Development of Island-Based Fishery Management Plans (FMPs) in the U.S. Caribbean

Transition from Species-Based FMPs to Island-Based FMPs

Environmental Assessment

November 2014

Abbreviations and Acronyms Used

ACL annual catch limit

AM accountability measure

APA Administrative Procedures Act

BVI British Virgin Islands

CEA cumulative effects analysis

CEQ Council on Environmental Quality

CFMC Caribbean Fishery Management Council

CZMA Coastal Zone Management Act

DPNR Department of Planning and Natural Resources of the USVI

EA environmental assessment

EEZ exclusive economic zone

EFH essential fish habitat

ESA Endangered Species Act

FMP fishery management plan

FMU fishery management unit

HAPC habitat area of particular concern

Magnuson-Stevens Act Magnuson-Stevens Fishery Conservation and Management Act

MMPA Marine Mammal Protection Act

MSY maximum sustainable yield

NMFS National Marine Fisheries Service

NOAA National Oceanic and Atmospheric Administration

OMB Office of Management and Budget

OY optimum yield

PRA Paperwork Reduction Act

RFA Regulatory Flexibility Act

RIR Regulatory Impact Review

SEFSC Southeast Fisheries Science Center

SEIS supplemental environmental impact statement

SERO Southeast Regional Office

USVI United States Virgin Islands

Development of Island-Based Fishery Management Plans (FMPs) in the U.S. Caribbean

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Proposed actions: Transition from species-based FMPs to island-based FMPs in the U.S. Caribbean

Lead agencies: Caribbean Fishery Management Council (Council) and the National Marine Fisheries Service

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What are Island-Based FMPs?

Currently, the Council and NOAA's National Marine Fisheries Service organize FMPs in the U.S. Caribbean by species or species groups (e.g., Spiny Lobster, Reef Fish). Island-based FMPs will be structured by island or island group, rather than by species, to allow managers to better account for biological, social, and economic differences among the islands comprising the U.S. Caribbean.

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Chapter 1. Introduction

1.1 What Action is Being Proposed?

The Caribbean Fishery Management Council (Council) is proposing to transition management of federal fisheries in the U.S. Caribbean from the current species-based fishery management plans (FMPs) to island-based FMPs. Current regulations under the Spiny Lobster FMP, Reef Fish FMP, Queen Conch FMP, and the Corals and Reef Associated Plants and Invertebrates FMP will be reorganized into FMPs for Puerto Rico, St. Thomas/St. John, and St. Croix.

1.2 Who is Proposing the Action?

The Council is proposing the development of island-based FMPs. If the Council decides to develop new FMPs, they will submit the FMPs to the National Marine Fisheries Service (NMFS) who ultimately approves, disapproves, or partially approves the actions in the plans on behalf of the Secretary of Commerce and implements the regulations. NMFS is an agency of the National Oceanic and Atmospheric Administration (NOAA).

Caribbean Fishery Management Council

- Responsible for conservation and management of U.S. Caribbean fish stocks.
- Consists of seven voting members:
  - Four voting members appointed by the Secretary of Commerce
  - One voting member appointed by each of the Governors of Puerto Rico and the U.S. Virgin Islands
  - The Regional Administrator of the National Marine Fisheries Service (NMFS) for the Southeast Region.
- Manages the area from 3 to 200 nautical miles (nm) off the coasts of the U.S. Virgin Islands, and 9 to 200 nm off the coast of Puerto Rico.
- Develops fishery management plans and recommends regulations to NMFS and the Secretary of Commerce for implementation.

1.3 Where is the Project Located?

The area under consideration for this project is the U.S. Caribbean exclusive economic zone (EEZ), defined as the marine waters located between 3 to 200 nautical miles (nm) off the U.S. Virgin Islands (USVI) and between 9 to 200 nm off Puerto Rico (Figure 1.1).

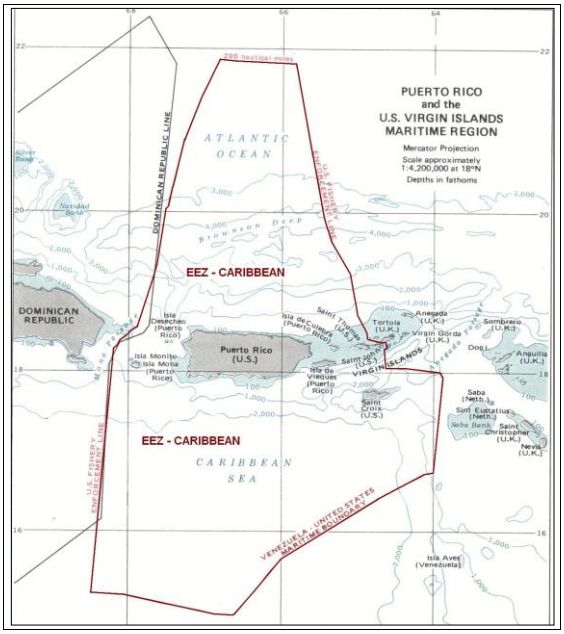


Figure 1.1. Jurisdictional boundaries of the Caribbean Fishery Management Council. (Source: http://www.caribbeanfmc.com/)

1.4 Why is the Council Considering Action?

At their 141st meeting, held during December 13 and 14, 2011, the Council voted to develop a discussion paper regarding the possibility of restructuring fishery management in the U.S. Caribbean to allow for management by island or island group rather than by species or species group. This directive from the Council responds to frequent requests by fishers, fishing community representatives, and the local governments of Puerto Rico and the USVI to consider the differences (e.g., ecosystems, culture, markets, gear, and seafood preferences) between the islands or island groups when addressing fisheries management in the U.S. Caribbean.

Purpose for Action

The purpose of this action is to facilitate management of U.S. Caribbean fishery resources by reorganizing the federal fishery management strategy to better account for biological, social, and economic differences among the islands comprising the U.S. Caribbean.

Need for Action

The need is to reconsider fishery management within the context of the islands of the U.S. Caribbean. This reconsideration shall:(1) prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery in the U.S. Caribbean, (2) take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches, and (3) provide for the sustained participation of the fishing communities of the U.S. Caribbean and to the extent practicable, minimize adverse economic impacts on such communities.

In the U.S. Caribbean, recreational and commercial fishing activities reflect local preferences and are, in many instances, dependent on the coral reef community and associated seagrass, mangroves, and un-vegetated habitats. In addition, the resultant harvest from each fishing sector is generally consumed locally, with little, if any, export. Thus, harvest patterns reflect the personal,

cultural, and marketing preferences of the local community on each island (Matos-Caraballo and Agar 2008; Kojis and Quinn 2011).

Those preferences contrast substantially between Puerto Rico and the USVI. For example, the commercial fishery in Puerto Rico is predominantly a snapper fishery whereas the St. Croix commercial fishery predominantly targets parrotfish. Preferences also differ among the islands that comprise the USVI and even among ethnic groups within each USVI island (Kojis and Quinn 2011). With parrotfish as an example, St. Croix fishers purposely target these species, reflecting a culturally driven market demand, landing, on average, more than 278,000 lbs of parrotfish annually during a three-year period from 2008 through 2010. In contrast, commercial fishers on St. Thomas consider parrotfish as bycatch, and commercial catch of all parrotfish species from the waters surrounding St. Thomas/St. John averaged less than 36,000 lbs annually during that same period.

Finally, the factors affecting habitats and their associated species, particularly anthropogenic impacts, but also natural events, differ among islands (PR and NOAA CRCP 2010; USVI and NOAA CRCP 2010). While St. Croix supports medium and heavy industries (e.g., rum distillery), St. Thomas is more a tourist-oriented enterprise, and the much larger island of Puerto Rico supports over 3.8 million residents and a host of industrial, tourism, and service industries. In addition to these differences are additional potential and realized differences in natural events that impinge on each island, including for example hurricanes, freshwater inputs, and ocean current patterns. These harvest preferences, anthropogenic impacts, and natural events combine to create a mosaic of conditions unique to each island.

This document provides an overview of the current fisheries management structure in the U.S. Caribbean. In addition, it evaluates the consequences to the physical, biological, social, and economic environments that NMFS and the Council will consider with regard to the proposed rearrangement of the U.S. Caribbean FMPs.

1.5 Background

Currently, species in the U.S. Caribbean are managed within the Spiny Lobster FMP (CFMC 1981), the Reef Fish FMP (CFMC 1985), the Corals and Reef Associated Plants and Invertebrates FMP (CMFC 1994), and the Queen Conch FMP (CFMC 1996) as amended. In 2011, the Council completed a series of amendments to these plans to comply with the 2007 revisions to the Magnuson-Stevens Fishery Conservation and Management (Magnuson-Stevens Act). As part of these amendments, the U.S. Caribbean EEZ was subdivided for management purposes (Figure 1.2). For example, these amendments established island-based annual catch limits (ACLs). ACLs are the highest level of landings that are acceptable to maintain a healthy stock size. The overall ACL for a particular species or species group in the U.S.

Caribbean was calculated based on historic landings for each species or species group from each island or island group(Table 1.1). Under this management structure, if an ACL is exceeded in a particular island or island group within the January 1 through December 31 calendar year, NMFS will implement accountability measures (AMs) effective in the EEZ of that island or island group. The AMs are designed to minimize the likelihood that an ACL will again be exceeded. This means that landings on each island or island group count towards the ACL for that island's portion of the EEZ. The Council drafted these amendments without considering the future development of an island-based management regime. However, because these amendments divided the U.S. Caribbean EEZ for management purposes, they should facilitate a relatively smooth transition from a species-specific approach to an island-based approach.

If implemented, island-based FMPs will create a new fisheries management structure in the U.S. Caribbean. The Fishery Ecosystem Plans (FEPs) developed by the Western Pacific Fishery Management Council (WPFMC) in 2009 provide an example of Placed-based management. The WPFMC has reorganized their plans from species-based to island-based management for remote island areas by consolidating their fishery-based FMPs into placed-based FMPs, which are referred to as FEPs. The WPFMC initiated a comprehensive ecosystem approach to fisheries management through an incremental, collaborative, and adaptive management process to develop and implement the FEPs. To be successful, this required increased understanding of a range of issues including biological and trophic relationships, ecosystem indicators and models, and the ecological effects of non-fishing activities on the marine environment (WPFMC 2009). Similar considerations could apply in the U.S. Caribbean. The Council has not used this approach in the U.S. Caribbean, but the recently completed 2010 and 2011 Caribbean ACL Amendments, by separating ACLs by island area, addressed the request by the stakeholders to conduct management on an island-based basis.

If the Council institutes an island-based approach, a reorganization of the four current U.S. Caribbean FMPs would be necessary. The Council considered three options to reorganize the FMPs into: (1) two (Puerto Rico/St. Thomas/St. John, St. Croix); (2) three (Puerto Rico, St. Thomas/St. John, St. Croix); (3) or four (Puerto Rico, St. Thomas, St. John, St. Croix) new FMPs. The Council decided to move forward with the development of three island-based FMPs.

Puerto Rico, St. Thomas, and St. John occupy a common geological feature, the Puerto Rican Bank platform (Heatwole et al. 1981). Thus, although the coral reefs and associated shallow-water communities are not continuous between the three island groups, it is likely that a biological connection exists (i.e., connectivity *sensu* Cowen and Sponaugle 2009) among the islands of the Puerto Rican Bank. The issue

of connectivity is later discussed at greater length.

There are distinct social, cultural, and economic differences among the islands of the U.S. Caribbean, and these differences are reflected in varying fishing activities. As an example, the cultural preference for parrotfish in St. Croix results in much larger harvest of parrotfish species from the waters surrounding that island. The greater targeting of parrotfish by St. Croix's commercial, recreational, and subsistence fishermen has resulted in higher levels of mortality than in the other U.S. Caribbean island areas.

Omnivores such as parrotfish serve an essential role as grazers within coral reef communities, reducing macroalgal abundance and thereby potentially enhancing the availability of settlement substrate for the species of coral of the genus *Acropora*[1] listed as threatened under the Endangered Species Act (Mumby 2006). However, the predatory consumption of corals by parrotfish further complicates the role of parrotfish within the coral community (Burkepile 2012). Place-based management approaches such as island-based management may best address such complex interactions, which are exacerbated by cultural differences among islands. Local oceanographic features also influence coral reefs and their associated communities in the U.S. Caribbean. Early theory considered that larvae from any source population were essentially dispersed throughout the Caribbean basin, but recent studies have established that this is generally not the case (Cowen and Sponaugle 2009). Instead, larval dispersal (and resultant population connectivity) of marine organisms within the Caribbean basin is spatially and temporally constrained (Swearer et al. 2002; Taylor and Hellberg 2003; Cowen et al. 2006; Cuif et al. 2013). This demographic-level connectivity, which defines larval inputs necessary to maintain or resuscitate a local population (*sensu* Cowen and Sponaugle 2009), requires substantial larval exchange relative to that level of exchange required to maintain genetic homogeneity (Slatkin 1994). Evidence described below supports the argument that, at least at the demographic level, stocks of species inhabiting U.S. Caribbean coral reefs may exhibit a finer level of stock structure than previously thought.

The Mona Passage between the Dominican Republic and Puerto Rico serves as a filter to larval dispersal of the important reef-building elkhorn coral, *Acropora palmata* (Baums et al. 2005). By integrating biological and physical parameters in a larval dispersal model, those authors reported that a combination of reproductive timing, larval traits, and oceanographic features act together to greatly reduce dispersal between the western and eastern Caribbean populations of elkhorn coral. On a finer scale, evidence indicates a high degree of population structure for elkhorn coral and also staghorn coral, *A. cervicornis*,

[1] *Acropora* species were formerly the dominant coral species in shallow water (3 ft-16 ft [1-5 m] deep) throughout the Caribbean and on the Florida Reef Tract, forming extensive, densely aggregated thickets (stands) in areas of heavy surf.

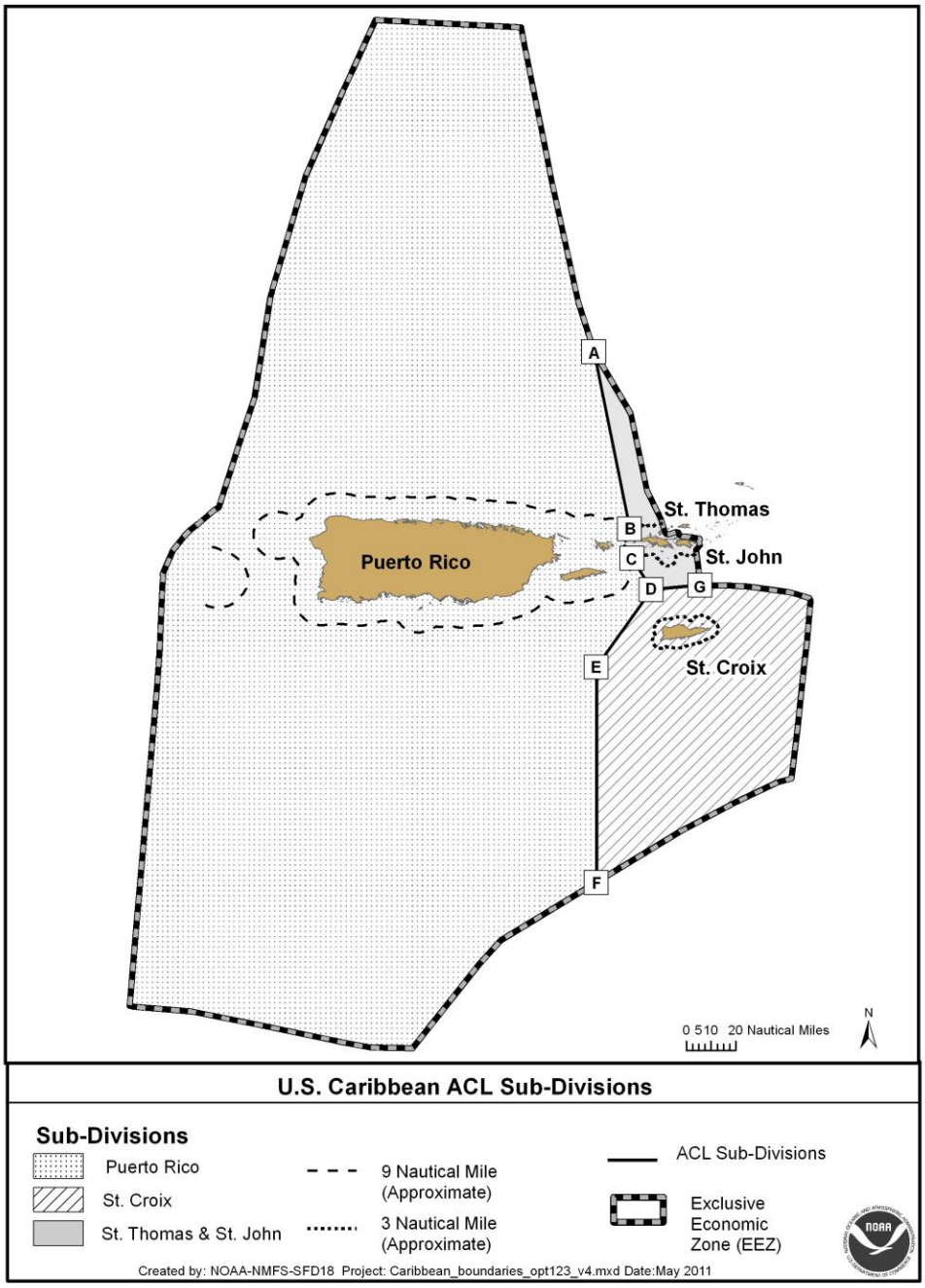
in coral reefs of La Parguera, located in the southwest corner of Puerto Rico. The existence of a distinct population structure in La Parguera for both species suggests a restriction of gene flow between some reefs in close proximity (Garcia and Schizas 2010). Similarly, for a red hind grouper (*Epinephelus guttatus*) spawning site south of St. Thomas, complex three-dimensional ocean current structure disperses larvae away from the site at the surface, but returns the juveniles to the vicinity of the original spawning site within the approximately 40 day planktonic larval duration (PLD) of this species (Cherubin et al. 2011).

In contrast to the situation described above for species with relatively short PLDs, the spiny lobster (*Panulirus argus*) has a PLD estimated to last at least five months (Lyons 1980; Goldstein et al. 2008). This longer PLD for lobster provides an opportunity for potentially greater dispersal distances and higher connectivity among the lobster populations of the USVI, Puerto Rico, and the wider Caribbean. Nevertheless, recent work by Butler et al. (2011) indicates that larval behavior may constrain dispersal distances of spiny lobster well below that predicted by the PLD alone.

A Caribbean-wide study by Roberts (1997) hypothesized dispersal routes of pelagic larvae for 18 Caribbean coral reef locations including Puerto Rico and the USVI. His model results suggest that a population located in St. Thomas' waters may serve as a source population for conspecific populations located on the west coast of Puerto Rico, but that Puerto Rico west coast populations would likely not source larvae to St. Thomas.

In summary, studies of larval dispersal and population connectivity indicate that biological connections among neighboring islands are complex and not intuitively obvious. Factors such as PLD, three-dimensional current structure, availability of suitable habitat, density of the incoming larval cohort, spatial and temporal variability, and many other factors will contribute to successful connectivity among populations. Given these complex patterns of biological connectivity among populations, the conventional wisdom that species inhabiting U.S. Caribbean coral reefs are fully connected and function as single stocks likely does not apply in some cases. Within this suite of biological, social, cultural, and economic considerations, it is valid and responsive to manage federal fishery resources within a more local, island-based context.

Finally, the Council identified the need for an Aquarium Trade Species FMP while developing the 2011 Caribbean ACL Amendment. If the Council develops new island-based FMPs, they would incorporate the management of aquarium trade species as appropriate within these new plans.



