 1984).

Loggerhead hatchlings forage in the open ocean and are often associated with *Sargassum* rafts (Hughes 1974, Carr 1987, Walker 1994, Bolten and Balazs 1995). The pelagic stage of these sea turtles are known to eat a wide range of things including salps, jellyfish, amphipods, crabs, syngnathid fish, squid, and pelagic snails (Brongersma 1972). Stranding records indicate that when pelagic immature loggerheads reach 40-60 centimeters (16-23 inches) straight-line carapace length they begin to live in coastal inshore and nearshore waters of the continental shelf throughout the U.S. Atlantic (Witzell 2002). Here they forage over hard- and soft-bottom habitats (Carr 1986). Benthic foraging loggerheads eat a variety of invertebrates with crabs and mollusks being an important prey source (Burke *et al.* 1993). Estimates of the maximum diving depths of loggerheads range from 211 to 233 meters (692-764 feet.) (Thayer *et al.* 1984, Limpus and Nichols 1988). The lengths of loggerhead dives are frequently between 17 and 30 minutes (Thayer *et al.* 1984, Limpus and Nichols 1988, Limpus and Nichols 1994, Lanyan *et al.* 1989) and they may spend anywhere from 80 to 94% of their time submerged (Limpus and Nichols 1994, Lanyan *et al.* 1989).

ESA-Listed Marine Fish

The historical range of the **smalltooth sawfish** in the U.S. ranged from New York to the Mexico border. Their current range is poorly understood but believed to have contracted from these historical areas. In the South Atlantic region, they are most commonly found in Florida, primarily off the Florida Keys (Simpfendorfer and Wiley 2004). Only two smalltooth sawfish have been recorded north of Florida since 1963 (the first was captured off North Carolina in 1999 (Schwartz 2003) and the other off Georgia 2002 [Burgess unpublished data]). Historical accounts and recent encounter data suggest that immature individuals are most common in shallow coastal waters less than 25 meters (Bigelow and Schroeder 1953, Adams and Wilson 1995), while mature animals occur in waters in excess of 100 meters (Simpfendorfer pers. comm. 2006). Smalltooth sawfish feed primarily on fish. Mullet, jacks, and ladyfish are believed

to be their primary food resources (Simpfendorfer 2001). Smalltooth sawfish also prey on crustaceans (mostly shrimp and crabs) by disturbing bottom sediment with their saw (Norman and Fraser 1938, Bigelow and Schroeder 1953).
NMFS convened the Smalltooth Sawfish Recovery Team, comprising sawfish scientists, managers, and environmental managers, to develop a plan to recover the U.S. distinct population segment (DPS) of smalltooth sawfish. The plan recommends specific steps to recover the DPS, focusing on reducing fishing impacts, protecting important habitats, and educating the public. The draft recovery plan was made available for public comment in August 2006 and can be found at www.nmfs.noaa.gov.

On May 1, 2009, the Southeast Regional Office, Sustainable Fisheries Division, requested reinitiation of the Endangered Species Act Section 7 consultation on the South Atlantic shrimp fishery and its effects on smalltooth sawfish because the amount of authorized incidental take for smalltooth sawfish had been exceeded. The most recent biological opinion on shrimp fishing under the Shrimp Fishery Management Plan for the South Atlantic, completed on February 25, 2005, concluded the continued authorization of the South Atlantic shrimp fishery is not likely to jeopardize the continued existence of smalltooth sawfish. An incidental take statement was issued authorizing the annual incidental lethal take of up to one smalltooth sawfish. A smalltooth sawfish take was observed in a shrimp trawl in the South Atlantic exclusive economic zone (EEZ) on July 26, 2008. It was in poor condition and believed not to have survived the interaction. Three additional smalltooth sawfish were observed taken in a shrimp trawls in the South Atlantic EEZ during a fishing trip from March 5-9, 2009. One of the smalltooth sawfish is thought to have died from the interaction; the other two were released alive and assumed to have survived.

Under the Endangered Species Act (ESA), it is illegal to catch or harm an endangered sawfish. However, some fishermen catch sawfish incidentally while fishing for other species. NMFS and the Smalltooth Sawfish Recovery Team have developed guidelines to fishermen telling them how to safely handle and release any sawfish they catch.

Five separate distinct population segments (DPSs) of the **Atlantic sturgeon** (*Acipenser oxyrinchus oxyrinchus*) were listed under the ESA effective April 6, 2012 (76 FR 5914; February 12, 2012). From north to south, the DPSs are the Gulf of Maine, New York Bight, Chesapeake Bay, Carolina, and South Atlantic (**Figure 3-4**). The New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs are listed as endangered, and the Gulf of Maine DPS is listed as threatened. The five DPSs were listed under the ESA as a result of threats from a combination of habitat curtailment and modification, overutilization (i.e., being taken as bycatch) in commercial fisheries, and the inadequacy of regulatory mechanisms in ameliorating these impacts and threats.

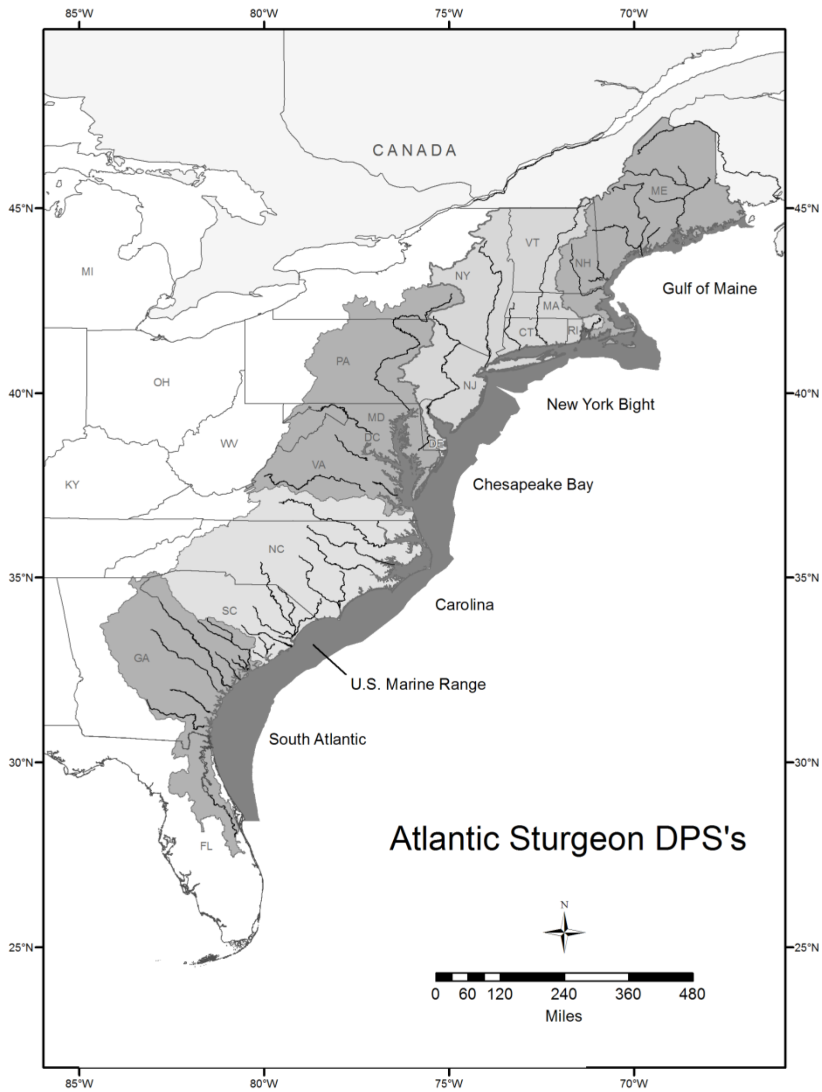


Figure 3-4. Map Depicting the Five DPSs of Atlantic sturgeon

Atlantic sturgeon are long-lived, estuarine dependent, anadromous[1] fish (Bigelow and Schroeder 1953, Vladykov and Greeley 1963, Mangin 1964, Pikitch et al. 2005, Dadswell 2006, ASSRT 2007), that historically occurred from Labrador south to the St. Johns River, Florida. Generally, Atlantic sturgeon use coastal bays, sounds, and ocean waters in depths less than 132 ft (Vladykov and Greeley 1963, Murawski and Pacheco 1977, Dovel and Berggren 1983, Smith 1985, Collins and Smith 1997, Welsh et al. 2002, Savoy and Pacileo 2003, Stein et al. 2004, USFWS 2004, Laney et al. 2007, Dunton et al. 2010, Erickson et al. 2011, Wirgin and King 2011), where they feed on a variety of benthic invertebrates and fish (Bigelow and Schroeder 1953, ASSRT 2007, Guilbard et al. 2007, Savoy 2007). Mature Atlantic sturgeon make spawning migrations from estuarine waters to rivers as water temperatures reach 43ºF for males (Smith et al. 1982, Dovel and Berggren 1983, Smith 1985, ASMFC 2009) and 54ºF for females

[1] Anadromous refers to a fish that is born in freshwater, spends most of its life in the sea, and returns to freshwater to spawn (NEFSC FAQ's, available at http://www.nefsc.noaa.gov/faq/fishfaq1a.html, modified June 16, 2011)

(Dovel and Berggren 1983, Smith 1985, Collins et al. 2000a), typically between February (southern systems) and July (northern systems). Individuals spawn at intervals of once every 1-5 years for males and once every 2-5 years for females. Spawning is believed to occur in flowing water between the salt front of estuaries and the fall line of large rivers, when and where optimal flows are 18-30 in/s and depths are 36-89 ft (Borodin 1925, Dees 1961, Leland 1968, Scott and Crossman 1973, Crance, 1987, Shirey et al. 1999, Bain et al. 2000, Collins et al. 2000a, Caron et al. 2002, Hatin et al. 2002, ASMFC 2009). Females may produce 400,000 to 4 million eggs per spawning year (Vladykov and Greeley 1963, Smith et al., 1982, Van Eenennaam et al. 1996, Van Eenennaam and Doroshov 1998, Stevenson and Secor 1999, Dadswell 2006) and deposit eggs on hard bottom substrate such as cobble, coarse sand, and bedrock (Dees 1961, Scott and Crossman 1973, Gilbert 1989, Smith and Clugston 1997, Bain et al. 2000, Collins et al. 2000a, Caron et al. 2002, Hatin et al. 2002, Mohler, 2003, ASMFC 2009). Upon hatching, studies suggest that early juvenile Atlantic sturgeon (age-0 [i.e., YOY], age-1, and age-2) remain in low salinity waters of their natal estuaries (Haley 1999, Hatin et al. 2007, McCord et al. 2007, Munro et al. 2007) for months to years before emigrating to open ocean as subadults (Holland and Yelverton 1973, Dovel and Berggen 1983, Waldman et al. 1996, Dadswell 2006, ASSRT 2007). Growth rates and age at maturity are both influenced by water temperature, as Atlantic sturgeon grow larger and mature faster in warmer waters. Atlantic sturgeon may live up to 60 years, reach lengths up to 14 feet and weigh over 800 lbs. Tagging studies and genetic analyses (Wirgin et al. 2000, King et al. 2001, Waldman et al. 2002, ASSRT 2007, Grunwald et al. 2008) indicate that Atlantic sturgeon exhibit ecological separation during spawning throughout their range that has resulted in multiple, genetically distinct, interbreeding population segments.

The construction of dams, dredging, and modification of water flows have reduced the amount and quality of habitat available for Atlantic sturgeon spawning and foraging. Water quality (temperature, salinity, and dissolved oxygen) has also been reduced by terrestrial activities, leading to further declines in available spawning and nursery habitat. Although spawning historically occurred within many Atlantic coast rivers, only 16 U.S. rivers are known to currently support spawning based on available evidence (i.e., presence of YOY or gravid Atlantic sturgeon documented within the past 15 years) (ASSRT 2007).

Overutilization of Atlantic sturgeon from directed fishing caused initial severe declines in Atlantic sturgeon populations in the Southeast, from which they have never recovered. Although directed harvest of this species has ceased, Atlantic sturgeon continue to be incidentally caught as bycatch in other commercial fisheries. Because Atlantic sturgeon mix extensively in marine waters and may utilize multiple river systems for nursery and foraging habitat in addition to their natal spawning river, they are subject to being caught in multiple fisheries throughout their range. Additionally, Atlantic sturgeon are more sensitive to bycatch mortality because they are a long-lived species, have an older age at maturity, have lower maximum fecundity values, and a large percentage of egg production occurs later in life. Based on these life history traits, Boreman (1997) calculated that Atlantic sturgeon can only withstand the annual loss of up to five percent of their population to bycatch mortality without suffering population declines. Mortality rates of Atlantic sturgeon taken as bycatch in various types of fishing gear range between 0-51 percent, with the greatest mortality occurring in sturgeon caught by sink gillnets. While many of the threats to the Atlantic sturgeon have been ameliorated or reduced due to the existing regulatory mechanisms, such as the moratorium on directed fisheries for Atlantic sturgeon, bycatch is currently not being addressed through existing mechanisms.

The recovery of Atlantic sturgeon along the Atlantic Coast, especially in areas where habitat is limited and water quality is severely degraded, will require improvements in the following areas: (1) elimination of barriers to spawning habitat either through dam removal, breaching, or installation of successful fish passage facilities; (2) operation of water control structures to provide appropriate flows, especially during spawning season; (3) imposition of dredging restrictions including seasonal moratoriums and avoidance of spawning/nursery habitat; and, (4) mitigation of water quality parameters that are restricting sturgeon use of a rivers (i.e., DO). Stronger regulatory mechanisms may likely aid in achieving these improvements. These regulatory mechanisms may also aid in reducing bycatch mortality in commercial fisheries, again assisting in the recovery of the species.

ESA-Listed Marine Invertebrates

Elkhorn (*Acropora palmata)* and staghorn (*A. cervicornis*) coral were listed as threatened under the ESA on May 9, 2006. The Atlantic *Acropora* Status Review (*Acropora* Biological Review Team 2005) presents a summary of published literature and other currently available scientific information regarding the biology and status of both these species.

Elkhorn and **staghorn** corals are two of the major reef-building corals in the wider Caribbean. In the South Atlantic region, they are found most commonly in the Florida Keys; staghorn coral occurs the furthest north with colonies documented off Palm Beach, Florida (26°3'N). The depth range for these species ranges from <1 meter (3 feet) to 60 meters (197 feet). The optimal depth range for elkhorn is considered to be 1 to 5 meters (3-16 feet) depth (Goreau and Wells 1967), while staghorn corals are found slightly deeper, 5 to 15 meters (16-49 feet) (Goreau and Goreau 1973).

All Atlantic *Acropora* species (including elkhorn and staghorn coral) are considered to be environmentally sensitive, requiring relatively clear, well-circulated water (Jaap *et al.* 1989). Optimal water temperatures for elkhorn and staghorn coral range from 25° to 29°C (77-84°F) (Ghiold and Smith 1990, Williams and Bunkley-Williams 1990). Both species are almost entirely dependent upon sunlight for nourishment, contrasting the massive, boulder-shaped species in the region (Porter 1976, Lewis 1977) that are more dependent on zooplankton. Thus, Atlantic *Acropora* species are much more susceptible to increases in water turbidity than some other coral species.

Fertilization and development of elkhorn and staghorn corals is exclusively external. Embryonic development culminates with the development of planktonic larvae called planulae (Bak *et al.* 1977, Sammarco 1980, Rylaarsdam 1983). Unlike most other coral larvae, elkhorn and staghorn planulae appear to prefer to settle on upper, exposed surfaces, rather than in dark or cryptic ones (Szmant and Miller 2006), at least in a laboratory setting. Studies of elkhorn and staghorn corals indicated that larger colonies of both species had higher fertility rates than smaller colonies (Soong and Lang 1992).

Species of Concern

NOAA Fisheries Service has created a list of Species of Concern as a publicly available list identifying other species of concern. These are species about which NMFS has some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the ESA. NMFS uses the list to draw proactive attention and conservation action to these species. No federal mandate protects species of concern under the ESA although voluntary protection of these species is urged. To date, no incidental capture of any of these species has been reported in the shrimp fishery in the South Atlantic region.

<u>List of Marine Species of Concern in the Southeastern United States</u>
Alwife herring **Alosa pseudoharengus**
Atlantic bluefin tuna **Thunnus thynnus**
Blueback herring **Alosa aestivalis**
Dusky shark *Carcharhinus obscurus*
Sand tiger shark *Odontaspis taurus*
Speckled hind *Epinephelus drummondhayi*
Warsaw grouper *Epinephelus nigritus*
Nassau grouper *Epinephelus striatus*
Ivory Tree Coral *Oculina varicosa*

3.3 Human Environment

3.3.1 Economic Description of the Commercial Fishery

3.3.1.4 Economic Activity

3.3.2 Economic Description of the Recreational Fishery

3.3.2.1 Harvest

3.3.2.2 Effort

3.3.2.3 Permits

3.3.2.4 Economic Value and Expenditures

3.4 Social and Cultural Environment

The proposed actions in this amendment may affect fishermen and communities associated with the snapper grouper fishery and the deepwater shrimp fisheries. Communities associated with each of the fisheries are described in the sections below and previous amendments with detailed descriptions of social environments of these fisheries are incorporated as references. The fishing restrictions for the HAPCs included in this amendment are also described in order to provide context.

Although fishing for dolphin-wahoo and coastal migratory pelagic species may occur in areas that could be impacted by the proposed actions of this amendment, fishermen for these species should not be impacted by the actions in this amendment.

This amendment includes proposed changes for Oculina Bank HAPC, the Stetson-Miami Terrace CHAPC, and the Cape Lookout CHAPC. HAPC fishing restrictions include the prohibition of anchoring or using grapples; trawling, using fish traps, or bottom-longlines; fishing for or possession of rock shrimp; and possession of coral or bottom habitat. The Oculina Experimental Closed Area (located within in the Oculina Bank HAPC) includes additional restrictions including the prohibition of fishing for or possession of snapper or grouper species. All snapper or grouper taken incidentally by hook and line gear must be released immediately by cutting the line without removing the fish from water.

In general, the people who may be directly affected by the proposed regulations include captain and crew of commercial and for-hire vessels, vessel owners, recreational anglers, and coastal communities. In addition to regulatory change, individuals who may be affected by proposed actions also live and work in an environment with natural, economic, social and political dynamics.

Coastal growth and development affects many coastal communities, especially those with either or both commercial and recreational working waterfronts. The rapid disappearance of these types of waterfronts has important implications as the disruption of various types of fishing-related businesses and employment. The process of "gentrification," which tends to push those of a lower socio-economic class out of traditional communities as property values and taxes rise has become common along coastal areas of the U.S. and around the world. Working waterfronts tend to be displaced with development that is often stated as the "highest and best" use of waterfront property, but often is not associated with water-dependent occupations. However, with the continued removal of these types of businesses over time the local economy becomes less diverse and more reliant on the service sector and recreational tourism. As home values increase, people within lower socio-economic strata find it difficult to live within these communities and eventually must move. Consequently they spend more time and expense commuting to work, if jobs continue to be available. Newer residents often have no association with the water-dependent employment and may see that type of work and its associated infrastructure as unappealing. They often do not see the linkage between those occupations and the aesthetics of the community that produced the initial appeal for many migrants. The demographic trends within counties can provide some indication as to whether these types of coastal change may be occurring if an unusually high rate of growth or change in the demographic character of the population is present. A rise in education levels, property values, fewer owner occupied properties and an increase in the median age can at times indicate a growing process of gentrification (Colburn and Jepson 2012). Demographic profiles of coastal communities can be found in the Comprehensive Annual Catch Limit Amendment (SAFMC 2011c).

3.4.1 Fishing Communities

The communities displayed in the figures in Sections 3.4.2-3 below represent a categorization of communities based upon their commercial landings. When possible, the overall value of local commercial landings divided by the overall value of commercial landings referred to as a "regional quotient" (RQ) was examined. For confidentially reasons this RQ measure could not be displayed for all fisheries. Instead, the top communities by total landings by pounds were examined for those species with confidentiality issues. These data were assembled from the accumulated landings system which includes all species from both state and federal waters landed in 2010. For the RQ analysis, all communities were ranked on this "RQ" and divided by those who were above the mean and those below. This breakdown of fisheries involvement is similar to the how communities were categorized in the community profiling of South Atlantic fishing communities (Jepson *et al*. 2005). However, the categorization within the community profiles included other aspects associated with fishing such as infrastructure and other measures to determine a community's status with regard to reliance upon fishing.

The social vulnerability index (SoVI) was created to understand social vulnerability of communities to coastal environmental hazards and can also be interpreted as a general measure of vulnerability to other social disruptions, such as adverse regulatory change or manmade hazards. Detailed information about the SoVI can be found in Comprehensive ACL Amendment (SAFMC 2011c). High social vulnerability does not necessarily mean that there will be adverse effects of proposed actions in this amendment, only that there may be a potential for adverse effects under the right circumstances. Fishing communities in these counties may have more difficulty adjusting to regulatory changes if those impacts affect employment or other critical social capital. The SoVI for counties in each state is illustrated in the maps in Sections 3.4.4-7.

3.4.2 Snapper Grouper Fishing Communities

Some historical fishing areas or anchoring areas for snapper grouper could be impacted by the proposed actions in this amendment.

A detailed description of the social environment of the snapper grouper fishery is included in the Comprehensive ACL Amendment (SAFMC 2011c) and is incorporated herein by reference.

Figure 3-5 presents the top communities based upon a regional quotient of combined commercial landings and value for all snapper grouper species in the South Atlantic snapper grouper complex. There were 154 communities with snapper grouper landings but the 11 communities included in **Figure 3-5** were those with Pounds RQ larger than 3 percent. Therefore, because so many communities have snapper grouper landings, many had low RQs and are not included in the figure. There are also communities that have high landings of a particular species, such as black sea bass in Sneads Ferry, NC, or golden tilefish in Port Orange, FL.

Key West, FL, has the highest landings of combined snapper grouper species, followed by Murrell's Inlet, SC, and Miami FL. No Georgia communities made up more than 3% of the snapper grouper landings.

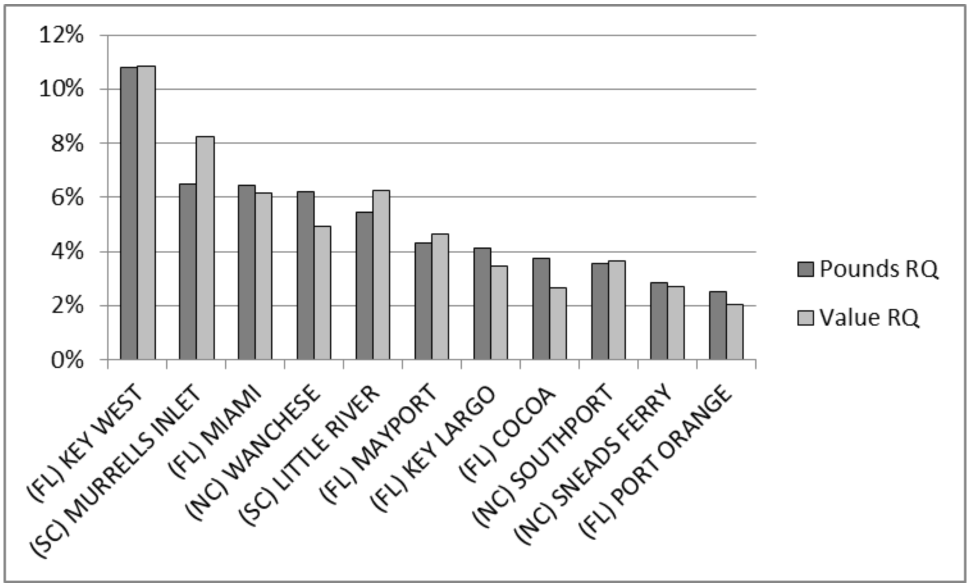


Figure 3-5. The top eleven South Atlantic communities ranked by Pounds and Value Regional Quotient (RQ) of Snapper Grouper species. Only communities with Pounds RQ larger than 3% were included. Data source: ALS 2010.

The recreational sector of the snapper grouper fishery is very important throughout the region, and recreational landings estimate vary depending on the region and species. Black sea bass, tilefish, vermilion snapper, silk snapper, red grouper, black grouper and gray triggerfish are some of the more important species for private recreational anglers.

The for-hire recreational fleet is also important in each state, and there is a federal charter permit required for snapper grouper. The distribution of charter permits at the county level is included in Sections 3.4.4-7. Overall, Florida has the largest number of charter permits (**Table 3-4**). The primary communities in North Carolina are part of Dare County, New Hanover County, Brunswick County, and Carteret County. Communities in South Carolina with significant for-hire fleets are in Charleston County and Horry County, and in Georgia most of the permits are associated with communities in Chatham County and Glynn County. In Florida, almost half of the permits are from Monroe County, and a majority of the permits are associated with communities in south Florida (Brevard, Palm Beach and Miami-Dade Counties).

Table 3-4. Federal snapper grouper charter permits in the South Atlantic region (2012).

State	Number of Snapper Grouper Charter Permits
North Carolina	253
South Carolina	105

Georgia	25
Florida	641
TOTAL	**1,024**

3.4.3 Deepwater Shrimp Fishing Communities

Deepwater shrimp (rock shrimp and royal red shrimp) are harvested in areas which might be impacted by the proposed actions in this amendment (see **Figures S-2, S-4, and** for deepwater shrimp VMS points). Transit areas for these deepwater shrimp fisheries might also be impacted by actions in this amendment. In addition, some shrimp vessels may need to upgrade their VMS units (to maintain a ping rate that is acceptable by law enforcement while transiting through the HAPC) in order to comply with actions in this amendment. A detailed description of these fisheries is included in the Comprehensive Ecosystem-Based Amendment 1 (SAFMC 2010c) and incorporated herein by reference. It should be noted that royal red shrimp is not a federally managed species in the South Atlantic.

