OPTIONS PAPER

Comprehensive Ecosystem-Based Amendment 2

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13. Amend Council FMPs as needed to designate new or modify existing EFH and EFH-HAPCs.

2.0 NEED FOR ACTION

Requirements to Meet National Standard 1 Guidelines

In 2006 the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) was re-authorized and included a number of changes to improve conservation of managed fishery resources. The goals require that conservation and management measures "shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry". Included in these changes are requirements that the Regional Councils must establish both a mechanism for specifying annual catch limits (ACLs) at a level such that overfishing does not occur in the fishery and accountability measures (AMs) to correct if overages occur. Accountability measures are management controls to prevent the ACLs from being exceeded and to correct by either in-season or post-season measures if they do occur.

The ACL is set by the Council, but begins with specifying an overfishing limit (OFL), which is the yield, above which overfishing occurs. Once an OFL is specified, an acceptable biological catch (ABC) level is recommended by the Council's Scientific and Statistical Committee (SSC). The ABC is based on the OFL and takes into consideration scientific uncertainty. The OFL and ABC are set by scientists, whereas the next two reference points, ACL and annual catch target (ACT) are set by managers. The ACT is not required to be specified, but if used should be set at a level that takes into account management uncertainty and provides a low probability of the ACL being exceeded. These measures must be implemented by 2010 for all stocks experiencing overfishing and 2011 for all others. The Councils determined that to meet the National Standard 1 guidelines (NS1) by implementing these measures that the amendment must be completed, submitted for formal review, and have implemented regulations during the August 6, 2011 through March 31, 2012 fishing year.

There are some exceptions for the development of ACLs; for example, when a species can be considered an ecosystem component species and species with annual life cycles. Stocks listed in the Fishery Management Unit (FMU) are classified as either ''in the fishery'' or as an ''ecosystem component''. By default, stocks are considered to be "in the fishery" unless declared ecosystem component species. Ecosystem component (EC) species are exempt from the requirement for ACLs. In addition, EC species may, but are not required to be included in a Fishery Management Plan (FMP) for any of the following reasons: data collection purposes; ecosystem considerations related to specification of optimum yield (OY) for the associated fishery; as considerations in the development of

conservation and management measures for the associated fishery; and/or to address other ecosystem issues.

To be considered for possible classification as an EC species, the species should:

(A) Be a non-target species or non-target stock;

(B) Not subject to overfishing, approaching overfished, or overfished;

(C) Not likely to become subject to overfishing or overfished, according to the best available information, in the absence of conservation and management measures; and

(D) Not generally be retained for sale or personal use.

Amendment 1 to the Fishery Management Plan for Coral, Coral Reefs and Live/Hardbottom Habitat (Coral FMP; SAFMC & GMFMC 1990) established a 50,000-colony combined quota for octocoral harvest in federal waters of the South Atlantic and Gulf of Mexico.

This amendment proposes to establish MSY, OFL, ACL and AMs for octocorals in the South Atlantic region. Alternatives would give the Council the opportunity to prohibit harvest in Federal waters (ACL = 0) to address directed harvest of EFH or continue to allow harvest of octocorals under the existing Live Rock Aquaculture program.

The amendment also addresses the harvest of the erect form of corky sea fingers (*Briareum* sp.) and encrusting coral *Erythropodium* sp. and the requirements of National Standard 1 Guidelines for these species. The Coral AP maintains that the erect form of corky seafingers is easily harvested without the substrate and there is demand for it in the aquarium trade. Similarly, *Erythropodium* sp., even though it is an encrusting coral, can easily be peeled off the substrate on which it is growing. This action has potential beneficial economic impacts to the industry.

Possible harvest the invasive orange cup coral, *Tubastraea coccinea* and National Standard 1 Guidelines for this species are also addressed in this amendment. The orange cup coral, *Tubastraea coccinea*, is a stony coral not native to the South Atlantic region. The harvest of stony corals is prohibited in the South Atlantic. However, at the request of the Coral AP, the Council is considering the feasibility and implications of allowing harvest of this invasive coral species.

This amendment would make use of the framework procedure established under the Comprehensive Essential Fish Habitat Amendment (SAFMC 1998) to amend Council fishery management plans (FMPs) as needed to designate new or modify existing EFH and Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPCs).

3.0 OCTOCORALS AND LIVE ROCK AQUACULTURE

A. Maximum Sustainable Yield (MSY)

Option 1. No action. There is no specified MSY for octocorals.

Option 2. Set MSY = OY (50,000 colonies)

Option 3. Recommendation from SSC

B. Acceptable Biological Catch

Option 1. No action. There is no specified ABC for octocorals in the South Atlantic.

Option 2. Recommendation from SSC.

C. Overfishing Level

Option 1. No action. There is no specified OFL for octocorals in the South Atlantic.

Option 2. Recommendation from SSC

D. Annual Catch Limit

Option 1. No action. There is no specified ACLfor octocorals in the South Atlantic.

Option 2. ACL = 0

Option 3. ACL = ___% of MSY

Option 4. Recommendation from SSC.

E. Accountability Measures

Option 1. No action. There is no specified OFL for octocorals in the South Atlantic.

Option 2. Recommendation from SSC

F. Modify the Live Rock Aquaculture permit system

Option 1. No action. Do not modify the existing live rock aquaculture permit system.

Option 2. Modify the existing live rock aquaculture permit system to allow harvest of octocorals within lease sites only and nowhere else in state or federal waters.

Others???

3.1 Octocoral Fishery Description

3.1.1 History of the Commercial Fishery

The commercial live octocoral fishery probably dates back to the late 1950s or early 1960s when salt water aquariums first started to become popular and the supply of marine specimens began to appear in major cities in the United States. In the early days, filtration systems tended to be crude and the average marine aquarist stocked his aquarium with fish and a few common invertebrates such as crabs, shrimp, and starfish. As the hobby grew and filtration systems improved, more and more aquarists began to stock their aquariums with difficult-to-keep invertebrates such as clams, snails, stony corals, and octocorals. By 1980, the octocoral fishery was becoming well established, and a handful of the hardier octocoral species collected off the Florida coasts could be found in most large marine aquarium stores throughout the U.S. The demand for Florida octocorals has continued to grow, as has the list of species harvested and successfully kept in the average marine aquarium. Florida-collected octocorals dominate the U.S. market as well as some of the European and Asian markets.