Reference Point	Latitude	Longitude	Comments
A	19º 37’ 29”	65º 20’ 57”	Intersects with the International/EEZ boundary
B	18º 25’ 46.3015”	65º 06’ 31.866”	Intersects with the EEZ/Territorial boundary
C	18º 13’ 59.0606”	65º 05’ 33.058”	Intersects with the EEZ/Territorial boundary
D	18º 01’ 16.9636”	64º 57’ 38.817”	
E	17º 30’ 00.000”	65º 20’ 00.1716”	
F	16º 02’ 53.5812”	65º 20’ 00.1716”	
G	18º 03’ 03”	64º 38’ 03”	

Figure 1.2. Detailed boundaries, including the coordinates, for subdividing the U.S. Caribbean EEZ among islands (Puerto Rico, St. Croix) or island group (St. Thomas/St. John). Subdivisions were allocated using an equidistant approach that resulted in lines being spaced equally between the territorial waters of the neighboring islands. Source: CFMC 2011a, 2011b.

Table 1.1. Annual catch limit (ACL) values (lbs) for each island group, fishery management unit, and sector (only for Puerto Rico) defined in the 2010 and 2011 Caribbean ACL Amendments. For the Puerto Rico recreational sector, numbers of individuals are in parentheses.

Fishery Management Unit	Puerto Rico		St. Croix	St. Thomas / St. John
	Commercial Sector	Recreational Sector		
	ACL	ACL	ACL	ACL
Queen Conch	0	0	50,000	0
Parrotfish	52,737	15,263 (9,118)	240,000	42,500
Snapper Unit 1	284,685	95,526 (83,197)	N/A	N/A
Snapper Unit 2	145,916	34,810 (7,862)		
Snapper Unit 3	345,775	83,158 (78,024)		
Snapper Unit 4	373,295	28,509 (27,866)		
Snapper Total	1,149,671	242,004 (196,949)	102,946	133,775
Grouper	177,513	77,213 (93,580)	30,435	51,849
Angelfish	8,984	4,492 (1,667)	305	7,897
Boxfish	86,115	4,616 (2,810)	8,433	27,880
Goatfishes	17,565	362 (814)	3,766	320
Grunts	182,396	5,028 (11,531)	36,881	37,617
Wrasses	54,147	5,050 (4,613)	7	585
Jacks	86,059	51,001 (37,945)	15,489	52,907
Scups & Porgies	24,739	2,577 (3,079)	4,638	21,819
Squirrelfish	16,663	3,891 (8,510)	121	4,241
Surgeonfish	7,179	3,590 (5,365)	33,603	29,249
Triggerfish & Filefish	58,475	21,929 (11,620)	24,980	74,447
Spiny Lobster	327,920	N/A	107,307	104,199

	U.S. Caribbean EEZ
	ACL
Tilefish	14,642
Aquarium Trade	8,155

Chapter 2. Proposed Action and Alternatives

2.1 Action: Shift Fisheries Management in the U.S. Caribbean from Species-Based Fishery Management Plans (FMPs) to Island-Based FMPs.

Alternative 1: (no action) – Continue managing fishery resources in U.S. Caribbean exclusive economic zone (EEZ) under the Spiny Lobster FMP, Reef Fish FMP, Queen Conch FMP, and the Corals and Reef Associated Plants and Invertebrates FMP.

Alternative 2: Four Island FMP Approach – Develop four new island-based FMPs (Puerto Rico, St. Croix, St. Thomas, and St. John).

Alternative 3 (Preferred): Three Island FMP Approach – Develop three new island-based FMPs (Puerto Rico, St. Croix, and St. Thomas/St. John).

Alternative 4: Two Island FMP Approach – Develop two new island-based FMPs (Puerto Rico/ St. Thomas/St. John, and St. Croix)

Discussion

The purpose of this action is to restructure the management of federal fisheries in the U.S. Caribbean EEZ from the current species-based approach to an island-based approach. **Alternative 1** (no action) will maintain the existing species-based fisheries management approach. The Caribbean Fishery Management Council (Council) would continue to manage federal fisheries in the U.S. Caribbean EEZ via amendments to each of the Spiny Lobster FMP, Reef Fish FMP, Queen Conch FMP, and the Corals and Reef Associated Plants and Invertebrates FMP, as appropriate. **Alternative 2** would result in the development of new island-based FMPs for each of Puerto Rico, St. Croix, St. Thomas, and St. John. Under this alternative, the Council would manage the EEZ resources through separate FMPs for each of these islands. **Preferred Alternative 3** would result in three new island-based FMPs, including one for Puerto Rico, one for St. Croix, and a combined FMP for St. Thomas/St. John. This alternative allows the National Marine Fisheries Service (NMFS) and the Council to continue using combined reporting of the commercial sector landings to manage the EEZ fishery resources in St. Thomas/St. John. Therefore, **Preferred Alternative 3** allows the Council to maintain the same EEZ partition established by both of the Caribbean Annual Catch Limits (ACL) Amendments of 2011 (CFMC 2011a, 2011b). The St. Croix and Puerto Rico EEZ resources would be managed under separate FMPs utilizing separately reported commercial landings data as is presently the case. **Alternative 4** would result in two new island-based FMPs. Under this alternative, the Council would combine management of the Puerto Rico, St. Thomas, and St. John EEZ resources within

a single FMP. This approach is based on the rationale that Puerto Rico, St. John, and St. Thomas constitute a single continuous ecosystem as they sit on the same shelf platform, the Puerto Rican Bank. The EEZ resources of St. Croix would be managed under a separate FMP as the island sits on a different shelf.

Management Reference Points

Maximum Sustainable Yield (MSY) – The greatest amount or yield that can be sustainably harvested under prevailing environmental conditions.

Overfishing Threshold (OFL) – The maximum rate of fishing a stock can withstand (MFMT) or maximum yield a stock can produce (OFL) annually, while still providing MSY on a continuing basis.

Overfished Threshold (MSST) – The biomass level below which a stock would not be capable of producing MSY.

Acceptable Biological Catch (ABC) - A term used by a management agency, which refers to the range of acceptable catch for a species or species group.

Annual Catch Limit (ACL) – The level of annual catch of a stock or stock complex that serves as the basis for invoking accountability measures.

Optimum Yield (OY) – The amount or yield that provides the greatest overall benefit to the Nation, taking into account food production, recreational opportunities and the protection of marine ecosystems.

As previously discussed in Section 1.5, there are conflicting data regarding the degree of connectivity between reef species inhabiting coastal waters of the U.S. Virgin Islands (USVI) (including St. Croix) and Puerto Rico (Roberts 1997; Swearer et al. 2002; Taylor and Hellberg 2003; Cowen et al. 2006). To some degree, the distances separating all of the U.S. Caribbean islands are small enough to support substantial connectivity among the islands, including St. Croix, despite its apparent spatial isolation (Pittman et al. 2014). Work by Roberts (1997) showed that surface current patterns in the Caribbean made it possible for pelagic larvae with a one-month dispersal periods to be shared/transported between the islands of Puerto Rico and the USVI. In addition, the distinct social, cultural, and economic differences among these islands may determine the patterns of use of their federally managed resources. Conversely, differences among their respective ecosystems may be substantial enough to influence the social, cultural, and economic characteristics of the human communities dependent on these ecosystems. These arguments highlight the close relationship between the U.S Caribbean human communities and the ecosystems upon which they depend. As explained within the 'Four-Island' approach, there are geological differences between these islands that influence the gears used by local fishers and the species they target.

The island-based FMPs will be developed following the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1853). Through the actions taken in the 2010 and 2011 Caribbean ACL Amendments (CFMC 2011a, 2011b), the Council no longer manages U.S. Caribbean fisheries resources within a single, or U.S. Caribbean-wide, context

(except for tilefish and aquarium trade species). Rather, these amendments established boundaries to define EEZ subdivisions for each island or island group (Figure 1.2). This island-based allocation provides the initial foundation for partitioning the current species-specific FMPs, most directly if a three-island approach is chosen, but with modifications if a two- or four-island approach is chosen.

Chapter 3. Affected Environment

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

- **Physical environment** (Section 3.1)

  Examples include geology, climate, and habitat

- **Biological environment** (Section 3.2)

  Examples include the biology and ecology of managed species

- **Human environment** (Section 3.3)

  Examples include the social, cultural, and economic aspects

- **Administrative environment** (Section 3.4)

  Examples include the fisheries monitoring, the regulatory process, and enforcement activities

3.1 Physical Environment

The physical and geological environments of the U.S. Caribbean were described in detail in the Generic Essential Fish Habitat (EFH) Amendment to the fishery management plans (FMPs) of the U.S. Caribbean and in the Essential Fish Habitat Final Environmental Impact Statement (EFH-FEIS) (CFMC 1998, 2004), and are incorporated here by reference.

The U.S. Caribbean is located in the eastern portion of the Caribbean archipelago, about 1,100 miles (mi) (1,770 km) east-southeast of Miami, Florida (Olcott 1999). It comprises the Commonwealth of Puerto Rico in the Greater Antilles and the Territory of the U.S. Virgin Islands (USVI) in the Lesser Antilles island chain (Figure 3.1), both of which separate the Caribbean Sea from the western central Atlantic Ocean.

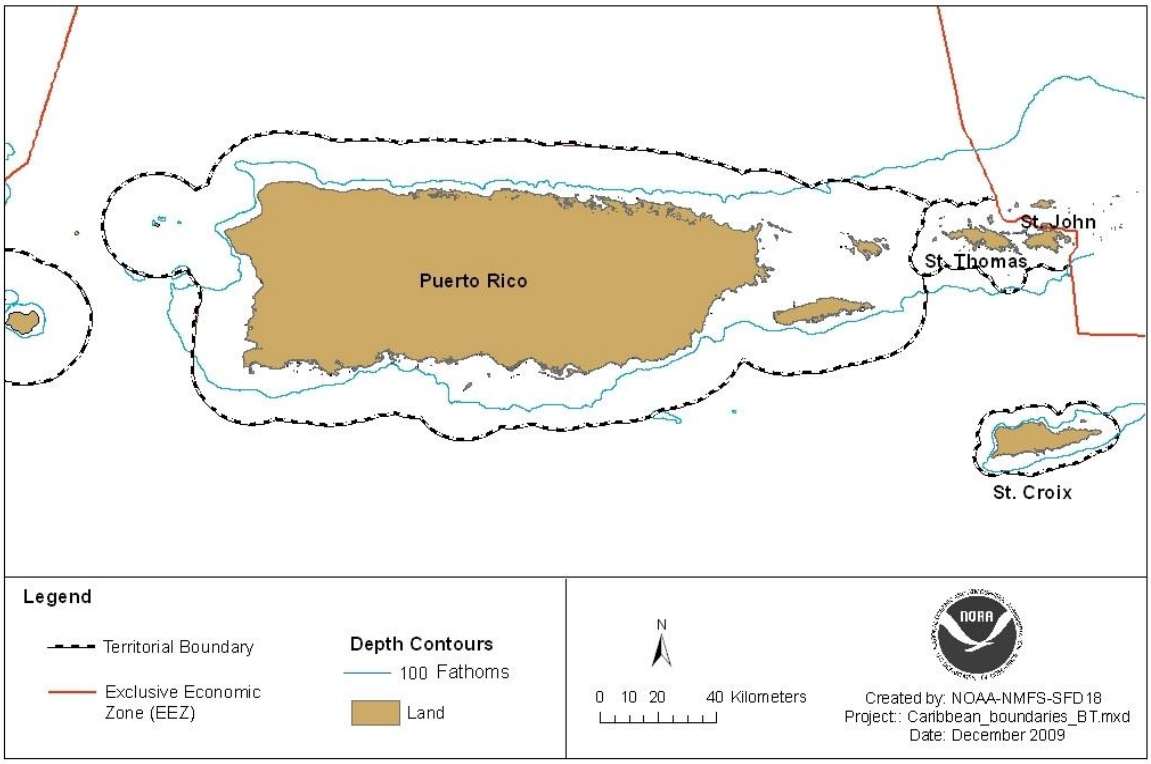


Figure 3.1. Location of Puerto Rico and the U.S. Virgin Islands. Source: CFMC 2011a, 2011b.

The USVI are part of the Virgin Islands chain, which lies about 50 mi (80 km) east of Puerto Rico and consist of about 80 islands and cays (Olcott 1999). The USVI include the largest and most important islands of the Virgin Islands chain: St. Croix, St. Thomas, and St. John. Together, the USVI total approximately 134 mi^2 (347 km^2) of land space area (Catanzaro et al. 2002).

St. Croix is located about 46 mi (74 km) south of St. Thomas and St. John (CFMC 2004). Covering about 80 mi^2 (207 km^2), St. Croix is entirely surrounded by the Caribbean Sea. The islands of St. Thomas and St. John are bordered by the Atlantic Ocean to the north and the Caribbean Sea to the south. Their respective areas are approximately 32 mi^2 (83 km^2) and 20 mi^2 (52 km^2) (Catanzaro et al. 2002). The island of St. Thomas is bordered to the west by the Puerto Rico islands of Vieques and Culebra, and to the east by St. John, USVI. St. John is bordered to the east by the British Virgin Islands (BVI).

The island of Puerto Rico is almost rectangular in shape, about 110 by 35 mi (177 by 56 km), and is the smallest and the most eastern island of the Greater Antilles (CFMC 1998; Morelock et al. 2001). Its coast measures approximately 700 mi (1,227 km) and includes the adjacent inhabited islands of Vieques and Culebra. In addition, the Commonwealth of Puerto Rico includes the islands of Mona, Monito, and various other small islands without permanent populations. Deep ocean waters fringe Puerto Rico. The Mona Passage, which separates the island from Hispaniola to the west, is about 75 mi (120 km) wide and more than 3,300 ft (1,000 m) deep. Off the northern coast is the 28,000 ft (8,500 m) deep Puerto Rico Trench, and to the south the sea bottom descends to the 16,400 ft (5,000 m) deep Venezuelan Basin of the Caribbean Sea.

3.1.1 Geology

The shelf shared by the islands of St. Thomas and St. John is about 8 mi (12.9 km) wide on the south and 20 mi (32.2 km) wide on the north (Goenaga and Boulon 1991). St. Croix, which lies on a different geological platform, is separated from the other islands by a 13,200 ft (4,000 m) deep trench (CFMC 2004) (Figure 3.2). The St. Croix shelf is much narrower and shallower than that of the northern islands (Goenaga and Boulon 1991), extending only 2.5 mi (4 km) wide in the south, less than 0.1 mi (0.2 km) wide on the northwest, though up to several kilometers wide in the northeast and on the Lang Bank (CFMC 2004).

Puerto Rico shares the same shelf platform as St. Thomas and St. John, and that shelf also extends east to include the BVI. The St. Croix platform connects through a deep submerged mountain range to the southeast platform of Puerto Rico (Figure 3.2).

Section 3 of the EFH-FEIS (CFMC 2004) summarizes the available information on the geology of the U.S. Caribbean.

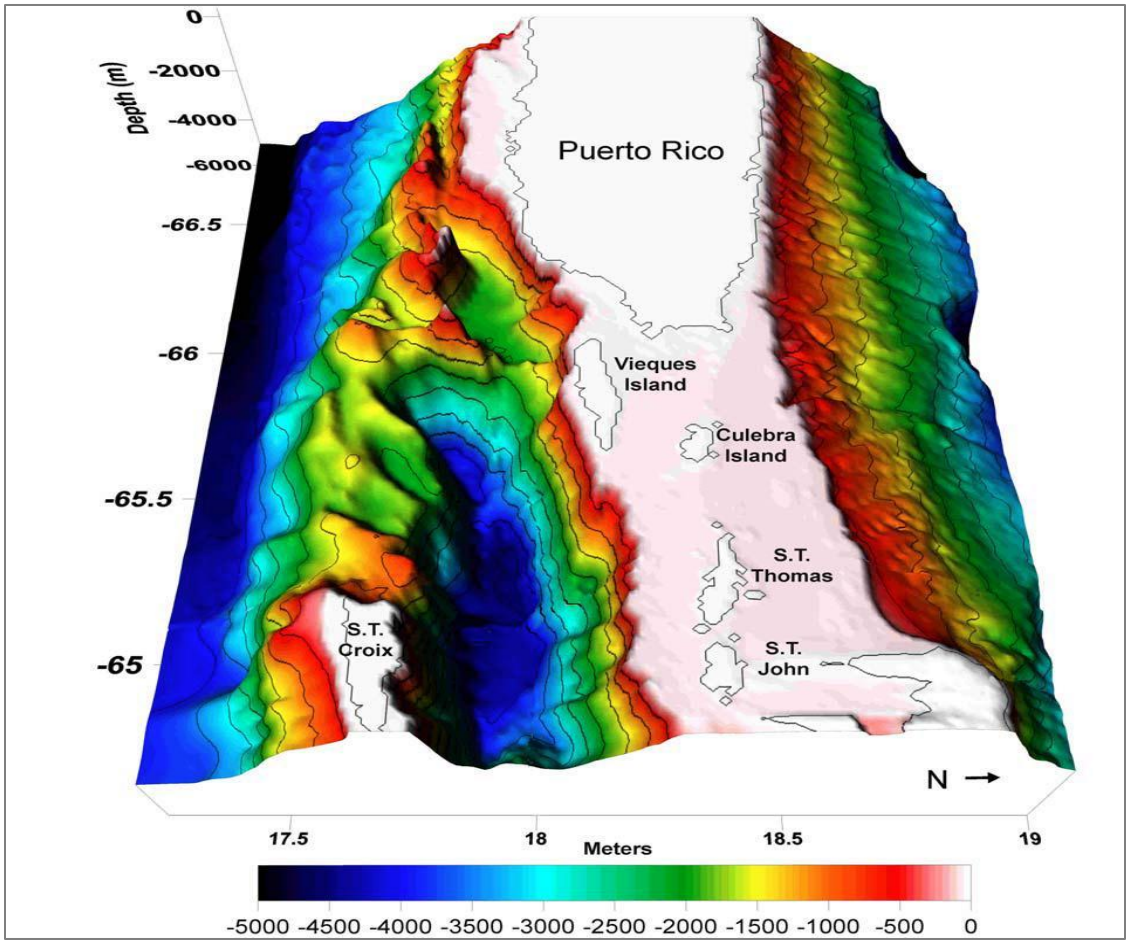


Figure 3.2. Shared platform between the east coast of Puerto Rico and the islands of St. Thomas and St. John. The deep trough between the Puerto Rico/St. Thomas/St. John platform and St. Croix is clearly seen in this graphic representation of depth (Source: García-Sais et al. 2005).

3.1.2 Oceanography and Climate

The Caribbean Current flows about 62 mi (100 km) south of the U.S. Caribbean islands at an average speed of 0.5 to 1 knots (CFMC 2004). The current is characterized by large cyclonic and anticyclonic gyres. Its strength is influenced by changes in the position of the inter-tropical convergence zone (ITCZ).

The zonal shift of the ITCZ is also responsible for the seasonal change in precipitation in the Caribbean. The dry season occurs when the ITCZ is near the equator, generally in the late winter to spring. The wet season occurs when the ITCZ is at its most northerly position in the Caribbean, generally in the late summer into late fall (CFMC 2011a and references therein).

Surface water salinity changes along with the seasonal change in precipitation. However, precipitation affects salinity only indirectly. Discharge from the Amazon, Orinoco, and

Magdalena rivers is the main contributor to buoyancy in the Caribbean Sea, increasing silica concentrations, decreasing salinity (Yoshioka et al. 1985) and increasing chlorophyll and pigments, as well as increasing the input of terrestrial materials (Kjerfve 1981). These parameters vary with changes in the outflow from these South American rivers, dependent on rainfall in the areas supplying water to these rivers.