Rock shrimp and royal red shrimp use the same vessels and gear. Royal red shrimp is primarily caught by fishermen targeting rock shrimp. **Table 3-5** and **Table 3-6** present the communities with commercial landings of rock shrimp and royal red shrimp respectively. In the South Atlantic, the majority of rock shrimp and royal red shrimp landings occur in Florida with some commercial landings in Georgia. A very small amount of rock shrimp has also historically been landed in South Carolina, although not in recent years.

Table 3-5. Fishing communities in the South Atlantic with rock shrimp landings, in descending order by pounds landed (ALS 2011)

State	City
FL	Titusville
FL	Mayport
FL	Jacksonville
FL	Cocoa Beach
GA	Brunswick
FL	Fernandina Beach
FL	Key West
FL	Cocoa
FL	Marathon

For rock shrimp, the communities with the highest amount of landings are located in Florida in Brevard and Duval Counties (**Table 3-5**). The top four communities of Titusville, Mayport, Jacksonville, and Cocoa Beach made up approximately 95% of rock shrimp landings in 2011.

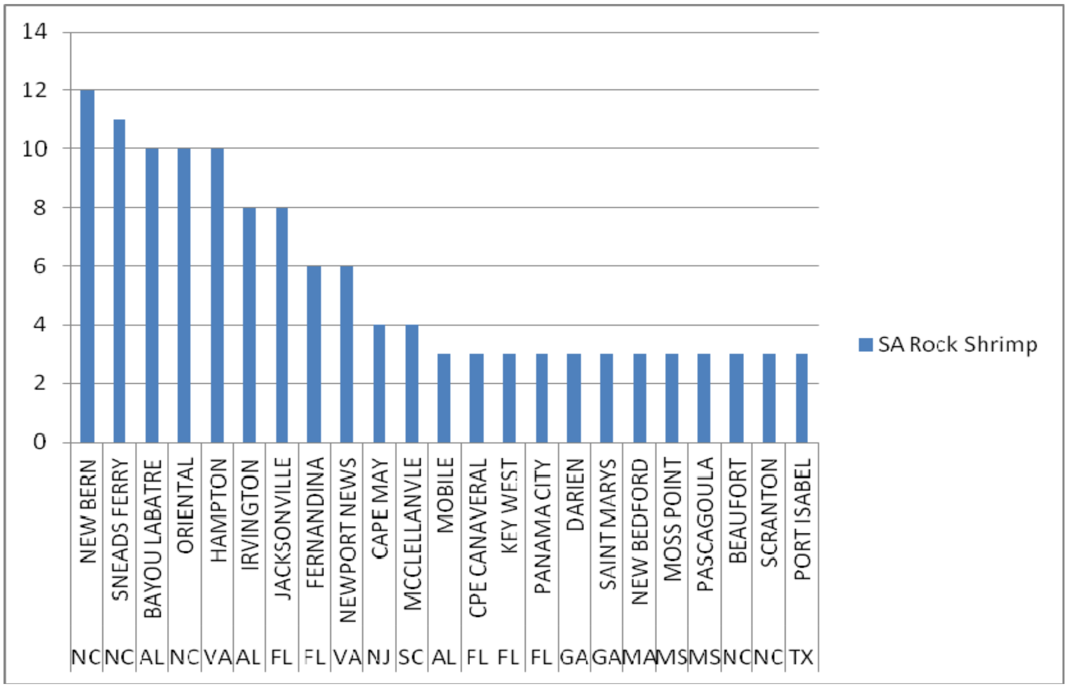


Figure 3-6. Top fishing communities with South Atlantic rock shrimp permits. Only communities with three or more permits were included. (SERO FOIA, permit list as of November 7, 2012).

As seen in **Figure 3-6**, fishing communities with the majority of South Atlantic rock shrimp permits are not confined to this region. Several communities located in the Gulf region are among the top communities with South Atlantic rock shrimp permits. These Gulf vessels are likely participants who seasonally migrate to South Atlantic waters and have so since the mid-1990's. In addition, several communities located in the Northeast (Virginia, New Jersey, and Massachusetts) are among the top communities with South Atlantic rock shrimp permits. For South Atlantic states, the majority of permits are in located in North Carolina (59 permits) and Florida (54 permits).

Table 3-6. Fishing communities in the South Atlantic with royal red shrimp landings, in descending order by pounds landed (ALS 2011)

State	City
FL	Mayport
FL	Jacksonville
FL	Titusville
FL	Atlantic Beach

For royal red shrimp, four South Atlantic communities along the east coast of Florida received commercial landings in the year 2011 (**Table 3-6**). Three of the four communities with landings of royal red shrimp in 2011 also had landings of rock shrimp. A significant portion of the total landings of royal red shrimp were delivered to the top community of Mayport, Florida. Landings by community cannot be reported here because of confidentially issues.

3.4.4 North Carolina

There are a number of North Carolina counties classified as being either medium high or high on the social vulnerability scale and within those counties there are numerous fishing communities (**Figure 3-7**). Those counties that are considered to be either medium high or high on the SoVI are: New Hanover, Onslow, Carteret, Washington, Bertie, Chowan, Pasquotank, and Perquimans.

Many fishermen in North Carolina work under the dual jurisdiction of the Mid-Atlantic Fishery Management Council and the South Atlantic Fishery Management Council.

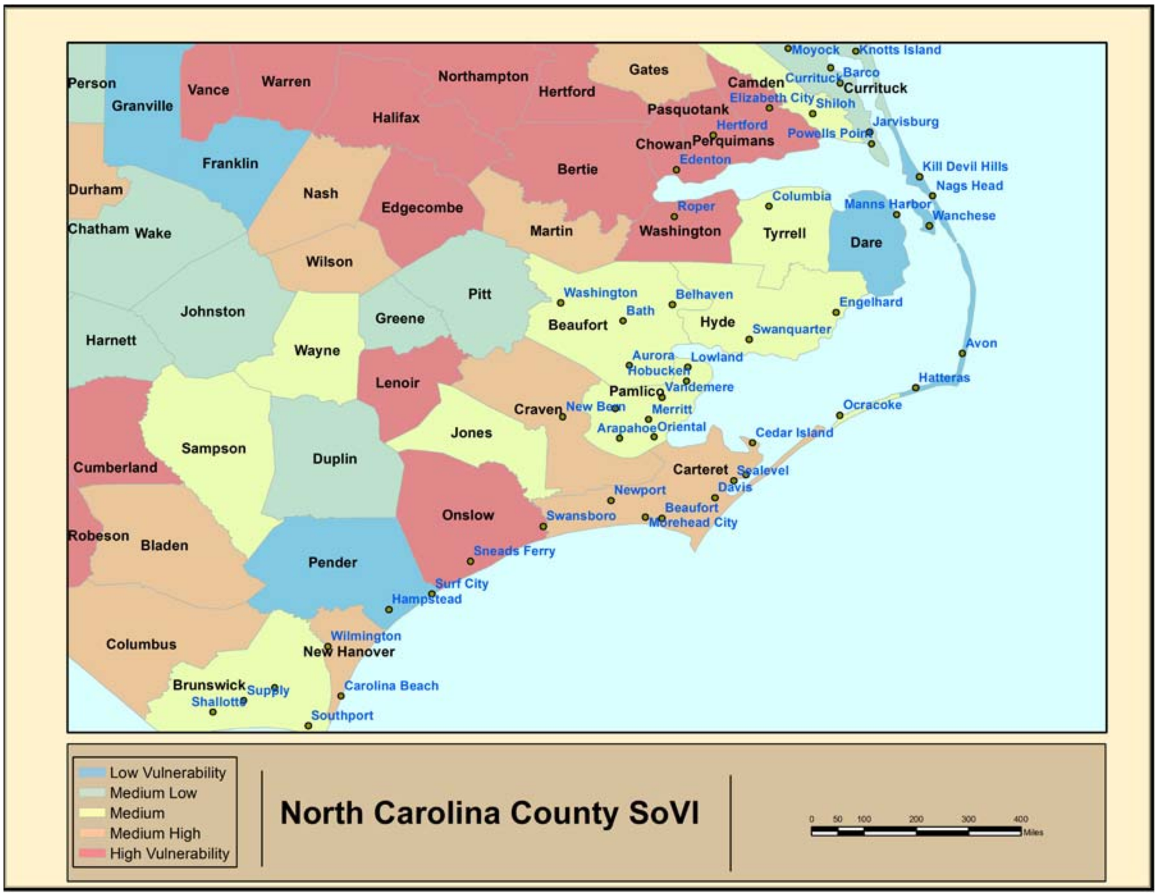


Figure 3-7. The Social Vulnerability Index applied to North Carolina Coastal Counties**.**

Commercial Fishing

There has been a steady decline in the number of federal commercial permits North Carolina and in 2012 there were 1,194 permits to fish commercial species (**Table 3-7**). Brunswick County, Carteret County, New Hanover County and Dare County have the largest number of permits, making up over half of all federal permits in North Carolina. Mackerel permits (Spanish mackerel and King mackerel) and dolphin wahoo permits are the most commonly held commercial permits in North Carolina. Snapper grouper permits make up about one-tenth of commercial permits in the state.

Table 3-7. Federal commercial fishing permits in North Carolina coastal counties (2012).

County*	Snapper Grouper	Mackerels	Dolphin-Wahoo	Rock Shrimp	Penaeid Shrimp	Spiny Lobster**	Total
Beaufort	0	2	4	1	4	0	**11**
Brunswick	32	56	69	2	17	22	**198**
Carteret	21	30	55	4	12	7	**129**
Craven	0	0	2	12	12	0	**26**
Dare	19	77	108	1	6	2	**213**
Hyde	1	6	6	7	24	1	**45**
New Hanover	18	35	42	0	1	5	**101**
Onslow	11	19	13	17	27	2	**89**
Pamlico	0	2	9	14	17	19	**61**
Pasquotank	0	8	3	0	0	0	**11**
Pender	9	11	10	1	1	2	**34**
Total	**111**	**246**	**321**	**59**	**121**	**60**	**1,194**

* Based on the mailing address of the permit holder.
**Includes non-Florida permits and tailing permits.

Most dealer permits are associated with Carteret, Dare and New Hanover Counties (**Table 3-8**). Almost all of the dealer permits are snapper grouper and dolphin-wahoo permits.

Table 3-8. Federal dealer permits in North Carolina coastal counties (2012).

County*	Snapper Grouper	Dolphin-Wahoo	Rock Shrimp	Golden Crab	Wreckfish	Total
Beaufort	1	1	0	0	1	**3**
Brunswick	5	5	0	0	0	**10**
Carteret	10	10	1	0	1	**22**
Craven	2	2	2	0	1	**7**
Dare	9	11	2	1	4	**27**
Hyde	1	2	0	0	1	**4**
New Hanover	7	7	0	0	0	**14**
Onslow	4	5	0	0	1	**10**
Pamlico	0	0	0	0	0	**0**
Pasquotank	0	0	0	0	0	**0**
Pender	2	2	0	0	0	**4**
Total	**41**	**45**	**5**	**1**	**9**	**101**

* Based on the mailing address of the permit holder.

Recreational Fishing

Recreational fishing is well developed in North Carolina and, due to natural geography, is not limited to areas along the coast. North Carolina offers several types of private recreational licenses for residents and visitors, and for different durations (10-day, annual, and lifetime). Non-resident recreational license sales are high, indicating how coastal recreational fishing is tied to coastal tourism in the state. In general recreational license sales have remained stable or increased, with the exception of annual non-resident license sales, which have declined in recent years (**Table 3-9**)

Table 3-9. Coastal recreational fishing license sales by year and type.

License Type	2007	2008	2009	2010	2011
Annual Resident	23,793	19,222	19,398	20,254	19,270
Annual non-Resident	179,923	143,810	142,569	141,475	130,743
10-day Resident	40,255	39,110	45,724	47,619	45,467
10-day Non-Resident	131,105	125,564	132,193	137,066	130,026

Source: NC Division of Marine Fisheries

In 2012 there were 663 South Atlantic federal charter permits for dolphin wahoo, mackerel and cobia and snapper grouper registered to individuals in North Carolina coastal counties (**Table 3-10**). A majority of the charter permits are from Dare County, Brunswick County, and Carteret County. It is common for charter vessels to hold all three federal charter permits.

Table 3-10. Federal charter permits in North Carolina coastal counties (2012).

County*	Dolphin Wahoo	Mackerels and Cobia	Snapper Grouper	Total
Beaufort	1	1	1	3
Brunswick	46	46	44	136
Carteret	40	34	34	108
Craven	3	2	2	7
Dare	89	83	78	250
Hyde	4	4	4	12
New Hanover	36	33	29	98
Onslow	6	7	7	20
Pasquotank	3	3	2	8
Pamlico	0	0	0	0
Pender	7	7	7	21
Total	**235**	**220**	**208**	**663**

* Based on the mailing address of the permit holder.

3.4.5 South Carolina

Coastal South Carolina had no counties that were either medium or highly vulnerable (**Figure 3-8**). This does not mean that communities could not be vulnerable to adverse impacts because of regulatory action. It may suggest that coastal South Carolina is more resilient and capable of absorbing such impacts without substantial social disruption. South Carolina had no communities with landings or value over 3% for any coastal pelagic. While there were no substantial commercial landings within the state, the recreational fishery may be important.

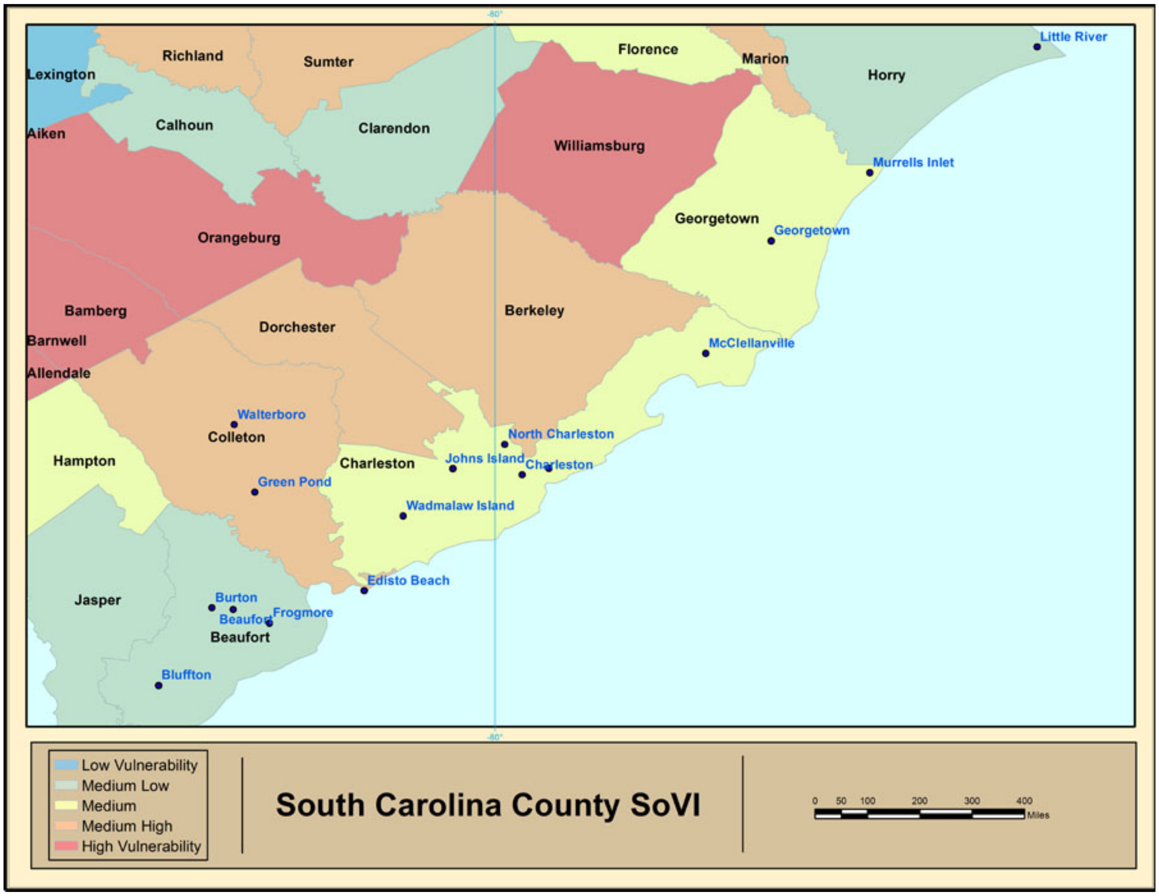


Figure 3-8. The Social Vulnerability Index applied to South Carolina Coastal Counties.

Commercial Fishing

While pockets of commercial fishing activities remain in the state, most are being displaced by the development forces and associated changes in demographics. There are 190 commercial permits in South Carolina coastal counties (**Table 3-11(a) and Table 3-11(b)**). Horry, Georgetown, and Charleston Counties have the majority of finfish permits, and Beaufort County and Charleston County have the highest number of shrimp permits.

Table 3-11(a). Federal commercial finfish permits in South Carolina coastal counties (2012).

County*	Dolphin-Wahoo	King Mackerel	Snapper Grouper	Spanish Mackerel	Wreckfish	Total
Beaufort	0	0	1	0	0	**1**
Berkeley	1	1	1	0	0	**3**
Charleston	17	4	9	2	2	**34**
Georgetown	17	11	12	4	0	**44**
Horry	21	7	20	6	0	**54**
Total	**56**	**23**	**43**	**12**	**2**	**136**

Table 3-11(b). Federal commercial lobster and shrimp permits in South Carolina coastal counties (2012).

County*	Spiny Lobster**	Rock Shrimp	Penaeid Shrimp	Total
Beaufort	0	1	13	**14**
Charleston	0	5	20	**25**
Georgetown	2	0	3	**5**
Horry	8	1	1	**10**
Total	**10**	**7**	**37**	**54**

* Based on the mailing address of the permit holder.
**Includes non-Florida permits and tailing permits.

There are 27 dealer permits registered to South Carolina coastal counties (**Table 3-12**). Most are in Charleston County. There are no federal dealer permits in Beaufort or Berkeley Counties.

Table 3-12. Federal dealer permits in South Carolina coastal counties (2012).

County*	Dolphin-Wahoo	Snapper Grouper	Wreckfish	Total
Charleston	7	6	2	**15**
Georgetown	2	2	1	**5**
Horry	3	4	0	**7**
Total	**12**	**12**	**3**	**27**

* Based on the mailing address of the permit holder.

Recreational Fishing

Many areas that used to be dedicated to commercial fishing endeavors are now geared towards the private recreational angler and for-hire sector. Most of the charter permits are associated with vessels from Charleston, Horry, and Georgetown Counties (**Table 3-13**). It is common for charter vessels to have all three federal charter permits.

Table 3-13. Federal charter permits in South Carolina coastal counties (2012).

County*	Dolphin-Wahoo	Mackerels and Cobia	Snapper Grouper	Total
Beaufort	10	17	14	**41**

Berkeley	0	1	1	**2**
Charleston	43	38	36	**117**
Georgetown	18	19	19	**56**
Horry	28	28	25	**81**
Total	**99**	**103**	**95**	**297**

*Based on the mailing address of the permit holder.

The majority of South Carolina saltwater anglers target coastal pelagic species such as king mackerel, Spanish mackerel, tunas, dolphins, and billfish. A lesser number focus primarily on bottom fish such as snapper and groupers and often these species are the specialty of the headboats that run out of Little River, Murrells Inlet, and Charleston. There are 35 coastal marinas in the state and 34 sport fishing tournaments. South Carolina offers private recreational licenses for residents and visitors, and sales of all license types have more than doubled since 2006 (**Table 3-14**).

Table 3-14. Sales of all saltwater recreational license types in South Carolina.

Year	Number of Licenses Sold
2006	106,385
2007	119,255
2008	132,324
2009	124,193
2010	208,204
2011	218,834

Source: SC DNR

3.4.6 Georgia

Overview

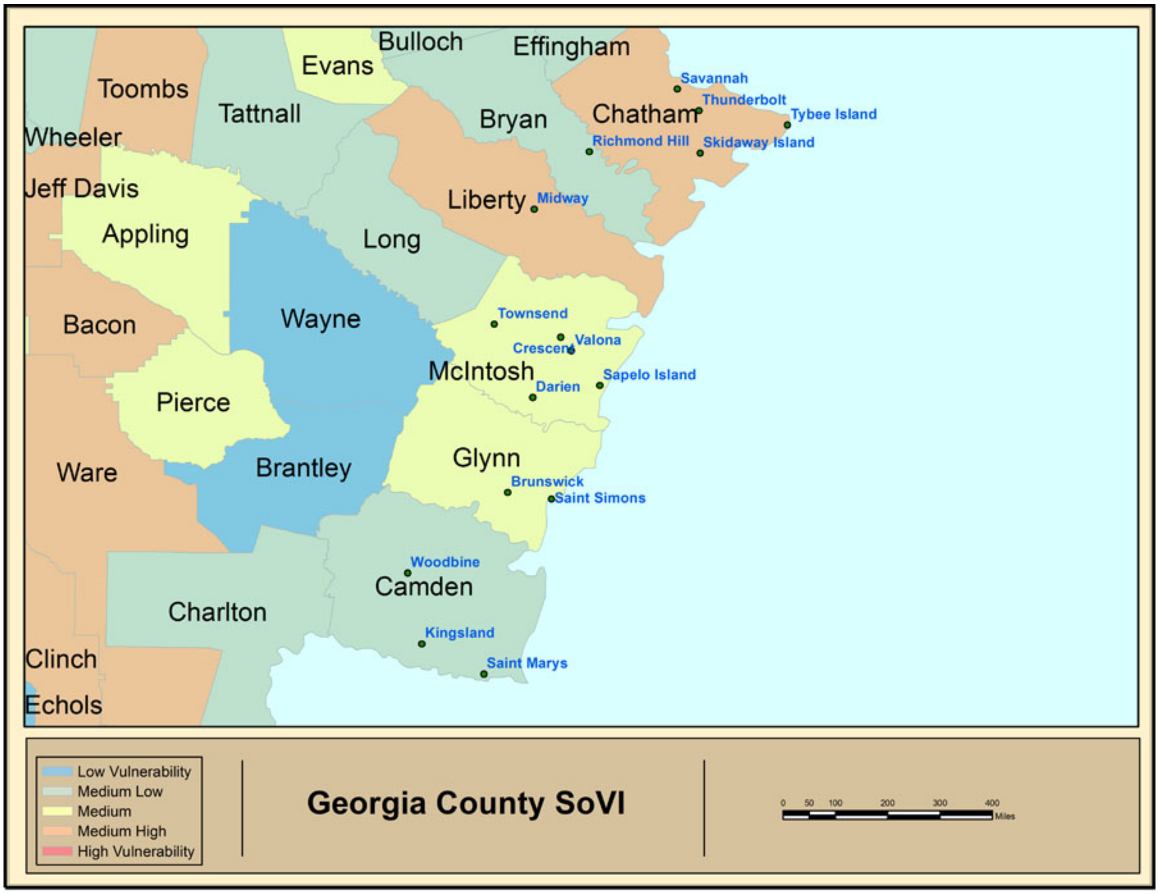


Figure 3-9. The Social Vulnerability Index applied to Georgia Coastal Counties.

There were two counties in Georgia with medium high vulnerability and those were Liberty and Chatham (**Figure 3-9**). The fishing communities located in those counties are Savannah, Thunderbolt, Tybee Island and Skidaway Island in Chatham County, and Midway in Liberty County.

Commercial Fishing

Overall Georgia has much lower numbers of permits than other states. McIntosh County has the most permits (**Table 3-15**). Many Georgia fishermen target shrimp or hold state commercial fishing permits.

Table 3-15. Federal commercial fishing permits in Georgia coastal counties (2012).

County*	Dolphin-Wahoo	King Mackerel	Spiny Lobster**	Rock Shrimp	Snapper Grouper	Spanish Mackerel	Penaeid Shrimp	Total
Camden	1	1	4	2	1	1	4	**14**
Chatham	2	1	0	1	1	1	17	**23**
Glynn	1	1	0	2	1	1	15	**21**
Liberty	0	0	0	0	0	0	2	**2**
McIntosh	3	3	4	5	3	2	34	**54**

Total	7	6	8	10	6	5	72	114

* Based on the mailing address of the permit holder.
**Includes non-Florida permits and tailing permits.

There are only seven federal dealer permits associated with Georgia coastal communities, and only in Glynn and McIntosh County (**Table 3-16**).

Table 3-16. Federal dealer permits in Georgia coastal communities (2012).

County*	Dolphin-Wahoo	Rock Shrimp	Snapper Grouper	Wreckfish	Total
Glynn	1	1	1	0	**3**
McIntosh	1	1	1	1	**4**
Total	**2**	**2**	**2**	**1**	**7**

* Based on the mailing address of the permit holder.

Recreational Fishing

Most federal charter permits are associated with Chatham and Glynn County (**Table 3-17**). Private recreational licenses in Georgia are included in a combination saltwater/freshwater license and offered in short-term and long-term licenses. Although license holders may or may not fish for saltwater species, license sales over the past five years (**Table 3-18**) suggest that in general, private recreational fishing in Georgia has stayed fairly steady with the exception of 2009, when license sales dropped for one year.

Table 3-17. Federal charter permits in Georgia coastal counties (2012).

County	Dolphin-Wahoo	Mackerels and Cobia	Snapper Grouper	Total
Chatham	9	10	9	**28**
Glynn	4	5	5	**14**
McIntosh	1	1	1	**3**
Total	**14**	**16**	**15**	**45**

*****Based on the mailing address of the permit holder.

Table 3-18. Sales of recreational fishing license types that include saltwater in Georgia.

Year	Number of Licenses Sold
2007	592,633
2008	526,294
2009	325,189
2010	567,175
2011	529,850

Source: GA DNR

3.4.7 Florida

Figure 3-10. The Social Vulnerability Index applied to South Atlantic Florida Counties.

A good portion of Florida's east coast (**Figure 3-10**) is considered either medium high or highly vulnerable in terms of social vulnerability. In fact, the only counties not included in those two categories are Nassau, St. John's and Monroe.

Commercial and recreational fishermen in the Florida Keys commonly fish both Gulf and Atlantic sides, and work under dual jurisdiction of the South Atlantic Fishery Management Council and the Gulf of Mexico Fishery Management Council.