The Council, together with the Gulf of Mexico Fishery Management Council, became the first fishery management councils to describe the octocoral fishery in 1982 in the original Coral FMP (SAFMC 1982). Amendment 1 to the Coral FMP, developed in 1990 set an annual harvest limit of 50,000 octocoral colonies from federal waters, allowed for a minimal bycatch of substrate around the holdfast, set allowable gear types, and defined the area where harvest was permitted. The FWC then ruled that octocoral harvest in Florida waters would be unlimited. If the exclusive economic zone (EEZ) yearly quota was reached before September 30, then harvest would be closed in state waters until October 1 of the following year.

Over the years, there has been occasional interest in collecting octocorals for use in biomedical research. Past work has mostly focused on sampling a wide variety of species and searching for chemical compounds that might be of interest to this type of research. Compounds of interest were eventually synthesized in the lab, eliminating the need to continue harvesting specific octocoral species for their extraction (K. Nedimeyer, personal communication). No large-scale harvest of octocorals for biomedical purposes is presently taking place in the South Atlantic EEZ (K. Nedimeyer, personal communication).

Although octocoral harvest in the South Atlantic EEZ is legal in almost all areas from south of Cape Canaveral, the overwhelming bulk of the commercial octocoral harvest is located primarily in the Florida Keys. Harvest of octocorals from state waters occurs as

far north as Jupiter Inlet, but it is also mostly a Florida Keys based fishery. Octocoral landings since 2000 indicate that the majority of the harvest (approximately 76%) has occurred on the east coast of Florida **(Figure 1 & Table 1)** and almost exclusively in the Florida Keys (K. Nedimeyer, personal communication). In this area, the shelf is narrower and water clarity is greater than off the west coast of Florida. Consequently, a greater variety of octocoral species is found in the waters off the Florida Keys. In addition, conditions in the field are favorable to harvesting octocorals. Harvest data from 2000-2008 show that 70% of average annual landings originate in state waters (**Table 1**). This trend has been anecdotally corroborated by the SAFMC Coral Advisory Panel.

3.1.2 Licenses and Permits

Commercial harvest of octocorals in federal waters is restricted to individuals or corporations holding a federal octocoral permit or a valid Florida Saltwater Products License (SPL) with a marine life (ML) endorsement issued by NOAA Fisheries. Federal permits are available through NOAA Fisheries Service in St. Petersburg, Florida, and are not restricted in any way. Saltwater products licenses from FWC are unrestricted, but the ML endorsement necessary to land commercial quantities of any organism designated as a "marine life" species, which includes all octocorals, is restricted. The commercial marine life fishery in Florida waters and the adjacent federal waters is managed by a limited entry program administered by the FWC, and only a limited number of the licenses currently issued are transferable and valid for harvesting octocorals.

The State of Florida also has a Special Activities License (SAL) that can be issued to researchers, public aquariums, and educational institutions, which allows the harvest of octocorals in state and federal waters. The permit holder must state in the application the number and species of octocorals they wish to harvest, and the request is reviewed by FWC staff before being issued. Requests for any substantial amounts of octocoral harvest in federal waters are referred to NOAA Fisheries for review and approval. The SAL permit may have additional requirements or exemptions that are issued by the state of Florida on a case-by-case basis.

Recreational harvest of octocorals is permitted with a Florida Saltwater Fishing License (SFL) and is restricted to six specimens per day, and the harvest is considered part of the aggregate recreational bag limit of marine life, which is no more than a total of 20 marine specimens per license-holder per day. This permit must adhere to the most stringent of federal or state criteria.

3.1.3 Reporting requirements

All octocorals harvested commercially by marine life fishermen must be reported monthly to the Florida Fish and Wildlife Research Institute (FWRI). Landings are reported on trip tickets that were originally designed to report landings of lobster and other marine resources. Landings must be identified as coming from specific zones along the coast, and within each zone it must be specified as coming from state or federal waters. On the trip ticket, however, an ocotocoral harvester cannot specifically report landings originating in different areas. Due to demand from the aquarium trade, harvesters often seek particular species in a certain size range; therefore, several areas may be harvested in one trip. This may have resulted in inadequate reporting of octocoral landings over the years.

Octocorals harvested under a federal fisheries permit must be reported to NOAA Fisheries Service.

Octocorals harvested by SAL holders must be reported to FWRI.

Octocorals harvested by recreational fishermen are not reported.

3.1.4 Harvest Methods

Almost all commercial harvest of octocorals is done by marine life fishermen for the live aquarium trade; therefore, harvest is by hand and is done in small numbers on any given day. Because octocorals are listed as a marine life species by the state of Florida, fishermen harvesting them using a Florida SPL with ML endorsement must transport and land them in a live and healthy condition.

As many as 50 different species of octocorals are harvested off the east and west coasts of Florida, but only about a dozen species make up the majority of the harvest. In a typical day, a harvester may visit from six to eight sites to collect specimens; between 50 and 200 colonies are thus collected once every two or three weeks. Water depth ranges from 5 to 150 feet, but most specimens from federal waters are photosynthetic specimens from shallow waters (less than 80 feet). Sea fans, *Gorgonia ventalina*, and *G. flabellum* as well as all black corals of the genus *Antipathes* are protected in state and federal waters and there is no allowable harvest.

The aquarium trade has specific size and shape requirements, which force marine life fishermen to be very selective in their harvest. For the most part, small specimens are not selected by harvesters, and few specimens larger than about 20 inches are collected because they are too big for most aquariums and are difficult to ship. The standard

shipping box has an inside dimension of 15 x 15 inches, so although a 20-inch specimen could fit diagonally in a standard box or could be bent, most wholesale shippers and purchasers prefer specimens less than 15 inches long. Shape and quality are other factors that fishermen must consider when selecting specimens. The ideal specimen is one that has several lateral branches and no dead spots or odd growths.