Sea surface temperature ranges from a minimum of 25 degrees Celsius (ºC) in February-March to a maximum of about 28.5ºC in August-September. Temperature is important in controlling flowering in seagrass (Miller and Lugo 2009). Critical flowering temperature for seagrass in Puerto Rico and the USVI is 25ºC. Tidal regimes differ between the north and south coasts. The fluctuations range from a diurnal tide of about 3.9 in (10 cm) on the south coast to a semi-diurnal regime of between 24-39 in (60 to 100 cm) along the north coast, where waves are larger (CFMC 2004). But the astronomical tidal range is slight (8 to 12 in [20 to 30 cm]) (Kjerfve 1981).

Detailed information about the oceanography and climate of Puerto Rico and USVI can be found in Section 5.1.2 of the 2010 Caribbean Annual Catch Limit (ACL) Amendment and is incorporated herein by reference. The 2010 Caribbean ACL Amendment can be found at http://www.caribbeanfmc.com/fmp%20ACLS/final%202010_Caribbean_ACL_Amendment_FEIS_092011.pdf, and is hereby incorporated herein by reference. No effects to the oceanography or to the climate are expected from this action and these conditions will not be addressed in Section 4 Environmental Consequences. More information on the effects of climate change is included in the Cumulative Effects Section 4.6.

3.1.3 Major Habitat Types

About eighty different bottom types are found around Puerto Rico and the USVI (CFMC 1985, 1994). The bottom types vary with depth and consist of combinations of gravel, rock, sand, mud, and clay. The bottom types greatly influence which organisms are found in each habitat. These environments are threatened by human activities, such as coastal development and fishing activities, but also by natural factors, such as El Niño Southern Oscillation events and hurricanes, which leave habitats more vulnerable to human disturbance. Climate changes resulting from global warming are also a threat. Bryant et al. (1998) reports that almost two-thirds of the mapped coral reefs in the Caribbean are at risk and one-third are at high risk of impact resulting from increasing water temperatures.

All of these habitats are described in as much detail as is available in Section 3.2 of the EFH-FEIS (CFMC 2004) and new information was included in the 5-year review of the Generic EFH Amendment to the FMPs completed November 2011. The 5-year EFH-FEIS review incorporates all new and recently acquired information on the description of the marine environments at 98 to 164 ft (30 to 50 m) depth off Puerto Rico and the USVI (e.g., García-Sais

et al. 2010, http://www.caribbeanfmc.com). Specific details regarding the coastal habitats of the USVI and Puerto Rico follow.

The coastal-marine environment of the USVI is characterized by a wide variety of habitat types. For example, NOAA's National Ocean Service mapped 21 distinct benthic nearshore habitat types using aerial photographs acquired in 1999. Those maps document 9 mi^2 (24 km^2) of unconsolidated sediment, 62 mi^2 (161 km^2) of submerged vegetation, 0.8 mi^2 (2 km^2) of mangroves, and 116 mi^2 (300 km^2) of coral reef and hard bottom over an area of 189 mi^2 (490 km^2) in the USVI. Coral reefs, seagrass beds, and mangrove wetlands are the most productive marine habitat areas (CFMC 2004). For more information on the U.S. Caribbean habitat types please refer to the EFH-FEIS (CFMC 2004) which provides an in-depth description of the distribution of these habitats, along with information on their ecological functions and condition.

A general description of the marine environments of the USVI is provided in Island Resources Foundation (1977). Detail description of the marine and coastal environment in the USVI can be found in the 2005 USVI Department of Planning and Natural Resources United States Virgin Islands Marine Resources and Fisheries Strategic and Comprehensive Conservation Plan (http://www.dpnr.gov.vi/download-forms). The fringing reefs on St. John are considered to be poorly developed (Randall 1963). Outside this area, in Coral Bay, a more mature reef profile is found at Lagoon Point. St. Croix has the most extensive reefs, with many miles of bank-barrier reefs, often with algal ridges, extending in an almost unbroken line from Coakley Bay on the north coast, around the eastern tip to Great Pond Bay on the south coast. There are also numerous fringing and patch reefs. On the north coast, the eastern shelf is up to several miles wide and is rimmed by emergent Holocene reefs, considered to be the best developed on the island. The western portion is less than 0.1 nautical miles (nm) (0.2 km) wide and is traversed by two small submarine canyons; in the Salt River and Cane Bay areas, the edge of the shelf drops precipitously into great depths and the reefs form a vertical wall supporting abundant growths of black coral. The south shore has a shelf up to 2.2 nm (4.0 km) wide (Hubbard et al. 1981). The reef zonation of the entire island has been mapped from aerial photographs for the Bureau of Land Management. The most extensive reef development in St. Thomas is along a submerged barrier reef that lies along the narrow shelf edge, beginning near Inner Brass Island and continuing west to the western end of St. Thomas (Tetra Tech 1991a). Scattered reef formations occur throughout the rest of the island and along cays and islets. St. Thomas and St. John have extensive shelf habitats with the shelf being approximately 8 miles wide on the south and 20 miles wide on the north. Mean shelf-edge coral cover ranges from 37% to 49% (Herzlieb et al., in press).

In Puerto Rico, 30 m^2 (49 $km^{2)}$ of unconsolidated sediment, 448 m^2 (721 km^2) of submerged vegetation, 45 m^2 (73 km^2) of mangroves, and 470 m^2 (756 km^2) of coral reef and colonized hard bottom have been mapped (Kendall et al. 2001).

3.2 Biological Environment

3.2.1 Species Most Impacted by this Action

All species under management in the Spiny Lobster FMP, Reef Fish FMP, Queen Conch FMP, and the Corals and Reef Associated Plants and Invertebrates FMP could be affected by this action when reorganized from species-based FMPs to island-based FMPs (Appendix 1). However, this action has no significant effects, either positive or negative, to the current managed species as current regulations will not change as a consequence of this action. A complete description of the life history characteristics (e.g., life cycles, distribution, location, and ecological importance) of these species can be found in Section 5.2 Biological Environment of the 2005 Comprehensive Amendment to the FMPs of the U.S. Caribbean (CFMC 2005) available at http://www.caribbeanfmc.com/fmp_sfa_amendment.html

3.2.2 Protected Species

There are 32 different species of marine mammals that may occur in the Caribbean (UNEP 2008). All 32 species are protected under the Marine Mammal Protection Act and five (sperm, sei, fin, blue, and humpback whales) under the purview of NOAA's National Marine Fisheries Service (NMFS) are also listed as endangered under the Endangered Species Act (ESA). Critical habitat has also been designated for elkhorn and staghorn coral ("*Acropora*") and green, hawksbill, and leatherback sea turtles in the Caribbean. Sea turtle critical habitat occurs almost exclusively in Commonwealth and Territorial waters. The potential impacts from the continued authorization of fishing under all four Caribbean FMPs on each of these listed species have been considered in previous ESA Section 7 consultations, including biological opinions. Additional information on all of these consultations and their determinations are in **Appendix 3**. The analyses in those consultations indicate that of the species listed above, sea turtles and *Acropora* are the most likely to interact with U.S. Caribbean fisheries. A description of these species is included below.

3.2.2.1 ESA-Listed Sea Turtles

Green, hawksbill, leatherback, and loggerhead sea turtles are all highly migratory and travel widely throughout the U.S. Caribbean exclusive economic zone (EEZ). The following sections are a brief overview of the general life history characteristics of the sea turtles found in the Caribbean EEZ. Several volumes exist that cover the biology and ecology of these species more thoroughly (e.g., Lutz and Musick 1997, Lutz et al. 2002).

Green sea turtle hatchlings are thought to occupy the open ocean (the "pelagic stage") 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 cm straight carapace length, juveniles migrate from pelagic habitats to benthic foraging areas (Bjorndal 1997). As juveniles move into benthic foraging areas their diet shifts toward herbivory. They consume primarily seagrasses and algae, but are also know to eat 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 360 ft (110 m) (Frick 1976), but they are most frequently making dives of less than 65 ft (20 m) (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 cm in straight carapace length (Meylan 1988, Meylan and Donnelly 1999). The pelagic stage is followed by juveniles migrating to 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 hardbottom 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 (Andres 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).

Leatherbacks are the most pelagic of all ESA-listed sea turtles and spend most of their time in the open ocean. However, they are seen over the continental shelf where they enter coastal waters 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 1,000 m (Eckert et al. 1989), but more frequently dive to depths of 50-84 m (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 percent of their time submerged (Standora et al. 1984).

Loggerheads are less common in the Caribbean region than in the Gulf of Mexico or South Atlantic regions. 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 prey including salps, jellyfish,

amphipods, crabs, syngnathid fish, squid, and pelagic snails (Brongersma 1972). Stranding records indicate that when pelagic immature loggerheads reach 40 to 60 cm straight carapace length they begin to live in coastal inshore and nearshore waters (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 211-233 m (692-764 ft), (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 percent of their time submerged (Limpus and Nichols 1994, Lanyan et al. 1989).

3.2.2.2 ESA-Listed Marine Invertebrates

Elkhorn (*Acropora palmata)* and staghorn (*A. cervicornis*) coral ("*Acropora*") were listed as threatened under the ESA on May 9, 2006. The Atlantic *Acropora* Status Review (*Acropora* Biological Review Team 2005) available at http://sero.nmfs.noaa.gov/pr/pdf/050303%20status%20review.pdf 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. Individual staghorn coral colonies can reach up to 1.5 m across but may form thickets composed of multiple colonies that are difficult to differentiate. Elkhorn coral colonies can grow to at least 2 m in height and 4 m in diameter and can also form dense, interlocking thickets. The depth of these species ranges from less than 1 m to 60 m. The optimal depth range for elkhorn is considered to be 1 to 5 m depth (Goreau and Wells 1967), while staghorn corals are found slightly deeper, 5 to 15 m (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). Both species obtain nutrition from filter feeding on plankton and from byproducts produced by photosynthetic algae that live in their soft tissue. Optimal water temperatures for *Acropora* range from 25° to 29°C (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.

Elkhorn and staghorn corals reproduce both sexually and asexually. Asexual reproduction occurs through fragmentation when pieces of a colony break off and re-attach to hard substrate to

form a new colony. Fragmentation results in multiple colonies that are genetically identical. Both species are hermaphroditic and broadcast spawn eggs and sperm into the water column for external fertilization (Szmant 1986). However, neither species can self-fertilize, and two genetically distinct parents are required to produce viable larvae (Baums et al. 2005a).

Fertilization and development of *Acropora* 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, *Acropora* 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 *Acropora* corals indicated that larger colonies of both species had higher fertility rates than smaller colonies (Soong and Lang 1992).

Coral reefs with varying densities of elkhorn and staghorn corals are present in Puerto Rico off all coasts of the main island and around some of its smaller islands. Where surveys have been conducted, dense, high profile thickets of elkhorn and staghorn corals are present in only a few reefs along the southwest, north, and west shore of the main island and isolated offshore locations (Schärer et al. 2009, Weil et al. unpublished data, Hernandez unpublished data). Large stands of dead elkhorn also exist on the fringing coral reefs along the shoreline (e.g., Punta Picúa, Punta Miquillo, Río Grande, Guánica, La Parguera, and Mayagüez).

The USVI also support populations of elkhorn and some staghorn corals. Elkhorn and staghorn corals are present around most of St. Croix, and elkhorn colony density in Buck Island National Monument is higher in the northern and eastern areas around the island (Mayor et al. 2006). There are limited quantitative data of presence of either species off the islands of St. Thomas; however, anecdotal reports of both species have been reported. There are several areas around the island of St. John that support healthy populations of both elkhorn (Grober-Dunsmore et al. 2006) and staghorn corals.

3.3 Human Environment

3.3.1 Economic Environment

3.3.1.1 Description of the Fisheries

Commercial fisheries within the U.S. Caribbean provide multiple benefits to residents of Puerto Rico and the USVI. These fisheries have been characterized as "artisanal" because the fishing vessels tend to be less than 45 ft long, have small crews, participate in multiple fisheries, and yield smaller revenues. It is common for commercial fishermen to sell their catches, repair their vessels, and construct and repair gear. In addition, a significant portion of these fishermen retain a portion of their landings for their own or their family's consumption, and, as such, engage in subsistence fishing (Griffith et al. 2007, Stoffle et al. 2009, Valdés-Pizzini et al. 2010). In the

USVI, for example, approximately 11 percent of commercial fishermen reported that they did not sell any of their catch in 2011 (Kojis and Quinn 2012). Commercial fishing is also an important economic safety net by providing food, livelihoods and income for those with limited occupational mobility and limited access to capital, and in that sense, it is therapeutic by reducing economic stresses and associated psychological and physical health effects. There are no federal permit requirements that restrict the number of commercial fishermen or fishing vessels in federal waters of the U.S. Caribbean; however, both Puerto Rico and the USVI require licenses to engage in commercial fishing.

Puerto Rico's and the USVI's commercial fisheries sectors are important contributors to income, employment, food and nutritional security, and social and economic stability. Fisheries are woven in the cultural fabric of local residents, especially in the USVI, and make an important contribution to attainment of food and nutrition security. Fish is a prime source of animal protein for the USVI population. During the three-year period from 2007 through 2009, USVI per capita consumption of fish and shellfish averaged 23.0 lbs as compared to 1.0 lbs in Puerto Rico, 121.7 lbs in Antigua and Barbuda, 50.1 lbs in the U.S., and 24.1 lbs in the Dominican Republic (Fisheries of the United States 2011). During the same 3-year period, the average of per capita commercial landings was 14.4 lbs; however, those per capita landings also declined by approximately 50 percent during that time (USVI Annual Economic Indicators 2010).

The fisheries sectors in the USVI and Puerto Rico provide employment and livelihood opportunities for some of the most socio-economically disadvantaged residents. The majority of persons engaged in commercial fishing typically have low levels of formal education, limited access to capital, and limited occupational and geographical mobility. Moreover, most fish for their personal and family's consumption. The relative importance of fish and fishing is increased when there is hunger. According to Governor de Jongh's November 2011 Proclamation to Proclaim Hunger and Homelessness Week in the USVI, the Virgin Islands Interagency Council on Homeless and the Virgin Islands Continuum of Care in Homelessness recognize that homelessness and hunger are serious problems facing many individuals and families in the USVI.

On August 24, 2011, the USVI set a moratorium on the issuance of new commercial fishing licenses, and the number of licensed fishermen has declined. There were 401 licensed commercial fishermen (187 in St. Thomas/St. John and 214 in St. Croix) on the Department of Fish and Wildlife registration list for the 2009 to 2010 year; and, as of March 2011, there were 297 licensed commercial fishermen (120 in St. Thomas/St. John and 177 in St. Croix) for the 2010 to 2011 year (Kojis and Quinn 2011).

In St. Croix, there was approximately one licensed commercial fishermen for every 236 residents in 2010, and approximately one for every 294 residents in 2011. Similarly, in 2010, there was

approximately one licensed commercial fisherman for every 298 residents of St. Thomas/St. John, but only approximately one for every 479 residents in 2011. Those numbers, however, assume every licensed commercial fishermen was active, although approximately 23 percent of licensed commercial fishermen of St. Thomas/St. John, and approximately 10 percent of licensed commercial fishermen of St. Croix who were interviewed in 2011, reported they were not active (Kojis and Quinn 2011). Given the continuing artisanal nature of fisheries in the USVI, there has not been a decline in the number of fishermen because of a shift to larger boats with industrial gear that are capable of catching more fish with less labor. Instead, other factors are motivating USVI commercial fishermen to stop fishing.

Puerto Rico has not limited the number of commercial fishing licenses; however, there has been a substantial decline in licenses issued. From 2002 to February 2008, there was a decline in licenses issued: from 955 to 557 (Matos-Caraballo 2009). There has also been a substantial decline in the number of licensed commercial fishermen who are actively fishing. From 2002 to 2008, the number of active commercial fishermen in Puerto Rico fell 25 percent (1,163 in 2002 to 868 in 2008). The percent of active fishermen who fished full-time, however, increased from 36 percent in 2002 to almost 75 percent in 2008 (Matos-Caraballo and Agar, 2011). Recreational fishing also provides food, livelihoods, income, and other benefits to residents of Puerto Rico and USVI. Puerto Rico's charter fishing industry is unevenly spread over the island, with the San Juan area, the Northeast, and the Southwest regions supporting the most charter boats, while in other areas, an occasional commercial fisherman may enter the industry seasonally or on a temporary basis (Griffith et al. 2007). There are at least 15 recreational fishing and boating clubs around the islands that sponsor tournaments, which are important to the recreational fishing community, politically. The USVI's charter fishing fleet is located almost totally in St. Thomas, particularly in the island's East end (Impact Assessment Inc. 2007). Recreational fishing aboard for-hire fishing businesses tends to be focused on catching large migratory and coastal pelagic species (CFMC 2011a and 2011b; Impact Assessment Inc. 2007).

Anglers aboard private and rented vessels target multiple species, but those in federal waters tend to focus on large migratory species. Annual fishing tournaments for large pelagic species, especially in Puerto Rico, bring in anglers from the U.S. mainland and provide seasonal employment and incomes to local residents. Since January 2010, anglers who wish to fish in federal waters of the U.S. Caribbean are required to be registered each year with NOAA's National Angler Registry, unless they are onboard a recreational vessel with a Highly Migratory Species Permit. As of March 9, 2010, 582 of Puerto Rico's anglers were registered with the National Angler Registry; and as of March 1, 2010, only 12 USVI anglers were registered. The requirement to register in the National Angler Registry is a relatively recent requirement, and could explain the low number of recreational fishermen registered in the USVI.

Recreational fishing varies in the USVI. In St. Croix, most recreational fishing activities take place on the shoreline, whereas in St. Thomas and St. John, most anglers use boats. Hence, it is expected that most to all of the 12 registered anglers in the USVI reside in St. Thomas/St. John. Puerto Rico requires a license to recreationally harvest species in state waters, while the USVI does not presently have such a requirement for its recreational harvesters. The USVI, however, does require a license to recreationally fish in three areas of its waters.

For-hire fishing vessels in the U.S. Caribbean operate within the broader scenic and sightseeing water transportation industry. This industry also includes dinner cruises, sightseeing cruises, whale watching, and other recreational boat trips. According to 2010 County Business Patterns data (U.S. Census Bureau County Business Patters, 2013), there were nine businesses with 100 to 249 employees in the industry in Puerto Rico and 10 in the USVI with 0 to 99 employees. Of the 10 in the USVI, seven were in St. Thomas, two in St. John and one in St. Croix. It is most likely that many of these businesses were not operating in the charter fishing or party boat fishing industry. However, for purposes here, all are presumed to be full or part-time participants in the for-hire fishing industry.

The total area of fishable habitat in the U.S. Caribbean is estimated to be approximately 2,467 square nautical miles (nm^2) (8,462 km^2). Fishable habitat is defined as those waters less than or equal to 100 fathoms (183 m). The fishable habitat within the EEZ is 355 nm^2 (1,218 km^2) of the U.S. Caribbean total, with 116 nm^2 (398 km^2) occurring off Puerto Rico and 240 nm^2 (823 km^2), occurring off the USVI. The marine fishable areas of Puerto Rico and the USVI are small by comparison with states on the mainland. Puerto Rico's coast is marked by a narrow insular shelf that is only 2 to 3 km wide and covers 1,702.5 nm^2 (5,839.5 km^2), which is considered to be the size of the territory's commercially fishable area. The vast majority of the fishable habitat in federal waters off Puerto Rico is located off the west coast. The USVI shelf encompasses an area of approximately 630 nm^2 (2,161 km^2). There are 510 nm^2 (1749.3 km^2) of fishable habitat off St. Thomas/St. Johns, with 218 nm^2 (747.7 km^2) of that habitat in the EEZ. There are 120 nm^2 (411.6 km^2) of fishable habitat off St. Croix, with 21 nm^2 (72 km^2) of that habitat in the EEZ.