Commercial Fishing

Despite the high population growth rates and emphasis on a tourism economy in Florida, the commercial fishing sector in Florida is still robust in some areas. There are several important communities that target snapper grouper species such as Mayport, Jacksonville, and Cocoa Beach, along with Key West, Marathon and Tavernier in the Florida Keys. Additional detailed information about Florida fishing communities can be found in the Comprehensive ACL Amendment (SAFMC 2011c).

Florida has the largest number of commercial permits in the region (**Table 3-19(a) and Table 3-19(b)**). The southern counties (Monroe, Miami-Dade, Broward, Palm Beach, and Duval) generally have the most commercial permits, especially finfish. The northern counties have the highest number of penaeid shrimp permits in the state. The federal spiny lobster permits are most commonly associated with Monroe County in addition to the more than 900 Florida spiny lobster endorsement holders (pers. comm, FWC).

Table 3-19(a). Federal commercial finfish permits in Florida coastal counties (2012).

County*	**Dolphin-Wahoo**	**King Mackerel**	**Snapper Grouper**	**Spanish Mackerel**	**Wreckfish**	**Total**
Brevard	98	84	28	85	0	**295**
Broward	87	47	13	60	0	**207**
Duval	37	27	27	26	0	**117**
Indian River	53	51	11	54	0	**169**
Martin	62	59	7	72	0	**200**
Miami-Dade	163	82	77	153	0	**475**
Monroe	365	163	217	245	2	**992**
Nassau	8	5	4	5	0	**22**
Palm Beach	173	150	43	156	0	**522**
St Johns	12	6	10	7	0	**35**
St Lucie	60	52	9	69	0	**190**
Volusia	24	15	16	17	3	**75**
Total	**1,142**	**741**	**462**	**949**	**5**	**3,299**

Table 3-19(b). Federal commercial crab, lobster and shrimp permits in Florida coastal counties (2012).

County*	Golden Crab	Spiny Lobster**	Rock Shrimp	Penaeid Shrimp	Total
Brevard	0	25	5	9	**39**
Broward	4	10	4	8	**26**
Duval	0	20	10	32	**62**
Indian River	0	7	0	1	**8**
Martin	0	12	2	2	**16**
Miami-Dade	0	30	3	7	**40**
Monroe	2	137	3	8	**150**
Nassau	0	4	7	13	**24**
Palm Beach	3	21	0	4	**28**
St Johns	0	2	0	4	**6**
St Lucie	0	11	1	2	**14**
Volusia	0	13	0	2	**15**
Total	**9**	**292**	**35**	**92**	**428**

*****Based on the mailing address of the permit holder.
**Includes only federal tailing permits, not Florida crawfish endorsements.

Florida is the only state that has permit holders for all federal dealer permits. Most deals are associated with Monroe, Miami-Dade, and Broward Counties (**Table 3-20**).

Table 3-20. Federal dealer permits in Florida (2012).

County*	Dolphin-Wahoo	Golden Crab	Rock Shrimp	Snapper Grouper	Wreckfish	Total
Brevard	5	3	4	6	2	**20**
Broward	14	6	0	13	1	**34**
Duval	2	1	2	3	1	**9**
Indian River	2	0	0	2	0	**4**
Martin	2	1	0	2	0	**5**
Miami-Dade	10	2	3	10	6	**31**
Monroe	23	6	5	24	9	**67**
Nassau	0	0	1	0	0	**1**
Palm Beach	7	3	1	6	1	**18**

St Johns	2	0	0	2	1	**5**
St Lucie	2	0	0	2	0	**4**
Volusia	6	0	1	7	2	**16**
Total	**75**	**22**	**17**	**77**	**23**	**214**

*****Based on the mailing address of the permit holder.

Recreational Fishing

Recreational fishing is economically and socially important for all Florida coastal counties, and for both residents and tourists. Most charter permits are associated with the southern counties (**Table 3-21**), but there are at least 20 permits in all counties.

Table 3-21. Federal charter permits in Florida coastal counties (2012).

County*	Dolphin-Wahoo	Mackerels and Cobia	Snapper Grouper	Total
Brevard	66	65	65	**196**
Broward	58	57	59	**174**
Duval	17	16	17	**50**
Indian River	18	18	20	**56**
Martin	10	10	11	**31**
Miami-Dade	39	38	42	**119**
Monroe	285	278	294	**857**
Nassau	6	7	7	**20**
Palm Beach	49	49	63	**161**
St Johns	23	23	23	**69**
St Lucie	7	6	8	**21**
Volusia	30	33	32	**95**
Total	**608**	**600**	**641**	**1,849**

*Based on mailing address of the permit holder.

In 2010/2011, there were approximately 860,000 resident marine recreational licenses and 394,000 non-resident marine recreational licenses sold in Florida (FWC 2012). Eastern Florida recreational anglers took 10 million fishing trips: 5.4 million by private/rental boats, 4.5 million from shore, and 180,000 by party/charter boat (NMFS 2009)

3.4.8 Environmental Justice Considerations

Executive Order 12898 requires federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. This executive order is generally referred to as environmental justice (EJ).

To evaluate EJ considerations for the proposed actions, information on poverty and minority rates is examined at the county level. Information on the race and income status for groups at the different participation levels (vessel owners, crew, dealers, processors, employees, employees of associated support industries, etc.) is not available. Because the proposed actions would be expected to affect fishermen in several communities along the South Atlantic coast and not just those profiled, it is possible that other counties or communities have poverty or minority rates that exceed the EJ thresholds.

In order to identify the potential for EJ concern, the rates of minority populations (non-white, including Hispanic) and the percentage of the population that was below the poverty line were examined. The threshold for comparison that was used was 1.2 times the state average for minority population rate and percentage of the population below the poverty line. If the value for the community or county was greater than or equal to 1.2 times the state average, then the community or county was considered an area of potential EJ concern (EPA 1999). Census data for the year 2010 was used. Estimates of the state minority and poverty rates, associated thresholds, and community rates are provided in **Table 3-22**; note that only communities that exceed the minority threshold and/or the poverty threshold are included in the table**.**

While some communities expected to be affected by this proposed amendment may have minority or economic profiles that exceed the EJ thresholds and, therefore, may constitute areas of concern, significant EJ issues are not expected to arise as a result of this proposed amendment. No adverse human health or environmental effects are expected to accrue to this proposed amendment, nor are these measures expected to result in increased risk of exposure of affected individuals to adverse health hazards. The proposed management measures would apply to all participants in the affected area, regardless of minority status or income level, and information is not available to suggest that minorities or lower income persons are, on average, more dependent on the affected species than non-minority or higher income persons.

Table 3-22. Environmental Justice thresholds (2010 U.S. Census data) for counties in the South Atlantic region. Only coastal counties (east coast for Florida) with minority and/or poverty rates that exceed the state threshold are listed.

State	County	Minority Rate	Minority Threshold*	Poverty Rate	Poverty Threshold*
Florida		**47.4**	**56.88**	**13.18**	**15.81**
	Broward	52.0	-4.6	11.7	4.11
	Miami-Dade	81.9	-34.5	16.9	-1.09
	Orange County	50.3	-2.9	12.7	3.11
	Osceola	54.1	-6.7	13.3	2.51
Georgia		**50.0**	**60.0**	**15.0**	**18.0**
	Liberty	53.2	-3.2	17.5	0.5
South Carolina		**41.9**	**50.28**	**15.82**	**18.98**
	Colleton	44.4	-2.5	21.4	-2.42
	Georgetown	37.6	4.3	19.3	-0.32
	Hampton	59.0	-17.1	20.2	-1.22
	Jasper	61.8	-19.9	9.9	-0.92
North Carolina		**39.1**	**46.92**	**15.07**	**18.08**
	Bertie	64.6	-25.50	22.5	-4.42

State	County	Minority Rate	Minority Threshold*	Poverty Rate	Poverty Threshold*
	Chowan	39.2	-0.1	18.6	-0.52
	Gates	38.8	0.3	18.3	-0.22
	Hertford	65.3	-26.2	23.5	-5.42
	Hyde	44.5	-5.4	16.2	1.88
	Martin	48.4	-9.3	23.9	-5.82
	Pasquotank	43.4	-4.3	16.3	1.78
	Perquimans	27.7	11.4	18.6	-0.52
	Tyrrell	43.3	-4.2	19.9	-1.82
	Washington	54.7	-15.6	25.8	-7.72

*The county minority and poverty thresholds are calculated by comparing the county minority rate and poverty estimate to 1.2 times the state minority and poverty rates. A negative value for a county indicates that the threshold has been exceeded.

The actions in this proposed amendment are expected to incur social and economic benefits to users and communities by implementing management measures that would contribute to the protection of important habitat. Although there may be some impacts on vessels due to area closures (such as the inability to fish historic fishing grounds, and the possible need to upgrade some VMS units in order to be able to ping at a more frequent rate), the overall long-term benefits are expected to contribute to the social and economic health of South Atlantic communities.

Finally, the general participatory process used in the development of fishery management measures (e.g., scoping meetings, public hearings, and open South Atlantic Council meetings) is expected to provide sufficient opportunity for meaningful involvement by potentially affected individuals to participate in the development process of this amendment and have their concerns factored into the decision process. Public input from individuals who participate in the fishery has been considered and incorporated into management decisions throughout development of the amendment.

3.5 Administrative Environment

3.5.1 The Fishery Management Process and Applicable Laws

3.5.1.1 Federal Fishery Management

Federal fishery management is conducted under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (16 U.S.C. 1801 et seq.), originally enacted in 1976 as the Fishery Conservation and Management Act. The Magnuson-Stevens Act claims sovereign rights and exclusive fishery management authority over most fishery resources within the U.S. Exclusive Economic Zone (EEZ), an area extending 200 nautical miles 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 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 of Commerce (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 NOAA Fisheries Service.

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 miles offshore from the seaward boundary of the States of North Carolina, South Carolina, Georgia, and east Florida to Key West. The South Atlantic Council has thirteen voting members: one from NOAA Fisheries Service; one each from the state fishery agencies of North Carolina, South Carolina, Georgia, and Florida; and eight public members appointed by the Secretary. On the South Atlantic Council, there are two public members from each of the four South Atlantic States. Non-voting members include representatives of the U.S. Fish and Wildlife Service, U.S. Coast Guard, State Department, and Atlantic States Marine Fisheries Commission (ASMFC). The South Atlantic Council has adopted procedures whereby the non-voting members serving on the Council Committees have full voting rights at the Committee level but not at the full Council level. South Atlantic Council members serve three-year terms and are recommended by State Governors and appointed by the Secretary of Commerce 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 matters, are open to the public. The South Atlantic Council uses a Scientific and Statistical Committee 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 Procedures Act, in the form of “notice and comment” rulemaking.

3.5.1.2 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 Environment and Natural Resources. The Marine Resources Division of the South Carolina Department of Natural Resources regulates South Carolina’s marine fisheries. Georgia’s marine fisheries are managed by the Coastal Resources Division of the Department of Natural Resources. The Marine Fisheries Division of the Florida Fish and Wildlife Conservation Commission is responsible for managing Florida’s marine fisheries. Each state fishery management agency has a designated seat on the South Atlantic Council. The purpose of state representation at the 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 the Atlantic States Marine Fisheries Commission (ASMFC) in management of marine fisheries. This commission was created to coordinate state regulations and develop management plans for interstate fisheries. It has significant authority, through the Atlantic Striped Bass Conservation Act and the Atlantic Coastal Fisheries Cooperative Management Act, to compel adoption of consistent state regulations to conserve coastal species. The ASFMC also is represented at the Council level, but does not have voting authority at the Council level.

NOAA Fisheries Service' 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.

3.5.1.3 Enforcement

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

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

NOAA General Counsel issued a revised Southeast Region Magnuson-Stevens Act Penalty Schedule in June 2003, which addresses all Magnuson-Stevens Act violations in the Southeast Region. In general, this Penalty Schedule increases the amount of civil administrative penalties that a violator may be subject to up to the current statutory maximum of $120,000 per violation. NOAA General Counsel requested public comment through December 20 2010, on a new draft policy.

Chapter 4. Environmental Consequences

4.1 Action 1. Expand boundaries of the Oculina Bank HAPC

Alternative 1 (**No Action**). Do not modify the boundaries of the Oculina Bank HAPC. The existing Oculina Bank HAPC is delineated by the following boundaries: on the north by 28°30' N, on the south by 27°30' N., on the east by the 100-fathom (183-m) contour, and on the west by 80°00' W.; and two adjacent satellite sites: the first bounded on the north by 28°30' N., on the south by 28°29' N., on the east by 80°00' W., and on the west by 80°03' W.; and the second bounded on the north by 28°17' N., on the south by 28°16' N., on the east by 80°00 W., and on the west by 80°03' W.

Alternative 2. Modify the northern boundary of the Oculina Bank HAPC.

> **Sub-Alternative 2a.** Modify the northern boundary of the Oculina Bank HAPC from the current northern boundary of the Oculina HAPC (28° 30'N) to 29° 43.5'W. The west and east boundaries would follow close to the 70 meter and 100 meter depth contour lines, respectively, while annexing obvious hard bottom features as represented in the simplified polygon (**Figures 4-1** and **4-2**). Sub-alternative 2a = 329 square miles
>
> **Preferred Sub-Alternative 2b.** The Deepwater Shrimp AP recommendation is to adjust the southern portion of the eastern boundary line of the proposed Oculina Bank HAPC northern extension identified in Alternative 2a. The adjustments are to move the boundary west to further reduce fishing tracks impacted. The revised polygon would reduce the rock shrimp VMS points (2-4 knots) for the available time series (2003-2013) to 4.2% from 5.5% in Alternative 2a. The replacement of two coordinates would further modify the western boundary and result in a slight reduction (0.09%) in the number of rock shrimp VMS points (2003-2013) (2-4 knots). (**Figures 4-3** and **4-4**). Sub-alternative 2b = 267 square miles
>
> *IPT recommendation for language revisions to Preferred Sub-Alternative 2b:*
> *Modify the Oculina Bank HAPC to move the northern boundary to 29° 43.5'N. The western boundary would follow close to the 70 meter contour while annexing hard bottom features with two coordinates replaced in the southern portion of the boundary to reduce rock shrimp fishing tracks impacted. The eastern boundary line of the proposed Oculina Bank HAPC northern extension identified in Alternative 2a would be shifted west to further reduce rock shrimp fishing tracks impacted. The alternative is represented in the simplified polygons* ***Figures S-3*** *and* ***S-4****. Sub-alternative 2b = 267 square miles*

Preferred Alternative 3. Modify the western boundary of the Oculina Bank HAPC from 28° 4.5'N to the north boundary of the current Oculina HAPC (28° 30'N). The east boundary would coincide with the current western boundary of the Oculina HAPC (80° W). The west boundary

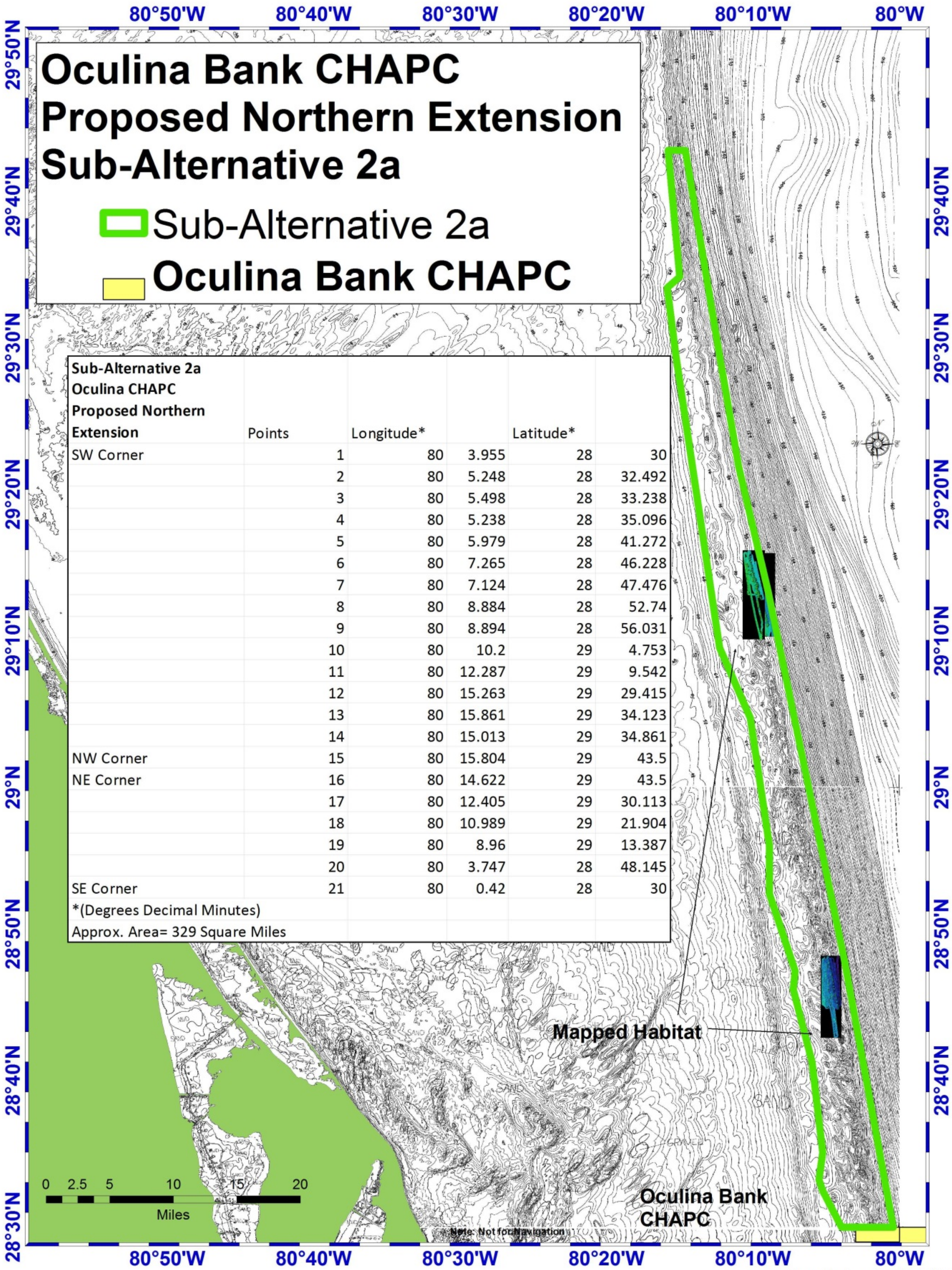
could either use the 60 meter contour line, or the 80° 03'W longitude (**Figures 4-5** and **4-6**).
Alternative 3 = 76 square miles

Note: Coordinates for the HAPC extension alternatives are found in **Appendix M**

Background

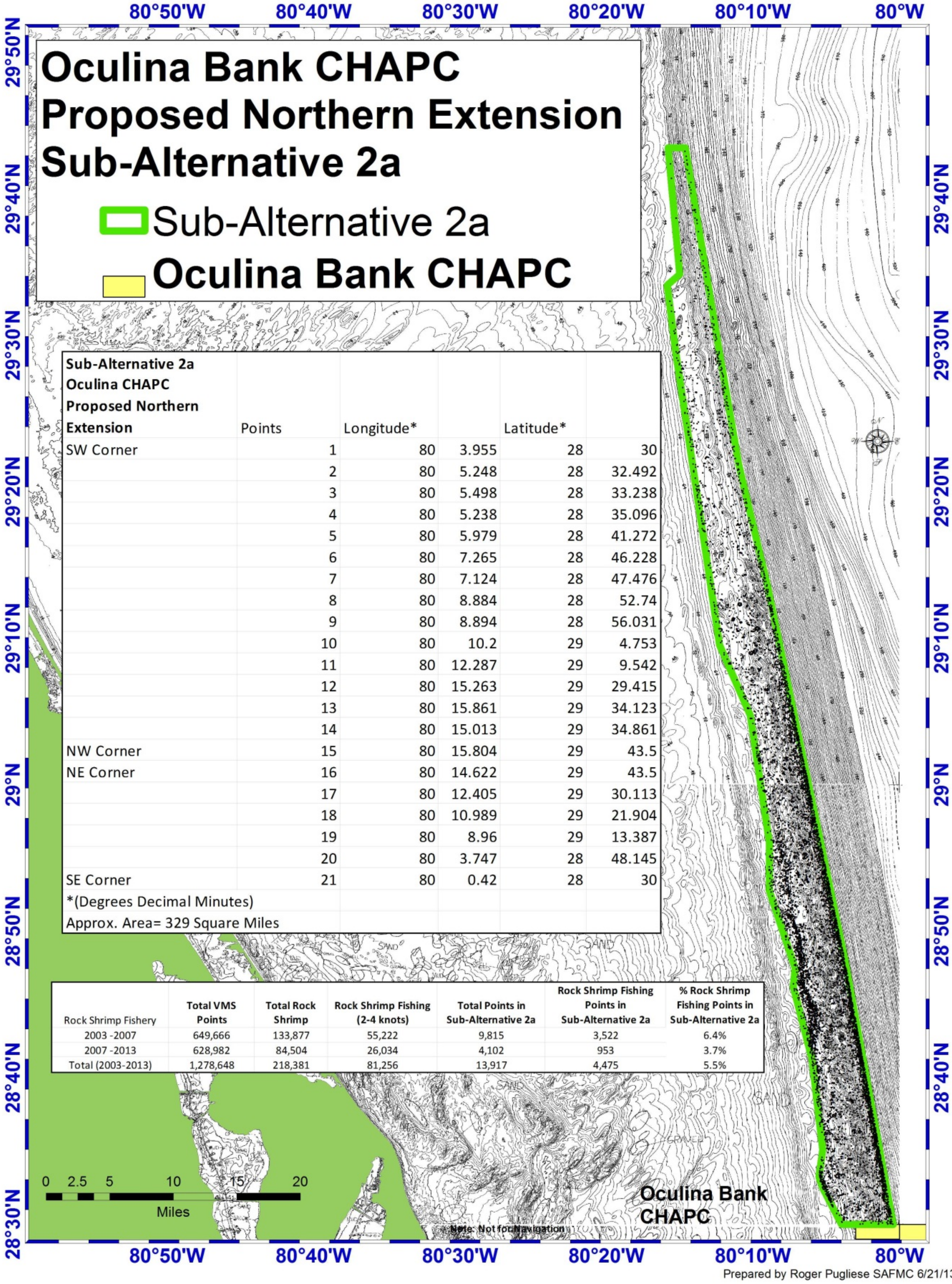
Recommendations for boundary modifications to the Coral Habitat Areas of Particular Concern (CHAPCs) were brought forward by the South Atlantic Fishery Management Council's (South Atlantic Council) Coral Advisory Panel (AP) in October 2011. Reed and Farrington 2010 and Reed et al. in press show that NOAA regional charts are quite accurate in depicting high-relief features off eastern and southern Florida (**Appendix J**). Reed and Farrington (**Appendix J**) used these charts to select areas to be further mapped with higher resolution multibeam sonar and then groundtruthed with video/photo surveys with manned submersibles or remotely operated vehicle (ROV). The bathymetric charts were employed by the Coral AP to identify where coral mounds are likely to occur, and areas that should be protected through an expansion of the existing HAPC.

Coral scientists serving on the AP presented findings from recent research identifying new areas of deepwater coral habitat previously uncharacterized (reference **Section 3.1.1.3** for additional information). In a report submitted by Reed (**Appendix J**), scientists associated the discovery of habitat north and west of the existing Oculina Bank HAPC as a continuation of the original reef track depicted in NOAA regional bathymetric charts. The charts were used by scientists to select sites north of Cape Canaveral, Florida (off Daytona, Florida and Titusville, Florida areas) to further map with high resolution multibeam sonar and ground-truth with an Remotely Operated Vehicle (ROV) and submersible video surveys (**Appendix J**). The mapping and surveys, conducted during a June 2011 field excursion aboard the NOAA ship *Pisces* (funded in part through NOAA's Deep Sea Coral Research and Technology Program), verified the high-relief features were *Oculina varicosa* coral bioherms. Over 100 individual mounds were observed and determined to be approximately 49-65 feet (15-20 meters) in height and covered in dead coral rubble, standing dead coral, and sparse live *Oculina varicosa* colonies (**Appendix J**). The observations of hard-bottom habitat and high relief features resulted in AP recommendations to the South Atlantic Council for consideration of a northern and western expansion of the Oculina Bank HAPC.



Sub-Alternative 2a Oculina CHAPC Proposed Northern Extension	Points	Longitude*		Latitude*	
SW Corner	1	80	3.955	28	30
	2	80	5.248	28	32.492
	3	80	5.498	28	33.238
	4	80	5.238	28	35.096
	5	80	5.979	28	41.272
	6	80	7.265	28	46.228
	7	80	7.124	28	47.476
	8	80	8.884	28	52.74
	9	80	8.894	28	56.031
	10	80	10.2	29	4.753
	11	80	12.287	29	9.542
	12	80	15.263	29	29.415
	13	80	15.861	29	34.123
	14	80	15.013	29	34.861
NW Corner	15	80	15.804	29	43.5
NE Corner	16	80	14.622	29	43.5
	17	80	12.405	29	30.113
	18	80	10.989	29	21.904
	19	80	8.96	29	13.387
	20	80	3.747	28	48.145
SE Corner	21	80	0.42	28	30
*(Degrees Decimal Minutes)					
Approx. Area= 329 Square Miles					

Figure 4-1. Action 1, Sub-Alternative 2a. Oculina Bank HAPC Proposed Northern Extension and Associated Habitat Mapping and Bathymetry.