The Coral FMP states harvest by non-powered hand tools is permitted. Most corals are harvested with a dive knife, a mason's hammer, or a hammer and wood chisel. The Coral FMP allows for the harvest of a minimal amount of substrate (1 inch around the base of the octocoral), and most harvesters harvest much less than this amount. Allowing the substrate around the holdfast to be harvested reduces the chance of injuring the specimen and also makes it easier for the final consumer, the aquarist, to attach it to a rock in their aquarium or place it upright in the sand.

Most marine life fishing vessels are open, equipped with outboard motors, and less than 25 feet long. Fishermen either work alone or with one other person on the boat. Most divers use standard self contained underwater breathing apparatus (SCUBA) gear, but a few use boat-mounted surface supplied air systems. Marine life vessels are required to have some sort of aeration system on board to aerate the livestock both on the water and during transport to an onshore holding facility.

Recreational harvest is carried out similarly to the commercial harvest and uses the same types of vessels and gear. Recreational harvesters are not required to aerate their catch, but the catch must be landed live.

Allowable gear

Hand harvest is the only allowable method. A toxic chemical may not be used or possessed in a coral area in the EEZ. A power-assisted tool may not be used to take prohibited coral, allowable octocoral or live rock. Possession in the EEZ of coral resources harvested with a power assisted tool is prohibited.

3.1.5 Economic description

The FWRI collects and maintains fishery harvest data for this fishery. However, the total economic value of the catch increases as the product moves from the collector to the final consumer. The traditional chain of possession of the product is collector to wholesaler to pet shop to aquarist, and traditionally the price is at least doubled at each step of the process. Therefore, a $4 octocoral reported to the FWRI will sell for at least $16 to the final aquarist, and could be much more than that. Most of this income comes into Florida from the rest of the United States and from other parts of the world (primarily Europe).

Octocoral harvest differs markedly between the South Atlantic and Gulf waters, with total harvest for 2000 through 2008 reported at 85,223 and 460 colonies, respectively (**Tables 1 & 2**). Similarly, harvest in federal waters vs. state waters varies widely with a substantial majority of the landings in east Florida occurring in state waters (**Figure 1**). For the period 2000 through 2008, total harvest for South Atlantic federal and state waters was 85,223 and 273,869 colonies, respectively (**Table 1**). In 2008, a total of 9,831 colonies were harvested from the South Atlantic EEZ and 31,531 came from Florida waters. The total ex-vessel value for 2008 was $153,846 (**Table 1**). Harvest levels have fluctuated over the last several years, with 2006 showing the highest landings (**Figure 1**). Total harvest levels in 2004 and 2005 were lower than those for 2003, most likely reflecting the disruptive impacts of hurricanes on the ability of the fishermen to harvest (**Table 1**). Re-growth of corals in an area scoured by hurricanes to a level that will sustain a harvest varies from two to four years, depending on the habitat type and the targeted species. FWRI data indicate there were 26 fishermen reporting harvest from the South Atlantic EEZ from 2002 to 2006, and 103 fishermen reporting state harvest during that same time period (K. Nedimeyer, pers. comm).

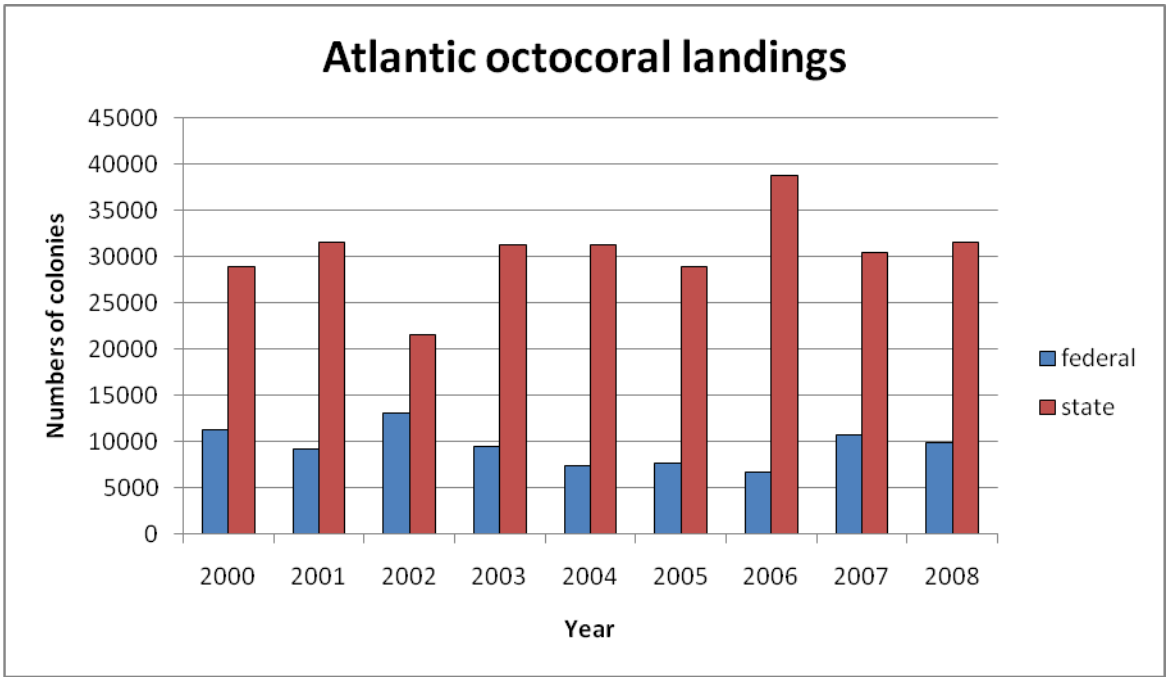

Figure 1. Octocoral harvest in South Atlantic Federal and state waters for the period 2000-2008 (Source: Florida Fish and Wildlife Research Institute).

Table 1. Octocoral harvest (in numbers of colonies) and ex-vessel value for South Atlantic federal and state waters for the period 2000-2008 (Source: Florida Fish and Wildlife Research Institute).