St. Croix and St. Thomas/St. John have significant differences in the size and depths of the insular shelf surrounding them and their exposure to the Atlantic Ocean. The bulk of the shelf occurs off St. Thomas and St. John, with a 291 nm^2 (998 km^2) total area in territorial waters and a 218 nm^2 (748 km^2) total area in federal waters (CFMC 2005). St. Croix's shelf area is approximately 120 nm^2, while the St. Thomas/St. John shelf is approximately 510 nm^2. St. Croix's shelf is shallower and mostly less than 80 ft (24.4 m) deep, while St. Thomas/St. John's shelf is deeper, mostly greater than 80 ft deep (Kojis and Quinn 2011). In addition, St. Thomas/St. John has exposure to the rougher seas of the Atlantic Ocean that St. Croix does not have. These differences are reflected in the varying fishing practices of the island areas'

fishermen. For example, St. Croix's shallower waters are more suitable for diving in order to catch fish, than St. Thomas's/St. John's deeper waters. St. Thomas/St. John fishers commonly use fish traps, modified lobster traps, and plastic lobster traps to target fish and lobster, and to a lesser extent vertical setlines, gill and trammel nets, and SCUBA. In St. Croix, fishers diversify into other gears such as multi-hook vertical setlines, gill and trammel nets, free diving, SCUBA, spearfishing, and lobstering. Hand lines and rods and reels are also used.

Fishing conditions off Puerto Rico's coasts also vary considerably. North coast fishers are limited by adverse weather, high wave action during six months of the year, and a coastal topography that offers few protected areas in which to anchor fishing boats. These conditions result in fewer reported commercial fishing trips by north shore fishers than their counterparts on the other coasts. Features that make the south coast more suitable for fishing operations include a larger insular shelf area, a somewhat less abrupt drop-off, the presence of a number of cays and sandy beaches that make the use of beach seines possible, and less exposure to storms, which is more conducive for the use of fish traps and pots. Also, the size of the insular shelf area off the south coast is about 1.85 times the size of the shelf off the north coast (Collazo and Calderón 1987/88) providing much larger spatial extent for some fisheries, particularly traps and nets, than on the north coast. South coast commercial fishermen make more trips annually than those on the north and east coasts according to the 2002 and 2008 censuses. The east coast has the largest insular shelf size, and it represents 46 percent of Puerto Rico's insular shelf (Collazo and Calderón 1987/88). The east coast also lies on the same geological platform as St. Thomas and St. John. Depths of the waters along the east coast are less than 240 ft (73 m) throughout, which partially explains why the large majority of east coast commercial fishermen fish on the insular shelf: 94 percent in 2002 and 93 percent in 2008. However, Puerto Rico's west coast has an insular shelf area that is greater than the shelf areas of the north and south coasts (Collazo and Calderón 1987/88), and has the largest fishing zone in the state with over 30 fishing areas (Griffith et al. 2002). Along the west coast is the Mona Passage, which contains islands, deep water, rocky stretches of bottom, and shallower inshore, muddy and rocky bottom areas that are easily accessible in small vessels (Griffith et al. 2002). West coast commercial fishers historically account for the largest number of annual fishing trips, from 45 percent in 2010 to 47 percent in 2011 of all trips off Puerto Rico. The west coast also accounts for the largest share of historical annual landings. From 2010 through 2011, for example, west coast landings represented approximately 43 percent of all landings by weight and approximately 57 percent by value. The south coast ranked second (approximately 19 percent by weight and 25 percent by value), followed by the east coast (approximately 18 percent by weight and 12 percent by value) and last the north coast (approximately 19 percent by weight and 6 percent by value).

Each of the four FMPs (Spiny Lobster, Reef Fish, Queen Conch, and the Corals and Reef Associated Plants and Invertebrates) establishes a distinct Caribbean-wide fishery management unit (FMU) composed of stocks and stock complexes that are separated into managed or data-

collection only categories. The following descriptions of the fisheries are focused on the currently managed stocks and stock complexes of each FMU. Although these descriptions are presented by U.S. Caribbean-wide FMU, differences within each fishery are also discussed.

3.3.1.1.1 Queen Conch

The Queen Conch FMU is composed of one managed species: queen conch. Present regulation prohibits fishing for or possession of queen conch in federal waters off Puerto Rico, St. Thomas and St. John. That is not to say that the fishery is limited to commercial, recreational, and subsistence fishermen of St. Croix. Queen conch is harvested from state waters of Puerto Rico and the two districts (St. Croix and St. Thomas/St. John) of the USVI, and is a popular menu item in restaurants that cater to both tourists and locals (Stoffle et al. 2009, Griffith et al. 2007). Puerto Rico requires its licensed recreational fishermen to have a permit to harvest queen conch (*carrucho*) from its waters. Although the USVI does not require such a permit, it restricts where recreational fishing for queen conch can occur and the gears used to harvest it.

In the U.S. Caribbean, queen conch is harvested by hand while free and SCUBA diving in waters up to approximately 30 m deep (Cimo et al. 2012). In 2008, approximately 33 percent of Puerto Rico's licensed commercial fishermen reported harvesting conch (Matos-Caraballo and Agar 2011), while, in 2011, approximately 42 percent of St. Croix's and approximately 9 percent of St. Thomas/St. John's commercial fishermen reported harvesting the species (Kojis and Quinn 2012).

Queen conch landings data are reported in pounds of meat harvested. Often these reported landings do not specify the individual sizes of the conch or if the meat is clean or unclean. In Puerto Rico, however, landings are typically reported as clean, while they are reported as either clean or unclean in St. Croix (Cimo et al. 2012).

Average annual commercial landings vary greatly across the island areas. For example, the average of 2010 and 2011 landings were 1,754 lbs in St. Thomas/St. John, 67,530 lbs in St. Croix, and 254,609 lbs in Puerto Rico (Amendment 2 to the Queen Conch FMP). Queen Conch landings are substantially higher in St. Croix than St. Thomas/St. John, primarily because St. Croix has a shallower shelf and the primary method of harvesting queen conch is by SCUBA and by free diving. Moreover, St. Croix's shelf supports more queen conch per 0.01 km^2 than that of St. Thomas (Kojis and Quinn 2012).

In Puerto Rico, landings of queen conch also vary significantly by coast. From 2010 to 2011, for example, the west coast's landings of queen conch represented approximately 58 percent of all Puerto Rican queen conch landings (by weight), followed in turn by the east coast

(approximately 30 percent), south coast (approximately 10 percent) and the north coast (approximately 2 percent).

In both, Puerto Rico and the USVI, data on historical recreational landings from the Marine Recreational Fisheries Statistical Survey (MRFSS) and subsistence landings of queen conch are not available. Although the MRFSS survey has been conducted in Puerto Rico to obtain estimates on marine finfish, the survey has not collected data on shellfish. Subsistence fishers do not harvest queen conch in Puerto Rico (Griffith et al. 2007); however, USVI commercial fishermen have reported consuming or giving away conch they harvested. In 2011, approximately 2 percent of St. Thomas/St. John and approximately 14 percent of St. Croix commercial fishermen stated that they keep and consume or give away their conch landings (Kojis and Quinn 2012).

Amendment 2 of the FMP (2010 Caribbean ACL Amendment) divided and managed queen conch by the three island areas (Puerto Rico, St. Thomas/St. John and St. Croix), which required dividing the EEZ into three parts by island area. The Puerto Rico ACL and St. Thomas/St. John ACL were set at zero, while the St. Croix ACL was set at 50,000 lbs to be consistent with both the prohibitions on fishing for, or possession of, queen conch outside of the Lang Bank area of the EEZ and the St. Croix District landings quota of 50,000 lbs for queen conch, regardless of where harvested (state and/or federal waters). The Puerto Rico and St. Thomas/St. John ACLs, however, do not suggest landings of queen conch harvested from state waters off these island areas are, or should be, zero.

More information about the queen conch fishery in the USVI and Puerto Rico can be found in the descriptions of the fishery within the environmental impact statements for the 2010 and 2011 Caribbean ACL Amendments (CFMC 2011a, 2011b) and are incorporated herein by reference.

3.3.1.1.2 Spiny Lobster

The Spiny Lobster FMU is composed of one managed species, Caribbean spiny lobster, which is not undergoing overfishing. Historical landings show considerable differences across the island areas and across the coasts of Puerto Rico. Puerto Rico ranks first among the three island areas in commercial landings of spiny lobster. For example, from 2006 through 2008, Puerto Rico commercial fishermen landed an average of 292,245 lbs annually, followed in turn by St. Croix commercial fishermen who landed 154,891 lbs, and St. Thomas/St. John commercial fishermen who landed 121,635 lbs. Historically, on average, annual landings of Caribbean spiny lobster have represented approximately 49 percent of all invertebrate landings in Puerto Rico, over 90 percent of all invertebrate landings in St. Thomas/St. John, and approximately 49 percent in St. Croix (CFMC 2011b). Within Puerto Rico, more landings occur on the west coast, although it is the primary species landed for many south coast municipalities. Like queen conch, spiny lobster

is sought out by tourists who visit Puerto Rico and the USVI (Stoffle et al. 2009; Impact Assessment Inc. 2007; Griffith et al. 2007). In St. Croix, commercial fishermen sell their lobster catches primarily to restaurants and hotels that cater to tourists (Stoffle et al. 2009).

In 2011, approximately 58 percent of St. Croix and approximately 30 percent of St. Thomas/St. John commercial fishermen reported that they targeted lobster (Kojis and Quinn 2012). Approximately 49 percent of Puerto Rico's commercial fishermen in 2008 reported that they targeted lobster, with considerable variation by coast: north (27.8 percent), south (57.1 percent), east (64.5 percent) and west (47.2 percent) (Matos-Caraballo and Agar 2011). The lower percentage on the north coast reflects that coast's narrow shelf and exposed coast that is least amenable to trap fishing.

Annual commercial landings of the species have shown generally decreasing trends in Puerto Rico, St. Thomas/St. John and St. Croix since 2007 (CFMC 2011b). One explanation for the declining trend is the decreasing use of traps and pots, which are gears that require a significant amount of a fisherman's time to build, repair, and maintain. Traps and pots also require land to store them, which is increasingly limited by privatization of the shoreline.

The relative importance of spiny lobster fishing varies within the USVI. In 2001, spiny lobster ranked second among categories of fish targeted in St. Croix, and third in St. Thomas/St. John (Kojis and Quinn 2011). Along Puerto Rico's south coast, the second most targeted species is spiny lobster. Spiny lobster ranks fifth among targeted species on the north coast, fourth on the east coast, and third on the west coast (CFMC 2011a).

The 2011 Caribbean ACL Amendment established separate ACLs for spiny lobster by island area: Puerto Rico ACL, St. Thomas/St. John ACL, and St. Croix ACL. More information about these ACLs and the spiny lobster fishery in the three island areas can be found in the description of the fishery within the environmental impact statement of the 2011 Caribbean ACL Amendment (CFMC 2011b) and is incorporated herein by reference. Puerto Rico requires licensed recreational fishermen to have a permit to harvest spiny lobster.

Historical recreational landings of spiny lobster are unknown in both Puerto Rico and the USVI. Spiny lobster is not known to be targeted by subsistence fishermen of either place. Additional information about the spiny lobster fishery in the USVI and Puerto Rico can be found in the description of the fishery within the environmental impact statement of the 2011 Caribbean ACL Amendment (CFMC 2011b) and is incorporated herein by reference.

3.3.1.1.3 Reef Fish

The Caribbean Reef Fish FMU includes the following managed stock complexes: snappers, groupers, parrotfishes, grunts, goatfishes, porgies, squirrelfishes, tilefishes, jacks, surgeonfishes, triggerfishes, filefishes, boxfishes, wrasses, angelfishes, and aquarium trade species. Stocks within the snappers, parrotfish and groupers complexes are undergoing overfishing, whereas the others are not.

Reef fish are the primary target of commercial fishermen in St. Croix, St. Thomas/St. John, and on Puerto Rico's four coasts. Approximately 85 percent of St. Thomas/St. John commercial fishermen, and approximately 80 percent of those in St. Croix reported that they targeted reef fish in 2011 (Kojis and Quinn 2011). In 2008, 88 percent of Puerto Rico north coast, 88 percent of south coast, 76 percent of east coast and 65 percent of west coast fishermen reported that they targeted reef fish species (CFMC 2011a).

Reef fish are a popular target of recreational and subsistence fishermen. Recreational landings data for reef fish are available for Puerto Rico beginning in 2000 through MRFSS, but complementary data are not available for the USVI.

Previous actions established separate ACLs for Puerto Rico, St. Thomas/St. John, and St. Croix (CFMC 2011a, 20011b). More detailed information about the reef fish fishery in Puerto Rico and USVI can be found in the environmental impact statements for those amendments and are incorporated herein by reference.

Collection of invertebrates for the aquarium trade usually occurs in shallow waters from half to two meters deep in seagrass and mangrove habitats. Therefore, it is presumed that the marine invertebrate fishery does not extend into federal waters off Puerto Rico. The USVI prohibits harvest for the aquarium trade, but if that prohibition were lifted, harvest would be expected to occur entirely in USVI waters. Additional information about the aquarium trade fishery can be found in the 2011 Caribbean ACL Amendment (CFMC 2011b) and is incorporated herein by reference.

3.3.1.1.4 Coral and Reef Associated Plants

The managed stock complexes of the Coral and Reef Associated Plants FMU are soft corals, hard corals, gorgonians, black corals, and aquarium trade species. Extraction and possession of any hydrocorals, anthozoans, gorgonian corals, hard corals, and black corals, alive or dead (including live rock) that are included in the FMU are prohibited in the U.S. Caribbean EEZ unless a permit for scientific research, education and/or restoration is obtained. The same

prohibition applies in territorial waters of Puerto Rico and the USVI. Any harvest that occurs is black-market activity.

The same description provided for the aquarium trade species within the Reef Fish FMP in Section 3.3.1.1.3 also applies to the aquarium trade species within the Coral FMP.

3.3.1.2 General Economic Environment

Puerto Rico and the USVI continue to struggle with high unemployment and poverty rates. According to the American Community Survey, 45 percent of Puerto Rico's population and 28.9 percent of the USVI population live in poverty. During the last six months of 2012, Puerto Rico's average unemployment rate was 14 percent, while the USVI's average unemployment for 2012 was 11.7 percent. The average unemployment rate was higher in St. Croix (14.1 percent) than in St. Thomas/St. John (9.6 percent). Although unemployment has remained high in both Puerto Rico and the USVI, prices for food and housing have continued to rise. Tourist visits, however, have increased, which has brought some economic relief to the two areas.

Tourism is the largest sector of the USVI economy and its importance has increased greatly with the collapse of the manufacturing sector. Manufacturing was the second largest sector of the USVI economy, and its primary industries were refined petroleum products, rum, and jewelry (CFMC 2011a and 2011b). The Hovensa oil refinery in St. Croix, which was one of the ten largest refineries in the world, as well as the USVI's largest private employer, closed in 2012. Approximately 95 percent of its output had been exported to the U.S. mainland, and much of the USVI's export performance was dependent on Hovensa (USVI Bureau of Economic Research 2010). With the closing, approximately 2,000 jobs were lost directly and indirectly and the USVI's annual tax revenue declined by $100 million (Governor de Jongh, February 24, 2012 available at http://www.governordejongh.com/blog/2012/02/governor-seeks-federal-assistance-in-aftermath-of-hovensa-closure.html). The USVI's middle income class has shrunk with the loss of the refinery's higher wages. Tourist visits have increased, which has brought some economic relief, but wages in the tourist sector are substantially less than those previously earned by Hovensa employees.

Two historic examples of an "industrial" fishery in the U.S. Caribbean have been Puerto Rico's tuna canning industry and the swordfish fishery of St. Thomas (CFMC 2011a and 2011b). In the 1960s, Puerto Rico became a desirable location for tuna canning facilities because of favorable tax laws, its large pool of low-cost labor and easy access to Atlantic tuna. By the 1970s, at the peak of tuna canning in Puerto Rico, 7 establishments had more than 10,000 employees in Mayagüez and Ponce, and an estimated 80 percent of tuna consumed in the U.S. was canned in Mayagüez (Figueroa-Lugo 1998). After the 1970s, changes in tuna-fishing regulatory requirements and tax laws, coupled with economic incentives of moving canneries to foreign

countries closer to the Pacific tuna fisheries, essentially eliminated the competitive advantage of locating tuna-canning plants in Puerto Rico. In 1992, there were 5 tuna canneries in Puerto Rico with 5,318 employees, but by 1997, there were only 2 employing 2,500 to 4,999 persons (1997 Economic Census of Outlying Areas and 2006 County Business Patterns, U.S. Census Bureau). Star Kist Caribe reduced its operations from 3,000 employees to 1,500 employees during the summer of 2001, and then closed all operations on the island in May 2001 (Rodríguez-Pérez 2005: 119). By 2005, there was only one tuna-canning plant with 250 to 499 employees (2006 County Business Patterns, U.S. Census Bureau). This last tuna plant closed in June 2012, losing approximately 260 jobs. Highly migratory species (HMS), such as swordfish, require fishing infrastructure, such as HMS dealers, that the U.S. Caribbean does not have. The high costs of limited access permits that exist within HMS fisheries represent sizeable barriers to entry that in recent years has essentially excluded the U.S. Caribbean's small-scale commercial fishermen (Blankinship 2012).

Greater details about the broader economic environment of the USVI can be found in Regulatory Amendment 4 to the Reef Fish FMP, and is incorporated herein by reference. Similarly, more information about Puerto Rico's general economic environment can be found in the 2010 Caribbean ACL Amendment (CFMC 2011a) and is incorporated herein by reference.

3.3.2 Social and Cultural Environment

Several recent reports on the fishing communities of Puerto Rico and the USVI identify areas of fishing infrastructure and highlight their dependence upon fishing (Griffith et al. 2007; Impact Assessment Inc., 2007; Valdes-Pizzini et al. 2010). Some have suggested entire islands could be considered as a single fishing community (Stoffle et al. 2011; Stoffle et al. 2010; Valdes-Pizzini et al. 2010) as fishermen may conduct fishing related activities over a wide geographical terrain. Yet, there are distinct areas where fishing might be more directly tied to a smaller political unit, as in Puerto Rico (Griffith et al. 2007). These opinions provide the basis to distinguish these islands as separate geographical units of analysis for the purposes of describing the socio-cultural environment, but may also lend themselves to a further distinction that supports separate management.

Puerto Rico

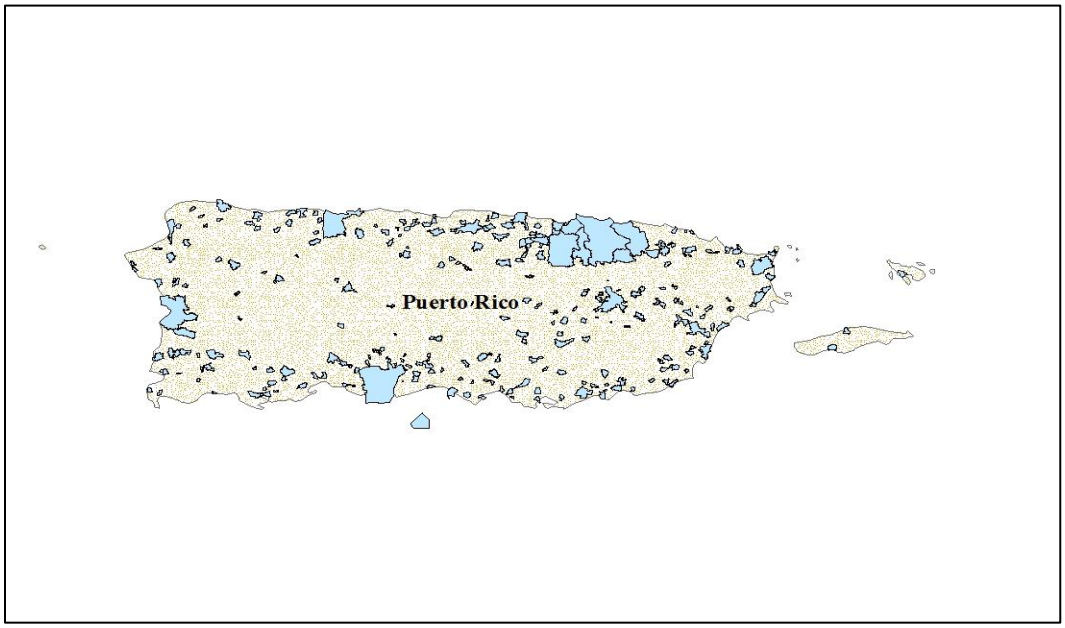


Figure 3.3. Map of Puerto Rico with census designated places (SERO 2012). Source: U.S. Census Bureau.