Sub-Alternative 2a Oculina CHAPC Proposed Northern Extension	Points	Longitude*		Latitude*	
SW Corner	1	80	3.955	28	30
	2	80	5.248	28	32.492
	3	80	5.498	28	33.238
	4	80	5.238	28	35.096
	5	80	5.979	28	41.272
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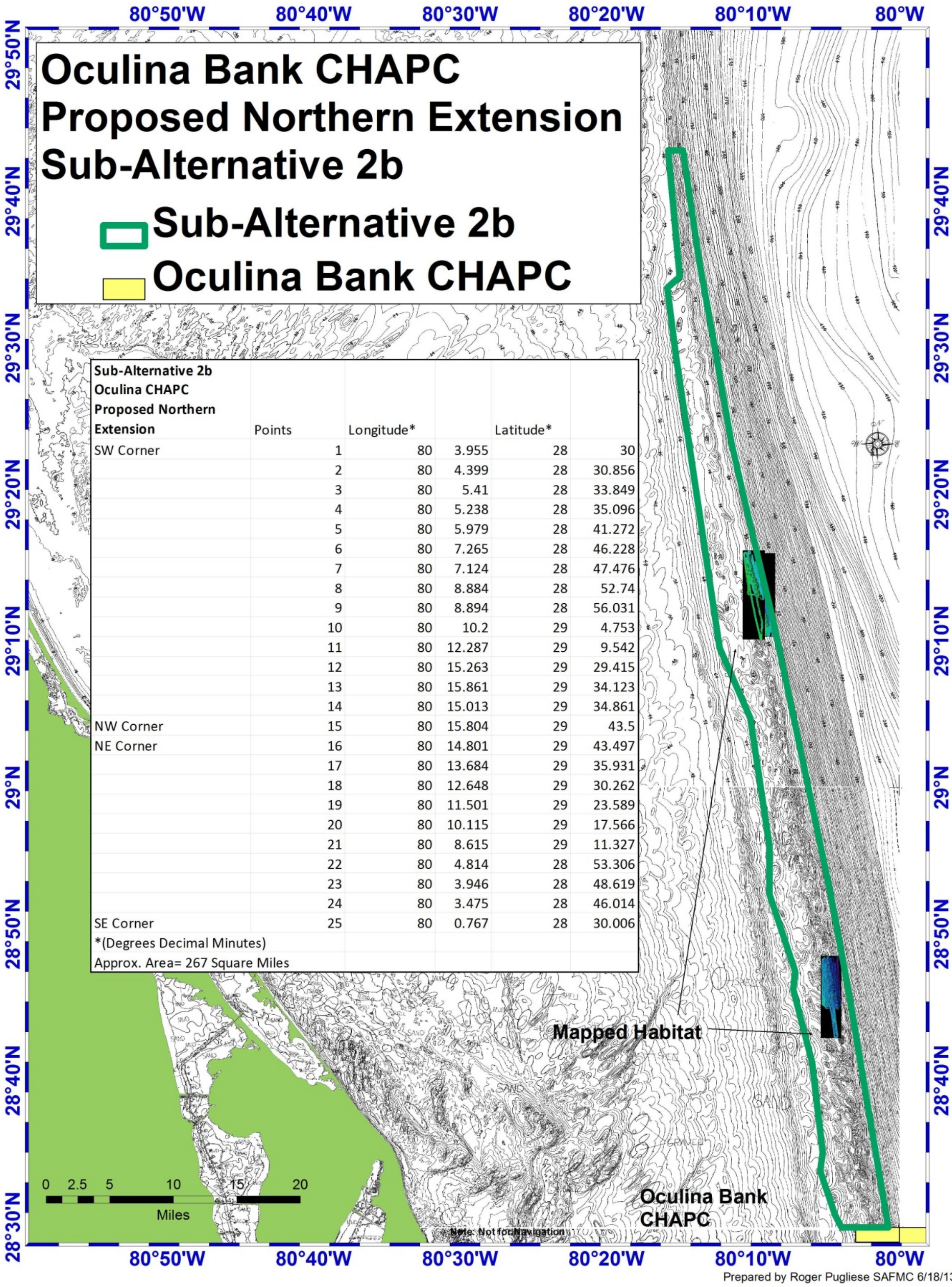
	13	80	15.861	29	34.123
	14	80	15.013	29	34.861
NW Corner	15	80	15.804	29	43.5
NE Corner	16	80	14.622	29	43.5
	17	80	12.405	29	30.113
	18	80	10.989	29	21.904
	19	80	8.96	29	13.387
	20	80	3.747	28	48.145
SE Corner	21	80	0.42	28	30
*(Degrees Decimal Minutes)					
Approx. Area= 329 Square Miles					

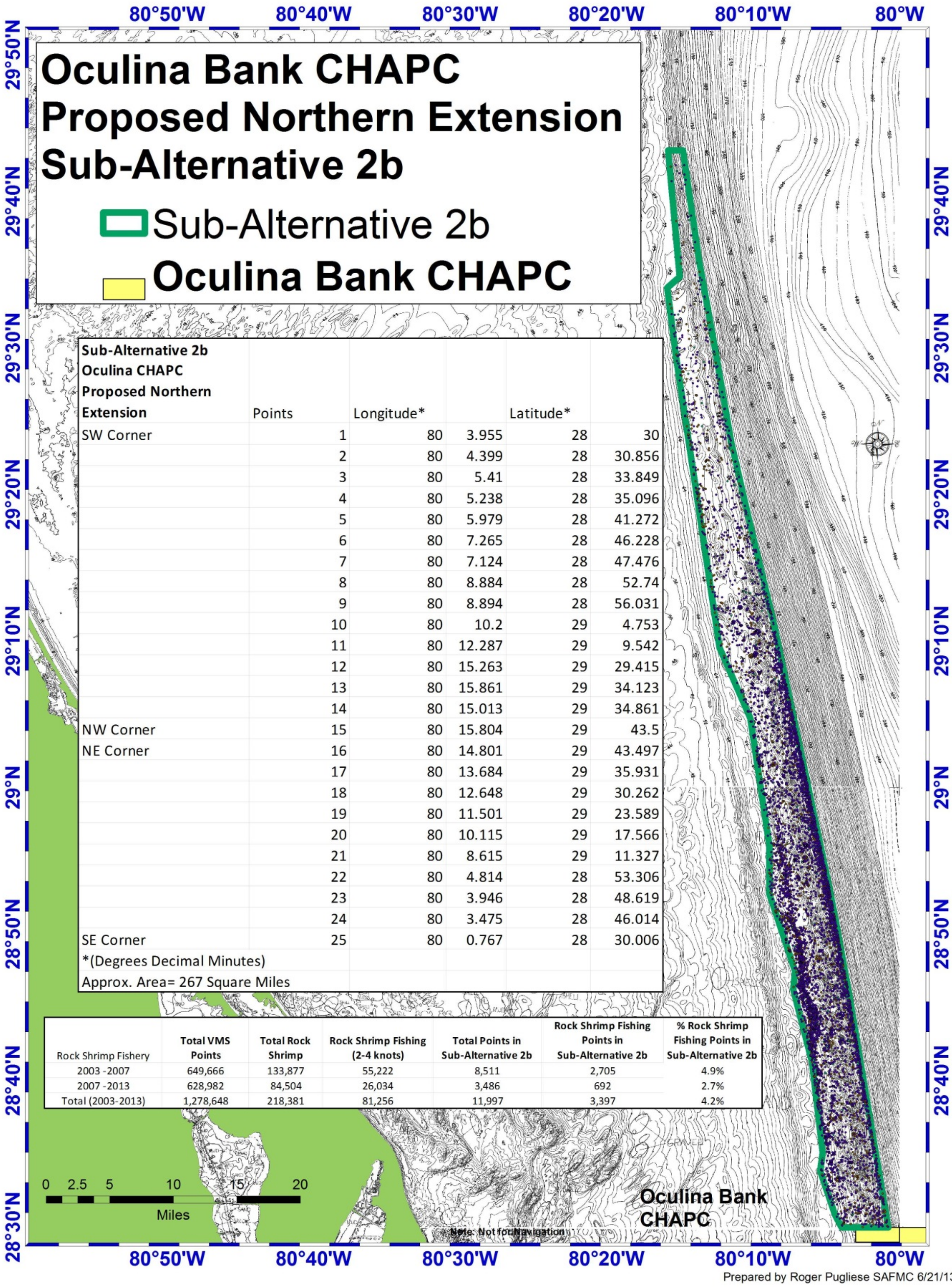
Rock Shrimp Fishery	Total VMS Points	Total Rock Shrimp	Rock Shrimp Fishing (2-4 knots)	Total Points in Sub-Alternative 2a	Rock Shrimp Fishing Points in Sub-Alternative 2a	% Rock Shrimp Fishing Points in Sub-Alternative 2a
2003 -2007	649,666	133,877	55,222	9,815	3,522	6.4%
2007 -2013	628,982	84,504	26,034	4,102	953	3.7%
Total (2003-2013)	1,278,648	218,381	81,256	13,917	4,475	5.5%

Figure 4-2. Action 1, Sub-Alternative 2a. Oculina Bank HAPC Proposed Northern Extension and VMS.



Sub-Alternative 2b Oculina CHAPC Proposed Northern Extension	Points	Longitude*		Latitude*	
SW Corner	1	80	3.955	28	30
	2	80	4.399	28	30.856
	3	80	5.41	28	33.849
	4	80	5.238	28	35.096
	5	80	5.979	28	41.272
	6	80	7.265	28	46.228
	7	80	7.124	28	47.476
	8	80	8.884	28	52.74
	9	80	8.894	28	56.031
	10	80	10.2	29	4.753
	11	80	12.287	29	9.542
	12	80	15.263	29	29.415
	13	80	15.861	29	34.123
	14	80	15.013	29	34.861
NW Corner	15	80	15.804	29	43.5
NE Corner	16	80	14.801	29	43.497
	17	80	13.684	29	35.931
	18	80	12.648	29	30.262
	19	80	11.501	29	23.589
	20	80	10.115	29	17.566
	21	80	8.615	29	11.327
	22	80	4.814	28	53.306
	23	80	3.946	28	48.619
	24	80	3.475	28	46.014
SE Corner	25	80	0.767	28	30.006
*(Degrees Decimal Minutes)					
Approx. Area= 267 Square Miles					

Figure 4-3. Action 1, Sub-Alternative 2b. Oculina Bank HAPC Proposed Northern Extension and Associated Habitat Mapping and Bathymetry.



Sub-Alternative 2b Oculina CHAPC Proposed Northern Extension	Points	Longitude*		Latitude*	
SW Corner	1	80	3.955	28	30
	2	80	4.399	28	30.856
	3	80	5.41	28	33.849
	4	80	5.238	28	35.096
	5	80	5.979	28	41.272
	6	80	7.265	28	46.228
	7	80	7.124	28	47.476
	8	80	8.884	28	52.74
	9	80	8.894	28	56.031
	10	80	10.2	29	4.753
	11	80	12.287	29	9.542
	12	80	15.263	29	29.415
	13	80	15.861	29	34.123
	14	80	15.013	29	34.861
NW Corner	15	80	15.804	29	43.5
NE Corner	16	80	14.801	29	43.497
	17	80	13.684	29	35.931
	18	80	12.648	29	30.262
	19	80	11.501	29	23.589
	20	80	10.115	29	17.566
	21	80	8.615	29	11.327
	22	80	4.814	28	53.306
	23	80	3.946	28	48.619
	24	80	3.475	28	46.014
SE Corner	25	80	0.767	28	30.006
*(Degrees Decimal Minutes)					
Approx. Area= 267 Square Miles					

Rock Shrimp Fishery	Total VMS Points	Total Rock Shrimp	Rock Shrimp Fishing (2-4 knots)	Total Points in Sub-Alternative 2b	Rock Shrimp Fishing Points in Sub-Alternative 2b	% Rock Shrimp Fishing Points in Sub-Alternative 2b
2003 - 2007	649,666	133,877	55,222	8,511	2,705	4.9%
2007 - 2013	628,982	84,504	26,034	3,486	692	2.7%
Total (2003-2013)	1,278,648	218,381	81,256	11,997	3,397	4.2%

Figure 4-4. Action 1, Sub-Alternative 2b. Oculina Bank CHAPC Proposed Northern Extension and VMS.

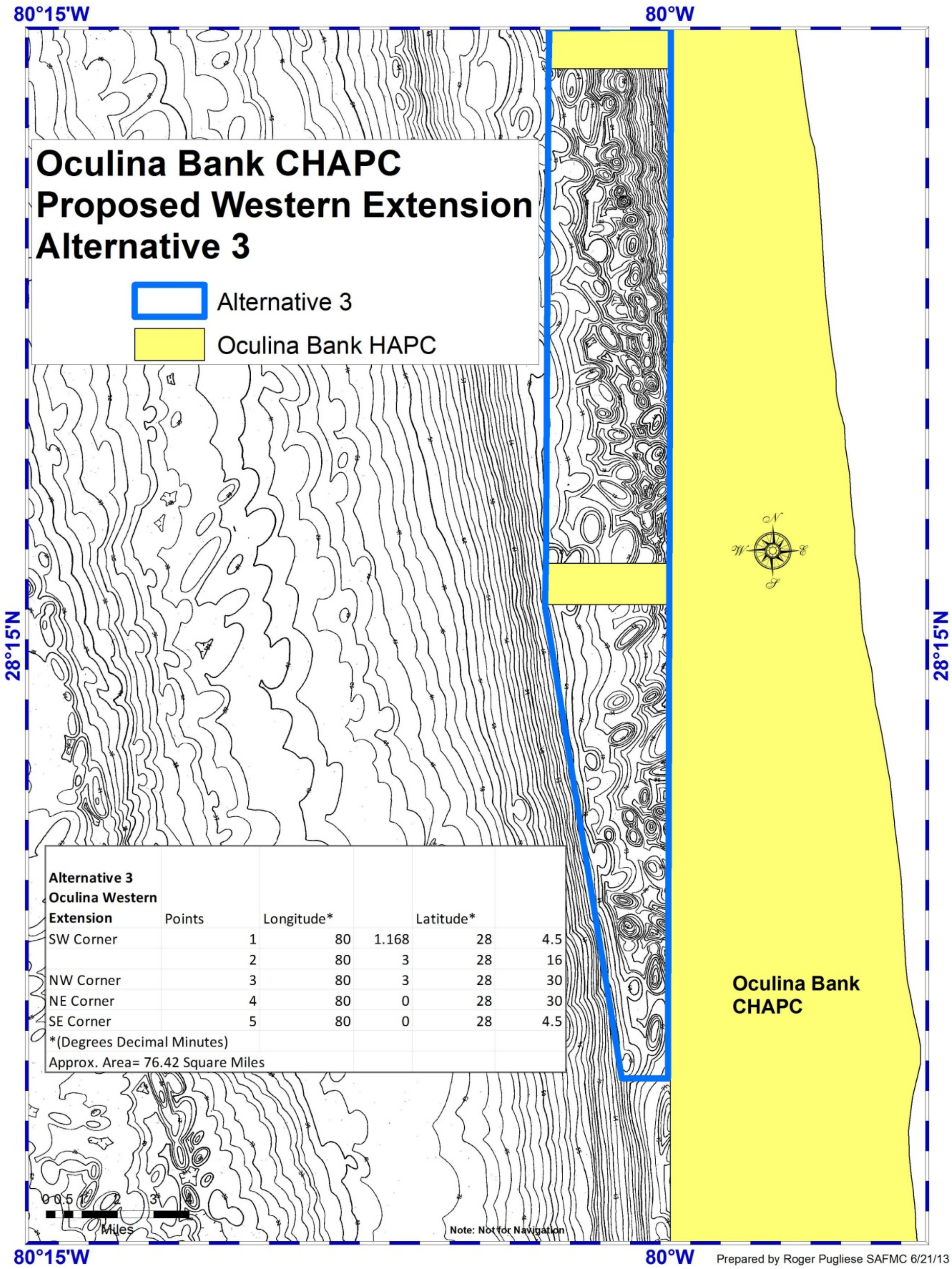
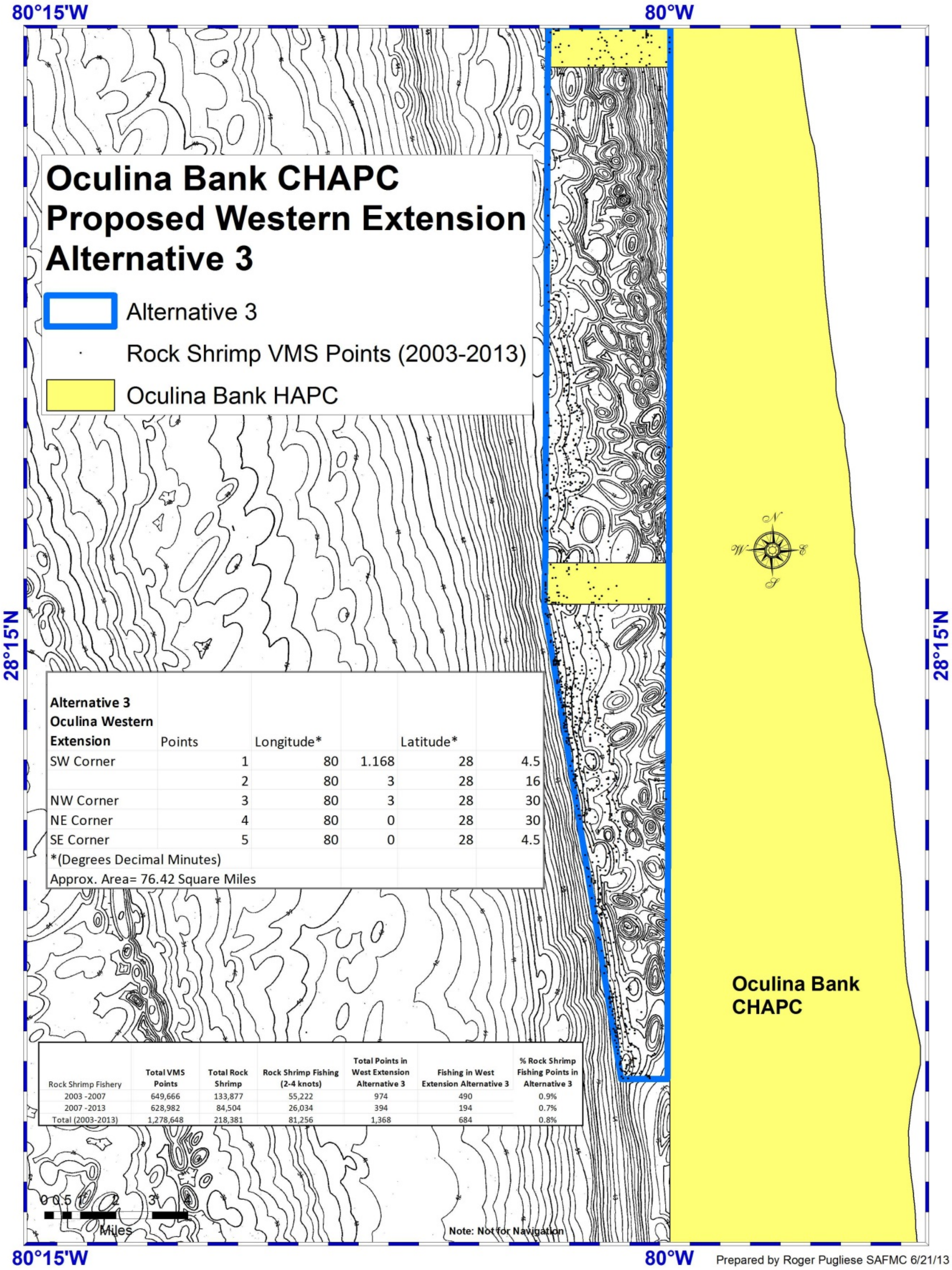


Figure 4-5. Action 3, Alternative 3. Oculina Bank CHAPC Proposed Western Extension and Associated Habitat and Bathymetry.



Alternative 3 Oculina Western Extension	Points	Longitude*		Latitude*	
SW Corner	1	80	1.168	28	4.5
	2	80	3	28	16
NW Corner	3	80	3	28	30
NE Corner	4	80	0	28	30
SE Corner	5	80	0	28	4.5
*(Degrees Decimal Minutes)					
Approx. Area= 76.42 Square Miles					

Rock Shrimp Fishery	Total VMS Points	Total Rock Shrimp	Rock Shrimp Fishing (2-4 knots)	Total Points in West Extension Alternative 3	Fishing in West Extension Alternative 3	% Rock Shrimp Fishing Points in Alternative 3
2003 -2007	649,666	133,877	55,222	974	490	0.9%
2007 -2013	628,982	84,504	26,034	394	194	0.7%
Total (2003-2013)	1,278,648	218,381	81,256	1,368	684	0.8%

Figure 4-6. Action 1, Alternative 3. Oculina Bank HAPC Proposed Western Extension and Rock Shrimp VMS (2003-2013).

Table 4-1. Rock shrimp fishing associated with Oculina Bank HAPC proposed northern extension Sub Alternative 2a and Sub-Alternative 2b (Rock Shrimp VMS: 2003-2013).

Rock Shrimp Fishery	Total VMS Points	Total Rock Shrimp	Rock Shrimp Fishing (2-4 knots)	Total Points in Sub-Alternative 2a	Rock Shrimp Fishing Points in Sub-Alternative 2a	% Rock Shrimp Fishing Points in Sub-Alternative 2a
2003 -2007	649,666	133,877	55,222	9,815	3,522	6.4%
2007 -2013	628,982	84,504	26,034	4,102	953	3.7%
Total (2003-2013)	1,278,648	218,381	81,256	13,917	4,475	5.5%
Rock Shrimp Fishery	Total VMS Points	Total Rock Shrimp	Rock Shrimp Fishing (2-4 knots)	Total Points in Sub-Alternative 2b	Rock Shrimp Fishing Points in Sub-Alternative 2b	% Rock Shrimp Fishing Points in Sub-Alternative 2b
2003 -2007	649,666	133,877	55,222	8,511	2,705	4.9%
2007 -2013	628,982	84,504	26,034	3,486	692	2.7%
Total (2003-2013)	1,278,648	218,381	81,256	11,997	3,397	4.2%

Table 4-2. Rock shrimp fishing associated with Oculina Bank HAPC proposed western extension Alternative 3 (Rock Shrimp VMS: 2003-2013).

Rock Shrimp Fishery	Total VMS Points	Total Rock Shrimp	Rock Shrimp Fishing (2-4 knots)	Total Points in West Extension Alternative 3	Fishing in West Extension Alternative 3	% Rock Shrimp Fishing Points in Alternative 3
2003 -2007	649,666	133,877	55,222	974	490	0.9%
2007 -2013	628,982	84,504	26,034	394	194	0.7%
Total (2003-2013)	1,278,648	218,381	81,256	1,368	684	0.8%

4.1.1 Biological Effects

Currently within the Oculina Bank HAPC prohibited gear includes bottom longline, bottom trawl, dredge, pot or trap as well as the use of an anchor, anchor and chain, or grapple and chain. **Alternative 2** and associated sub-alternatives and **Preferred Alternative 3**, propose increasing the size of the Oculina Bank HAPC and extending the gear prohibitions to the expanded area. These prohibitions would include the use of bottom longline, bottom trawl, dredge, pot or trap as well as the use of an anchor, anchor and chain, or grapple and chain. Therefore, as the size of the Oculina Bank HAPC is increased, the biological benefits would increase for coral, including *Oculina*, species that use the bottom substrate as habitat, and rock shrimp. Increasing the size of the Oculina Bank HAPC, may provide a refuge for other important species in the area, such as snapper grouper species by prohibiting bottom longline activity as well as anchoring.

Fishing gear that comes in contact with the seafloor inevitably disturb the seabed and pose the most immediate direct threat to deepwater coral ecosystems. Fishing gear that impacts the seafloor include bottom trawls, bottom longlines, bottom gillnets, dredges, and pots/traps (Chuenpagdee et al. 2003; Morgan and Chuenpagdee 2003). Bottom tending gear and anchors, grapples, and chains can break fragile corals, dislodge reef framework, and scar corals, opening lesions for infection. Impacts of gear damage are not limited to direct crushing of live coral but also include effects of the attached chains, which can abrade and denude coral structures. Stress caused by abrasion may result in a decline in health or stability of the reef or live bottom system. In shallow water, coral will respond through polyp retraction, altered physiology or behavior, and when sheered by anchor chains provide a point for infection. It is thought deepwater corals may respond similarly (John Reed, pers. comm. 2007). Damage inflicted by bottom tending gear, anchors, chains, and grapples is not limited to living coral and hardbottom resources but extends to disruption of the balanced and highly productive nature of the coral and live/hardbottom ecosystems.

Bottom and mid-water trawl

Bottom trawling is considered the most ecologically destructive fishing method (Chuenpagdee et al. 2003; Morgan and Chuenpagdee 2003). This gear type is used to target shrimp species in the South Atlantic living on or just above the seafloor, has been shown to severely impact deepwater coral ecosystems (Fosså et al. 2002; Hall-Spencer et al. 2002; Puglise et al. 2005). In addition, Amendment 1 to the Snapper Grouper FMP prohibited the retention of snapper grouper species caught by roller rig trawls and their use on live/hardbottom habitat north of 28° 35' N. latitude (SAFMC 1988). Furthermore, Amendment 1 to the Fishery Management Plan for the Shrimp Fishery of the South Atlantic Region (SAFMC 1996) prohibited trawling in the area east of 80° 00' W. longitude between 27° 30' N. latitude and 28° 30' N. latitude shoreward of the 183-meter (600-foot) depth contour.

Bottom trawls can weigh several tons and the footrope is further weighted to keep the net in close contact with the bottom. The footrope is usually a chain or cable and sometimes includes large, heavy rollers (rockhopper gear) that ride over obstructions and keep the net from snagging and tearing. Bottom trawling is widespread throughout the world's oceans and there are many international examples of coral damage caused by this fishing method. In Norway, trawling has severely impacted 30% to 50% of existing *Lophelia pertusa* reefs (Fosså et al. 2002) and significant trawl damage to *L. pertusa* reefs has also been documented in Irish waters (HallSpencer et al., 2002). In the Canadian Atlantic, bottom trawling dislodges deepwater corals, which inevitably end up in fishing nets (Mortensen et al., 2005). Koslow et al. (2000) reported that trawling reduced coral cover on a Tasmanian seamount from 90% to 5%, and Anderson and Clark (2003) reported that 1 hour of trawling for orange roughy (*Hoplostethus atlanticus*) off New Zealand removed 1.6 tons of corals. In the U.S., between 1997 and 2001, an average of 81.5 tons of coral was removed every year by commercial fishing in the North Pacific region; 97% of this was attributed to bottom trawls (North Pacific Fishery Management Council, 2003; NMFS, 2004).