Year	State/Fed Waters	Numbers of colonies	Ex-vessel Value ($)
2000	Federal	11,253	25,509
2001	Federal	9,160	18,235
2002	Federal	13,114	33,116
2003	Federal	9,380	25,910
2004	Federal	7,352	21,370
2005	Federal	7,700	25,899
2006	Federal	6,670	20,594
2007	Federal	10,763	36,804
2008	Federal	9,831	35,747
TOTAL		**85,223**	**225,048**
2000	State	28,895	77,141
2001	State	31,500	87,799
2002	State	21,472	53,682
2003	State	31,187	83,463
2004	State	31,185	87,197
2005	State	28,901	87,557
2006	State	38,805	116,684
2007	State	30,393	102,041
2008	State	31,531	118,099
TOTAL		**273,869**	**813,663**

In the Gulf of Mexico, total octocoral harvest ranged from no harvest in federal waters during 2000-2005 to 5,234 colonies in state waters in 2001 (**Figure 2**). As in the South Atlantic, harvest of octocorals in the Gulf of Mexico occurs mainly in state waters. Total harvest in the EEZ off west Florida for 2000-2008 was only 460 colonies; whereas, total harvest for state waters over the same period was 35,076 colonies (**Table 2**).

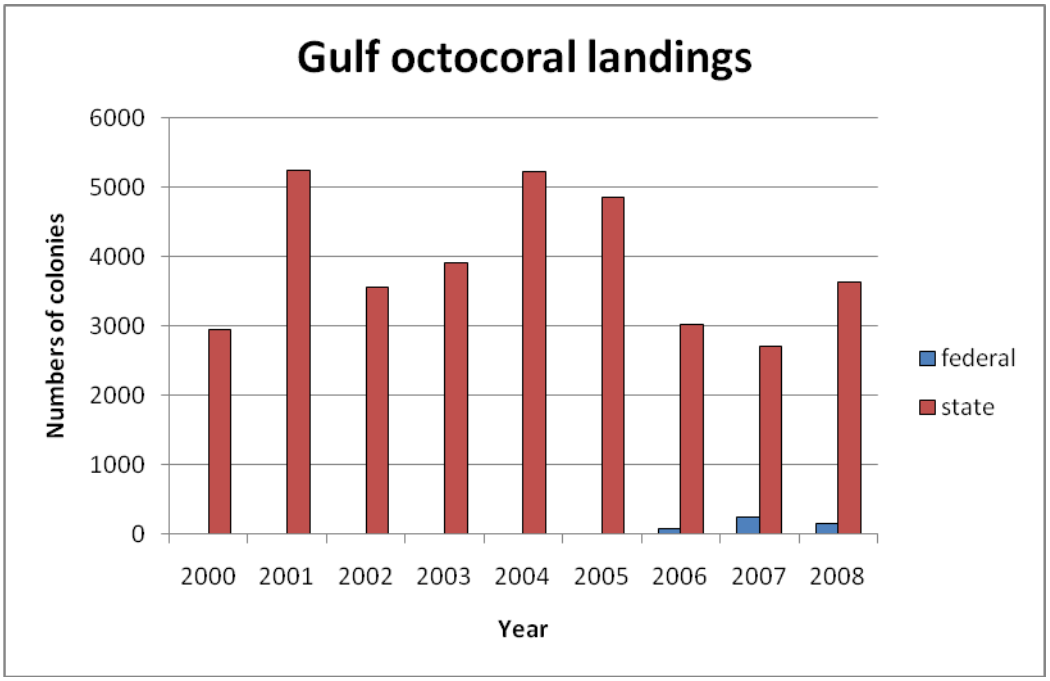

Figure 2. Octocoral harvest in Gulf of Mexico Federal and state waters for the period 2000-2008 (Source: Florida Fish and Wildlife Research Institute).

Table 2. Octocoral harvest (in numbers of colonies) and ex-vessel value for Gulf of Mexico Federal and state waters for the period 2000-2008 (Source: Florida Fish and Wildlife Research Institute).

Year	State/Fed	Numbers of colonies	Ex-vessel value ($)
2000	Federal	0	0
2001	Federal	0	0
2002	Federal	0	0
2003	Federal	0	0
2004	Federal	0	0
2005	Federal	0	0
2006	Federal	75	150
2007	Federal	234	523
2008	Federal	151	375
TOTAL		**460**	**1,048**
2000	State	2952	5,264
2001	State	5234	13,271
2002	State	3552	8,933
2003	State	3917	7,765
2004	State	5221	11,411
2005	State	4851	6,060

Table 2. Continued. Octocoral harvest (in numbers of colonies) and ex-vessel value for Gulf of Mexico Federal and state waters for the period 2000-2008 (Source: Florida Fish and Wildlife Research Institute).

Year	State/Fed	Numbers of colonies	Ex-vessel value ($)
2006	State	3017	6,110
2007	State	2708	5,745
2008	State	3624	9,829
TOTAL		**35,076**	**74,387**

3.1.6 Social and cultural environment

Although the area where octocoral harvest is permitted extends from the Florida Keys to Cape Canaveral, the entire harvest from the South Atlantic EEZ is from the Florida Keys with most of the harvesters either living in the Florida Keys or in Southeast Florida. Within the Florida Keys, there is no harvest in Key Largo National Marine Sanctuary or in Biscayne National Park, and within the Florida Keys National Marine Sanctuary there are several closed areas where all consumptive harvest is prohibited.

Most fishermen that land octocorals also harvest other marine life specimens on the same trip and multiple species of octocorals usually can be harvested on the same dive. Octocoral communities are always associated with hardbottom habitats, and densities vary greatly. Harvest volume is governed by demand and by the amount of holding capacity available on the fishing vessel and at the shore-based holding facility.

3.1.7 Bycatch

Because the octocorals are almost exclusively harvested one at a time by divers, there is very little bycatch. However, all octocorals most likely have communities of invertebrates living on them that may be specially adapted to each of the different species of octocorals. These invertebrates may include different types of shrimp, amphipods, nudibranchs, and starfish. Some of these organisms are occasionally seen on the specimens (in the field) or at the bottom of containers used to transport freshly harvested specimens, but the amount per colony is generally very small. Accurate bycatch species identification and counts can only be done in a laboratory, and it is unlikely that this information is available for most of the species harvested by marine life fishermen.