As with many island coastal economies, fisheries are a key component of the local economy. Like many other coastal areas throughout the Caribbean, in Puerto Rico (Figure 3.3) there are three main types of fisheries: commercial, recreational, and subsistence. The commercial sector is responsible for the majority of landings. The commercial fishery has been referred to as "artisanal" and can be considered small-scale and family-based (Griffith et al. 2007). Most fishing operations are multi-gear and multi-species according to Griffith et al. (2010) with nearly two-thirds utilizing at least three gear types. A number of different gear types are used by Puerto Rican fishermen, including: handline, rod & reel, longline, bottomline, fish traps, lobster traps, gill nets, trammel nets, cast nets and SCUBA gear (Matos-Caraballo and Agar, 2010). There seems to be an increase in the use of SCUBA gear in the commercial fisheries. This technological change could have a significant impact on the commercial fisheries, as those using this gear type are younger and not as aware of traditional fishing territories and the accompanying etiquette (Griffith et al. 2007). According to a recent census, there were approximately 868 active commercial fishermen in Puerto Rico in 2008 (Matos-Caraballo and Agar, 2008). This number is highly contested though, as pointed out in Griffith et al. (2010), even a range of 1,500 to 2,500 has been suggested too low by fishermen. The confusion may be attributed to what an active fisherman is considered to be. Nevertheless, the number has decreased from an earlier census conducted in 1988 when there were over 1,700. For those commercial fishing families that are active in the industry, fishing provides the sole income for between 40-45 percent while nearly half report having work outside of fishing (Griffith et al. 2007).

Recent profiles of Puerto Rico's recreational fisheries report over 1 million fishing trips taken in 2004 with the majority being shore mode overall (Getner 2004). The majority of trips for non-residents were charter or for-hire mode trips. Most of resident fishing trips were taken in the north, while non-residents were primarily fishing from the east. Hook and line was the predominant gear type and dolphin was the overall dominant target species for residents. Non-residents tend to target fewer species but dominant target species varied depending upon where they were fishing (Getner 2004). Puerto Rico's recreational fishermen range from charter boat captains to individuals who fish with a can, line and a hook. There are at least 15 nautical clubs around the island that are politically important to recreational fishermen and also sponsor tournaments.

Subsistence fishing in Puerto Rico is primarily a working class family activity where they see fish as a source of high quality protein for their family (Griffith et al. 2007). They do differ in some respects from other sectors with regard to key aspects, in that they may often be retired or unemployed (Griffith et al. 2007). It is clear that many Puerto Ricans participate in subsistence fishing. However, without more detailed research, it is difficult to know how pervasive this activity is on the island, or their household's dependence upon fish as a food source.

Griffith et al. (2007) found that in terms of fishing communities there were both Place-based and network-based communities in Puerto Rico. Although fishermen were spread out considerably across the island, there were certain locations that seemed to provide key features of a Place-based fishing community, including fishing infrastructure and social interactions on a daily basis. Overall, they were able to identify 38 place based fishing communities on the island (Griffith et al. 2007).

St. Croix

Fishing on the island of St. Croix (Figure 3.4) has historically been a "marginal" activity to the larger backdrop of other economic sectors on the island. However, fishing has been a core value and important to the identity of the Cruzan population (Valdes-Pizzini et al. 2010).

Commercial fishing on St. Croix is much like that of Puerto Rico in that it is "artisanal." Most fishermen construct and repair their gear and boats, as well as market their fish (Kojis and Quinn 2012; Valdes-Pizzini et al. 2010). The number of commercial fishers is elusive, as in Puerto Rico, but recent estimates place the number of active fishermen in the range of 200 to 250. This does not include those who may provide support services for registered fishermen or those who may not be registered to fish (Valdes-Pizzini et al. 2010).

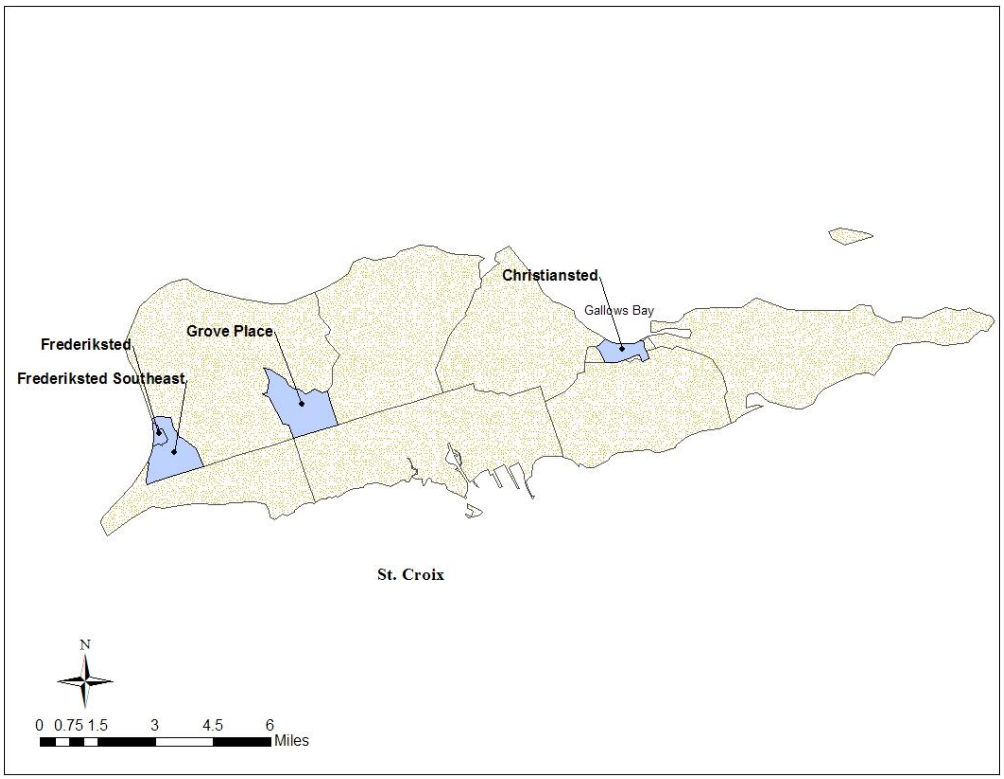


Figure 3.4. Map of St. Croix with census designated places (SERO 2012). Source: U.S. Census Bureau.

The majority of St. Croix commercial fishermen classify themselves as Hispanic with the next largest ethnic group identified as West Indian. The most frequent racial designation is Black. Most are full-time fishermen putting in over 36 hours a week (Kojis and Quinn 2012), however, the percentage may be lower than other islands and may be linked to perceptions of the current state of the fisheries. Many seek work outside of fishing, as it is increasingly difficult to make a living from that particular occupation (Valdes-Pizzini et al. 2010). The dominant gear type used is hook and line, with diving second. Trap fishing is third, but many fishermen indicated that they fish several gear types throughout the year and sometimes within the same trip (Kojis and Quinn 2012, Stoffle et al 2010). Vessels are usually small and can be hauled on trailers to different parts of the island according to factors such as desired fishing location, targeted species, and weather conditions.

According to Valdes-Pizzini et al. (2010), most of the deepwater snapper are fished off the eastern and southeastern end of the island, while the major trap grounds are off the southwestern part of the island. Dive fishing occurs most on the east end and along the southern shore, which are the most productive fishing grounds and the focus of conservation initiatives (Valdes-Pizzini et al. 2010).

While there has been limited research on the recreational fishing sector of St. Croix, a few reports provide a brief glimpse of related activities. In one survey of fishing clubs, tuna, dolphin

and wahoo were identified as the primary target species of recreational fishermen from St. Croix (Messineo and Uwate 2004). Valdes-Pizzini et al. (2010) report about 11 percent of St. Croix residents participate in recreational fishing, although, because they are not required to have a license, estimates are varied. The charter fishing and sport fishing tournaments are becoming increasingly important to the St. Croix economy, but the St. Croix offshore fleet is modest compared that of St. Thomas and St. John (Valdes-Pizzini et al. 2010). It is common for fishermen from St. Thomas to visit St. Croix to fish in local tournaments, as many of the target species are caught in waters located in-between the islands, and the distance between the islands does not pose any logistical deterrent.

Respondents to the Messineo and Uwate (2004) survey rated their fishing resources for the island as fair to good, with an average rating of good, but somewhat lower than other islands. This is similar to what was reported for commercial fishermen by Valdes-Pizzini et al. (2010). The main concerns identified as affecting the fishing resources of the island were gillnets, longlines, fish traps, overfishing, and expansion on Buck Island, as reported by recreational fishermen. Respondents from St. Croix were more aware of, and willing to join, the Fishery Advisory Committee, than those from other USVI islands according to Messineo and Uwate (2004).

There seems to be little, if any, description of subsistence fishing in St. Croix. Although it does exist, and is likely an important source of food for many, there is not sufficient information to provide a complete description. Ethnographic research about subsistence fishermen that focuses on exactly who fishes for subsistence, and how reliant are they on their catch, would assist in the description and further analysis that might be linked to the current census of fishermen.

In terms of fishing community designation, it seems to be the consensus of Valdes-Pizzini et al. (2010) that the geographical dispersion of fishermen throughout the island, and the same dispersion of their fishing activities, make it difficult to identify any particular community as a fishing community. Gallows Bay has historically been considered a fishing community, but has recently undergone significant change that now brings to question whether this area could be considered a fishing community. There are ties to the "roots" of commercial fishing, but day to day activities often hide the activities that link the community to fishing (Valdes-Pizzini et al. 2010).

St. Thomas and St. John

Both commercial and recreational fishing are important aspects of the island economies of St. Thomas and St. John (Figure 3.5), although the tourism sector may significantly dwarf their contributions in terms of economic value. Still, there are important remnants of commercial fishing communities that exist on the islands, and newer spaces for recreational fishing that are growing in importance (Impact Assessment Inc. 2007). Whether they are fishing communities in

the true sense, or fishing activity is so spread across the island that the entire geography should be considered a fishing community, as has been suggested (Stoffle et al. 2011), it has yet to be established administratively.

Two areas where concentrations of commercial fishing activity are located on St. Thomas are the northside and southside of the island. Hull Bay on the northside provides a protected area with a boat ramp where many commercial vessels are moored. Frenchtown, on the southside, has docking facilities with a covered market and considerable activity throughout the week, especially on Saturdays (Impact Assessment Inc. 2007).

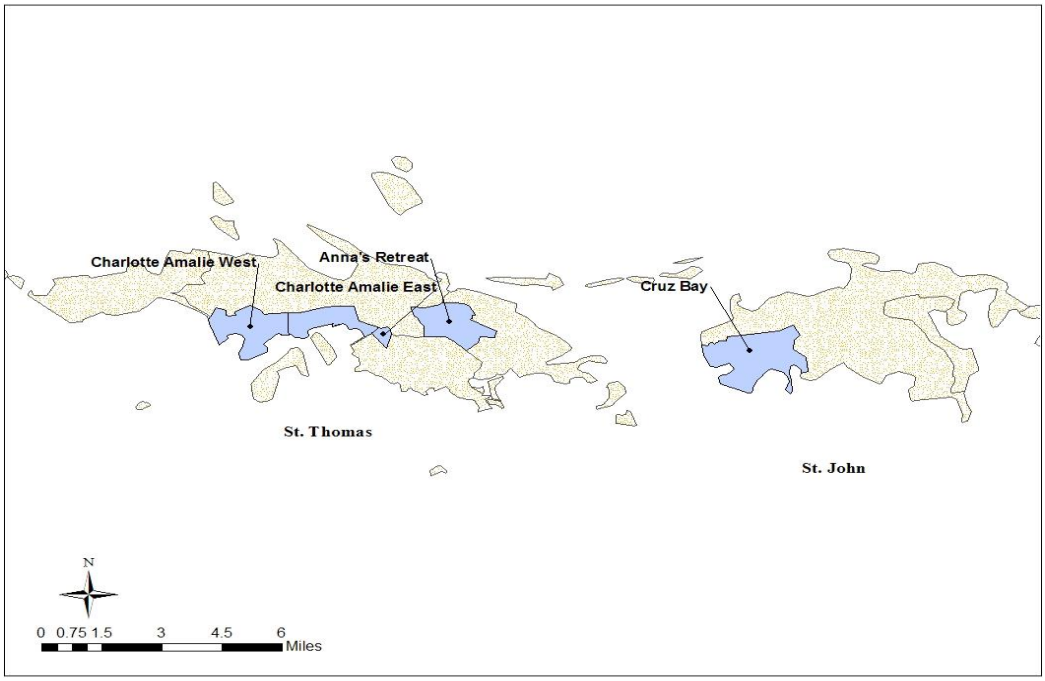


Figure 3.5. Map of St. Thomas and St. John with census designated places (SERO 2012). Source: U.S. Census Bureau.

Like St. Croix and Puerto Rico, commercial fishing on St. Thomas and St. John is likely artisanal. Most fishermen construct and repair their gear and boats, as well as market their fish (Kojis and Quinn 2012). The recent census of fishermen places the number of active fishermen at around 187 on both islands.

The majority of commercial fishermen of St. Thomas and St. John classify themselves as French descent with the next largest ethnic group identified as West Indian. The most frequent racial designation is White. The time spent fishing is split almost evenly between full-time fishermen, who put in over 36 hours a week, fishermen putting in 15 to 36 hours a week, and those spending less than 15 hours a week fishing (Kojis and Quinn 2012).

The dominant gear type used in St. Thomas and St. John is hook and line, with traps second. Dive gear fishing is third, but many fishermen, as in St. Croix, indicated that they fish several gear types throughout the year (Kojis and Quinn 2012). Vessels are also small and can be hauled on trailers to different parts of the island according to the type of fishery prosecuted seasonally. However, both the northside and southside provide mooring and dockage, as do other marinas and protected bays around the island where vessels are kept and the island topography makes trailering boats difficult (Impact Assessment Inc. 2007).

According to Impact Assessment Inc. (2007) the primary trap fishing areas for lobster and finfish are located to the south and north of the islands. The primary handline area is to the south with a small area north of St. Thomas, while net fishing is almost exclusively conducted on the northside of St. Thomas (Impact Assessment Inc. 2007:111). The primary target of fishermen from St. Thomas/St. John is reef fish, with coastal pelagic being second, and spiny lobster third (Kojis and Quinn 2012).

Recreational fishing is likely more important in St. Thomas than other islands in the USVI. The East End of the island has a concentration of charter fishing vessels and infrastructure. In contrast to commercial fishermen, recreational fishermen are more likely to target coastal pelagic fish, which explains the highly disperse fishing area for charter fishermen which extends well beyond the north sides of both islands, and far south of St. Thomas (Impact Assessment Inc. 2007 :111).

Again, there seems to be little, if any, description of subsistence fishing in either St. Thomas or St. John. Although it does exist, and is likely an important source of food for many, there is not sufficient information to provide a complete description.

In terms of fishing community designation, it appears that the geographical dispersion of fishermen throughout St. Thomas, and the same dispersion of their fishing activities, has led some to suggest that the entire island should be designated a fishing community (Stoffle et al. 2011). Some parts of St. Thomas have been identified as having substantial fishing activity and it has been proposed that they could be considered a place-based fishing community (IAI 2007). Nevertheless, fishing has been identified as an important component of the culture and livelihood of many individuals on the islands, whether commercial, recreational or subsistence, and has been tied directly, and indirectly too many of the island's residents and businesses.

3.3.3 Environmental Justice Considerations

Executive Order 12898 requires federal agencies conduct their programs, policies, and activities in a manner to ensure individuals or populations are not excluded from participation in, or denied the benefits of, or subjected to discrimination because of their race, color, or national origin. In addition, and specifically with respect to subsistence consumption of fish and wildlife, federal

agencies are required to collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence. The main focus of Executive Order 12898 is to consider "the disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories…" This executive order is generally referred to as environmental justice (EJ).

Commercial, recreational, and subsistence fishermen, and coastal communities could be expected to have impacts from the proposed action in the U.S. Caribbean. However, information on the race and income status for individuals who fish is not available. Because the proposed action could be expected to impact fishermen and community members on several islands within the U.S. Caribbean and census data are available at the community level, census data have been assessed to examine whether any island communities have poverty or minority rates that exceed thresholds for raising EJ concerns. Census data from the American Community Survey for the year 2010 (U.S. Census Bureau American Community Survey, 2013) were used to calculate the percentages and thresholds for Puerto Rico only, as data for the USVI are not available at this time.

The threshold for comparison used was 1.2 times the state average for the proportion of minorities and population living in poverty (EPA 1999). If the value for the community is greater than or equal to 1.2 times this average, then the community is considered an area of potential EJ concern. Puerto Rico had a minority rate of 99.1% and a poverty rate of 45.2%. Out of all the communities listed in Table 3.1, Patillas is the only community identified by Griffith et al. (2010) as being a fishing community. Although there may be EJ concerns within this community, the social effects from the action within this amendment should have positive effects overall. See Section 4.4 for a discussion of the social effects. Table 3.1 lists those communities that have exceeded the threshold for poverty (the community average was subtracted from the state threshold, so any negative number is above the threshold). Because the island average for minorities is 92%, the threshold was over 100% and no community can exceed that number, therefore, only poverty is reported here.

Those communities that appear in Table 3.1 would be considered to exhibit social vulnerabilities related to a high poverty rate if the regulatory action were to have negative social effects. It is likely that structuring the FMPs to more readily address the uniqueness of the separate geographic areas will have positive impacts, and not negatively impact, those communities listed in Table 3.1. However, this is a largely speculative conclusion, because the actual impacts of the FMPs and their associated management measures will depend on the future management actions implemented through the geographically organized FMPs.