A mid-water trawl is a cone-shaped net, which is towed in mid-water. It is normally made of four panels, ending in a codend and the net has lateral wings extending forward from the opening. The horizontal opening is maintained by otter boards. Floats and/or sail kites on the headline and weights on the groundline provide for the vertical opening. Large modern midwater trawls are rigged in such a way that the weights in front of and along the groundline provide for the vertical opening of the trawl (FAO 2009). Evidence indicates that the use of mid-water trawls can also cause damage to seamount habitats, including deepwater coral (Auster and Langton 1999; Clark et al. 2005). Mid-water trawls fished with weights in the footrope and chaffing gear in the cod end of the trawls will remove or significantly damage coral and live bottom habitat (Auster and Langton 1999; P. Auster 2009 pers. comm.) Midwater trawls have been documented to impact benthic habitat (NRC 2002) and are more effective when fished very close to, or even lightly touching, the bottom (Clark et al 2006). Especially vulnerable to these impacts in the proposed deepwater CHAPCs, are the coral pinnacles which rise in some areas to over 500 feet off the ocean floor.

Prohibiting use of any bottom tending gear in the proposed areas including trawls in this amendment is a precautionary step to avoid damage to the most vulnerable *Lophelia* and *Enallopsammia* coral-topped mounds occurring on virtually all the pinnacles explored to date with submersibles or ROVs (Reed 2006, Lumsden et. al 2007). Fisheries for orange roughy and alfonsino in the South Pacific and other fisheries on seamounts have resulted in significant damage to seamount habitats and deepwater corals (P. Auster 2009 pers. comm.; NRC 2002). While no specific research has examined the impact of mid-water trawls on the South Atlantic coral mounds within the proposed CHAPC expansions (Actions 1, 3, and 4), Vierros et al. (2006) indicate that a lack of scientific data should not be used as an excuse for inactivity and should also be balanced by the application of the precautionary principle through ecosystem-based management practices (WWF 2006).

Bottom Longline

Bottom longlines consist of a single mainline to which hundreds of shorter lines are attached armed with baited hooks. Anchors attached to the longline secure the gear to the ocean floor. Habitat damage from bottom longlines depends on the gear configuration including weights, number of hooks and type of line as well as hauling speed and technique. Habitat damage is also dependent on bottom type, with documentation of damage to corals and sponges. Mortensen et al. (2005) reported that 4% of corals along a transect off Nova Scotia had been damaged by bottom longlines.

In the South Atlantic, the use of bottom longline gear for snapper grouper species is restricted to depths greater than 50 fathoms and is prohibited 27°10' North latitude (due east of St. Lucie Inlet, Florida). Landings with this gear type are dominated by golden tilefish, which occurs in mud habitat. Most bottom longline for snapper grouper species is set at depths ranging from 180 to 300 meters, which includes the depth range in which golden tilefish most commonly occur (Low and Ulrich 1983).

Bottom longline gear is also used to target shark species. Shark bottom longline observer program data from 1994 to 2006 were plotted using to a Geographic Information System evaluate the impact of the shark bottom longline on the snapper-grouper complex within the marine protected areas (MPAs) that were being proposed MPAs through Amendment 14 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP; SAFMC 2007). The figures provided an overview of the number and locations of sets that intersected all the MPAs originally considered (Figures 4-1 and 4-2). The figures also document that most sets were shoreward of the 200 meter depth contour. Therefore, shark bottom longline has historically had little or no interaction with the proposed HAPC expansion areas in Actions 1, 3, and 4). Amendment 2 to the Atlantic Highly Migratory Species FMP (73 FR 35778), which includes management measures designed to rebuild overfished species and prevent overfishing of Atlantic sharks, is expected to reduce effort and harvest of shark species.

Dredge

Most dredges are rake-like devices that use bags to collect the catch. They are typically used to remove shellfish from the seabed, but can also be used to harvest crustaceans, finfish and echinoderms. The design details of the gear depend on the species they are intended to collect. On soft bottoms, a dredge disturbs the micro-relief (wave ripples) of bottom habitat and re-suspends fine sediments. On hardbottoms, the dredge can scrape off epibenthic fauna and disturb the substrate.

Large dredges are used offshore to harvest sea scallops. Because scallops sense and retreat from a slow-moving dredge, scallop dredges are towed at speeds up to 2.5 m/s. The scallop dredge has a steel frame with a tongue with an eye, a blade with no teeth and a bag. The mouth opening of the dredge ranges from 3 to 4.5 meters and dredge weight ranges from 500 to 1,000 kg. The largest scallop dredge vessels (~ 60 m long) drag two 4.5-meter dredges, one from each side of the vessel, and use winches and navigational electronics to maintain high efficiency. Scallop dredges disturb the seabed, which is necessary to dislodge scallops for capture in the net (NRC 2002).

Pots and Traps

Habitat damage from pots and traps can depend on many factors: size, weight and material of the trap; hauling speed and ocean conditions; depth of haul; number of traps set; and the substrate where the trap is placed. When traps make contact with the seafloor, they cause benthic disturbance, especially during hauling when they may be dragged over the seafloor. Fish traps, which are prohibited in the South Atlantic, are often larger and heavier than invertebrate traps so can cause more damage than lighter gear such as inshore lobster pots and black sea bass pots (Fuller et al. 2008).

In addition to the prohibition on the use of any bottom tending gear within Oculina Bank HAPC, fishing for or possessing rock shrimp or *Oculina* coral is prohibited under **Alternative 1 (No Action)**. **Alternative 2** and associated sub-alternatives, and **Alternative 3** propose to increase the size of the Oculina Bank HAPC and extend the prohibitions to a larger area. Therefore, as the size of the Oculina HAPC is increased, the biological benefits would be expected to increase for corals, including *Oculina*, and for the rock shrimp populations. Further, biological benefits would be expected for snapper grouper species in the proposed HAPC expansions since fishing for snapper grouper species while at anchor or with bottom longline would be prohibited. In order of most to least expected biological benefits, **Sub-Alternative 2a** would be expected to have the greatest effect by closing an additional 430 square miles, followed by **Preferred Sub-Alternative 2b** (228 square miles), and **Preferred Alternative 3** (76 square miles).

The use of vertical gear (e.g., hook and line, bandit gear) in the snapper grouper fishery would not be prohibited by the expanded Oculina Bank HAPC. As evidenced by Tables 4-3 and 4-4 recreational and commercial fishing for snapper grouper species is taking place in the proposed HAPC expansion area; however, the level of harvest is minimal. The use of vertical gear to target snapper grouper species has the potential to adversely impact coral. Sinkers, which transport bait to the bottom, particularly the heavier weights used in the high current environment typically experienced on the Oculina Bank, can impact and break off branches of Oculina coral and other fragile coral species. Additionally, fishing line can become entangled amongst its coral branches (SAFMC 2007). This gear would not be prohibited by the expanded Oculina Bank HAPC.

Hook and line fishing commonly referred to as deep drop fishing is conducted by recreational anglers targeting species such as snowy grouper, yellowedge grouper, warsaw grouper, queen snapper, blueline tilefish, golden tilefish, blackbelly rosefish, and other species in depths of 152 to 366 meters (500 to 1,200 feet). Deep drop fishing is done by the recreational sector primarily with an electric fishing reel. Weights used range from 3 pounds to 6 pounds or more depending on the current and depth. In contrast to the wreckfish portion of the snapper grouper fishery, where fishermen attempt to maintain a constant position of the bottom, fishermen in the deep drop recreational sector typically drift to catch snapper grouper species. Table 4-3 describes the percent reductions in overall harvest of snapper grouper species that are currently caught in the proposed Oculina expansion alternatives.

Tables 4-3 and 4-4 show estimated percent reductions in overall harvest of snapper grouper species assuming no snapper grouper species are caught in the proposed expanded Oculina CHAPC for the headboat and commercial sector, respectively. Tables 4-3 assumes harvest is distributed within 1/6° latitude X 5-fathom area-depth headboat reporting grids, with no effort redistribution. Table 4-4 assumes harvest is uniformly distributed within 1° latitude X 5-fathom area-depth commercial logbook reporting grids and no effort redistribution. As such, if the harvest occurs specifically within the area proposed for closure, rather than uniformly across the area-depth reporting grid, the harvest reduction might be greater than estimated. Similarly, if the harvest occurs outside the area proposed for closure, the harvest reduction might be lower than estimated. If the harvest is uniformly distributed within the area-depth reporting grid, the values in Tables 4-3 and 4-4 represent an upper bound in harvest reduction since fishermen would still be able to target snapper grouper species in the area but would no longer be able to anchor, use bottom longline, or other bottom tending gear. If effort redistributes, impacts on total harvest could be less than estimated. If fishers are able to harvest some of these stocks with innovative techniques that do not require anchoring or bottom-tending gear, then impacts on total harvest would again be less than estimated.

Fifteen snapper grouper species have been commercially harvested in the area proposed under **Sub-Alternative 2a** since 2005, but average landings (2005-2012) are less than 500 pounds for all species except for blueline tilefish (661 lbs/year using longline), greater amberjack (897 lbs/year using vertical line only), snowy grouper (2,256 lbs/year using vertical line and 576 lbs/year using longline), and golden tilefish (8514 lbs/year using longline). Seven snapper grouper species have been commercially harvested the area proposed under **Sub-Alternative 2b** since 2005, but average landings (2005-2012) are less than 500 pounds for all species except blueline tilefish (646 lbs/year using longline), snowy grouper (1,623 lbs/year using vertical line and 576 lbs/year using longline), and golden tilefish (8,514 lbs/year using longline).

Table 4-3. Estimated percent reductions in snapper grouper recreational headboat harvest from proposed CHAPC extensions in **Action 1**, by species, based on mean harvest by area (2009-2011). A dash indicates no fish were caught in the proposed area.

Extension	blueline tilefish	gag	greater amberjack	red grouper	red porgy	scamp	silk snapper	snowy grouper	vermilion snapper	yellowedge grouper
Alternative 2a	-	0.055%	0.067%	-	0.001%	0.018%	-	-	0.050%	-
Alternative 2b	-	0.036%	0.049%	-	0.001%	0.013%	-	-	0.034%	-
Alternative 3	-	0.000%	0.012%	-	-	-	-	-	0.008%	-

Source: NMFS-SERO (2013) using headboat CRNF files (SEFSC 2012).

Table 4-4. Estimated percent reductions in snapper grouper commercial harvest from proposed CHAPC extensions in **Action 1**, by species, based on mean harvest by area (2009-2011).

Extension	blueline tilefish	gag	greater amberjack	red grouper	red porgy	scamp	silk snapper	snowy grouper	vermilion snapper	yellowedge grouper
Alternative 2a	0.016%	0.378%	5.809%	0.037%	0.027%	0.236%	0.012%	1.839%	0.066%	0.033%
Alternative 2b	0.009%	0.115%	3.720%	0.003%	0.004%	0.153%	0.000%	1.178%	0.004%	0.016%
Alternative 3	0.000%	0.023%	1.143%	0.002%	0.001%	0.022%	0.000%	0.280%	0.001%	0.007%

Source: NMFS-SERO (2013) using headboat CRNF files (SEFSC 2012).

As made clear from Tables 4-3 and Table 4-4, the proposed action alternatives would not have a significant impact on snapper grouper harvest. The largest impact is on commercial vessels harvesting greater amberjack, which are often caught in the water column. **Sub-Alternative 2a** would have the greatest impact on commercial greater amberjack harvest at 5.809%. Preferred **Sub-Alternative 2b** would have a reduction of 3.720%. The impacts on the headboat harvest is minimal, as most headboat effort occurs inshore of the proposed area.

These activities would not have a direct biological impact on dolphin wahoo or coastal migratory pelagic species as fishing for those species would still be allowed in the expanded area. The golden crab fishery operates within allowable gear areas, which are not located in the proposed Oculina HAPC.

4.1.2 Economic Effects

"Marine resources are a type of natural capital that can be invested or used to generate a return to its owner" (Carter 2003). From an economic perspective, CHAPCs may be viewed as an investment instrument that is applied to a public asset (i.e., federal fishery resources). To be considered economically successful, total social benefits from CHAPC investment must outweigh all opportunity costs that are incurred, after accounting for risk. The most efficient investment scheme is the one that either maximizes excess social benefit over cost or possibly minimizes excess social cost over benefit. In other words, the preferred regulatory option should be the one that provides the greatest benefit for the least cost. A similar approach was used for Snapper Grouper Amendment 14 (SAFMC 2007) that established a network of MPAs. In this context, the net value of the proposed CHAPC expansions can be evaluated using a traditional benefit-cost framework: do the potential benefits of protection, adjusted to account for risks, outweigh the potential costs realized over both the short and long run. The discussion included here of general economic effects was covered in CE-BA 1 (SAFMC 2010c) and has been modified to fit the context of this amendment.

For the most part benefit-cost valuation for MPAs, and similar designations (like CHAPCs), is determined by distributional effects related to the displacement of recreational and commercial fishermen, changes in economic impact on surrounding communities, and bio-economic linkages associated with the protected stock. However, societal issues may be present as well. Economic benefits and costs resulting from CHAPC protection may be characterized as either consumptive (e.g., commercial and recreational fishing) or non-consumptive (e.g., diving for sightseeing purposes). Consumptive costs and benefits are direct biological and economic effects that affect the profitability of a commercial fishing fleet, the satisfaction of recreational fishermen, and the efficient use of society‘s resources. Non-consumptive benefits and costs include societal losses and gains as well as effects on fishery management. The following subsections describe specific costs and benefits relevant to implementation of CHAPCs for deepwater species. After that, specific information is provided regarding the economic environment surrounding several affected fisheries.

4.1.2.1 Costs

Consumptive Costs
Most of the consumptive costs associated with CHAPCs can be generalized as displacement effects directly incurred by commercial vessels that normally fish in the protected areas. Direct consumptive costs to fishermen unable to fish in protected areas include a decrease in catch levels; an increase in trip-level costs associated with searching for new fishing grounds; an increase in opportunity costs associated with learning a new type of fishing; congestion and user conflicts on new fishing grounds; and increased personal risk. Displacement effects have a negative impact on the predicted value of the proposed expansions of the CHAPCs in **Actions 1, 3,** and **4**. Sometimes fishermen are able to mitigate these costs by redirecting effort to open areas and targeting different species. Although some displaced fishermen may avoid some displacement costs as a result of redirecting effort and targeting different species, the addition of new fishing effort to open areas could have an extra negative effect on the health of other stocks.

4.1.2.2 Major Types of Displacement Costs

Decreased Catch Levels
In the short run, total catch by displaced vessels may be reduced. This result depends on technological decision-making by the affected vessels in response to an area closure.

Changes in fishermen behavior are likely to have a temporal and spatial context and depend on both economic and biological conditions. Short-run technological decisions could involve changes in the variable cost structure, gear modifications, and location choices involving fishing grounds as well as homeports. Decreased harvest levels may be mitigated to the extent that fishermen can find alternative forms of fishing or spillover effects may create future harvest benefits such as increased catches or reduced harvest variability.

Increase in Trip-Level/Search/Opportunity Costs
Perhaps the most significant portion of displacement costs comes from the effect the closed area has on fishing behavior. Displaced operators must now choose new fishing locations, maybe target new species, or even learn a new type of fishing. These new trip level decisions have a direct impact on trip-related variable costs as well as time-related opportunity costs. In particular, fuel costs are likely to change. The immediate search for profitable alternative fishing grounds likely results in additional fuel expenditures and lost opportunities to fish. In the case of the deepwater closures, vessels may actually use less fuel if the new fishing grounds are closer to shore or if significant spillover effects are realized on adjacent boundaries. If displaced fishermen try to learn a new type of fishing or employ new types of gear, additional costs may be incurred as the fishermen go along the learning curve.

Harvest and Personal Risks
Closed area regulations could cause fishermen to incur extra risk as they seek new and unfamiliar fishing grounds or employ unfamiliar fishing techniques. This risk could incorporate both harvest and personal dimensions. Again though, the closure of deepwater areas may force vessels inshore, which could decrease the personal risk to the crew while reduced harvest variability from spillover effects could result in extra benefits.

Regional Economic Impacts

A possible indirect consumptive cost is the short-run impact that a reduction in income has on the surrounding communities. If displaced fishermen cannot mitigate all losses incurred from the proposed CHAPC expansions, their communities likewise would be negatively affected as less income flows through different sectors of the local economy. Fishing income originally spent in the community by fishermen cycles throughout the regional economy producing a multiplier effect, which induces regional expenditures and savings totaling more than the original income. The amount of fishing income lost and the magnitude of the multiplier effect determines the extent of the negative impact on the predicted value.

Non-consumptive Costs

Decreases in the quality of inshore fishing grounds and reduced option, bequest, and existence values resulting from increased fishing pressure redirected toward inshore fish stocks result in non-consumptive costs. **Action 2** may mitigate some of these consequences. To the extent that these costs are realized, a negative influence must be accounted for in the predicted valuation of CHAPCs. See **Figure 4-7** for examples of non-consumptive uses and a depiction of how non-consumptive uses relate to other economic values of CHAPCs.

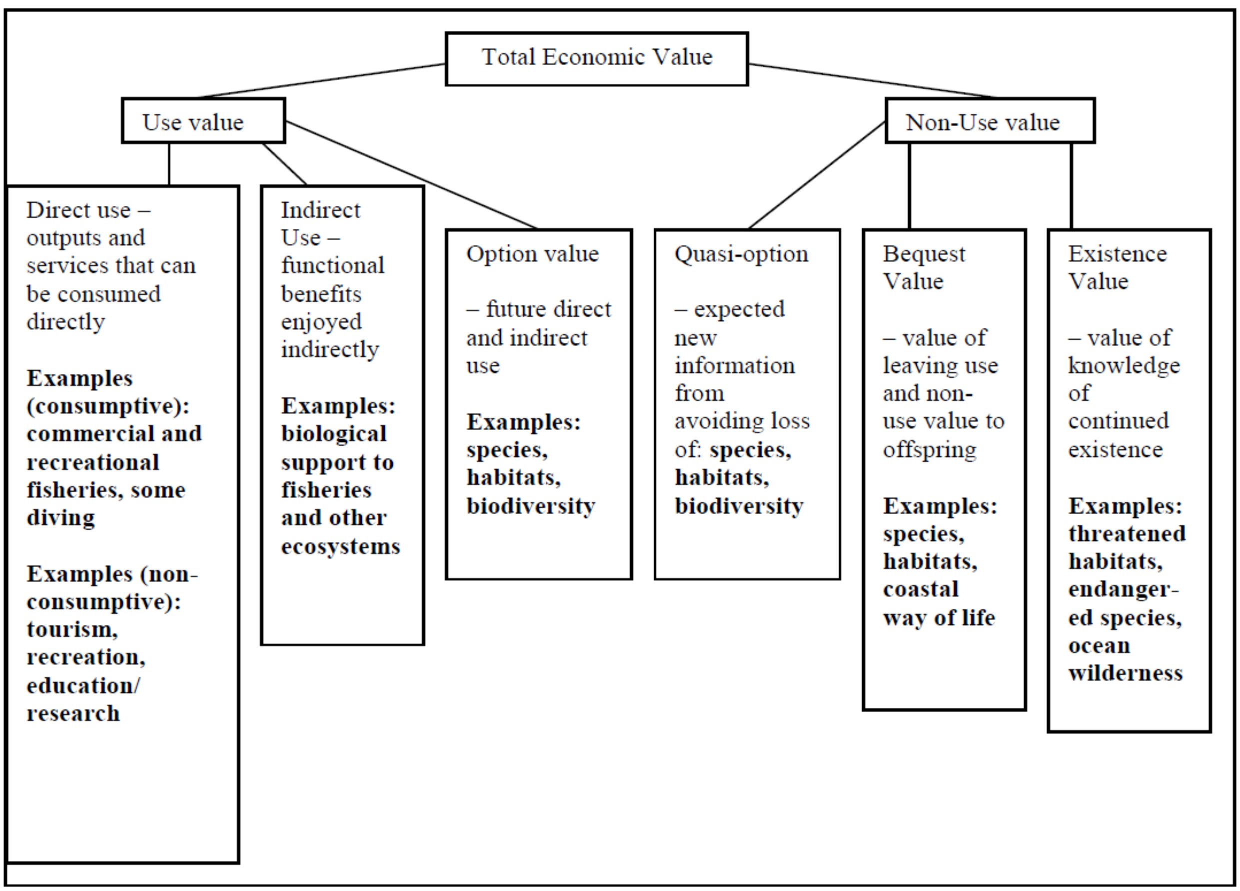


Figure 4-7. Flow chart depicting different economic values associated with protected areas.

Management Costs

Direct costs incurred by management or some institutional body include funding for planning, maintenance, and enforcement; however, enforcement costs could be mitigated relative to other types of effort restrictions resulting in a net benefit. The added regulatory cost that management must incur due to implementation of a closed area is a negative impact on the predicted value.

4.1.2.3 Benefits

Consumptive Benefits

Consumptive benefits could be realized over the long run if spillover effects are assumed to affect aggregate harvest levels in the remaining fishable areas as stocks become healthier. Major consumptive benefits include spillover effects, increased stock biomass, increased harvest levels, and reduced variability of harvests and revenues.

Replenishment/Stock Effects

These effects refer to a net increase in biomass and aggregate harvest in the remaining open areas as a result of improved habitat due to expansion of the CHAPCs. The amount of economic benefit that would eventually be derived due to spillover effects from the CHAPCs depends on a myriad of biological and economic factors specific to the species in question and the vessels that target them. The long-term realization of spillover effects would have a positive impact on the predicted economic value of the proposed CHAPC expansions.

Increased Catch Levels

Over the long run, aggregate catch by displaced and unaffected vessels alike may increase due to spillover effects. This result depends on biological characteristics of the stock as well as fleet wide technological decision-making in response to the area closure. If spillover occurs in open fishing grounds, which historically have contributed a relatively small share towards aggregate catch (perhaps due to overexploitation), then the probability of increased harvests is relatively higher; however, if the protected species are overly sessile, the probability of increased harvests is relatively lower (Sanchirico et al. 2002).

Non-consumptive Benefits

Quality Increases in CHAPCs

If regulation works from a biological perspective, then habitat and protected fish in the CHAPCs over time become more numerous and heavier, on average, due to an increase of older fish in the population. Protection could also increase biodiversity, community structure, and general habitat conditions in the short- and long-term (Leeworthy and Wiley 2002). These benefits could contribute to an overall healthier ecosystem which eventually supports sustained recreational and commercial fishing activities. Thus, environmental quality increases constitute a positive addition to the predicted value of a CHAPC.

Option Values

Benefits may arise from maintaining the option to use the ecological resources within the proposed CHAPCs in the future. In essence, society is paying a risk premium (i.e., closing the area to certain activities) to keep the option of future use available and hedge the uncertainty associated with damaging corals and their habitat. Thus, the capture of option value through gear restrictions constitutes a positive addition to the predicted value of the proposed CHAPCs. See **Figure 4-7** for a depiction of how option values relate to other economic values of protected areas.

Bequest and Existence Values
Benefits may arise from CHAPCs as future generations are able to utilize the resources in these areas. The amount that society is willing to pay for this benefit is known as a bequest value. Additionally, knowing that deepwater species would continue to exist in the future is known as an existence value. Thus, the realization of bequest and existence values through closures constitutes a positive addition to the predicted value of the proposed CHAPCs expansions. See **Figure 4-7** for a depiction of how bequest and existence values relate to other economic values of protected areas.

4.1.2.4 Commercial Fishery Sector

Action1, Alternative 1 (No Action) would not expand the boundaries of the Oculina HAPC. The additional areas proposed in **Alternatives 2** and **3 (Preferred)** would not be protected from bottom longlines; trawls (mid-water and bottom); dredge, pots, or traps; or use of anchor and chain, or use of grapple and chain by all fishing vessels. As a result, the commercial fishery could experience long-term negative impacts from potential loss of habitat for commercial species due to lack of protection of these areas. The various sub-alternatives under **Alternative 2** and **Alternative 3 (Preferred)** could have negative short-term impacts on the rock shrimp and snapper grouper fisheries.

Rock Shrimp
The rock shrimp and snapper-grouper fisheries are known to operate in the proposed Oculina Bank HAPC expansion. **Table 4-5** is based on the vessel monitoring system (VMS) points as a percent of fishing that occurred in the areas proposed under **Alternatives 2** and **3 (Preferred)** **(Tables 4-1**, **4-2**, and **4-4**). The ex-vessel value of the reduction in rock shrimp landings is estimated to be approximately \$3.00 per pound in 2012 dollars (Pers. comm., Mike Merrifield, July 9, 2013). The value of rock shrimp will fluctuate based on the availability of the shrimp and could go as high as perhaps \$3.50 per pound or as low as \$2.50 per pound. The ex-vessel value only indicates the potential loss to the vessel. The economic impact of reduced landings will be higher. For example, shrimp that have an ex-vessel value of \$3.00 per pound will be processed and sold at \$13.50 per pound (headed) by the dealer to a restaurant (Pers. comm., Mike Merrifield, July 10, 2013). Each pound of processed shrimp requires 1.67 pounds of whole shrimp. Restaurants typically sell rock shrimp for \$8 per dozen and there are approximately 4 dozen processed shrimp per pound. The dealer gets paid \$13.50 per pound by the restaurant, from which there is \$5 in raw material plus processing and other costs that must be taken out to become the dealer’s profit. The restaurant gets \$32 per pound from which their \$13.50 purchase price per pound plus costs must be removed in order to determine their profit from the shrimp. Examples of direct and indirect multipliers of the ex-vessel value include costs to the fishermen, dealer, and restaurant include hiring employees, processing, payments to vendors and other

charges. In addition, induced multipliers are those dollars as they continue to flow through the economy, but are not directly related to the final product, such as the spending of a personal nature by the fisherman or dealer of money received from the sale of rock shrimp such as for home mortgages, groceries to feed their families, etc.