There is no visible bycatch among most of the shallow water, photosynthetic species of octocorals. There may be an occasional macro-alga or sponge attached to the substrate

that surrounds the base of the octocorals. Experienced harvesters usually collect octocorals in areas where the target species are abundant and they can quickly and easily remove a specimen without damaging any surrounding benthic communities.

Bycatch is slightly more common on some of the deepwater, non-photosynthetic specimens, very little of which are collected in the federal waters of the Florida Keys. Most deepwater octocorals are collected off Broward and Palm Beach counties in state waters. Bycatch associated with deepwater octocorals usually consists of small brittle stars and basket stars, and the number and species composition varies greatly by species, location, and season.

The impact of harvesting octocorals is most likely not discernable. Few fish feed directly on octocorals, and the selective nature of the harvest has very little impact on the overall community. Also, due to the rapid growth of octocorals and their short natural lifespan, there is a rapid population replacement cycle in hardbottom habitats *(citations).*

3.2 Live Rock Aquaculture

The federal live rock aquaculture fishery for the South Atlantic EEZ takes place exclusively in the Florida Keys, mostly due to the narrow continental shelf off Southeast Florida and unsuitable conditions north of there. In the Florida Keys, most of the federal aquaculture sites are in depths of 30 to 50 feet along the outer reef edge.

Federal live rock aquaculture permits are managed by the NOAA Fisheries Service Southeast Regional Office in St Petersburg, Florida. Applicants must select a suitable site in federal waters, have the site surveyed and approved by a biologist from the Florida Keys National Marine Sanctuary, provide a geologic description of the seed rock to be used, and complete all the necessary paperwork required by NOAA Fisheries Service. Permitting from start to finish can be accomplished in less than three months if the applicant is well prepared, but most applications take longer to be approved.

Development of an approved site requires hard work both above the water and below the water. Collecting and depositing suitable rock is tedious and must be done by hand. Upland rocks, generally purchased from limestone quarries in South Florida, must be transported to the site by boat and then lowered to the bottom in baskets and placed within the designated site boundaries. The average rock size is about 5 pounds and is somewhere between the size of a softball and a football. High quality rocks are irregular

in shape and have numerous holes in them. Low quality rocks lack the irregular shape, have few if any holes, and are a denser type of limestone.

Most aquaculturists employ off-season commercial crawfish boats to transport the rock to the site and lower it to the bottom. A medium to large sized trap boat can haul 10,000 pounds of rock, and if the rock site is close to the dock, they can take two or more trips a day to the site. Most of the big rock deposits and underwater stacking activities take place in the late spring, summer, and fall when the commercial boats are available, the weather is consistently favorable, and the water is warm and clear.

To date, all federal sites have been located in sand, so most individuals have opted to lay a foundation of larger, less desirable rocks on the sand, and then build mounds on top of these foundations. Most work is done with SCUBA gear, but some operations use surface supplied air systems which consist of low pressure, high volume air compressors, filters, pressure tanks, and long hoses that have regulators on the ends.

The time required to "grow" a high quality live rock is about two years, but there is a market for one year old "base" rock, and there are maintenance steps that can be taken to produce high quality rock in less than two years. The quality of the seed rock has an impact on how soon it can be harvested and its market value. Hand selected seed rocks will have a higher yield than machine sorted seed rocks.

Vessel types for live rock aquaculture depend on the size of the operation and the type of business. Individuals selling more than a thousand pounds of rock a week generally operate 25 to 35 foot vessels ranging from open, center console skiffs, with outboard motors to traditional, closed cabin vessels with inboard diesel engines. Operations of this size usually have a crew of two or three people, and use mechanical lifting devices such as davits and hydraulic hoists. Individuals selling less than a thousand pounds per week tend to operate out of boats less than 25 feet, have a crew of two people who remove the rock from the water by hand. These small operators also tend to participate in the marine life fishery, and often mix marine life collecting trips with live rock harvesting stops.

After the rock is harvested, it is usually transported submerged in water to a shore-based facility where it is stored. Most of the rock is shipped by airfreight from Miami or Ft. Lauderdale FL, but some is transported by truck to wholesalers in Tampa, FL where it is then flown out of the Tampa area airports. A limited amount of rock is also shipped by FedEx, UPS, DHL, the United States Postal service, and some is even trucked into the Southeast U.S.

3.2.1 Economic description of the fishery

Since 2000, aquacultured live rock harvest has been higher in Federal waters that in Florida state waters. According to data collected by FWRI, a total of 1,334,831 units of aquacultured live rock was harvested from the South Atlantic EEZ during 2000 to 2008. In contrast, a total of approximately 241,000 units was harvested from state waters over the same period (**Table 3; Figure 3**).

The landings data show a clear upward trend until 2004, after which landings dropped from over 143,000 units in 2005, to just over 71,000 units in 2006, and to just over 13,000 pounds in 2006 (**Table 3; Figure 3**). This precipitous drop was a direct result of two very active hurricane seasons and a disastrous late season hurricane Wilma in October of 2005. Only one upper Florida Keys live rock site remained in production following hurricane Wilma. Landings have remained low over the past few years and, for many, the risks of trying to grow live rock in the exposed offshore waters of the Florida Keys far outweigh the potential benefits.

Table 3. Aquacultured live rock harvest (in numbers of units) and ex-vessel value for South Atlantic federal and state waters for the period 2000-2008 (Source: Florida Fish and Wildlife Research Institute).