Table 3.1. Puerto Rico communities exceeding the poverty environmental justice thresholds for 2010. (SERO 2012)

Community	Poverty Rate	State Threshold	Over Threshold
Adjuntas Municipio, Puerto Rico	57.2	54.24	2.96
Aguada Municipio, Puerto Rico	56.5	54.24	2.26
Barranquitas Municipio, Puerto Rico	54.7	54.24	0.46
Ciales Municipio, Puerto Rico	59.3	54.24	5.06
Coamo Municipio, Puerto Rico	55.8	54.24	1.56
Comerío Municipio, Puerto Rico	58.4	54.24	4.16
Corozal Municipio, Puerto Rico	58.4	54.24	4.16
Guánica Municipio, Puerto Rico	58.2	54.24	3.96
Guayanilla Municipio, Puerto Rico	56.5	54.24	2.26
Isabela Municipio, Puerto Rico	57.1	54.24	2.86
Lajas Municipio, Puerto Rico	55.7	54.24	1.46
Lares Municipio, Puerto Rico	58.1	54.24	3.86
Las Marías Municipio, Puerto Rico	58.2	54.24	3.96
Maricao Municipio, Puerto Rico	65.7	54.24	11.46
Maunabo Municipio, Puerto Rico	55.6	54.24	1.36
Moca Municipio, Puerto Rico	57.0	54.24	2.76
Morovis Municipio, Puerto Rico	62.0	54.24	7.76
Naranjito Municipio, Puerto Rico	55.3	54.24	1.06
Orocovis Municipio, Puerto Rico	62.6	54.24	8.36
Patillas Municipio, Puerto Rico	57.0	54.24	2.76
Peñuelas Municipio, Puerto Rico	57.7	54.24	3.46
Quebradillas Municipio, Puerto Rico	60.6	54.24	6.36
Salinas Municipio, Puerto Rico	58.5	54.24	4.26
San Sebastián Municipio, Puerto Rico	58.5	54.24	4.26
Utuado Municipio, Puerto Rico	57.6	54.24	3.36
Villalba Municipio, Puerto Rico	57.1	54.24	2.86
Yauco Municipio, Puerto Rico	56.8	54.24	2.56

3.4 Administrative Environment

3.4.1 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. EEZ, an area extending from the seaward boundary of each coastal state to 200 nm from shore, as well as 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 Secretary of Commerce (Secretary) and eight regional fishery management councils that represent the expertise and interests of constituent states/territories. Regional councils are responsible for preparing, monitoring, and revising management plans for fisheries needing management within their jurisdiction. The Secretary is responsible for promulgating regulations to implement plans and amendments after ensuring management measures are consistent with the Magnuson-Stevens Act and with other applicable laws. In most cases, the Secretary has delegated this authority to NMFS.

The Caribbean Fishery Management Council (Council) is responsible for fishery resources in federal waters of the U.S. Caribbean. These waters extend to 200 nm offshore from the nine-mile seaward boundary of the Commonwealth of Puerto Rico and the three-mile seaward boundary of the Territory of the USVI.

The total area of fishable habitat in the U.S. Caribbean is estimated to be approximately 2,467 nm^2 (8,462 km^2). Fishable habitat is defined as those waters less than or equal to 100 fathoms (183 m). The fishable habitat within the EEZ is 355 nm^2 (1,218 km^2) of the U.S. Caribbean total, with 116 nm^2 (398 km^2) occurring off Puerto Rico, and 240 nm^2 (823 km^2) occurring off the USVI. The vast majority of the fishable habitat in federal waters off Puerto Rico is located off the west coast.

The vast majority of the fishable habitat in federal waters off the USVI is located off the north coast of St. Thomas. The majority of fishable habitat occurs in that area, as does the majority of fishing activity for Council-managed species, except for fishing for deep water snappers, which occurs primarily in the EEZ (at depths greater than 100 fathoms) (CFMC 2005).

The Caribbean Council consists of seven voting members: four public members appointed by the Secretary, one each from the fishery agencies of Puerto Rico and the USVI, and one from NMFS. Public interests are also involved in the fishery management process through

participation on advisory panels and through Council meetings that, with few exceptions for discussing personnel matters, are open to the public. In addition, the regulatory process is in accordance with the Administrative Procedures Act, in the form of "notice and comment" rulemaking, which provides extensive opportunity for public scrutiny and comment, and requires consideration of, and response to, those comments.

Regulations that implement the management measures in the FMPs are enforced through actions of NOAA's Office of Law Enforcement, the United States Coast Guard, and various territorial authorities. To better coordinate enforcement activities, federal and territory enforcement agencies have developed cooperative agreements to enforce the Magnuson-Stevens Act. However, enforcement in the Caribbean region is severely underfunded. Because personnel and equipment are limited, compliance with federal regulations depends largely on voluntary compliance (Heinz Center 2000).

The Fishery Conservation Amendments of 1990 (P.L. 101-627) conferred management authority for Atlantic HMS, including tunas, oceanic sharks, marlins, sailfishes, and swordfish, to the Secretary from the Fishery Management Councils. For additional information regarding the HMS management process and authority in the Caribbean, please refer to the Fishery Management Plan for Atlantic Tunas, Swordfish, and Sharks (HMS FMP, http://www.nmfs.noaa.gov/sfa/hms/).

Recreational fishermen in the U.S. EEZ are required to register in the National Saltwater Angler Registry. The National Saltwater Angler Registry helps NOAA to gauge the health of marine fisheries. Congress created the registry, a national directory of anglers, through the Magnuson-Stevens Reauthorization Act of 2006 to improve surveys of fishermen used to assess the health of fish stocks and the economic contributions of anglers. Through effective regulations based on data collected through the registry, NOAA helps to preserve recreational fishing for the anglers, fishing businesses, coastal communities and millions of Americans whose lives and livelihoods are connected to saltwater fishing. For information, please visit the Marine Recreational Information Program Web site at: http://www.countmyfish.noaa.gov/.

3.4.2 Commonwealth/Territory Fishery Management

The governments of the Commonwealth of Puerto Rico and the Territory of the USVI have the authority to manage their respective state fisheries. As a Commonwealth, Puerto Rico has an autonomous government, but is voluntarily associated with the United States. The USVI is an unincorporated territory with a semi-autonomous government and its own constitution (OTA 1987).

Puerto Rico has jurisdiction over fisheries in waters extending up to nine nm from shore. Puerto Rico's Department of Natural and Environmental Resources (PRDNER) manages those

fisheries. Section 19 of Article VI of the Constitution of the Commonwealth of Puerto Rico provides the foundation for the fishery rules and regulations. Puerto Rico Law 278 of 1998 establishes public policy regarding fisheries. The USVI has jurisdiction over fisheries in waters extending up to three nm from shore, with the exception of about 5,650 acres of submerged lands off St. John, which are owned and managed by the National Park Service (Goenaga and Boulon 1991). The Virgin Islands Department of Planning and Natural resources is the USVI's fishery management agency.

Each state fishery management agency has a designated seat on the Council. The purpose of local government representation at the council level is to ensure local participation in federal fishery management decision-making. The state governments have the authority to manage their respective state fisheries. Each of the states exercises legislative and regulatory authority over their natural resources through discrete administrative units. Although each agency is the primary administrative body with respect to the states' natural resources, both Puerto Rico and USVI cooperate with numerous state and federal regulatory agencies when managing marine resources.

Both Puerto Rico and the USVI require commercial fishing licenses, permits for some species, and reporting. Puerto Rico requires a license for commercial fishers, and has categories for full-time, part-time, novice, and non-resident commercial fishers, ornamental fisheries, and owners of rental boats, including charter and party/head boats. Currently the PRDNER requires a commercial fishing license for fishing in commonwealth waters and an additional permit for the commercial harvest of land crab, incidental catch, and sirajo gobies. In addition, a license is required for the recreational sector as well as an additional permit for the recreational harvest of land crabs, queen conch, spiny lobster, billfish, fresh water shrimp, and sirajo gobies (PRDNER 2010).

The USVI only has a license requirement for commercial fishers who are permanent USVI residents, with the exception of a recreational shrimp permit for Altoona Lagoon and Great Pond on St. Croix, and for fishing activities in the Great St. James Marine Reserve off St. Thomas. The USVI government is currently developing recreational fishing regulations for the Territory.

Additional information regarding fishery management in state or federal waters can be found in Section 5.4 of the 2011 Caribbean ACL Amendment (CFMC 2011b).

Chapter 4. Environmental Effects

Chapter 4 describes the effects to the physical, biological, economic, social, and administrative environment from the alternatives in Chapter 2.

4.1 Direct and Indirect Effects on the Physical Environment

Managing by island rather than by species could potentially enhance fisheries management. Therefore, an island-based approach could potentially minimize impacts to the physical, biological, economic, and social environments from fishing activities. However, any expected benefit is unknown at this time because all future impacts to the physical environment depend on the nature of the specific future management actions implemented under the reorganized fishery management plans (FMPs).

Alternative 1: No action Alternative

Alternative 2: Four Island FMP Approach

Alternative 3: (Preferred) Three Island FMP Approach

Alternative 4: Two Island FMP Approach

Alternative 1 (no action) would not result in changes to the management of federal fisheries in the U.S. Caribbean exclusive economic zone (EEZ). Therefore, the action would not have any direct or indirect effect on the physical environment. **Alternatives 2**, **3 (Preferred),** and **4,** are not expected to have any direct or indirect impact to the physical environment. The National Marine Fisheries Service (NMFS) and the Caribbean Fishery Management Council (Council) already prohibit the use of destructive fishing gears and methods such as explosives, chemicals, power assisted tools, powerheads, gill nets, and trammel nets among others (50 CFR part 622). By prohibiting destructive fishing methods and ensuring that activities do not adversely affect essential fish habitat (EFH) and habitat areas of particular concern (HAPC), the Council and NMFS will ensure that negative impacts on the physical environment from authorized fishing activities are negligible.

Shifting to an island-based approach does not trigger tangible impacts to the physical environment as they are just geographic representations designated on maps and do not involve placing anything structural in the water or physical environment. Shifting management of federal fisheries in the EEZ from species-based fishery management plans FMPs to island-based FMPs would only restructure or repackage the existing management measures and it would be considered largely an administrative exercise. However, tailoring management measures to specific islands could potentially make fisheries management more effective therefore minimizing adverse direct or indirect effects to the physical environment.

4.2 Direct and Indirect Effects on the Biological Environment

Under **Alternative 1** (no action), the status quo under the current FMPs would remain unchanged. Therefore, **Alternative 1** would continue a fisheries management process that evaluates the effects to the biological environment at a U.S. Caribbean regional level. **Alternatives 2**, **3 (Preferred),** and **4,** are not expected to have any substantial impact on the biological environment (e.g., biodiversity, ecosystem function) but would modify the management process to better account for the localized biological differences between the islands. **Alternatives 2**, **3 (Preferred),** and **4,** may indirectly increase benefits to the biological environment by analyzing the effects of an action at a smaller and localized scale. With the proposed action, the decision making process would better account for these local differences among the islands and how those local differences impact each individual fishery.

Recent evidence suggests that, at least for some of the subject species, a high degree of population structure exists both within, and among, these islands of the U.S. Caribbean. For example, recent studies of elkhorn coral (*Acropora palmata*) and staghorn coral (*A. cervicornis*) occupying the coral reefs of the La Parguera region in the southwest corner of Puerto Rico have revealed a high degree of population structure. The existence of a distinct population structure in La Parguera for both species suggests restricted gene flow between some reefs in close proximity (Garcia and Schizas 2010). Similarly, for a red hind grouper (*Epinephelus guttatus*) spawning site south of St. Thomas, complex three-dimensional ocean current structure disperses larvae away from the site at the surface, but returns the juveniles to the vicinity of the original spawning site within the approximately 40 day planktonic larval duration of this species (Cherubin et al. 2011).

Factors such as planktonic larval dispersion, three-dimensional current structure, availability of suitable habitat, density of the incoming larval cohort, spatial and temporal variability, and many other factors will contribute to successful connectivity among populations. Given these complex patterns of biological connectivity among populations, the conventional wisdom that species inhabiting U.S. Caribbean coral reefs are fully connected and function as single stocks, likely does not apply at least in some cases, and possibly for the majority of species. Within this suite of biological, social, cultural, and economic considerations, it is valid and responsive to manage federal fishery resources within a more local, island-based context.

Fishing practices are different among the islands (Section 1.5), affecting the biology of the ecosystems and the environment in different ways. A better distinction of these localized differences between the island as suggested by **Alternatives 2**, **3 (Preferred),** and **4** would better tailor fisheries management in the U.S. Caribbean islands.

Under **Alternatives 2**, **3 (Preferred),** and **4,** the status and trends of both target and non-target species would continue to be evaluated annually. **Alternatives 2**, **3 (Preferred),** and **4,** would establish island-area management standards and potentially require assessments of stock status at an island-area level for each and every island area. The division of management standards by island area already exists as evidenced in the Caribbean Annual Catch Limit (ACL) Amendments (CFMC 2011a, 2011b). For example, the Puerto Rico maximum sustainable yield (MSY) proxy is the average of combined annual landings (commercial and recreational) in Puerto Rico. The St. Thomas/St. John and St. Croix MSY proxies are the average of landings (commercial only) in the respective island area for specified years. However, stock assessments have not similarly changed, although Southeast Data, Assessment, and Review (SEDAR) studies already evaluate stocks of the different islands. Any future impact to the biological environment is unknown at this time because those future impacts depend on the nature of the specific future management actions implemented under the reorganized FMPs.

4.3 Direct and Indirect Effects on the Economic Environment

Under **Alternative 1** (no action) the existing FMPs would remain unchanged. The current FMPs, which divide marine resources into mutually exclusive fishery management units (FMUs), are better suited for management of fisheries characterized by industrial-scale fishing where fishermen specialize in the harvest of one or a few species within a particular FMU. For example, New England lobster fishermen specialize in the harvest of the American Lobster, so the American Lobster FMP successfully addresses that specialization. However, in the U.S. Caribbean, industrial-scale fishing and specialization do not occur. U.S. Caribbean fisheries are artisanal, and fishermen are opportunists, harvesting species across the current FMUs. For example, Puerto Rico and USVI fishermen harvest spiny lobster (Spiny Lobster FMU) and reef fish (Reef Fish FMP) in traps. In consequence, the existing FMPs and FMUs as specified by **Alternative 1** are less successful in both, characterizing historic and continuing fishing practices in the region, and identifying interdependent effects of regulatory changes. **Alternatives 2**, **3 (Preferred),** and **4,** would restructure the FMPs to eliminate the current divisions of resources that are largely based on the notion of a fishery as little more than the fish, rather than as a biological, economic, and social phenomenon. Instead, the FMU of an island-based FMP would be composed of all managed species harvested by fishermen of that island area. Thus, **Alternatives 2**, **3 (Preferred),** and **4,** may indirectly increase benefits derived from long-term management of the resources by improving assessments of the interdependent costs and benefits of alternative actions on fishermen, their families, and communities, therefore, improving regulatory decision-making. However, any future impact to the economic environment is unknown at this time, because all future impacts depend on the nature of the specific future management actions implemented under the reorganized FMPs.

The current FMPs and FMUs under **Alternative 1** also implicitly presume a homogenization of fishing practices that typically result from industrialization and specialization. Industrial

competition among fishermen who catch species within a specific FMU, for example, promotes standardization of vessels and gear because every competing fishing firm is motivated to catch the most fish at the least cost. Therefore, a regulation that restricts a fishing practice in a homogeneous fishery applies equally to each and every fisherman, and the average impact is a perfect assessment of that impact. That average, however, is far less representative of the actual impact on every fisherman when there is substantial variation in fishing practices, such as occurs in the U.S. Caribbean. Within the U.S. Caribbean, fishing practices vary significantly with the differences in island histories and natural and social environments. **Alternative 1** would continue a fisheries management process that tends to negate these differences, while **Alternatives 2**, **3 (Preferred),** and **4,** would modify the management process to better account for more localized differences. **Alternative 2** would allow for the greatest improvement of information and benefits that result from such refinement, followed in turn by **Alternatives 3 (Preferred)** and **4**, respectively. **Alternatives 2**, **3 (Preferred),** and **4,** may indirectly increase benefits derived from long-term management of the resources by improving assessments of the costs and benefits of alternative actions on fishermen of each island area, their families, and communities. This would in turn, improve regulatory decision-making. However, it is reasonable to expect that the greater the use of refined information, the greater the time and costs to obtain that additional information and keep it up to date. **Alternative 2**, for example, would require refinement of St. Thomas/St. John District landings into St. Thomas landings versus St. John landings.

The 2010 and 2011 Caribbean ACL Amendments (CFMC 2011a, 2011b) divided the EEZ into three island areas: the Puerto Rico EEZ, St. Croix EEZ, and St. Thomas/St. John EEZ. **Alternative 2** would require changing from one to three of the existing EEZs, depending on the assumptions used to divide the EEZ from three parts to four. The environmental impact statements (EISs) for the above amendments included the assumptions that fishermen of a specific island area operate only in that island-area's EEZ and the EEZs do not overlap. So, if those assumptions were continued, the Puerto Rico EEZ and St. Croix EEZ would be unchanged (except if their locations in geographic space are changed) and **Alternative 2** would require the division of the St. Thomas/St. John EEZ into two parts: the St. Thomas EEZ and St. John EEZ. That assumption is reasonable if the distances between island-areas' fishing grounds are so great that it is not economically rational to fish in another island-area's EEZ. However, the distance between St. Thomas and St. John is only four miles from St. Thomas' east end, and, it is likely that, regardless of how the St. Thomas/St. John EEZ was divided, fishermen from St. John would fish in the St. Thomas EEZ and/or St. Thomas fishermen would fish in the St. John EEZ. Therefore, if the above assumption is to remain valid, **Alternative 2** would require a permitting process that would prohibit fishermen and/or vessels from a specific island area from operating, or at least harvesting species, in the EEZ of another island area. For example, St. John fishermen and/or fishing vessels would be permitted to operate or fish only in the St. John EEZ, and St. Thomas fishermen and/or vessels would be permitted to operate or fish only in the St. Thomas

EEZ. At present, combined commercial landings of St. Thomas and St. John count toward a St. Thomas/St. John ACL. If the above permitting process were implemented, and the St. Thomas/St. John EEZ were divided such that each EEZ had the same quality and quantity of fishable habitat, each island area's fishermen could be expected to land 50 percent of an ACL.

As of March 18, 2011, there were nine commercially licensed fishermen in St. John and 111 in St. Thomas (Kojis and Quinn 2012). A 50 to 50 split of the fishable habitat in the EEZ and an equal split of an ACL would represent a redistribution of wealth from St. Thomas fishermen to St. John fishermen. Regardless of how the St. Thomas/St. John EEZ were divided, it is likely that fishermen from one or both of the island areas would be displaced from historic fishing grounds. Moreover, if the permitting process prohibits transiting through another island-area's EEZ, there would be additional displacement costs. The displacement costs would likely include catch and landings changes, trip-level search and associated costs, crowding and congestion costs, and personal safety costs. **Alternative 2** does not necessarily require the presumption that the four areas are mutually exclusive. For example, one way to avoid the above displacement costs would be to overlap the St. Thomas EEZ and St. John EEZ, so that historical common fishing grounds are not divided. However, if the common grounds represent most, to all, of the St. Thomas/St. John EEZ, there could be no positive net benefits from separate St. Thomas and St. John FMPs.

Preferred Alternative 3 would be consistent with the current 2-district division of the USVI and historic landings that are so divided. Therefore, **Preferred Alternative 3** would avoid the possibility of indirectly imposing additional time and costs on the fishermen and USVI government imposed by **Alternative 2**. **Preferred Alternative 3** is also consistent with previous amendments that divide the EEZ into the Puerto Rico EEZ, St. Croix EEZ, and St. Thomas/St. John EEZ. Hence, it precludes the possibility of a different division of the EEZ, such as a USVI EEZ, a West and South Coast Puerto Rico EEZ, and East and North Coast Puerto Rico EEZ. However, it does not necessarily negate the possibility that two or three of the EEZs may overlap all or part of a year because the locations of the EEZs are not specified, although there may be the implicit assumption that the locations would be the same as identified in the previous amendments.

Alternative 4 would imply that fishermen from Puerto Rico and St. Thomas/St. John operate in the same waters of the Caribbean EEZ. However, as stated previously, there have been the assumptions that fishermen operate only in waters off their island-area and these areas do not overlap. If those assumptions are true, **Alternative 4** would not have an economic (or arguably any) basis if the definition of a common fishery requires an overlap of Puerto Rico, and St. Thomas/St. John fishing activities within the EEZ. However, if a shared fishery is defined solely by the locations of fish of the same species, such as the same fish that are found in Puerto Rico and St. Thomas/St. John waters (and anywhere else), then the human element is stripped from

what the Puerto Rico/St. Thomas/St. John fishery, or any fishery is. In that case, the fishery is reduced to fish, and without human exploitation of the fish, management of a fishery is irrelevant. It is much more reasonable that a fishery is, or should be, delimited by species, the locations of those species, who exploits those species, and how they are exploited. With a greater or equal emphasis on economic and social differences, there is greater argument against **Alternative 4** and for **Alternatives 2** and **3 (Preferred)**.