Alternative 2a has the greatest direct negative economic effect for ex-vessel value at $472,600, followed by **Preferred Alternative 2b** at $193,549 and then by **Preferred Alternative 3** at $39,400 (**Table 4-5**). The combined direct negative economic effect of **Preferred Alternatives 2b** and **3** is $232,949.

Table 4-5. Percent of area affected, reduction in pounds harvested, and the value of the reduced pounds harvest of rock shrimp based on VMS estimates (2007 – 2013) for **Action 1** alternatives.

Action 1	% Affected Area	Reduced lbs	Value of Reduction
Alternative 2a	9%	157,533	$472,600
Pref Alternative 2b	4%	64,516	$193,549
Pref Alternative 3	1%	13,133	$39,400

Snapper Grouper

Commercial landings of 10 snapper grouper species are expected to be affected by the alternatives in **Action 1**. Expected average annual landing percent reductions of the 10 species from **Table 4-4** were used to calculate the average annual reduction in pounds and expected reduction in revenue (in 2012 dollars). The results are shown in **Table 4-5**. Landings value for greater amberjack would be expected to be most affected by each of the proposed closed areas, followed by gag, snowy grouper, and vermilion snapper. **Alternative 2a** would be expected to have the largest direct negative economic effect on ex-vessel values of $72,809 per year, followed by **Preferred Alternative 2b** at $42,941, and then **Preferred Alternative 3** at $12,672. The combined expected annual reduction ex-vessel in revenue from **Preferred Alternatives 2** and **3** is $55,613.

The commercial snapper grouper fishery in general is expected to benefit in the long-term from an overall healthier ecosystem resulting from protection of corals and habitat and from increased stock levels.

Table 4-6. Average annual reduction of pounds and value (in 2912 $) of snapper grouper complex species expected from alternatives from **Action 1** from the commercial sector.

Species		Alt 2a	**Pref Alt 2b**	**Pref Alt 3**
Blueline Tilefish	% Expected Reduction	0.016%	0.009%	0.000%
	Reduced lbs	12	7	0
	Value of Reduction	$18	$10	$0

Gag	% Expected Reduction	0.378%	0.115%	0.023%
	Reduced lbs	1,421	432	86
	Value of Reduction	$6,997	$2,129	$426
Greater Amberjack	% Expected Reduction	5.809%	3.720%	1.143%
	Reduced lbs	51,955	33,271	10,223
	Value of Reduction	$58,207	$37,275	$11,453
Red Grouper	% Expected Reduction	0.037%	0.003%	0.002%
	Reduced lbs	95	8	5
	Value of Reduction	$353	$29	$19
Red Porgy	% Expected Reduction	0.027%	0.004%	0.001%
	Reduced lbs	38	6	1
	Value of Reduction	$68	$10	$3
Scamp	% Expected Reduction	0.236%	0.153%	0.022%
	Reduced lbs	433	281	40
	Value of Reduction	$987	$640	$92
Silk Snapper	% Expected Reduction	0.012%	0.000%	0.000%
	Reduced lbs	1	0	0
	Value of Reduction	$2	$0	$0
Snowy Grouper	% Expected Reduction	1.839%	1.178%	0.280%
	Reduced lbs	1,078	691	164
	Value of Reduction	$4,257	$2,727	$648

Vermilion Snapper	% Expected Reduction	0.066%	0.004%	0.001%
	Reduced lbs	558	34	8
	Value of Reduction	$1,908	$116	$29
Yellowedge Grouper	% Expected Reduction	0.033%	0.016%	0.007%
	Reduced lbs	4	2	1
	Value of Reduction	$12	$6	$2
Total	Reduced lbs	55,595	34,731	10,530
	Value of Reduction	$72,809	$42,941	$12,672

Source: NMFS Logbook Data.

4.1.2.5 Recreational Fishery Sector

Some of the snapper grouper species living in the areas slated for the CHAPC expansion proposed in **Action 1** are commonly targeted by recreational fishermen. The species living in the proposed extension areas include blueline tilefish, gag, greater amberjack, red grouper, red porgy, scamp, silk snapper, snowy grouper, vermilion, yellowedge grouper. The short-term economic effects to the recreational fishery from **Alternatives 2** (including sub-alternatives) and **3 (Preferred)** consist of the decrease in landings from the prohibition on anchoring and prohibition on the use of certain bottom tending gear, including bottom longline. These short-term economic effects are expected to be negative. The long-term economic effects to the recreational sector from **Alternatives 2** (including sub-alternatives) and **3 (Preferred)** would result from greater stock levels of targeted species due to habitat protection primarily. Long-term economic effects are expected to be positive and to outweigh the negative short-term economic effects.

With regard to short-term economic effects, potential landings loss estimates have been made (**Table 4-3**) using headboat logbook information. While some headboat, charter and private recreational vessels likely fish in the Oculina Bank HAPC expansion areas proposed, only the poundage of species taken by headboats in the proposed areas in **Alternatives 2** (including sub-alternatives) and **3** (including sub-alternatives) in **Action 1** could be estimated due to a lack of data reported for charter and private recreational fishing on a geographic basis (see **Table 4-7**).

Table 4-7. Potential economic losses to headboats from Action 1 alternatives , in pounds.

	Alternative 2a	Alternative 2b	Alternative 3
Blueline tilefish	0	0	0

Gag	2	1	0
Greater amberjack	2	2	0
Red grouper	0	0	0
Red porgy	0	0	0
Scamp	1	1	0
Silk snapper	0	0	0
Snowy grouper	0	0	0
Vermilion snapper	86	59	14
Yellowedge grouper	0	0	0

The anchoring prohibition that would be in effect in **Action 1, Alternatives 2** (including sub-alternatives) and **3 (Preferred)** would not affect fishing activities for those that do not anchor (e.g., troll fishery for billfish, dolphin, wahoo, tuna, etc.). While most fishing vessels would not be able to anchor effectively in the deeper depths included in the proposed areas in **Alternatives 2** (including sub-alternatives) and **3 (Preferred)**, anecdotal information indicates that anchoring does sometimes occur on sea mounds and in shallower depths in the proposed areas. Negative short-term economic effects to recreational fishermen will occur for fishermen anchoring in the proposed expansion areas in **Alternatives 2** (including sub-alternatives) and **3 (Preferred)**. While these landings losses cannot be quantified for charter and private recreational vessels (as mentioned above), negative economic effects to headboats could total the amounts shown in Table 4-3 where losses are highest for gag, greater amberjack, scamp and vermilion snapper. Because losses would only occur for catches made while anchoring and estimates for those vessels anchoring do not exist, the percentage landings shown in Table 4-3 and actual landings in pounds shown in **Table 4-7** are the upper limits of short-term negative effects on headboats. The potential short-term negative economic effects for headboats are totaled in **Table 4-8** below using average weights per species and a value of $32 per snapper grouper species. As stated above, if redistribution of fishing effort can be achieved, then economic effects could be less. If redistribution of fishing effort cannot be achieved, then economic effects could be higher than estimated.

Table 4-8. Potential economic losses to headboats from **Action 1** alternatives and suboptions, in 2011 dollars.

	Alternative 2a	**Alternative 2b**	**Alternative 3**
Blueline tilefish	$0	$0	$0
Gag	$51	$33	$0
Greater amberjack	$67	$49	$12
Red grouper	$0	$0	$0
Red porgy	$6	$6	$0
Scamp	$22	$16	$0
Silk snapper	$0	$0	$0
Snowy grouper	$0	$0	$0
Vermilion snapper	$2,757	$1,875	$441
Yellowedge grouper	$0	$0	$0

In deepwater areas like those proposed for expansion under **Action 1**, recreational fishermen sometimes use jigging gear to catch some of the species mentioned above as well as wreckfish and this is commonly referred to as “deep dropping”. However, according to fishermen participating in this type of fishing, the vessels do not anchor (personal communication, Greg Debrango, July 11, 2013). Furthermore, the gear they use is not prohibited under **Action 1**. Additionally, anecdotal information (personal communication, Greg Debrango, July 11, 2013) indicates that recreational deep dropping does not occur in the areas under consideration for CHAPC expansion. Since habitat damage from wreckfish and snapper grouper deep dropping fishing is unknown, even if fishing is taking place in the proposed areas, the effects cannot be quantified at this time.

Long-term economic effects to the recreational fishing sector are expected to be positive and to outweigh the short-term negative effects. The recreational snapper grouper fishery is expected to benefit in the long-term from an overall healthier ecosystem resulting from protection of corals and habitat and from increased stock levels.

In summary, the short-term negative economic effects on the recreational sector from the **Action 1** alternatives are largely unknown and were only able to be estimated for the headboats. The recreational short-term effects overall, are likely to be minimal and will only occur if anchoring is taking place and if recreation effort cannot be redistributed. The long-term economic effects are expected to be positive from the alternatives proposed under **Action 1**. **Alternative 2a** proposes the largest area for incorporation into the Oculina Bank CHAPC followed by **Preferred Alternatives 2b** and **3**. Therefore, **Alternative 2a** would likely result in the greatest long-term economic benefits for the recreational sector followed by **Preferred Alternatives 2b** and **3**, respectively. Short-term negative economic effects would likely be greatest under **Alternative 2a**, followed by **Preferred Alternatives 2b** and **3**, respectively.

4.1.2.6 Non-Use Value

Protecting this habitat described in **Action 1** is expected to result in overall positive net economic benefits to society. Specifically, society is expected to benefit from the possible availability of new information resulting from avoiding the loss of coral species that could be used to benefit society, an increase in bequest value, and an increase in existence value (see the beginning of the economic impacts section for an explanation of these terms). The full suite of benefits the species that the proposed CHAPC expansions would protect are unknown but could include medicinal and environmental benefits.

4.1.3 Social Effects

Closed areas can have significant negative social effects on fishermen if any 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, as long as 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.

For the proposed expansion of closed areas in this action, the primary communities with the highest regional landings of deepwater shrimp are all in Florida and include Titusville, Mayport, Jacksonville, Cocoa Beach and Atlantic Beach (**Section 3.4.3**; **Tables 3-5** and **3-6**). The communities of Jacksonville and Cocoa Beach include residents and businesses associated with the royal red and rock shrimp fisheries, however these are relatively larger areas with other economically important industries (such as tourism or NASA) and changes to the deepwater shrimp fishery would not expected to result in impacts at the community level. However, the local economies of Titusville, Mayport, and Atlantic Beach are more engaged and reliant on commercial fishing, including participation in the royal red and rock shrimp fisheries. Impacts on fishermen and individual businesses due to expansion of closed areas would be expected to occur primarily in these five areas, and community-level impacts would be expected in Titusville, Mayport, and Atlantic Beach.

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 costs of expanding closed areas that could impact the fleet would not occur under **Alternative 1 (No Action)** and changes in fishing behavior or fishing opportunities would not be expected. However, if maintaining the open areas where substantial deepwater coral exists or is likely to exist, any continued impact from fishing activities could have negative biological effects on the habitat, as discussed in **Section 4.1.1**. Significant impact to the deepwater coral could eventually impact the fishing fleet through more restrictive management measures.

Alternative 2 (and sub-alternatives) and **Preferred Alternative 3** would impact the rock shrimp fleet, royal red shrimp fleet and possibly other commercial fisheries by closing some historic, present and potential future fishing grounds. Additionally, if a transit provision is not established, travel costs could negatively affect some operations. If the cost to travel to or from the fishing grounds is too high due to expanded closed areas under **Alternative 2** (and sub-alternatives) and **Preferred Alternative 3**, a business may choose to no longer participate in the fishery. The size and the location of the closed areas are the two most significant factors that would be expected to negatively impact fishermen. Larger areas (such as **Sub-Alternative 2a**) could have more impact than smaller proposed areas (such as **Preferred Sub-Alternative 2b**) if the location is in an area where harvest is occurring.

4.1.4 Administrative Effects

The expansion of the Oculina Bank HAPC (**Alternative 2** and sub-alternatives, **Preferred Alternative 3**) would have a moderate administrative impact. Administrative impacts would be incurred through the rule making process, outreach, and enforcement. The impacts associated with enforcement would differ between the alternatives based on the size of the closed area. It is expected the larger the expansion of the HAPC the more enforcement would be needed. Most of the administrative impacts associated with these alternatives relate to at-sea enforcement.

However, the shrimp fisheries that occur in the area are required to have a VMS and this reduces the level of at-sea enforcement.
However, the shrimp fisheries that occur in the area are required to have a vessel monitoring system and this reduces the level of at-sea enforcement.

4.2 Action 2. Implement a transit provision through the Oculina Bank HAPC

Alternative 1 (No Action). Do not implement a transit provision through Oculina Bank HAPC. Currently, possession of rock shrimp in or from the area on board a fishing vessel is prohibited.

Alternative 2. Allow for transit through the Oculina Bank HAPC. When transiting the Oculina Bank, gear must be stowed in accordance with CFR Section 622.183(a)(1)(ii). Vessels must maintain a minimum speed of 5 knots while in transit through the Oculina HAPC. In the event minimal speed is not sustainable, vessel must communicate to appropriate contact.

Preferred Alternative 3. Allow for transit through the Oculina Bank HAPC with possession of rock shrimp on board. When transiting through the HAPC, vessels must maintain a minimum speed of not less than 5 knots, determined by a ping rage acceptable by law enforcement (i.e. 5 minutes), with gear appropriately stowed (stowed is defined as doors and nets out of water).

4.2.1 Biological Effects

Transit provisions have been established in the South Atlantic for other fisheries to allow for easier access to traditional fishing grounds through closed areas. Establishing a transit provision through Oculina Bank HAPC may have negative biological benefits for the rock shrimp stocks that are on the eastern side of Oculina Bank HAPC as fishing vessels would be able to access them more easily than they have in the past. Without a transit provision, the trip to those fishing grounds would be long and cost prohibitive to fishermen, providing an indirect protection to those shrimp populations. A transit provision for the dolphin and wahoo, coastal migratory pelagics, snapper grouper and golden crab fisheries is not needed as the regulations do not currently prevent them from transiting the area.

4.2.2 Economic Effects

The intent of **Action 2** is to lessen the economic effects on rock shrimp fishermen should the South Atlantic Council choose to implement **Action 1**, **Sub-alternative 2a**, **Preferred Sub-alternative 2b,** or **Preferred Alternative 3**, any of which would expand the size of the Oculina Bank HAPC northwards and westward. **Action 2, Alternative 1 (No Action)** would require rock shrimp fishermen to travel around either the northern or southern boundary of the Oculina Bank HAPC to reach allowable fishing grounds on the east side. None of the proposed sub-alternatives would extend the boundary of the HAPC southward. All of the other alternatives/sub-alternatives of **Action 1** would increase the northern latitude by the same distance. Moving the northern boundary further north would increase the direct economic costs in terms of increased expenses (fuel) and lost opportunity, not only due to the loss of fishing grounds in the additional closed area, but also due to fishing time lost by having to transit around the closed area. While the exact extent of the economic effects of **Action 1**, **Sub-Alternatives 2a** and **2b** combined with **Action 2, Alternative 1 (No Action)** cannot be determined, the overall range of economic effects of the sub-alternatives would best be characterized in terms of the total additional area closed. In order of most to least expected direct negative economic effects, **Sub-Alternative 2a** would be expected to have the greatest effect by closing an additional 430 square miles, followed by **Preferred Sub-Alternative 2b** (228 square miles).

Rock shrimp fishermen would receive some relief from the expected negative economic effects from **Action 1, Alternative 2** or **Preferred Alternative 3**. Either of these alternatives would allow fishermen to transit the Oculina Bank HAPC with gear stowed and transiting at a minimum speed of 5 knots. **Action 1 Alternative 2**, regardless of which alternative or sub-alternative is chosen, would benefit fishermen because the transit provision through the Oculina Bank HAPC would allow transit through the entire HAPC. Fishermen that are now required to transit around the current boundaries could transit through as long as they follow the guidelines. This would be a positive, direct economic benefit for these fishermen as they will use less fuel and take less time to get to their fishing grounds.

Preferred Alternative 3 has the same transit provisions as **Alternative 2**, however **Preferred Alternative 3** requires vessels to have aboard a VMS system that will have the ability to have a higher ping rate than many vessels in the fleet currently have. Currently, there are 79 vessels in the rock shrimp fleet that have VMS. Of those, 22 have older units purchased when the fishery was required to implement them in 2003. Those units will need to be upgraded (see **Table 4-9** for current approved VMS unit costs). None of the units would be eligible for reimbursement by the NMFS OLE VMS Fund. The 22 vessels needing to upgrade their units would have to pay for the installation, maintenance, and increased communications charges associated with having a VMS (**Table 4-10**).

Table 4-9. NMFS-approved VMS units and cost.

Brand and Model	Cost
Boatracs FMCT-G	$3,095
Thrane and Thrane TT-3026D	$2,495
Faria Watchdog KTW304	$3,295
CLS America Thorium TST	$3,095

Source: Data provided by NMFS Office of Law Enforcement, July 2012.

Table 4-10. Communication costs associated with some NMFS-approved VMS units.

1. Qualcomm (for Boatracs units)
$30/mo satellite fee, $.30/message, $.006 per character for messaging (average price estimated $35/month which includes 24/7 operations center support)
2. Telenor (for Thrane units)
$.06 per position report or $1.44 per day for 1 hour reporting. If in the "In Harbor"

mode, then \$.36 per day. Messaging costs \$.24 per e-mail. (\$30/mo average)

3. Iridium/Cingular Wireless (for Faria units)

\$50.25 per month which includes 12,000 Iridium bytes and 35,000 GSM bytes for email and e-forms reporting.

4. Iridium (for CLS America units)

\$45 per month for hourly reporting, \$1.75 per Kbyte for e-mail or forms submission.

Source: Data provided by NMFS Office of Law Enforcement, July 2012.

Installation costs are approximately \$300 per unit depending upon location of the vessel and installer assuming the vessel is already equipped with a wheelhouse or some other structure on the vessel that would protect the parts of the gear that must not be exposed to the elements. Vessels that do not have a wheelhouse or other weatherproofed area would face the additional cost of adding such a space to their vessel. The number of vessels needing such modifications or the cost of those modifications cannot be estimated. Such modifications would significantly increase the \$300 per unit installation cost for those vessels. Maintenance costs cannot be estimated with existing information. Communication costs for each of the models average from \$35 to \$80 per month, depending on owner data usage, and are provided in (**Table 4-2)**.

Assuming all 22 vessels needing to upgrade their units choose the lowest price Thrane unit at \$2,495 each, the cost of the units is expected to be \$54,890. The additional cost of installation would be approximately \$6,600, for a total minimum cost of \$61,490 to upgrade to the least expensive necessary hardware.

Currently, all rock shrimp vessels, regardless of whether they must upgrade their units will see increased cost. Even the 57 units that do not need to be replaced will incur charges of approximately \$150 to \$250 per unit to upgrade hardware/software that could include delays if the antenna must be transported to the vendor to perform the upgrade. Not knowing exactly how much each upgrade will cost, the middle of the range, \$200 mltiplied by the 57 units that do not need to replace their hardware will incur a one-time cost of \$11,400. The total cost of hardware and software upgrades required to allow transit under **Preferred Alternative 3** for all vessels in the fleet is estimated to be \$72,890.

All vessels who wish to transit the Oculina Bank HAPC will be required to pay for increased communications charges. The exact amount of the increased communications charges cannot be determined as it will depend on how often the vessel will cross through the Oculina Bank HAPC.

Some, if not all, of the increased cost of upgrading hardware and software, plus increased communications charges in order to transit through the Oculina Bank HAPC would be offset by not being required to transit around the HAPC to get to fishing grounds. Allowing transit ought to increase the amount of time on a trip spent fishing, as well as save on fuel and other vessel maintenance costs.

Alternative 2 would be expected to have the greatest direct economic effect on the rock shrimp fishery, followed by **Alternative 3**. **Alternative 1 (No Action)** would likely cause a direct negative economic effect on the fishery provided the size of the HAPC is increased as a result of **Action 1**. If the size of the Oculina Bank HAPC is not increased through **Action 1**, **Alternative**

1 (No Action) of **Action 2** is not expected to have increased or decreased direct economic effects.

4.2.3 Social Effects

If additional closed areas are established under **Action 1,** some negative impacts on the fishing vessels and crew may be reduced with a transit provision, as discussed in **Section 4.1.3**. The transit provision in **Alternative 2** would be beneficial to the shrimp vessels by reducing the risk of negative impacts due to increased travel time and costs when traveling around a closed area to outer fishing grounds. Establishment of a transit provision under **Alternative 2** would not be expected to reduce the long-term social benefits of coral protection while reducing some of the negative impacts on the fishing fleet and other vessels.

Preferred Alternative 3 would also be expected to continue coral protection and reduce some of the negative impacts on fishermen. By specifying that a transit provision is for rock shrimp vessels, this would also minimize any negative impacts and reduction in coral protection due to the allowable transit areas because rock shrimp vessel movement can be monitored through the required VMS systems on board. **Preferred Alternative 3** would be expected to help reduce negative impacts from **Action 1** on individual fishermen, fishing businesses, and the communities of Mayport and Titusville (see **Section 3.4.3**.)

4.2.4 Administrative Effects

There would be minor administrative impacts associated with a transit provision through Oculina Bank HAPC. Administrative impacts associated with enforcement would be greatest for the action alternatives. If modifications are made to the transit regulations, administrative impacts would increase on the agency during the development and implementation phase. **Preferred Alternative 3** would require the vessel to maintain a speed of 5 knots as indicated by an increased ping rate on the VMS. Depending on the frequency of transit, this might lead to a slight increase in the impacts associated with monitoring of VMS by law enforcement. There would be administrative impacts associated with ensuring that all VMS units are capable of the increasing ping rate and supplying VMS units to those which need to be replaced.

4.3 Action 3. Expand boundaries of the Stetson-Miami Terrace CHAPC

Alternative 1. (No Action) Do not expand the boundaries of the Stetson-Miami Terrace CHAPC.

The existing Stetson-Miami Terrace CHAPC is delineated by the coordinates identified in CFR §622.224(c)(1)(iii).

Alternative 2. Modify the southern southeast boundary of the Stetson-Miami Terrace CHAPC western extension in a manner that releases the flatbottom region to the extent possible while possible while maintaining protection of coral habitat (as depicted in **Figure 4-8**). Alternative 2 = 490 square miles

Alternative 3. Modify the Coral AP recommendation for expanding the Stetson-Miami Terrace CHAPC to include area of mapped habitat within the expansion, and exclude areas of royal red fishery activity based on VMS data (**Figure 4-9**). Alternative 3 = 653 square miles

Preferred Alternative 4. The recommendation is a back-up preferred Alternative for the proposed extension of the Stetson-Miami Terrace CHAPC. The back-up recommendation includes Alternative 2 as proposed with inclusion of a new Shrimp Fishery Access Area for drift-haul back as represented in the **Figure 4-10**. With the inclusion of a new Shrimp Fishery Access Area in Alternative 2, royal red shrimp fishing, or VMS points (2-4 knots) (2003-2013) would be further reduced to 0.1% from 0.7% for Alternative 2 alone **(Figure 4-10)**. Alternative 4 = 490 square miles

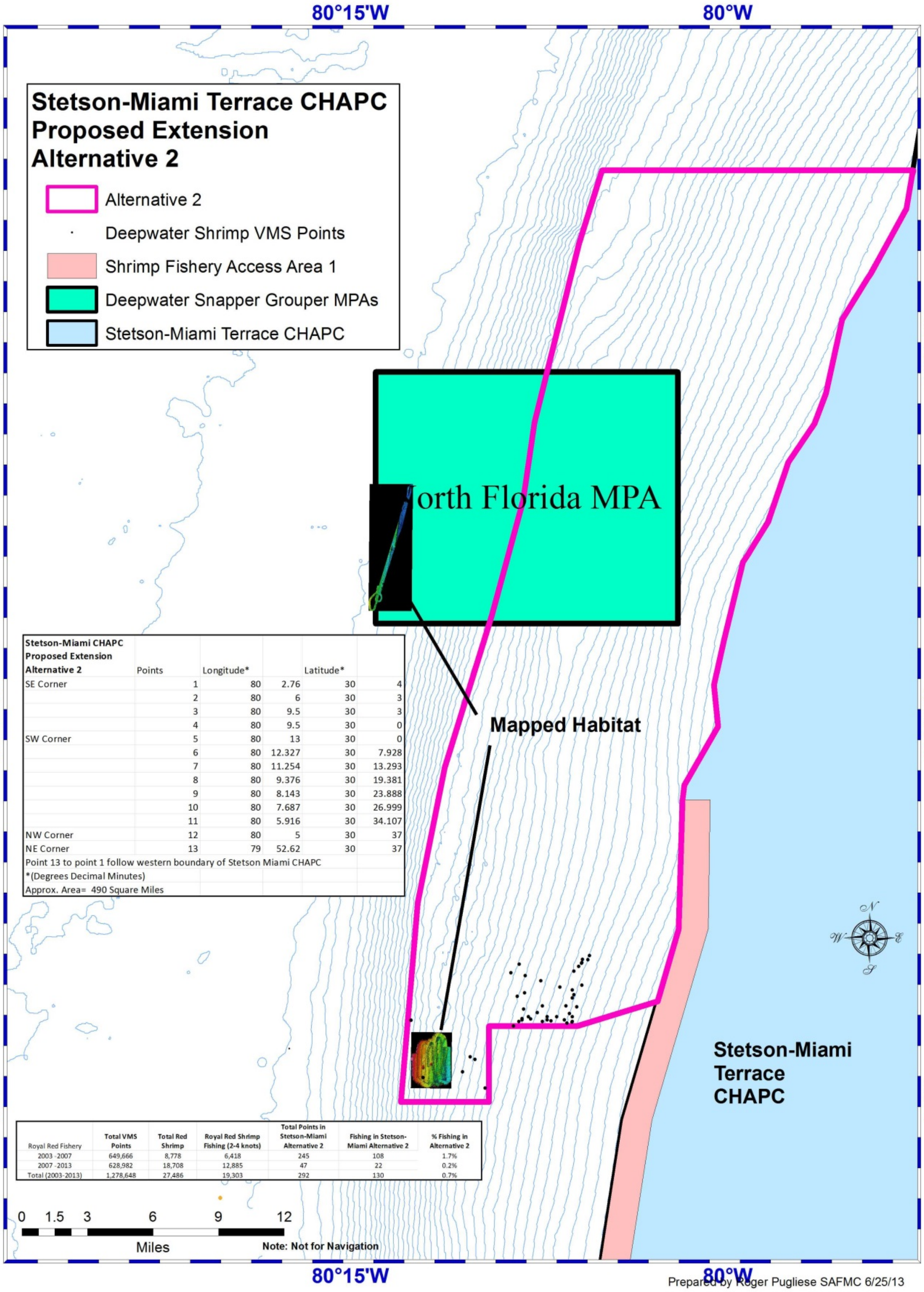
IPT recommendation for language revisions to **Preferred Alternative 4**:
Preferred *Alternative 4.* *Modify the southern southeast boundary of the Stetson-Miami Terrace CHAPC western extension in a manner that releases the flatbottom region to the extent possible while maintaining protection of coral habitat. Allow for a Shrimp Fishery Access Area to be used as a gear haul back/drift zone as shown in **Figure 4-10.** Alternative 4 = 490 square miles*

Note: Coordinates for the CHAPC extension alternatives are found in **Appendix M**

<u>Background</u>

Research conducted by Brooke and Ross (2012; **Appendix L**) was presented to the Coral AP in 2011 concerning field surveys where observations of a shallow water *Lophelia pertusa* ecosystem outside of the western boundary of the Stetson-Miami Terrace CHAPC were documented (reference **Section 3.1.1.4** for additional information). The surveys, conducted during 2010, utilized a variety of assessment techniques including multibeam mapping, ROV dives and ROV video. A poster was presented during the 5th International Symposium on Deep-Sea Corals 2012 (**Appendix L**) describing the discovery of live *Lophelia pertusa* coral colonies and deepwater organisms in unusually shallow depths off the coast of Jacksonville and adjacent to the western CHAPC boundary. Observations at this site included a shallow occurrence of deep water species, including corals (predominantly *Lophelia pertusa*), sponges, invertebrates and fish. The presence of coral thickets and rubble led scientists to determine the area was an established and highly productive ecosystem rather than a short-term anomaly. Scientists predict the ecosystem to be maintained by a long-term oceanographic feature bringing colder water onto the continental shelf (**Appendix L**). The findings from this research combined with bathymetric information, resulted in the AP's recommendation for modification of the western Stetson-Miami Terrace CHAPC boundary to include documented *Lophelia* sites as well as expected occurrences.