Year	State/Fed Waters	Numbers of units	Ex-vessel Value ($)
2000	Federal	165,512	218,141
2001	Federal	217,692	253,004
2002	Federal	223,946	337,150
2003	Federal	199,581	300,480
2004	Federal	209,526	350,850
2005	Federal	143,444	267,428
2006	Federal	71,163	171,450
2007	Federal	64,895	168,810
2008	Federal	39,072	108,428
TOTAL		**1,334,831**	**2,175,741**
2000	State	24,883	41,245
2001	State	18,945	34,031
2002	State	3,324	3,817
2003	State	21,146	34,791
2004	State	44,728	91,026
2005	State	14,303	22,297
2006	State	44,826	169,523
2007	State	34,289	128,787
2008	State	34,458	101,479

TOTAL		**240,902**	**626,996**

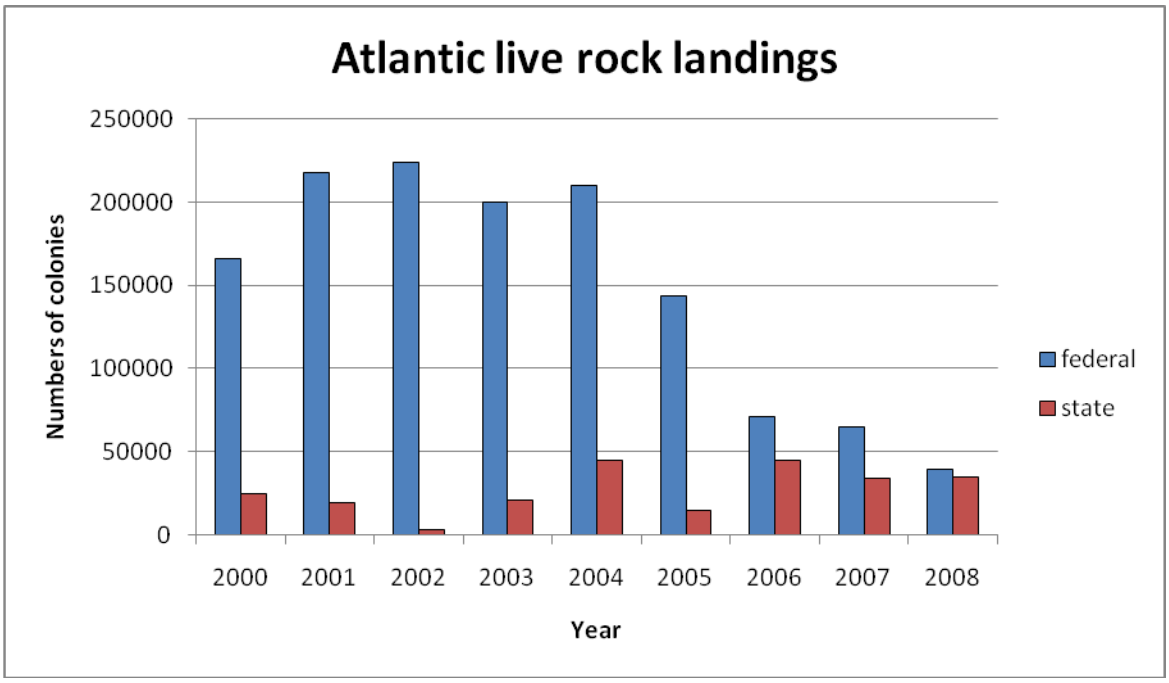

Figure 3. Aquacultured live rock harvest in South Atlantic Federal and state waters for the period 2000-2008 (Source: Florida Fish and Wildlife Research Institute).

The ex vessel price for high quality live rock is around $2.00 a pound, but the price can vary depending on the market and season. There is a considerable amount of price competition associated with cheap imports from Haiti and Southeast Asia, which has kept the price at or below the $2.00 per pound value for the last 15 years. Aquacultured live rock is generally denser and less porous than imported wild live rock, which detracts from its value. However, aquacultured live rock also tends to have more living organisms on it, which increases its value. Other positive selling points for the aquacultured rock are that it is domestically produced, may contain live stony corals, and it is not harvested from a natural reef.

3.2.2 Social and cultural environment

Live rock aquaculture is primarily a Florida based fishery with state and federal aquaculture sites on both coasts of Florida. Along the East Coast of Florida in the South Atlantic EEZ, all of the aquaculture sites are in the Florida Keys from about Tavernier to Key West. Most of the permit holders are also marine life fishermen, and the live rock is one of many products they harvest for the marine ornamental trade. Most live rock producers operate a small business with less than 5 employees, and most sell their product out of the state to wholesalers and pet shops, or directly to hobbyists. Prior to the

active hurricane seasons of 2004 and 2005, there were several companies based outside of the Florida Keys that were almost exclusively dependent on live rock for their income, but after losing everything to multiple hurricanes, they have moved their operations out of the Florida Keys or have gotten out of the business completely. The surviving live rock operations are those who do not depend on live rock for much more than 20% of their gross income.

3.2.3 Bycatch

Bycatch associated with live rock harvest is varied and often sold as part of the product. Macro algae, sponges, bryozoans, octocorals, and stony corals, which attach to the rock, add value determines what type of rock it can be sold as. Not all of these sessile organisms are desirable, so the rocks are sometimes "cleaned" on the bottom or on the boat so undesirable organisms are not taken to the holding facilities.

Another type of bycatch associated with live rock harvest is the numerous crabs, shrimps, snails, worms, and tiny fish, which cling to the rocks or hide in the crevices of the rocks. Often, a quick shake on the bottom loosens up a lot of these small fish and invertebrates, but many remain attached to the rock and are brought to the surface. Once on the boat, most producers sort the rock and place it into holding tanks for transport to shore, so the sorting process also releases some of the attached organisms, which are then dumped overboard. Whatever remains on the rock is taken to shore and ends up in shore-based holding facilities, and some organisms are shipped to the buyer still attached to the rock.

All of the bycatch associated with live rock aquaculture is inherently created by this method of harvest. Although there is bycatch associated with this industry, it is a bycatch that is essentially produced in conjunction with the production of live rock. In many ways, offshore live rock aquaculture is a type of polyculture, because many different organisms are raised at the same time on the same site. Live rock aquaculture operations are net producers of marine life because whole communities of fish and invertebrates establish themselves around the live rock site and although the harvest operations disturb these communities, they continue to thrive there from year to year.