Alternatives 2, **3 (Preferred),** and **4,** would eliminate time and costs currently incurred by U.S. Caribbean fishermen, who after reviewing proposed changes to one or more FMPs, realize the proposed changes would have no impact on them because the change concerns only an island area where they do not operate. For example, if a change to an existing FMP is proposed, there is the possibility that any fisherman from Puerto Rico, St. Thomas, St. John and/or St. Croix could be affected. So, under **Alternative 1** fishermen have to incur time and costs to determine if the proposed changes may affect them or not; if not, that may feel their time and money spent was in excess. Under **Alternatives 2**, **3 (Preferred),** and **4,** fishermen would easily determine if proposed changes affect their fishing practices because the proposed changes would, or would not, apply to the island area(s) where they operate. **Alternative 2** would establish the largest number of FMPs, and theoretically could allow for the largest reduction in time and costs incurred by fishermen in assessing whether or not a proposed change applies to them. **Preferred Alternative 3** could allow for the second largest reduction, followed by **Alternative 4**.

4.4 Direct and Indirect Effects on the Social Environment

Alternative 1 (no action) would not result in changes or direct effects to the social environment, however there could be indirect effects if the no action alternative is chosen as the preferred. There has been considerable discussion at the Council level with regard to island specific management, where the public is strongly in favor of this style of management. In some cases, displeasure has been expressed toward the lack of understanding of local needs and concerns, and this may still be a factor. However, the recent ACL amendment has attempted to set ACLs at the island level to accommodate some of these concerns, therefore moving toward island management may afford a more streamlined and successful management of Caribbean fisheries. If **Alternative 1** is chosen as preferred, fishermen may become dissatisfied and perceptions of the efficacy of management may erode. Such an erosion of perception can lead to lesser compliance and affect participation in management. Cooperation and participation in management have been shown to improve compliance with fishery regulations and can contribute to the overall well-being of fishermen and other stakeholders including the well-being of the resource.

Developing new FMPs under **Alternatives 2**, **3 (Preferred),** and **4,** would consider the unique attributes of each island or island group, taking into account the differences in the cultural, social, economic, physical, geological, and biological environment of each. However, any future

impact to the social environment is unknown at this time, because all future impacts depend on the nature of the specific future management actions implemented under the reorganized FMPs. **Alternative 2** would create an individual plan for each of the four major islands: St. Thomas, St. Croix, St. John, and Puerto Rico. While **Alternative 2** addresses the concerns that have been expressed by the public regarding island management, a better and more inclusive plan might be to have three plans with St. Thomas, and St. John combined as outlined in **Preferred Alternative 3**. This would accommodate the geographical proximity of the two islands while still addressing the different cultural, social, economic and other environments. Although the two islands are separate, there is a sense of unity as movement between the two is easily done by a short ferry ride, which many islanders use to travel to work and back. **Alternative 4** would combine into a single FMP the islands of Puerto Rico, St. Thomas, and St. John, and not consider these islands as separate economic and social environments, while ignoring some of the differences between the islands as discussed earlier.

The different histories of the islands have had a unique effect on the development of the fishing economy on each. Based upon different governance, dissimilar colonization and development of plantations and slavery, the islands have today developed their own unique culture and social environments. These differences are evident as one examines the ethnic and cultural makeup of the stakeholders within each island fishery. While all share common experiences and historical provenance, over the decades, important differences have evolved (see Sec. 3.3.2). Present day economies differ on each island, as affected by unique histories and the new trends of tourism and global economies have helped transform the older more traditional coastal way of life. Fishing is one activity that has remained an important part of island culture, yet each of the social and economic environments differ, and have dictated unique trajectories, for the development of all three sectors of fishing. By facilitating for more island centric management, each locale may be able to take advantage of the historical trends that have created each unique social and cultural environment, which may offer more streamlined and effective management. This may bring about more participation as stakeholders see management more responsive to their local needs. The increased cooperation may lead to more compliance, which should benefit the biological, economic, and social environments.

4.5 Direct and Indirect Effects on the Administrative Environment

Under **Alternative 1**, the Council will continue to manage federal fisheries within the U.S. Caribbean EEZ, under the species-based Spiny Lobster FMP, Reef Fish FMP, Queen Conch FMP, and the Corals and Reef Associated Plants and Invertebrates FMP. There would be no restructuring of the current FMPs by island or island group. However, under **Alternative 1**, the Council would have to develop a new Aquarium Trade Species FMP as recommended by the Council in the 2011 Caribbean ACL Amendment (CMFC 2011b).

Alternative 2's four FMP approach would require the USVI landings be separated into three island areas (St. Thomas, St. John, and St. Croix). Historic landings are not so divided. Instead, the USVI has two landing districts: the St. Thomas/St. John District and St. Croix District. Therefore, management standards required by **Alternative 2** would indirectly require the USVI government to either redefine its districts or at least separate St. Thomas and St. John landings from each other. If landings have to be aligned to each of these two islands, it could conceivably increase the administrative burden to the Virgin Islands Division of Fish and Wildlife, the responsible agency for submitting landings data to the Southeast Fisheries Science Center (SEFSC). It could prove difficult to identify the source island, either St. Thomas or St. John, from those landings reports, because a field for reporting harvest location was not included on the reporting forms until recently (2011-2012). As a result, assigning historic fisheries landings data before 2011 to the appropriate island could be difficult, or even impossible, at this time. Furthermore, changes to the collection and analysis scheme would be required to allocate the data for future island-based management. It might be possible to allocate historical landings to each of the St. Thomas and St. John fisheries on a percentage basis, or by using sporadically collected Trip Interview Program (TIP) data recorded since 1979 for St. Thomas and St. John. The number of TIP records for St. Thomas and St. John decreased substantially by the mid-1990's (McCarthy and Gedamke 2008), but may still provide a snapshot of the relative catch and fishing effort in the two islands. The same will hold true when modifying any management measures that are based on historical landings.

Under **Preferred Alternative 3**, development of three island or island-group FMPs would closely reflect present fishery management in the U.S. Caribbean EEZ as modified by the 2010 and 2011 Caribbean ACL Amendments (Figure 1.2). These amendments allocated ACLs by island (Puerto Rico, St. Croix) or island group (St. Thomas/St. John) with the exception of ACLs for tilefish and aquarium trade species. This alternative would have the fewest direct or indirect administrative effects as the 2010 and 2011 Caribbean ACL Amendments establish a structure similar to the structure proposed by this alternative. This alternative does not require a modification to the landings data acquisition or management schemes, greatly simplifying the administrative processes involved in the switch from species-based FMPs to an island-based FMP approach.

Alternative 4 could indirectly reduce the combined time and costs that the Puerto Rico and St. Thomas/St. John (USVI) governments incur by producing separate landings forms and maintaining different databases if, by its selection, it motivated the creation of a shared form and database. Unfortunately, any net benefit would require that Puerto Rico and St. Thomas/St. John fishing practices and administration to be essentially the same in state and federal waters, but they are not. On the other hand, **Alternative 4** could indirectly increase time and costs incurred by Puerto Rico and St. Thomas/St. John governments if, by its selection, it requires the creation and use of an additional landings form and database that accounts solely for fishing practices in, and landings from, the EEZ off Puerto Rico and St. Thomas/St. John. However, the additional

form would increase the time and costs incurred by fishermen when they report catches from the Puerto Rico/St. Thomas/St. John EEZ, which would likely duplicate part to all of an existing reporting requirement. It is more likely that **Alternative 4** would not indirectly affect existing reports and/or reporting requirements, and their associated costs to Puerto Rico and USVI governments or commercial fishermen, because relevant landings data would be obtained simply by combining past and present Puerto Rico and St. Thomas/St. John commercial landings. However, that would not apply to the recreational sector because there are no historical recreational landings data for St. Thomas/St. John. An increase in the administrative burden could be expected when combining the recreational sectors of St. Thomas and St. John under the same reference points for the recreational sector of Puerto Rico. However, NMFS could develop methodologies to account for the recreational sector of St. Thomas and St. John. In addition, NMFS will need to modify the current Puerto Rico recreational management reference points to account for the portion of the recreational sector which lacks landings information. However, the Council and NMFS could choose to continue management of the recreational sector of St. Thomas/St. John based on the commercial sector of these two islands.

The outcome of restructuring the current FMPs would be an entirely new, stand-alone FMP for each island or island group, containing all the necessary elements outlined in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). There are many important implications of an island-based approach. Each island-based FMP could be amended as necessary to reflect events specific to that island or island group, with minimal impact to those U.S. Caribbean islands not included in that FMP. Because future actions would be specific to an individual island or island group and would more specifically reflect shared economic and cultural considerations, this new structure would allow the Council to better explain plan changes and regulations, and would make it easier for constituents to understand those changes within the context of their culture and environment. Many of the future impacts to the administrative environment are unknown at this time, because all future impacts depend on the nature of the specific future management actions implemented under the reorganized FMPs.

There is the possibility of additional costs to management because of increased requirements for new research, monitoring, and stock assessments. Stocks could be functionally subdivided by island group, and assessed and managed accordingly, so data will need to be obtained and the assessments conducted on an island-based basis (i.e., for each island-based FMP). Based on present assessment procedures in the U.S. Caribbean, changes to data collection procedures would not be expected to be substantially impacted because data are already collected on an island-based basis. However, even if new FMPs are created separately for St. Thomas and St. John, since 2011 fishermen have been able to report which of the two islands was fished. Recent SEDAR assessments have been done by island, rather than by U.S. Caribbean region. The NMFS SEFSC will still determine the best stock assessment approach for managed species in the U.S. Caribbean independent of island or region-based management.

4.6 Cumulative Effects Analysis

As directed by the Council on Environmental Quality (CEQ), federal agencies are mandated to assess not only the direct and indirect impacts, but also the cumulative impacts of the proposed action. The CEQ regulations 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 C.F.R. 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.
This section uses an approach for assessing cumulative effects based upon guidance offered by the CEQ publication ―Considering Cumulative Effects (1997). The report outlines 11 items for consideration in drafting a cumulative effects analysis (CEA) for a proposed action.

1. Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals.
2. Establish the geographic scope of the analysis.
3. Establish the timeframe for the analysis.
4. Identify the other actions affecting the resources, ecosystems, and human communities of concern.
5. Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stress.
6. Characterize the stresses affecting these resources, ecos6.341e`cosystems, and human communities are affected (Chapter 3); and

III. Which effects are important from a cumulative effects perspective (information revealed in this CEA)?

1. Establish the geographic scope of the analysis.

The immediate areas affected by this action and evaluated in this CEA are the federal waters of the U.S. Caribbean. These waters extend off Puerto Rico from 9 nautical miles (nm) to 200 nm and from 3 nm to 200 nm off the USVI. Managed resources, non-target species, habitat, and protected species present in federal waters of the U.S. Caribbean are also within this geographic scope. The immediate areas affecting humans would include the fishing communities of Puerto Rico and the USVI. These are discussed in Section 3.3. A detailed description of the geographic range for the species primarily affected by this proposed amendment can be found in section 3.2.1. The ranges of other protected species as described in Section 3.2.2 and the essential fish habitat described in Section 3.1.3.

3. Establish the timeframe for the analysis.

The timeframe for this CEA should take into account both historical efforts to manage resources in the U.S. Caribbean EEZ, as well as future considerations if this amendment and its subsequent regulations, approved and implemented by NMFS. The timeframe for the CEA begins with the implementation of the Spiny Lobster FMP in 1981 and extends through 2020, which is seven years after the completion of this environmental assessment.

The inception of the Council was in 1976 when the U.S. Congress passed the Magnuson-Stevens Fishery Conservation and Management Act. The first time a species was managed within the U.S. Caribbean EEZ was in 1981 via the Spiny Lobster FMP for Puerto Rico and the U.S. Virgin Islands (CFMC 1981). Appendix 5 describes the history of management regarding the different FMPs in the U.S. Caribbean federal waters.

The biological information in this amendment is updated until the last action concerning resources within the U.S. Caribbean EEZ, which was the Regulatory Amendment 2 to the Fishery Management Plan for the Queen Conch Resources of Puerto Rico and the U.S. Virgin Islands (USVI). This regulatory amendment implemented compatibility of trip and bag limits for queen conch between federal and state waters in the management area of St. Croix, USVI.

4. Identify the other actions affecting the resources, ecosystems, and human communities of concern.

The following are some past, present, and future actions that could impact the federally managed species. However, the proposed action is unlikely to have additional cumulative effects as discussed in Sections 4.1 and 4.2, given that the reorganization of current fisheries management measures into an island-based fishery, will not result in any immediate substantive changes to existing fisheries regulations.

a. Past

The reader is referred to Appendix 4 of this amendment, Management History, for past federal actions affecting the federally managed resources in the U.S. EEZ.

Physical Environment

The current FMPs in the U.S. Caribbean already prohibit the use of destructive fishing gears and methods such as explosives, chemicals, power assisted tools, powerheads, gill nets and trammel nets among others (50 CFR part 622). Furthermore, the Council completed in 2005 the description and identification of EFH, how to minimize adverse effects of fishing, and identified actions to conserve and enhance EFH and HAPC for each of the managed species. In 2011, the

Council and NMFS completed a review of the 2005 document, which is incorporated herein by reference (CFMC 2011c).

The Magnuson-Stevens Act requires the Council and NMFS to ensure that activities do not adversely affect, to the extent possible, EFH or HAPC for any managed species. By prohibiting destructive fishing methods and ensuring that activities do not adversely affect EFH and HAPC, the Council and NMFS will ensure that negative impacts on the physical environment from authorized fishing activities are negligible

Biological Environment

As described in Appendix 4, FMPs have been developed and implemented for the spiny lobster, reef fish, queen conch, and the corals and reef associated plants and invertebrates fisheries in the U.S. Caribbean EEZ. These FMPs establish data requirements for the fishermen to report their landings for managed fisheries. In addition, these FMPs establish conservation measures for these species (e.g., seasonal closures, bag limits, size limits). Stock assessments are conducted by NMFS' SEFSC for target species. In addition, fishing methods such as trawls and drift nets, which indiscriminately capture marine organisms, are prohibited in the U.S. Caribbean EEZ.

Protected Species

As discussed in Section 3.2.2, all fisheries managed under the existing FMPs have undergone reviews for their impacts on protected species. Biological Opinions are prepared by NMFS under Section 7 of the Endangered Species Act (ESA) to determine whether or not fisheries are likely to jeopardize the continued existence of any ESA-listed species. No fishery managed under the Council under the existing FMPs has been found likely to jeopardize the continued existence of any listed species, or likely to destroy or adversely modify critical habitat for protected species under NMFS' purview in the U.S. Caribbean.

Human Communities

Soon after the Magnuson-Stevens Act was promulgated in 1976, the Council began developing FMPs for fisheries of the U.S. Caribbean. Fishery management plans serve as mechanisms for the Council and NMFS to respond to fishery management issues. Before the FMPs, fishery participants were subject to little or no regulation, whereas through the FMPs and subsequent amendments, fishery participants have become subject to increasing regulation. Such regulations include, but are not limited to, reporting requirements, gear requirements, seasonal restrictions, and protected species mitigation measures.

The 1996 reauthorization of the Magnuson-Stevens Act required that the Council identify fishing communities under its jurisdiction. A fishing community, as defined by the Magnuson-Stevens Act, means "a community which is substantially dependent or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes

vessel owners, operators, and crew and Unites States fish processors that are based in such a community" (16 U.S.C. § 1802). The Council has identified the USVI and the island of Puerto Rico as fishing communities. The Magnuson-Stevens Act requires that the Council and Secretary of Commerce describe the likely effects, if any, of conservation and management measures on fishing communities when developing FMPs or FMP amendments (16 U.S.C. §1853). The impacts of Council/NMFS actions on fishery participants are often transferred to fishing communities. For example, establishing ACLs for managed species could have socio-economic effects on fishermen. Observable effects on fishing communities from the regulation of fishery participants depend on the number of fishery participants affected and to what degree they are affected. Fishery management measures implemented under the FMPs have impacted fishing participants and fishing communities on various levels. The Council and NMFS will continue to assess the impact of management actions on fishery participants and fishing communities, and where possible, minimize negative effects while developing appropriate measures for the conservation and management of fishery resources.

b. Present

There are efforts under way to establish a control rule to modify the buffer reduction that is applied to the OFL or other chosen reference point to derive an ACL in response to changes in the overfishing status of any U.S. Caribbean FMU. The control rule would apply a specific buffer reduction based on the current status of the FMU as determined by NMFS. In addition, the Council is working on establishing compatibility between the Abrir La Sierra Bank, Tourmaline Bank, and Bajo de Sico closed areas to ensure compliance and avoid confusion among constituents.

c. Reasonably Foreseeable Future

With the implementation of the new island-based FMPs, the Council and NMFS will still manage marine resources by controlling fishing, impacts (human activities), vessel usage, and specific gear types that may be used in the conduct of a particular fishery. Although potential impacts on the physical, biological, and administrative environments, as well as human communities and protected species exist under normal fishing vessel operations, events in the U.S. Caribbean region such as groundings, spilled fuel/oil, garbage and wastes, and habitat damage through anchoring, are rare. The implementation of the new island-based FMPs (**Alternatives 2**, **3 (Preferred)**, and **4**) will maintain regulations that prohibit destructive fishing practices and non-selective gear types.

The shift towards island-based fisheries management could include future actions that would consider the dynamic variability of each of the islands unique social, economic, and cultural environments and could include the use of physical or biological indicators to measure impacts of fishery management actions. As greater scientific information becomes available, future

management actions could also include expanding the lists of species to include food web linkages such as predator-prey relationships. In addition, the list of species could be augmented to include species targeted in the U.S. Caribbean EEZ but not currently under federal management (e.g., dolphin fish, wahoo). However, as more precise data becomes available, such as harvest location, the Council could consider removing from the FMPs species that are primarily harvested in state waters. However, the Council could also undertake the discussion of these actions under the current species-based FMPs if the island-based FMPs weren't developed. Further, any future impact is theoretical and speculative. While the reorganization of the FMPs based on geography will facilitate management more narrowly tailored to the geographic areas, all future impacts depend on the nature of the specific future management actions implemented under the reorganized FMPs.

Enforcement agencies (NOAA, U.S. Coast Guard) currently operate throughout the U.S Caribbean. The need for enforcement and management may decrease as participants voluntarily become more involved in fishery management. Additionally, the increased inclusion of local expertise and knowledge in the conservation of the marine resources could improve the success of the management of the fisheries. No substantive changes would occur to the regulations affecting the federal fisheries under any of the alternatives. However, managers and scientists would need to adapt to the island-based nature of the proposed island-based FMPs. Managers and scientists would be able to more rigorously consider fishery interactions as well as the impacts of non-fishery activities on the marine environment. Thus, the cumulative effects of a shift toward island-based fishery management on administration and enforcement are unknown, but are expected to be beneficial.

5. Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stress.

In terms of the biophysical environment, the resources/ecosystems identified in earlier steps of the CEA are the spiny lobster, reef fish, queen conch, and the corals and reef associated plants and invertebrates populations that are indirectly affected by the regulations. This step should identify the trends, existing conditions, and the ability to withstand stresses of the environmental components.

The species that would be directly impacted by the action proposed in this environmental assessment are all the federally managed species under Spiny Lobster FMP, Reef Fish FMP, Queen Conch FMP, and the Corals and Reef Associated Plants and Invertebrates FMPs. Information on the species most affected by this amendment is provided in Section 3.2 of this document. In addition the human communities' response to this action is included in Section 4.4.

6. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds.