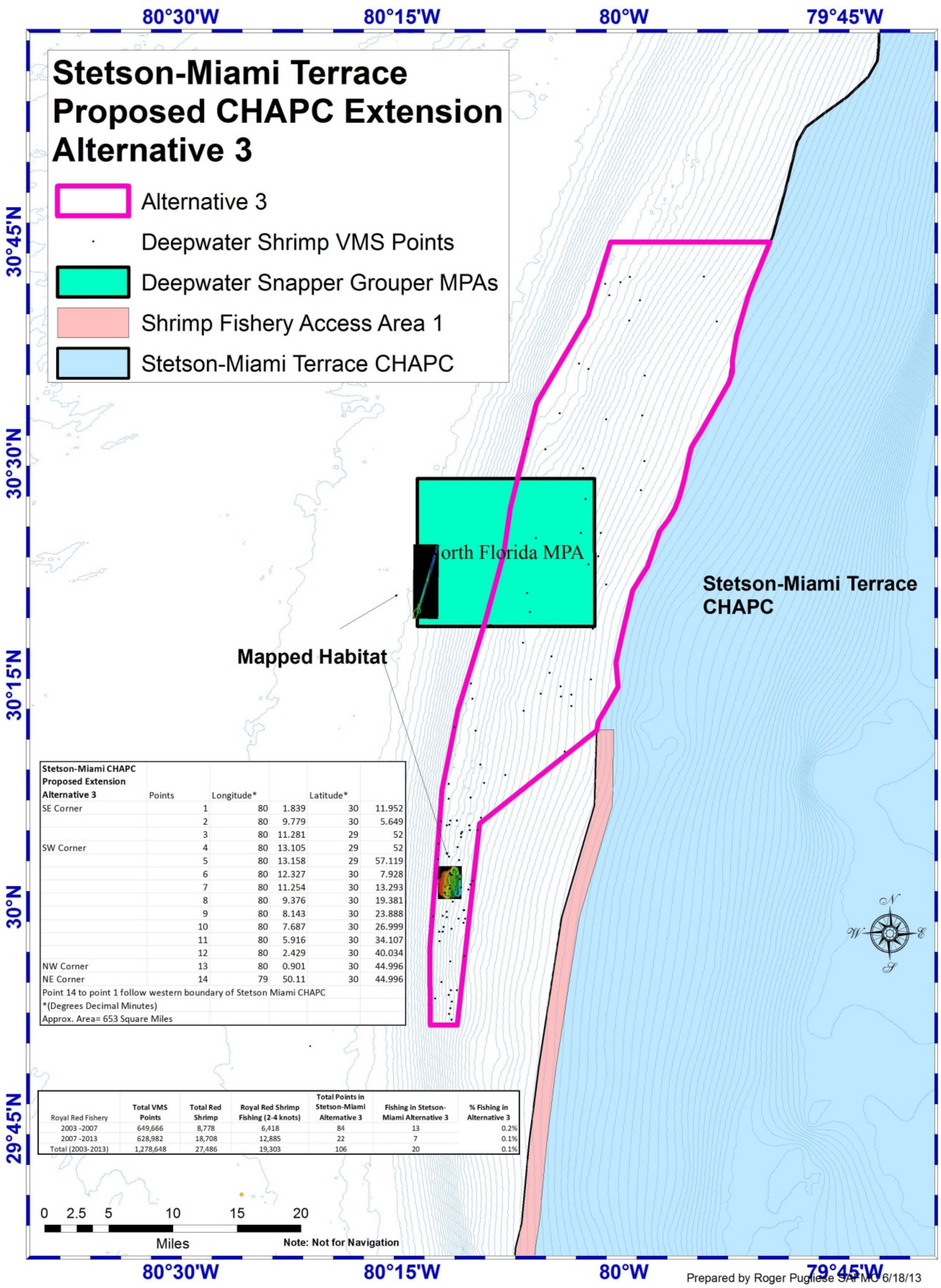
At the March 2013 South Atlantic Council meeting, the shrimp fishermen expressed concern about being able to haul back fishing gear without drifting into the CHAPC. **Preferred Alternative 4** was developed in response to their concerns. **Preferred Alternative 4** would essentially be the same as **Alternative 2** but would provide a haul back zone to reduce the risk of the shrimp fishermen being in violation.



Stetson-Miami CHAPC Proposed Extension Alternative 2	Points	Longitude*		Latitude*	
SE Corner	1	80	2.76	30	4
	2	80	6	30	3
	3	80	9.5	30	3
	4	80	9.5	30	0
SW Corner	5	80	13	30	0
	6	80	12.327	30	7.928
	7	80	11.254	30	13.293
	8	80	9.376	30	19.381
	9	80	8.143	30	23.888
	10	80	7.687	30	26.999
	11	80	5.916	30	34.107
NW Corner	12	80	5	30	37
NE Corner	13	79	52.62	30	37
Point 13 to point 1 follow western boundary of Stetson Miami CHAPC					
*(Degrees Decimal Minutes)					
Approx. Area= 490 Square Miles					

Royal Red Fishery	Total VMS Points	Total Red Shrimp	Royal Red Shrimp Fishing (2-4 knots)	Total Points in Stetson-Miami Alternative 2	Fishing in Stetson-Miami Alternative 2	% Fishing in Alternative 2
2003 -2007	649,666	8,778	6,418	245	108	1.7%
2007 -2013	628,982	18,708	12,885	47	22	0.2%
Total (2003-2013)	1,278,648	27,486	19,303	292	130	0.7%

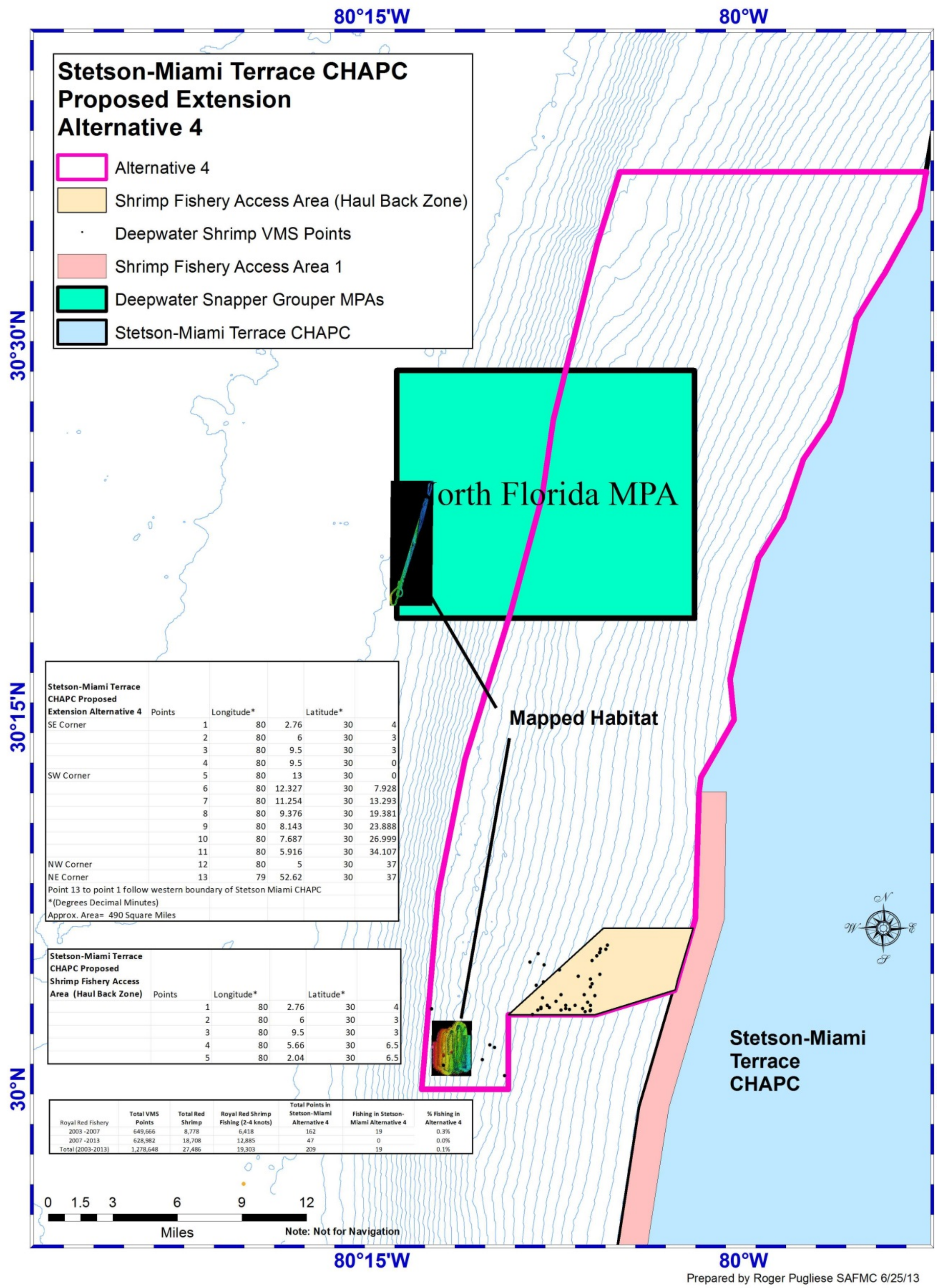
Figure 4-8. Action 3, Alternative 2. Proposed Western Extension of Stetson-Miami Terrace CHAPC Mapped Habitat and Rock Shrimp VMS (2003-2013).



Stetson-Miami CHAPC Proposed Extension Alternative 3	Points	Longitude*		Latitude*	
SE Corner	1	80	1.839	30	11.952
	2	80	9.779	30	5.649
	3	80	11.281	29	52
SW Corner	4	80	13.105	29	52
	5	80	13.158	29	57.119
	6	80	12.327	30	7.928
	7	80	11.254	30	13.293
	8	80	9.376	30	19.381
	9	80	8.143	30	23.888
	10	80	7.687	30	26.999
	11	80	5.916	30	34.107
	12	80	2.429	30	40.034
NW Corner	13	80	0.901	30	44.996
NE Corner	14	79	50.11	30	44.996
Point 14 to point 1 follow western boundary of Stetson Miami CHAPC					
*(Degrees Decimal Minutes)					
Approx. Area= 653 Square Miles					

Royal Red Fishery	Total VMS Points	Total Red Shrimp	Royal Red Shrimp Fishing (2-4 knots)	Total Points in Stetson-Miami Alternative 3	Fishing in Stetson-Miami Alternative 3	% Fishing in Alternative 3
2003 -2007	649,666	8,778	6,418	84	13	0.2%
2007 -2013	628,982	18,708	12,885	22	7	0.1%
Total (2003-2013)	1,278,648	27,486	19,303	106	20	0.1%

Figure 4-9. Action 3, Alternative 3. Proposed Western Extension of Stetson-Miami Terrace CHAPC Mapped Habitat and Rock Shrimp VMS (2003-2013).



Stetson-Miami Terrace CHAPC Proposed Extension Alternative 4	Points	Longitude*		Latitude*	
SE Corner	1	80	2.76	30	4
	2	80	6	30	3
	3	80	9.5	30	3
	4	80	9.5	30	0
SW Corner	5	80	13	30	0
	6	80	12.327	30	7.928
	7	80	11.254	30	13.293
	8	80	9.376	30	19.381
	9	80	8.143	30	23.888
	10	80	7.687	30	26.999
	11	80	5.916	30	34.107
NW Corner	12	80	5	30	37
NE Corner	13	79	52.62	30	37
Point 13 to point 1 follow western boundary of Stetson Miami CHAPC					
*(Degrees Decimal Minutes)					
Approx. Area= 490 Square Miles					

Stetson-Miami Terrace CHAPC Proposed Shrimp Fishery Access Area (Haul Back Zone)	Points	Longitude*		Latitude*	
	1	80	2.76	30	4
	2	80	6	30	3
	3	80	9.5	30	3
	4	80	5.66	30	6.5
	5	80	2.04	30	6.5

Royal Red Fishery	Total VMS Points	Total Red Shrimp	Royal Red Shrimp Fishing (2-4 knots)	Total Points in Stetson-Miami Alternative 4	Fishing in Stetson-Miami Alternative 4	% Fishing in Alternative 4
2003 -2007	649,666	8,778	6,418	162	19	0.3%
2007 -2013	628,982	18,708	12,885	47	0	0.0%
Total (2003-2013)	1,278,648	27,486	19,303	209	19	0.1%

Figure 4-10. Action 3, Alternative 4. Proposed Extension of Stetson-Miami Terrace CHAPC Mapped Habitat and Rock Shrimp VMS 2003-2013.

Table 4-11. Royal red shrimp fishing associated with Stetson-Miami Terrace CHAPC (Action 3) Alternatives 2, 3 and 4 (Deepwater Shrimp VMS: 2003-2013).

Royal Red Fishery	Total VMS Points	Total Red Shrimp	Royal Red Shrimp Fishing (2-4 knots)	Total Points in Stetson-Miami Alternative 2	Fishing in Stetson-Miami Alternative 2	% Fishing in Alternative 2
2003 -2007	649,666	8,778	6,418	245	108	1.7%
2007 -2013	628,982	18,708	12,885	47	22	0.2%
Total (2003-2013)	1,278,648	27,486	19,303	292	130	0.7%
Royal Red Fishery	Total VMS Points	Total Red Shrimp	Royal Red Shrimp Fishing (2-4 knots)	Total Points in Stetson-Miami Alternative 3	Fishing in Stetson-Miami Alternative 3	% Fishing in Alternative 3
2003 -2007	649,666	8,778	6,418	84	13	0.2%
2007 -2013	628,982	18,708	12,885	22	7	0.1%
Total (2003-2013)	1,278,648	27,486	19,303	106	20	0.1%
Royal Red Fishery	Total VMS Points	Total Red Shrimp	Royal Red Shrimp Fishing (2-4 knots)	Total Points in Stetson-Miami Alternative 4	Fishing in Stetson-Miami Alternative 4	% Fishing in Alternative 4
2003 -2007	649,666	8,778	6,418	162	19	0.3%
2007 -2013	628,982	18,708	12,885	47	0	0.0%
Total (2003-2013)	1,278,648	27,486	19,303	209	19	0.1%

4.3.1 Biological Effects

The Stetson Miami Terrace CHAPC (60, 937 square kilometers, 23,528 square miles) is the largest of the five deepwater CHAPCs implemented through the Comprehensive Ecosystem Based Amendment 1 (SAFMC 2010c). It encompasses three of the former proposed CHAPCs off the coasts of South Carolina, Georgia, and East Florida to the Miami Terrace off of Biscayne Bay, and extends the western boundary to the 400-meter depth contour.

Below is the description of the Stetson-Miami Terrace CHAPC.

Stetson Reef - Stetson Reef is characterized by hundreds of pinnacles along the eastern Blake Plateau offshore South Carolina and over 200 coral mounds. This area supports a 152 meter-tall (500 feet) pinnacle in 822 meters (2,697 feet) of water where recent submersible dives discovered live bushes of *Lophelia* coral, sponges, gorgonians, and black coral bushes. This represents one of the tallest *Lophelia* coral lithoherms known.

Savannah and East Florida Lithoherms - This site is characterized by numerous lithoherms at depths of 550 meters (1,804 feet) with relief up to 60 meters (197 feet) that provide live-bottom habitat. Submersible dives found that these lithoherms provided habitat for large populations of massive sponges and gorgonians in addition to smaller macroinvertebrates which have not been studied in detail. Some ridges have nearly 100% cover of sponges. Although few large fish have been observed at this site, a swordfish, several sharks, and numerous blackbelly rosefish were noted. Further south, echosounder transects along a 222-kilometer (138-mile) stretch off northeastern and central Florida (depth 700-800 meters; 2,297-2,625 feet) mapped nearly 300 coral mounds from 8 to 168 meters tall (26-551 feet).

Miami Terrace - The Miami Terrace and Escarpment is a Miocene-age terrace off southeast Florida that supports high relief hardbottom habitats and rich benthic communities in 200-600 meter (1,969 feet) depths. Dense aggregations of 50 to 100 wreckfish were observed, in addition to blackbelly rosefish, skates, sharks, and dense schools of jacks. *Lophelia* mounds are also present at the base of the escarpment, within the Straits of Florida, but little is known of their abundance, distribution, or associated fauna. The steep escarpments, especially near the top of the ridges, are rich in corals, octocorals, and sponges.

It is reasonable to expect that when a fishing vessel uses bottom tending gear, anchors, or grapples and chains in the deepwater CHAPCs, it would result in a taking/killing of prohibited coral or live rock. Corals covered by the Coral FMP are considered to be non-renewable resources. Fishing gear that comes in contact with the seafloor inevitably disturb the seabed and pose the most immediate direct threat to deepwater coral ecosystems. Fishing gear that impact the seafloor include bottom trawls, bottom longlines, bottom gillnets, dredges, and pots/traps (Chuenpagdee et al., 2003; Morgan and Chuenpagdee, 2003). Bottom tending gear and anchors, grapples, and chains can break fragile corals, dislodge reef framework, and scar corals, opening lesions for infection. Impacts of gear damage are not limited to direct crushing of live coral but also include effects of the attached chains which will abrade and denude coral structures. Stress caused by abrasion may result in a decline in health or stability of the reef or live bottom system. In shallow water, coral will respond through polyp retraction, altered physiology or behavior, and when sheered by anchor chains provide a point for infection. It is thought deepwater corals may respond similarly (John Reed, pers. comm. 2007). Damage inflicted by bottom tending gear, anchors, chains, and grapples is not limited to living coral and hardbottom resources but extends to disruption of the balanced and highly productive nature of the coral and live/hardbottom ecosystems.

Alternative 1 (No Action) would not modify the CHAPC coordinates for the Stetson Miami Terrace CHAPC. Within the CHAPCs, the use of bottom longline, bottom trawl, mid-water trawl, dredge, anchor, pot or trap, anchor and chain and grapple and chain is prohibited. **Alternatives 2, 3,** and **4 (Preferred)** would extend theses prohibitions to the expansion area of the Stetson-Miami Terrace HAPC. Therefore, the larger the expansion of the Stetson-Miami Terrace HAPC, the greater the biological effects to species found in the area. **Alternative 2**, which would provide an expansion of 490 square miles to the Stetson-Miami Terrace HAPC, would provide greater biological benefits to species caught within the expanded area than **Alternative 1 (No Action)**. **Alternative 3** (653 square miles) would have provide greater biological benefits to all species caught within the expanded area with the exception of royal red species. None of the alternatives would have any biological impact on dolphin wahoo or coastal migratory pelagic as the typical gear used for these species does not impact bottom habitat. Fishing for snapper grouper species would be allowed as long as there was no anchoring or use of bottom longline gear. However, fishing for snapper grouper species in the proposed expansion areas of the Stetson-Miami Terrace is uncommon and no biological impact on those species is expected. The golden crab fishery operates within allowable gear areas, which are not affected by the proposed expansion of the Stetson-Miami Terrace CHAPC.

Alternative 2 and **Alternative 3** would be expected to result in positive biological impacts to the deepwater coral habitat in these areas as it would extend the prohibitions on bottom damaging gear. Given the slow growth of deepwater corals, any impacts would be expected to result in long-term biological losses of deepwater coral habitat as well as the species that utilize this habitat. Under these alternatives, habitats within the Stetson-Miami Terrace proposed CHAPC expansion would be protected from damaging fishing gear such as bottom longline, anchoring, trawling (bottom and mid-water) which would have positive biological impacts on the species in the area.

Preferred Alternative 4 is similar to **Alternative 2** in that it would modify the coordinates to expand the CHAPC by 490 square miles. It would also provide royal red shrimp fishermen a zone within which they can haul back gear without drifting into an area where their gear is prohibited. This haul back zone may encourage fishermen to fish in the area giving a slight negative impact on the royal red populations. However, fishing effort in the area is historically low and the impact is not expected to be significant.

4.3.2 Economic Effects

The general economic effects of CHAPCs discussed previously in **Sections 4.1.2.1** through **4.1.2.3**, and **Section 4.1.2.5** regarding the recreational sector apply to **Action 3** as well. The royal red shrimp fishery is known to operate in the proposed Stetson-Miami Terrace CHAPC expansion. **Table 4-12** is based on the VMS points as a percent of fishing that occurred in the areas proposed under **Alternatives 2**, **3**, and **Preferred Alternative 4**. The ex-vessel value of the reduction in royal red shrimp landings is estimated to by size and in 2012 dollars. Royal red shrimp are graded in 2 sizes – large and small. Larges range in price from $3.25 to $4.00 per pound ($3.625 on average). Smalls range in price from 1.50 to 1.70 per pound ($1.60 on average). Approximately half of the shrimp landed are larges and half are smalls. (Pers. comm., Mike Merrifield, July 9, 2013).

The proposed closed areas of **Action 3** would result in some minor loss of ex-vessel income to the royal red shrimp fleet. **Alternative 2** is expected to result in average annual losses of $1,752. **Alternative 3** would result in expected average annual losses of $557. Like **Alternative 1 (No Action)**, **Preferred Alternative 4** is not expected to have any direct economic effects.

Table 4-12. Percent of area affected, reduction in pounds harvested, and the value of the reduced pounds harvest of royal red shrimp based on VMS estimates (2007 – 2013) for **Action 3** alternatives.

Action 3	% Affected Area	Reduced lbs	Value of Reduction
Alternative 2	0.171%	670	$1,752
Alternative 3	0.054%	213	$557
Pref Alternative 4	0.000%	0	$0

4.3.3 Social Effects

The broad potential social effects of establishing or expanding closed areas are discussed in **Section 4.1.3**, including specific communities that could experience negative impacts under the proposed action. **Alternative 1 (No Action)** would likely have minimal social effects (negative and positive) because this would maintain access to shrimp and snapper grouper harvest areas that would be reduced under **Alternative 2** or **Alternative 3**. The proposed extension of the Stetson-Miami Terrace CHAPC without a specified fishing area for the deepwater shrimp fleet (**Alternatives 2** and **3**) could have negative social effects on the royal red and rock shrimp fleet in the future and possibly other fisheries if potential fishing grounds are no longer available. Specifically, the Florida communities of Mayport, Titusville, and Atlantic Beach could be negatively impacted due to these communities' local engagement in commercial fishing and the deepwater shrimp fisheries. Additionally, deepwater shrimp fishermen and fishing businesses in Jacksonville and Cocoa Beach could likely experience negative impacts from the expansion.

Because **Preferred Alternative 4** would also establish the Shrimp Fishery Access Area based on information of fishing grounds of the royal red shrimp vessels, negative impacts on the deepwater shrimp fleets and associated businesses and communities could be reduced or removed. The expected economic impacts under **Alternatives 2** and **3** would likely be avoided with the establishment of the Shrimp Fishery Access Area in **Preferred Alternative 4** (see **Section 4.3.2**), which would also contribute to minimized impact on the fishermen, businesses, and associated communities. Although future opportunities could be reduced with expansion of the Stetson-Miami Terrace CHAPC, negative impacts on the fleet would likely be reduced while still enhancing coral protection in the area.

4.3.4 Administrative Effects

The expansion of the Stetson Miami Terrace CHAPC (**Alternative 2** and **Alternative 3**) would have minimal administrative impacts. Administrative impacts would be incurred through the rule making process, outreach and enforcement. The administrative impacts would differ between the alternatives in the amount of area they cover. It is expected the larger the expansion of the CHAPC the more enforcement would be needed. Most of the administrative impacts associated with these alternatives relate to at-sea enforcement.