4.0 ENCRUSTING GORGONIANS (*ERYTHROPODIUM SP.* AND *BRIAREUM ASBESTINUM*)

Amendment 2 to the Coral FMP (SAFMC & GMFMC 1994) redefined allowable octocorals to mean "erect non-encrusting species of the subclass Octocorallia, except the prohibited sea fans *Gorgonia flabellum* and *G. ventalina*, including only the substrate covered by and within one inch (2.54 cm) of the holdfast." If more than 1 inch (2.54 cm) of the substrate is harvested, then this is considered to be live rock and not allowable octocoral (CFR 622 .2). Therefore, harvest of encrusting octocorals is not permitted since this usually entails harvesting the rock on which the colony is growing in its entirety. The Coral AP maintains; however, that the erect form of corky seafingers (*Briareum* sp.) is easily harvested without the substrate and there is demand for it in the aquarium trade. Similarly, *Erythropodium* sp., even though it is an encrusting coral, can easily be peeled off the substrate on which it is growing. Hence, the AP requested that the Council consider allowing the take of these two species without the substrate on which they are growing. This action has potential beneficial economic impacts to the industry.

A. Maximum Sustainable Yield (MSY)

Option 1. No action. There is no specified MSY for encrusting gorgonians.
Option 2.
Option 3. Recommendation from SSC

B. Acceptable Biological Catch

Option 1. No action. There is no specified ABC for encrusting gorgonians in the South Atlantic.
Option 2. Recommendation from SSC.

C. Overfishing Level

Option 1. No action. There is no specified OFL for encrusting gorgonians in the South Atlantic.
Option 2. Recommendation from SSC

D. Annual Catch Limit

Option 1. No action. There is no specified ACL for encrusting gorgonians in the South Atlantic.

Option 2. ACL = 0
Option 3. ACL = ___% of MSY
Option 4. Recommendation from SSC.

E. Accountability Measures
Option 1. No action. There is no specified OFL for encrusting gorgonians in the South Atlantic.
Option 2. Recommendation from SSC

Background

The gorgonian soft coral *Briareum asbestinum* is morphologically variable among habitats in the Caribbean (West et al. 1993). Unlike most other gorgonian corals that are distributed over narrow depth ranges, *B. asbestinum* is widely distributed from shallow (1 to 5 m) sites to deep reefs at 40 m (Bayer 1961, Kinzie 1971). It occurs in both encrusting and erect forms in shallow water. Erect colonies from different habitats vary in morphology; shallow-water colonies are short, stout and sometimes branched while deep water colonies are long, slender and un-branched (West et al. 1993). The cause of the variation in morphology between the shallow- and deep-water forms is largely unknown although a strong genetic component may be expected (West et al. 1993).

Net growth of colonies of *Briareum asbestinum* is 16.6 cm per year and is determined by the number of branch tips (Brazeau and Lasker 1992). Mean longevity is of individual colonies is short (10.6 years) given rates of growth and loss. However, since fragmented branches can reattach and form new colonies, losses due to fragmentation contribute to the asexual expansion of the species (Brazeau and Lasker 1992).

5.0 ORANGE CUP CORAL, *TUBASTRAEA COCCINEA*.

The orange cup coral, *Tubastraea coccinea*, is a stony coral not native to the South Atlantic region (Cairns 2000, Fenner and Banks 2004). The harvest of stony corals is prohibited in the South Atlantic. However, at the request of the Coral AP, the Council is considering the feasibility and implications of allowing harvest of this invasive coral species.

A. Maximum Sustainable Yield (MSY)
Option 1. No action. There is no specified MSY for *T. coccinea*.
Option 2. Set MSY = OY (50,000 colonies)
Option 3. Recommendation from SSC

B. Acceptable Biological Catch

Option 1. No action. There is no specified ABC for *T. coccinea*
Option 2. Recommendation from SSC.

C. Overfishing Level
Option 1. No action. There is no specified OFL for *T. coccinea*
Option 2. Recommendation from SSC

D. Annual Catch Limit
Option 1. No action. There is no specified ACL for *T. coccinea*
Option 2. ACL = 0
Option 3. ACL = ___% of MSY
Option 4. Recommendation from SSC.

E. Accountability Measures
Option 1. No action. There is no specified OFL for *T. coccinea*.
Option 2. Recommendation from SSC

Background

Tubastraea faulkneri and *T. coccinea* are by far the most common species available in the aquarium industry, and are easily recognized by their orange cups. The dendroid colonies are very lightweight and are ahermatypic, meaning they do not contribute significantly to reef structure. The polyps are large and extend mostly at night. These corals have thick and sharply tapered tentacles, with the nematocyst buds and batteries visible as opaque spots on the translucent yellow to orange tentacles. A prominent central mouth is apparent on each polyp.

In nature, *Tubastraea* sp. is often found upside down at the entrance to caves. It is occasionally found in the open reef, under overhangs, or in areas of high nutrients that can provide for the corals nutritive needs. Furthermore, the highly porous skeleton is adept at storing phosphorous and nitrogen in its pore waters, which the corals can use as a "back-up supply" of these sometimes limited nutrients. Contrary to popular opinion, *Tubastraea* sp. is not found under overhangs and in caves because it cannot tolerate light. Nor is it found there because it cannot compete with other stony corals.

The orange cup coral does not have symbiotic algae in its tissue, and must therefore depend entirely on direct nutrient uptake from the water and capturing its food. Capable of feeding on large zooplankton, prey is rapidly engulfed and taken into the gastric cavity. Despite its obviously competent feeding behavior, this species does not seem to pose a threat to neighboring corals in terms of its stinging capabilities. Any such

behavior is also somewhat mollified in that the tentacles are usually extended at times when other corals are completely retracted. (E. Borneman http://www.reefs.org/library/aquarium_net/0797/0797_3.html).

Artificial structures are clearly preferred habitat, since in each area they are found first on artificial structures, and are prolific on some artificial structures in the Caribbean, Gulf of Mexico, and off Florida (Fenner and Banks 2004). Samarco et al. (2004) examined the expansion of coral communities in the northern Gulf of Mexico via oil and gas platforms. The authors found a relationship between *T. coccinea* abundance and platform age in shallow water, where its abundance decreased with increasing platform age. This indicates that *T. coccinea* may be an opportunistic pioneer species.