4.4 Action 4. Expand boundaries of the Cape Lookout CHAPC

Alternative 1. (No Action) Do not modify the boundaries of the Cape Lookout CHAPC. The existing Cape Lookout CHAPC is identified by the following coordinates:

Latitude	Longitude
34°24’37”	75°45’11”
34°10’26”	75°58’44”
34°05’47”	75°54’54”
34°21’02”	75°41’25”

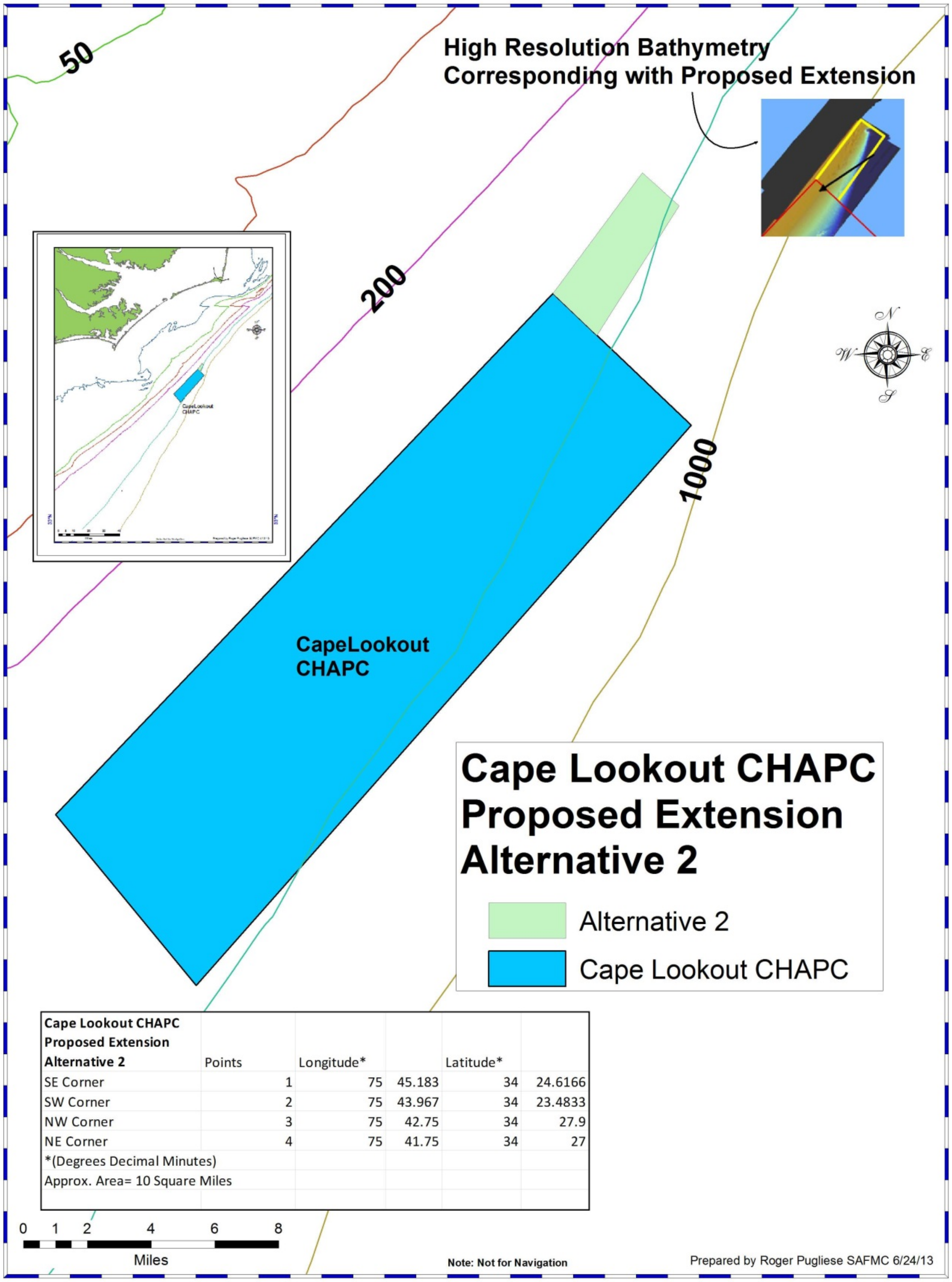
Preferred Alternative 2. Extend the northern boundary to encompass the area identified by the following coordinates (**Figure 4-11**) (Alternative 2 = 10 square miles):

Latitude	Longitude
34°24.6166’	75°45.1833’
34°23.4833’	75°43.9667’
34°27.9’	75°42.75’
34°27.0’	75°41.5’

Note: Coordinates for the CHAPC extension alternatives are found in **Appendix M**

Background

The Cape Lookout CHAPC was created to protect deepwater coral ecosystems and after review of recent studies it became apparent that the original coordinates did not include all of the deepwater coral. In a presentation to the Coral AP in 2011, Dr. Steve Ross reviewed multibeam sonar mapping results indicating mounds of *Lophelia pertusa* habitat in an area north of the Cape Lookout CHAPC boundary (refer to **Section 3.1.1.5** for additional information). Scientists have determined the low-relief mounds to be *Lophelia* coral bioherms that occur outside of the CHAPC boundary. As a result, the Coral AP recommended a northern extension of the Cape Lookout CHAPC to incorporate the newly discovered area of deepwater coral habitat. They recommended one alternative that would encompass the documented deepwater coral habitat. The South Atlantic Council adopted the APs recommendation and determined that it was not reasonable to include any additional alternatives because the one action alternative captured the only area of newly discovered deepwater coral habitat.



Cape Lookout CHAPC Proposed Extension Alternative 2	Points	Longitude*		Latitude*	
SE Corner	1	75	45.183	34	24.6166
SW Corner	2	75	43.967	34	23.4833
NW Corner	3	75	42.75	34	27.9
NE Corner	4	75	41.75	34	27
*(Degrees Decimal Minutes)					
Approx. Area= 10 Square Miles					

Figure 4-11. Action 4, Alternative 2. Cape Lookout CHAPC Proposed Extension and Mapped Habitat.

4.4.1 Biological Effects

CE-BA 1 implemented the Cape Lookout CHAPC in which the use of bottom longlines, trawls (mid-water and bottom), dredge, pots, or traps; use of anchor and chain, or use of grapple and chain by all fishing vessels; and possession of any species regulated by the Coral FMP are prohibited. Under **Alternative 1 (No Action)**, these same prohibitions would continue to apply. **Preferred Alternative 2** would expand the prohibitions of the original Cape Lookout CHAPC along the northern boundary. This would increase the size of the Cape Lookout CHAPC from 316 square kilometers to 324 square kilometers. This expansion would benefit deepwater coral ecosystems and has been proposed based on new information of occurrence of deepwater *Lophelia* corals in the area. **Alternative 2 (Preferred)** would not have any biological impact on dolphin wahoo or coastal migratory pelagic as the typical gear used for these species does not impact bottom habitat. Fishing for snapper grouper species would be allowed as long as there was no anchoring or use of bottom longline gear. The size of the proposed expansion of the Cape Lookout CHAPC in **Preferred Alternative 2** is very small (roughly 8 square kilometers) and landings data are not available at a fine enough resolution to perform analysis (pers. comm., Nick Farmer, NMFS SERO, July 9, 2013). However, fishing for snapper grouper species in the proposed expansion area is uncommon and little biological impact on those species is expected. Fishing for deepwater shrimp species does not occur within the proposed area. The golden crab fishery operates within allowable gear areas, which are not affected by the proposed expansion of the Cape Lookout CHAPC.

4.4.2 Economic Effects

The general economic effects of CHAPCs discussed previously in **Sections 4.1.2.1** through **4.1.2.3**, and **Section 4.1.2.5** regarding the recreational fishery apply to **Action 4**, as well. The size of the proposed closure from **Preferred Alternative 2** is very small (roughly 8 square kilometers) and landings data are not available at a fine enough resolution to perform analysis (pers. comm., Nick Farmer, NOAA Fisheries SERO, July 9, 2013).

Alternative 1 (No Action) would likely have minimal economic effects because this would maintain access to current harvest areas. The proposed extension of the Cape Lookout CHAPC under **Preferred Alternative 2** could have minimal direct negative economic effects particularly on the snapper grouper fleet if historic fishing grounds are no longer available.

4.4.3 Social Effects

The broad potential social effects of establishing or expanding closed areas are discussed in **Section 4.1.3**. The communities that could be impacted by changes in the Cape Lookout CHAPC are expected to be areas closer to the CHAPC off the North Carolina coast. **Alternative 1 (No Action)** would likely have minimal negative social effects because no current or potential fishing grounds would be closed. The proposed extension of the Cape Lookout CHAPC under **Preferred Alternative 2** could have negative social effects on some commercial vessels harvesting snapper grouper species if historic fishing grounds are no longer available, or if the closed area affected travel to and from harvest areas. However, the small size of the expansion proposed under **Preferred Alternative 2** would also be expected to result in less negative social impact, particularly associated with the economic impact (**Section 4.4.2**).

4.4.4 Administrative Effects

The expansion of the Cape Lookout CHAPC (**Preferred Alternative 2**) would have a minimal administrative impact. Administrative impacts would be felt through the rule making process, outreach and enforcement. The administrative impacts would differ between the alternatives in the amount of area they cover. It is expected the larger the expansion of the Cape Lookout CHAPC the more enforcement would be needed. Most of the administrative impacts associated with these alternatives relate to at-sea enforcement.

Chapter 5. Council's Choice for the Preferred Alternative

Chapter 6. Cumulative Effects

As directed by the National Environmental Policy Act (NEPA), federal agencies are mandated to assess not only the indirect and direct impacts, but also the cumulative impacts of actions. The NEPA defines a cumulative impact as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7). Cumulative effects can either be additive or synergistic. A synergistic effect occurs when the combined effects are greater than the sum of the individual effects.

Although the measures in the amendment would modify the Coral FMP, it sets in place provisions that will impact the shrimp and snapper grouper fisheries. The coastal migratory pelagic and dolphin wahoo fisheries will not be impacted by the implementation of this amendment due to the nature of their fishing activity.

Shrimp Fishery

Cumulative effects to the shrimp fishery with respect to restricting rock shrimp allowable fishing areas have been analyzed in detail in the Comprehensive Ecosystem Based Amendment 1 (2009) other management actions that relate to the rock shrimp fishery are incorporated by reference and summarized below.

Date	Action
1996	Require federal rock shrimp permit, trawling area limited. (SAFMC 1996a)
1998	Defined EFH and EFH HAPCs for South Atlantic shrimp resource. (SAFMC 1998a).
1998	Expanded the Oculina HAPC to include the area closed to rock shrimp harvest. (SAFMC 1998b). No person may use bottom longline, bottom trawl, dredge, pot or trap, anchors and chains, or grapples and chains. No one may fish for rock shrimp or possess rock shrimp in or from the area on board a fishing vessel, or possess Oculina coral.
1999	Established a reporting requirement and designated biological reference points. (SAFMC 1998c)

2004	Specified reduction in total weight of finfish of at least 30% for new BRDs to be certified; adopted the ACCSP release, discard, and protected species module; and required BRDs on all rock shrimp trips in the South Atlantic. (SAFMC 2004)
2008	Eliminate rock shrimp landing requirement for limited access endorsement; reinstate endorsement lost due to not meeting the rock shrimp landing requirement, reinstate endorsements lost due to failure to renew, change endorsement and permit names; require proof of VMS for endorsement renewal or transfer; and require the collection of economic data. (SAFMC 2008)
2009	Amend the Coral, Coral Reefs, and Live/Hardbottom Habitat FMP to establish Deepwater Coral Habitat Areas of Particular Concern (HAPC); create a Shrimp Fishery Access Area within the Stetson Reefs, Savannah and East Florida Lithoherms, and Miami Terrace Coral HAPC boundaries. (SAFMC 2009)
2011	Amend the Coral Fishery Management Plan to designate Essential Fish Habitat-Habitat Areas of Particular Concern. (SAFMC 2011b)

Reasonably foreseeable future actions include would revising the criteria and procedures by which South Atlantic states may request a concurrent closure of the penaeid shrimp (brown, pink, and white shrimp) commercial sector in the exclusive economic zone (EEZ) in order to protect overwintering white shrimp and also update the current overfished and overfishing status determination criteria for pink shrimp.

Snapper Grouper Fishery

The snapper grouper fishery has been highly managed and subject to many regulatory changes. Table 6-2 contains a list of past, present and future management action and their intended effects.

Time period/dates	Cause	Observed and/or Expected Effects
Pre-January 12, 1989	Habitat destruction, growth overfishing of vermilion snapper.	Damage to snapper grouper habitat, decreased yield per recruit of vermilion snapper.
January 1989	Trawl prohibition to harvest fish (SAFMC 1988).	Increase yield per recruit of vermilion snapper; eliminate trawl damage to live bottom habitat.
Pre-January 1, 1992	Overfishing of many snapper grouper species.	Spawning stock ratio of these species is estimated to be less than 30% indicating that they are overfished.
January 1992	<u>Prohibited gear</u>: fish traps south of Cape Canaveral, FL; entanglement nets; longline gear inside of 50 fathoms; powerheads and bangsticks in designated SMZs off SC. <u>Size/Bag limits</u>: 10” TL vermilion	Reduce mortality of snapper grouper species.

Time period/dates	Cause	Observed and/or Expected Effects
	snapper (recreational only); 12" TL vermilion snapper (commercial only); 10 vermilion snapper/person/day; aggregate grouper bag limit of 5/person/day; and 20" TL gag, red, black, scamp, yellowfin, and yellowmouth grouper size limit (SAFMC 1991).	
Pre-June 27, 1994	Damage to *Oculina* habitat.	Noticeable decrease in numbers and species diversity in areas of *Oculina* off FL
July 1994	Prohibition of fishing for and retention of snapper grouper species (HAPC renamed OECA; SAFMC 1993)	Initiated the recovery of snapper grouper species in OECA.
1992-1999	Declining trends in biomass and overfishing continue for a number of snapper grouper species including golden tilefish.	Spawning potential ratio for golden tilefish is less than 30% indicating that they are overfished.
July 1994	Commercial quota for golden tilefish; commercial trip limits for golden tilefish; include golden tilefish in grouper recreational aggregate bag limits.	
February 24, 1999	All S-G without a bag limit: aggregate recreational bag limit 20 fish/person/day, excluding tomtate and blue runners. Vessels with longline gear aboard may only possess snowy, Warsaw, yellowedge, and misty grouper, and golden, blueline and sand tilefish.	
Effective October 23, 2006	Snapper grouper FMP Amendment 13C (SAFMC 2006)	Commercial vermilion snapper quota set at 1.1 million lbs gw; recreational vermilion snapper size limit increased to 12" TL to prevent vermilion snapper overfishing.
Effective February 12, 2009	Snapper grouper FMP Amendment 14 (SAFMC 2007)	Use marine protected areas (MPAs) as a management tool to promote the optimum size, age, and genetic structure of slow growing, long-lived deepwater snapper grouper species (e.g., speckled hind, snowy grouper, warsaw grouper, yellowedge grouper, misty grouper, golden tilefish, blueline tilefish, and sand tilefish). Gag and vermilion snapper occur in some of these areas.
Effective March 20, 2008	Snapper grouper FMP Amendment 15A (SAFMC 2008a)	Establish rebuilding plans and SFA parameters for snowy grouper, black sea bass, and red porgy.
Effective Dates Dec 16, 2009, to Feb 16, 2010.	Snapper grouper FMP Amendment 15B (SAFMC 2008b)	End double counting in the commercial and recreational reporting systems by prohibiting the sale of bag-limit caught

Time period/dates	Cause	Observed and/or Expected Effects
		snapper grouper, and minimize impacts on sea turtles and smalltooth sawfish.
Effective Date July 29, 2009	Snapper grouper FMP Amendment 16 (SAFMC 2009a)	Protect spawning aggregations and snapper grouper in spawning condition by increasing the length of the spawning season closure, decrease discard mortality by requiring the use of dehooking tools, reduce overall harvest of gag and vermilion snapper to end overfishing.
Effective Date January 4, 2010	Red Snapper Interim Rule	Prohibit commercial and recreational harvest of red snapper from January 4, 2010, to June 2, 2010 with a possible 186-day extension. Reduce overfishing of red snapper while long-term measures to end overfishing are addressed in Amendment 17A.
Effective Dates June 3, 2010, to Dec 5, 2010	Extension of Red Snapper Interim Rule	Extended the prohibition of red snapper to reduce overfishing of red snapper while long-term measures to end overfishing are addressed in Amendment 17A.
Effective Date December 4, 2010	Snapper Grouper FMP Amendment 17A (SAFMC 2010a).	Specified SFA parameters for red snapper; ACLs and ACTs; management measures to limit recreational and commercial sectors to their ACTs; accountability measures. Establish rebuilding plan for red snapper. Large snapper grouper area closure inn EEZ of NE Florida. Emergency rule delayed the effective date of the snapper grouper closure.
Effective Date January 31, 2011	Snapper Grouper Amendment 17B (SAFMC 2010b)	Specified ACLs and ACTs; management measures to limit recreational and commercial sectors to their ACTs; AMs, for species undergoing overfishing. Established a harvest prohibition of six snapper grouper species in depths greater than 240 feet.
Effective Date June 1, 2011	Regulatory Amendment 10 (SAFMC 2010c)	Removed of snapper grouper area closure approved in Amendment 17A.
Effective Date July 15, 2011	Regulatory Amendment 9 (SAFMC 2011a)	Harvest management measures for black sea bass; commercial trip limits for gag, vermilion and greater amberjack
Effective Date May 10, 2012	Regulatory Amendment 11 (SAFMC 2011b)	Removed the harvest prohibition of six deepwater snapper grouper species implemented in Amendment 17B.

Time period/dates	Cause	Observed and/or Expected Effects
Effective Date April 16, 2012	Comprehensive ACL Amendment (SAFMC 2011c)	ACLs ACTs, and AMs for species not experiencing overfishing; accountability measures; an action to remove species from the fishery management unit as appropriate; and management measures to limit recreational and commercial sectors to their ACTs.
July 11, 2012	Amendment 24 (Red Grouper) (SAFMC 2011d)	Established a rebuilding plan for red grouper, specified ABC, and established ACL, ACT and revised AMs for the commercial and recreational sectors.
Effective Date July 1, 2012	Amendment 18A (SAFMC 2012a)	Established an endorsement program for black sea bass commercial fishery; established a trip limit; specified requirements for deployment and retrieval of pots; made improvements to data reporting for commercial and for-hire sectors
Effective Dates: September 17, 2012 (commercial); September 14, 2012 (recreational)	Temporary Rule through Emergency Action (Red snapper)	Established limited red snapper fishing seasons (commercial and recreational) in 2012.
Target 2012	Amendment 18A Transferability Amendment	Reconsidered action to allow for transfer of black sea bass pot endorsements that was disapproved in Amendment 18A.
Effective Date October 26, 2012	Amendment 20A (Wreckfish) (SAFMC 2012b)	Redistributed inactive wreckfish shares.
Effective Date October 9, 2012	Regulatory Amendment 12 (SAFMC 2012c)	Adjusted the golden tilefish ACL based on the results of a new stock assessment and modified the recreational golden tilefish AM.
Effective Date May 23, 2013	Snapper Grouper Amendment 18B (SAFMC 2013)	Establish a commercial longline endorsement program for golden tilefish; establish an appeals process; allocate the commercial ACL by gear; establish trip limit for the hook and line sector
Target 2013	Snapper Grouper Amendment 22 (under development)	Develop a recreational tag program for red snapper and deepwater species (snowy grouper, golden tilefish and wreckfish) in the South Atlantic.
July 17, 2013	Regulatory Amendment 13	Adjust ACLs and allocations for unassessed snapper grouper species with MRIP recreational estimates
Target 2013	Snapper Grouper Amendment 27 (under development)	Establish the SAFMC as the managing entity for yellowtail and mutton snappers and Nassau grouper in the Southeast U.S., modify the SG

Time period/dates	Cause	Observed and/or Expected Effects
		framework; modify placement of blue runner in an FMU or modify management measures for blue runner
Target 2013	Snapper Grouper Amendment 28	Modify red snapper management measures, including the establishment of a process to determine future annual catch limits and fishing seasons.
Target 2014	Snapper Grouper Amendment 29 (under development)	Update ABCs, ACLs, and ACTs for snapper grouper species based on recommendations from SSC.
Target 2013	Regulatory Amendment 18 (Approved by South Atlantic Council)	Adjust ACLs and management measure for vermilion snapper and red porgy based on results from new update assessment.
Target 2013	Generic For-Hire Reporting Amendment	Require all federally-permitted headboats in the South Atlantic to report landings information electronically and on a weekly basis.
Target 2013	Joint For-Hire Headboat Amendment for the South Atlantic (Approved by South Atlantic Council)	Require headboats report landings through electronic means every week.
Target 2014	Joint Commercial Logbook Reporting Amendment	Require all federally-permitted commercial fin fish fishermen in the southeast to report electronically.
Target 2014/2015	Joint Charterboat Reporting Amendment	Require all federally-permitted charterboats to report landings information electronically.

Reasonable foreseeable actions related to the snapper grouper fishery include modification of the ABC Control rule for eighteen snapper grouper species, and an three day opening of red snapper fishing in the South Atlantic.

Stressors outside of Council Management

Deepwater Horizon
On April 20, 2010, an explosion occurred on the Deepwater Horizon MC252 oil rig, resulting in the release of an estimated 4.9 million barrels of oil into the Gulf. In addition, 1.84 million gallons of Corexit 9500A dispersant were applied as part of the effort to constrain the spill.

Although the oil spill occurred in the Gulf of Mexico, there may be some impact on migratory species. Specifically, king mackerel, which move from the southern portion of their range to more northern areas for the spawning season. In the South Atlantic, impacts may be felt by the coastal migratory pelagic stocks, however the cumulative effects from the oil spill and response may not be known for several years.

Climate Change

Global climate change can affect marine ecosystems through ocean warming by increased thermal stratification, reduced upwelling, sea level rise, and through increases in wave height and frequency, loss of sea ice, and increased risk of diseases in marine biota. Decreases in surface ocean pH due to absorption of anthropogenic CO_2 emissions may impact a wide range of organisms and ecosystems (IPCC 2007, and references therein). These influences could affect biological factors such as migration, range, larval and juvenile survival, prey availability, and susceptibility to predators. Climate change is linked to the collapse or coral reefs due to carbon sequestration however at this time, the level of impacts on deepwater coral reefs or the species in this amendment cannot be quantified, nor is the time frame known in which these impacts would occur.

Cumulative Impacts

The analyses in the amendment found the effects of the proposed actions on the biological environment positive because they would afford protection to deepwater coral ecosystems, protecting the coral as well as the species that utilize them. Measures to expand the Stetson-Miami Terrace CHPAC and the Cape Lookout CHPAC would not have negative social or economic impacts as the measures do prevent all fishing from those areas, only those using bottom tending gear and fishing effort using bottom tending gear is low in those areas.
There may be slight negative biological impacts on rock shrimp populations as the transit provision will allow easier access to the fishing grounds on the offshore side of Oculina. The economic and social impacts for all actions are expected to be minimal, mostly related to the purchasing of new VMS systems to comply with the need for increased ping rates while transiting through the Oculina Bank HAPC. The cumulative impacts of the actions in the amendment in conjunction with past, present and reasonably foreseeable management, as well as other documented stressors are not expected to be significant.

Monitoring

The effects of the proposed action are, and will continue to be, monitored through collection of landings data by NOAA Fisheries Service, stock assessments and stock assessment updates, life history studies, economic and social analyses, and other scientific observations. Landings data for the recreational sector in the South Atlantic are collected through Marine Recreational Information Program (MRIP), NOAA's Headboat Survey, and state specific data collection programs. Commercial data are collected through trip ticket programs, port samplers, and logbook programs.

Chapter 7. List of Agencies, Organizations, and Persons Consulted

Responsible Agency

Coral Amendment 8:
South Atlantic Fishery Management Council
4055 Faber Place Drive, Suite 201
Charleston, South Carolina 29405
(843) 571-4366 (TEL)
Toll Free: 866-SAFMC-10
(843) 769-4520 (FAX)
safmc@safmc.net

Environmental Assessment
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 Coral Advisory Panel
SAFMC Shrimp Advisory Panel
SAFMC Deepwater Shrimp Advisory Panel
SAFMC Snapper Grouper Advisory Panel
SAFMC Scientific and Statistical Committee
North Carolina Coastal Zone Management Program
South Carolina Coastal Zone Management Program
Georgia Coastal Zone Management Program
Florida Coastal Zone Management Program
Florida Fish and Wildlife Conservation Commission
Georgia Department of Natural Resources
South Carolina Department of Natural Resources
North Carolina Division of Marine Fisheries
North Carolina Sea Grant
South Carolina Sea Grant
Georgia Sea Grant
Florida Sea Grant
Atlantic States Marine Fisheries Commission
Gulf and South Atlantic Fisheries Development Foundation
Gulf of Mexico Fishery Management Council
National Marine Fisheries Service
- Washington Office
- Office of Ecology and Conservation
- Southeast Regional Office
- Southeast Fisheries Science Center

Chapter 8. List of Preparers

Table 8-1. List of Coral Amendment 8 preparers.

Name	Agency/Division	Area of Amendment Responsibility
Karla Gore	NMFS/SF	IPT Lead/Fishery Biologist
Anna Martin	SAFMC	IPT Lead/Fishery Biologist
Jack McGovern	NMFS/SF	Fishery Scientist
David Dale	NMFS/HC	EFH Specialist
Andy Herndon	NMFS/PR	Biologist
Nick Farmer	NMFS/SF	Biologist
Stephen Holiman	NMFS/SF	Economist
Christina Package	NMFS/SF	Social Scientist
Margaret Miller	SEFSC	Fishery Scientist
Monica Smit-Brunello	NOAA/GC	Attorney Advisor
Brian Cheuvront	SAFMC	Fishery Economist
Kari MacLauchlin	SAFMC	Social Scientist
Roger Pugliese	SAFMC	Fishery Biologist
Gregg Waugh	SAFMC	Deputy Executive Director

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