Tubastraea coccinea was introduced in Brazil in the late 1980s and has since invaded 900 km of rocky coastline threatening the local coastal biodiversity. The "Projecto Coral-Sol", initiated in 2007, proposes to control the spread of this species with the intent of eradicating it in 20 years while adding value to its extraction and contributing to the sustainable development of coastal communities. Forty families of coastal communities of Ilha Grande (Grand Island) are being trained to collect and prepare the coral for use as craft, generating income alternatives, fighting the expansion of this invasive species and replacing the illegal trade in native corals. This project represents the first initiative of sustainable eradication of an exotic marine organism (from internet: http://www.biodiversidademarinha.org.br/index.php?option=com_content&task=view&id=23&Itemid=35)

6.0 ESSENTIAL FISH HABITAT

The Council's Comprehensive Ecosystem-Based Amendment 1 (CE-BA 1 in development), contains spatial information on designated EFH and Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPCs). This information was required by the EFH Final Rule in 2002. Through the CE-BA 2, the Council intends to amend Council Fishery Management Plans (FMPs) as needed to revise existing and possibly designate new EFH and Essential Fish Habitat-EFH-HAPCs as required by the EFH Final Rule.

Proposed List of New Essential Fish Habitat Areas of Particular Concern:
Council designated EFH-HAPCs to emphasize they are subsets of EFH. EFH-HAPCs on their own do not carry regulatory authority; however, the FMPs under which they were designated may include regulations that protect habitat from fishing impacts. The HAPCs and FMPs were developed together with the intent of providing additional

protection to the HAPCs. EFH-HAPCs include general habitat types (e.g., submerged aquatic vegetation) and geographically defined areas of ecological importance (e.g., Charleston Bump)
Four criteria used:

1. Rare (R)
2. Particularly susceptible to human-induced degradation (S)
3. Especially ecologically important (E)
4. Or located in an environmentally stressed area (ES)

The following list presents proposed new EFH-HAPCs, the FMP(s) under which they are to be designated and EFH-HAPC criteria met:

- Golden tilefish habitat (Snapper Grouper) R, S, E
- Mouth of Altamaha River including oyster reefs and marsh (Snapper Grouper and Coastal Migratory Pelagics) S, E, ES
- Shelf-edge reefs (spawning grounds for snapper/grouper complex) (Snapper Grouper) R, E
- All live bottom from shoreline out to 10 miles for black sea bass (Snapper Grouper) R, S, E, ES
- Intertidal oyster reef as nursery habitat (Snapper Grouper) S, E and ES
- All waters classified as Outstanding Resource Waters (Coastal Migratory Pelagics and Snapper Grouper) R, S, E
- Hardbottom and reef tract between Port Everglades and Hillsborough Inlet (Coastal Migratory Pelagics and Snapper Grouper) R, E
- Hardbottom and reef tract from Broward/Palm Beach County line northward to Lake Worth Inlet (Coastal Migratory Pelagics and Snapper Grouper) R, S, E, ES
- Bathtub reef (worm reefs) (Snapper Grouper) S, ES
- Horseshoe reef and Gulf Stream reef (Palm Beach County) (Snapper Grouper and Coastal Migratory Pelagics) R, E
- Hardbottom and reef tract from Port St. Lucie to Cape Canaveral (Snapper Grouper and Coastal Migratory Pelagics) E, ES
- Indian River Lagoon (Snapper Grouper and Coastal Migratory Pelagics) S, ES
- Lake Worth Lagoon (Snapper Grouper and Coastal Migratory Pelagics) S, ES
- Cape Canaveral scallop grounds (Shrimp) E
- Ridge complex off southeast Florida (Snapper Grouper and Coastal Migratory Pelagics) *criteria??*
- 17th Century stony corals off Hollywood (Snapper Grouper) R, S, E, ES
- Broward staghorn coral stand (Coral, Snapper Grouper) S, R, ES

- North Carolina Strategic Habitat Areas (Snapper Grouper and Coastal Migratory Pelagics) R, S, E, ES
- Bulls Bay South Carolina (Snapper Grouper, Coastal Migratory Pelagics and Shrimp - nursery areas) E, ES
- North Inlet, South Carolina (Snapper Grouper, Coastal Migratory Pelagics and Shrimp - nursery areas) E, ES
- Ashepoo, Combahee and Edisto Basin South Carolina (Snapper Grouper, Coastal Migratory Pelagics and Shrimp - nursery areas) S, E
- Deepwater MPAs (Snapper Grouper – deepwater species/snowy grouper, golden tilefish) R, E
- The Charleston Bump and the Point (Sargassum) R, E

Preliminary List of New Essential Fish Habitat:

1. Top ten meters of the water column in the South Atlantic EEZ (Sargassum)
2. EFH for Snapper Grouper in Mid-Atlantic and New England (in Snapper Grouper Amendment 18).

Establishing New EFH and EFH-HAPCs

The designation of new EFH and EFH-HAPCs would not result in direct impacts to the region's fishery resources. Rather, EFH and EFH-HAPC designation under this option would provide an opportunity for the Council to protect EFH from fishing activities in the EEZ and to review and recommend EFH conservation measures to protect habitat from non-fishing activities which are undertaken, authorized, or funded by Federal agencies. Similarly, designation of EFH and EFH-HAPCs would require Federal agencies to consult with NOAA Fisheries Service and the Council on activities which may adversely affect that habitat.

Designation of new EFH and EFH-HAPC will require the Council to consider all operations or actions that might interact with or affect the EFH, and may trigger a consultation for any activity that may affect the habitat. The direct effects of additional regulatory consideration would be the financial costs of a protracted regulatory process. Additional effects would accrue to any restrictions imposed as a result of the evaluation of impact of these activities. A consultation may incur costs associated with production delays, project/activity design modification, or mitigation measures. Since any restrictions that may subsequently be placed on these activities are unknown at this time, it is not possible to explicitly describe their effects.

There will be few social impacts from establishing new EFH and EFH-HAPCs. The social impacts will most likely come from future actions that are associated with such designations. In some cases, protection of habitat may mean restrictions in areas where harvesting presently takes place.

It is worth noting that identification of EFH will alter the process by which permits for activities which impact EFH and EFH-HAPCs are issued. The potential for increased restrictions, mitigation, and permitting requirements may have impacts upon the behavior of individuals and agencies seeking permits. The nature and extent of those impacts are unknown and will undoubtedly vary depending upon the individual and/or agency.

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