This section examines whether resources, ecosystems, and human communities are approaching conditions where additional stresses could have an important cumulative effect beyond any current plan, regulatory, or sustainability threshold (CEQ 1997). Sustainability thresholds can be identified for some resources, which are levels of impact beyond which the resources cannot be sustained in a stable state. Other thresholds are established through numerical standards, qualitative standards, or management goals. The CEA should address whether thresholds could be exceeded because of the contribution of the proposed action to other cumulative activities affecting resources.

External factors potentially impacting the physical, biological, and administrative environments, as well as human communities and protected species in the U.S. Caribbean EEZ include, but are not limited to, land-based sources of pollution and runoff, harbor dredging, ocean dumping, shipping activities, marine debris including derelict fishing gear, research vessel activities, climate change, and other recreational and commercial maritime activities. All of these factors are part of the environmental background that affects fishery resources and fisheries that are continually considered by the Council in managing the fisheries of the region and will continue to be considered in the future, regardless of which alternative is selected for implementation.

In addition, current and future factors include high fuel costs, increased seafood imports, and restricted access to traditional fishing grounds. High fuel costs affect fishing participants in that it is simply increasingly expensive to go fishing. The effect is that fishery participants reduce fishing trips, switch to less fuel-intensive fisheries, or simply do not go fishing at all. The amount of imported seafood is also increasing, and the U.S. now imports nearly 91 percent of consumed seafood (Fish Watch U.S. Seafood Facts available at http://www.fishwatch.gov/farmed_seafood/outside_the_us.htm). Increased seafood imports are significant as it relates to market competition, where a glut of fish products can flood the market and lower ex-vessel prices. Once market channels are lost to imported seafood products it may also be hard for fishery participants to regain those channels (WPFMC 2009).

Regional economies also have the ability to affect fishery participants and communities. For example, the Hovensa St. Croix Petroleum Refinery Plant closure in 2012, which left more than 1,200 people without work, could increase the community dependence on the local fisheries as their main source of income and food (http://www.caribjournal.com/2012/08/12/usvi-seeks-to-reopen-hovensa-refinery-possibly-under-new-ownership/).

In addition, climate change can affect marine ecosystems through ocean warming by increased thermal stratification, reduced upwelling, sea level rise, 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, particularly organism that absorb calcium from surface waters, such as corals and crustaceans (IPCC 2007). The Council and NMFS will consider all these external factors and their impact when developing future fisheries regulations.

7. Define a baseline condition for the resources, ecosystems, and human communities.

The purpose of defining a baseline condition for the resource and ecosystems in the area of the proposed action is to establish a point of reference for evaluating the extent and significance of expected cumulative effects. A description of the physical and biological environment affected by this action is included in Sections 3.1 and 3.2. In addition, the status and health of EFH have been extensively described (CFMC 1998, 2004, 2011c). For further details on the history of management of spiny lobster, reef fish, queen conch, and the corals and reef associated plants and invertebrates resources, please see Appendix 4 of this environmental assessment.

8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities.

The action proposed in this environmental assessment is largely administrative in nature and will not change current fishing activities implicating effects on public health or safety. Therefore, it is not expected to have any direct effect on the identified resources, ecosystems, or human communities. In addition, no vessel would be forced to participate in the fishery under adverse weather or ocean conditions as a result of the imposition of management regulations proposed in this amendment. Therefore, no safety-at-sea issues would be created. Chapter 4 describes the effect of the proposed action and alternatives on the affected environment, including the physical, biological, socio-economic, and administrative environment.

9. Determine the magnitude and significance of cumulative effects.

The proposed management action, as summarized in Chapter 2 of this document, would shift management in the U.S. Caribbean from species-based to island-based FMPs. The proposed action is not dependent on, or related to, any other foreseeable actions that would impact the same affected environment. This action does not change current fishing activities or affect current fishing operations. If the Council moves forward with island-based fisheries management, potential effects on the physical, biological, social, economic, and administrative environment are speculative. As described in Chapter 4.1, the delineation of FMP boundaries (**Alternatives 2**, **3**, and **4**) would not have any direct effects on protected species, as FMP boundaries are simply geographic representations on maps.

As described in Chapter 4.1, if there are any cumulative effects on the physical, biological, social, economic, and administrative environment from developing island-based FMPs, they are anticipated to be positive in terms of improving fishery management to provide for sustainable fishing in the U.S. Caribbean EEZ. The development of island-based FMPs could potentially have long term positive effects on the physical, biological, social, economic, and administrative environment. None of the alternatives considered within the action would result in negative cumulative effects on the biological environment. Species-based or island-based FMPs will still allow managers to control fishery harvests, establish data collection programs, and evaluate stocks on an annual basis. The cumulative effects of implementing island-based FMPs, when added to the effect of exogenous factors, are not anticipated to result in adverse effects to the physical, biological, social, economic, and administrative environment. In fact, the contrary could potentially occur under the island-based alternatives, that is, potential positive cumulative effects for target and non-target species are expected due to the shift towards Place-based fisheries ecosystem management that enhances understanding and results in improved management of marine ecosystems.

In addition, the proposed action would not adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places. This action is not likely to result in direct, indirect, or cumulative effects to unique areas, such as significant scientific cultural, or historical resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas as the proposed action is not expected to substantially increase fishing effort or the spatial and/or temporal distribution of current fishing effort within the U.S. Caribbean region. The Buck Island Reef National Monument, Virgin Islands Coral Reef National Monument, and Virgin Islands National Park are within the boundaries of the U.S. Caribbean EEZ. The proposed actions are not likely to cause loss or destruction of these national marine parks because the actions are not expected to result in appreciable changes to current fishing practices.

10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects.

As discussed in this Chapter, the proposed action is unlikely to have additional cumulative effects. This action would also be expected to result in a reduction in the administrative costs of managing federal resources in the U.S. Caribbean EEZ (Section 4.5). Each island-based FMP could be amended as necessary to reflect events specific to that island or island group, with minimal impact to those U.S. Caribbean islands not included in that FMP. Because future actions would be specific to an individual island or island group and would more specifically reflect shared economic and cultural considerations, this new structure would allow the Council to better explain plan changes and regulations and would make it easier for constituents to understand those changes within the context of their culture and environment. A reduction in the

administrative costs is expected when tailoring management by island by avoiding redundancies. Because this action is largely administrative, avoidance, minimization, and mitigation are not applicable.

11. Monitor the cumulative effects of the selected alternative and adopt management.

The Council and NMFS will continue to monitor the cumulative impacts of any future regulations to the physical, biological, social, economic, and administrative environment if shifting to an island-based fishery management approach.

Chapter 5. List of Preparers

Table 5.1. List of island-based environmental assessment preparers.

Name	Agency	Title
Miguel A. Lugo	NMFS/SF	Fishery Biologist
Bill Arnold	NMFS/SF	Caribbean Branch Chief / Fishery Biologist
Graciela García-Moliner	CFMC	Fishery Biologist
Andrew Herndon	NMFS/PR	Fishery Biologist
Mara Levy	NOAA/GC	Attorney
Michael Jepson	NMFS/SF	Social Scientist
David Keys	NMFS	Regional NEPA Coordinator
Denise Johnson	NMFS/SF	Industry Economist
Karla Gore	NMFS/SF	Fishery Biologist
Shepherd Grimes	NOAA/GC	Attorney
Anik Clemens	NMFS/SF	Technical Writer Editor
Brent Stoffle	NMFS/SC	Social Scientist
Nick Farmer	NMFS/SF	Fishery Biologist
Lynn Rios	NOAA/OLE	Enforcement Officer
Jose A. Rivera	NMFS/HC	EFH Specialist
Nancie Cummings	NMFS/SC	Fishery Biologist
Britni Tokotch	NMFS/SF	Fishery Biologist
María del Mar López	NMFS/SF	Fishery Biologist

NMFS = National Marine Fisheries Service, CFMC = South Atlantic Fishery Management Council, SF = Sustainable Fisheries Division, PR = Protected Resources Division, SERO = Southeast Regional Office, HC = Habitat Conservation Division, GC = General Counsel

Chapter 6. List of Agencies and Persons Consulted

Responsible Agencies

Caribbean Fishery Management Council
270 Muñoz Rivera Ave., Suite 401
San Juan, Puerto Rico 00918-1903
(787) 766-5926 (telephone)
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http://www.caribbeanfmc.com/

NMFS, Southeast Region
263 13th Avenue South
St. Petersburg, Florida 33701
(727) 824-5301 (telephone)
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http://sero.nmfs.noaa.gov/

List of Agencies, Organizations, and Persons Consulted

Department of Commerce Office of General Counsel
National Marine Fisheries Service Office of General Counsel
National Marine Fisheries Service Office of General Counsel Southeast Region
National Marine Fisheries Service Southeast Regional Office
National Marine Fisheries Service Southeast Fisheries Science Center
National Marine Fisheries Service Silver Spring Office
National Marine Fisheries Service Office of Law Enforcement Southeast Division
NMFS Endangered Species Division
NMFS Domestic Fisheries Division
USVI Department of Planning and Natural Resources
Puerto Rico Department of Natural and Environmental Resources

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Chapter 8. Appendices

APPENDIX 1 – List of Species in the Spiny Lobster FMP, Reef Fish FMP, Queen Conch FMP, and the Corals and Reef Associated Plants and Invertebrates FMP.

List of Species Listed Fisheries of the Caribbean, Gulf, and South Atlantic, 50 CFR part 622

Appendix A to Part 622 –Caribbean Coral Reef Resources

I. Coelenterates--Phylum Coelenterata

A. Hydrocorals--Class Hydrozoa

1. Hydroids--Order Athecatae

Family Milleporidae

Millepora spp., Fire corals

Family Stylasteridae

Stylaster roseus, Rose lace corals

B. Anthozoans--Class Anthozoa

1. Soft corals--Order Alcyonacea

Family Anthothelidae

Erythropodium caribaeorum, Encrusting gorgonian

Iciligorgia schrammi, Deepwater sea fan

Family Briaridae

Briareum asbestinum, Corky sea finger

Family Clavulariidae

Carijoa riisei

Telesto spp.

2. Gorgonian corals--Order Gorgonacea

Family Ellisellidae

Ellisella spp., Sea whips

Family Gorgoniidae

Gorgonia flabellum, Venus sea fan

G. mariae, Wide-mesh sea fan

G. ventalina, Common sea fan

Pseudopterogorgia acerosa, Sea plume

P. albatrossae

P. americana, Slimy sea plume

P. bipinnata, Bipinnate plume

P. rigida

Pterogorgia anceps, Angular sea whip

P. citrina, Yellow sea whip

Family Plexauridae

Eunicea calyculata, Warty sea rod
E. clavigera
E. fusca, Doughnut sea rod
E. knighti
E. laciniata
E. laxispica
E. mammosa, Swollen-knob
E. succinea, Shelf-knob sea rod
E. touneforti
Muricea atlantica
M. elongata, Orange spiny rod
M. laxa, Delicate spiny rod
M. muricata, Spiny sea fan
M. pinnata, Long spine sea fan
Muriceopsis spp.
M. flavida, Rough sea plume
M. sulphurea
Plexaura flexuosa, Bent sea rod
P. homomalla, Black sea rod
Plexaurella dichotoma, Slit-pore sea rod
P. fusifera
P. grandiflora
P. grisea
P. nutans, Giant slit-pore
Pseudoplexaura crucis
P. flagellosa
P. porosa, Porous sea rod
P. wagenaari

3. Hard Corals--Order Scleractinia

Family Acroporidae
Acropora cervicornis, Staghorn coral
A. palmata, Elkhorn coral
A. prolifera, Fused staghorn

Family Agaricidae
Agaricia agaricities, Lettuce leaf coral
A. fragilis, Fragile saucer
A. lamarcki, Lamarck's sheet
A. tenuifolia, Thin leaf lettuce
Leptoseris cucullata, Sunray lettuce

Family Astrocoeniidae
Stephanocoenia michelinii, Blushing star

Family Caryophyllidae
Eusmilia fastigiata, Flower coral
Tubastrea aurea, Cup coral

Family Faviidae
Cladocora arbuscula, Tube coral

Colpophyllia natans, Boulder coral
Diploria clivosa, Knobby brain coral
D. labyrinthiformis, Grooved brain
D. strigosa, Symmetrical brain
Favia fragum, Golfball coral
Manicina areolata, Rose coral
M. mayori, Tortugas rose coral
Montastrea annularis, Boulder star coral
M. cavernosa, Great star coral
Solenastrea bournoni, Smooth star coral

Family Meandrinidae
Dendrogyra cylindrus, Pillar coral
Dichocoenia stellaris, Pancake star
D. stokesi, Elliptical star
Meandrina meandrites, Maze coral

Family Mussidae
Isophyllastrea rigida, Rough star coral
Isophyllia sinuosa, Sinuous cactus
Mussa angulosa, Large flower coral
Mycetophyllia aliciae, Thin fungus coral
M. danae, Fat fungus coral
M. ferox, Grooved fungus
M. lamarckiana, Fungus coral
Scolymia cubensis, Artichoke coral
S. lacera, Solitary disk

Family Oculinidae
Oculina diffusa, Ivory bush coral

Family Pocilloporidae
Madracis decactis, Ten-ray star coral
M. mirabilis, Yellow pencil

Family Poritidae
Porites astreoides, Mustard hill coral
P. branneri, Blue crust coral
P. divaricata, Small finger coral
P. porites, Finger coral

Family Rhizangiidae
Astrangia solitaria, Dwarf cup coral
Phyllangia americana, Hidden cup coral

Family Siderastreidae
Siderastrea radians, Lesser starlet
S. siderea, Massive starlet

4. Black Corals--Order Antipatharia

Antipathes spp., Bushy black coral
Stichopathes spp., Wire coral

Aquarium Trade Species in the Coral FMP–-The following species are included for data collection purposes only.

I. Sponges--Phylum Porifera

A. Demosponges--Class Demospongiae

Aphimedon compressa, Erect rope sponge
Chondrilla nucula, Chicken liver sponge
Cynachirella alloclada
Geodia neptuni, Potato sponge
Haliclona spp., Finger sponge
Myriastra spp.
Niphates digitalis, Pink vase sponge
N. erecta, Lavender rope sponge
Spinosella policifera
S. vaginalis
Tethya crypta

II. Coelenterates-–Phylum Coelenterata

A. Anthozoans–-Class Anthozoa

1. Anemones--Order Actiniaria

Aiptasia tagetes, Pale anemone
Bartholomea annulata, Corkscrew anemone
Condylactis gigantea, Giant pink-tipped anemone
Hereractis lucida, Knobby anemone
Lebrunia spp., Staghorn anemone
Stichodactyla helianthus, Sun anemone

2. Colonial Anemones--Order Zoanthidea

Zoanthus spp., Sea mat

3. False Corals--Order Corallimorpharia

Discosoma spp. (formerly Rhodactis), False coral
Ricordia florida, Florida false coral

III. Annelid Worms--Phylum Annelida

A. Polychaetes--Class Polychaeta

Family Sabellidae, Feather duster worms
Sabellastarte spp., Tube worms
S. magnifica, Magnificent duster
Family Serpulidae
Spirobranchus giganteus, Christmas tree worm

IV. Mollusks--Phylum Mollusca

A. Gastropods--Class Gastropoda

Family Elysiidae
Tridachia crispata, Lettuce sea slug
Family Olividae
Oliva reticularis, Netted olive
Family Ovulidae

Cyphoma gibbosum, Flamingo tongue

B. Bivalves--Class Bivalvia

Family Limidae

Lima spp., Fileclams

L. scabra, Rough fileclam

Family Spondylidae

Spondylus americanus, Atlantic thorny oyster

C. Cephalopods--Class Cephalopoda

1. Octopuses--Order Octopoda

Family Octopodidae

Octopus spp. (except the Common octopus, O. vulgaris)

V. Arthropods--Phylum Arthropoda

A. Crustaceans--Subphylum Crustacea

1. Decapods--Order Decapoda

Family Alpheidae

Alpheaus armatus, Snapping shrimp

Family Diogenidae

Paguristes spp., Hermit crabs

P. cadenati, Red reef hermit

Family Grapsidae

Percnon gibbesi, Nimble spray crab

Family Hippolytidae

Lysmata spp., Peppermint shrimp

Thor amboinensis, Anemone shrimp

Family Majidae, Coral crabs

Mithrax spp., Clinging crabs

M. cinctimanus, Banded clinging

M. sculptus, Green clinging

Stenorhynchus seticornis, Yellowline arrow

Family Palaemonida

Periclimenes spp., Cleaner shrimp

Family Squillidae, Mantis crabs

Gonodactylus spp.

Lysiosquilla spp.

Family Stenopodidae, Coral shrimp

Stenopus hispidus, Banded shrimp

S. scutellatus, Golden shrimp

VI. Echinoderms--Phylum Echinodermata

A. Feather stars--Class Crinoidea

Analcidometra armata, Swimming crinoid

Davidaster spp., Crinoids

Nemaster spp., Crinoids

B. Sea stars--Class Asteroidea

Astropecten spp., Sand stars

Linckia guildingii, Common comet star
Ophidiaster guildingii, Comet star
Oreaster reticulatus, Cushion sea star

C. Brittle and basket stars--Class Ophiuroidea

Astrophyton muricatum, Giant basket star
Ophiocoma spp., Brittlestars
Ophioderma spp., Brittlestars
O. rubicundum, Ruby brittlestar

D. Sea Urchins--Class Echinoidea

Diadema antillarum, Long-spined urchin
Echinometra spp., Purple urchin
Eucidaris tribuloides, Pencil urchin
*Lytechinu*s spp., Pin cushion urchin
Tripneustes ventricosus, Sea egg

E. Sea Cucumbers--Class Holothuroidea

Holothuria spp., Sea cucumbers

VII. Chordates--Phylum Chordata

A. Tunicates--Subphylum Urochordata

Appendix A to Part 622--Caribbean Reef Fish

Lutjanidae--Snappers

Unit 1

Black snapper, *Apsilus dentatus*
Blackfin snapper, *Lutjanus buccanella*
Silk snapper, *Lutjanus vivanus*
Vermilion snapper, *Rhomboplites aurorubens*
Wenchman, *Pristipomoides aquilonaris*

Unit 2

Cardinal, *Pristipomoides macrophthalmus*
Queen snapper, *Etelis oculatus*

Unit 3

Gray snapper, *Lutjanus griseus*
Lane snapper, *Lutjanus synagris*
Mutton snapper, *Lutjanus analis*
Dog snapper, *Lutjanus jocu*
Schoolmaster, *Lutjanus apodus*
Mahogany snapper, *Lutjanus mahogani*

Unit 4

Yellowtail snapper, *Ocyurus chrysurus*

Serranidae--Sea basses and Groupers

Unit 1

Nassau Grouper, *Epinephelus striatus*

Unit 2

Goliath grouper, *Epinephelus itajara*

Unit 3

Coney, *Epinephelus fulvus*
Graysby, *Epinephelus cruentatus*
Red hind, *Epinephelus guttatus*
Rock hind, *Epinephelus adscensionis*

Unit 4

Black grouper, *Mycteroperca bonaci*
Red grouper, *Epinephelus morio*
Tiger grouper, *Mycteroperca tigris*
Yellowfin grouper, *Mycteroperca venenosa*

Unit 5

Misty grouper, *Epinephelus mystacinus*
Yellowedge grouper, *Epinephelus flavolimbatus*

Haemulidae--Grunts

White grunt, *Haemulon plumieri*
Margate, *Haemulon album*
Tomtate, *Haemulon aurolineatum*
Bluestriped grunt, *Haemulon sciurus*
French grunt, *Haemulon flavolineatum*

Porkfish, *Anisotremus virginicus*

Mullidae--Goatfishes

Spotted goatfish, *Pseudupeneus maculatus*
Yellow goatfish, *Mulloidichthys martinicus*

Sparidae--Porgies

Jolthead porgy, *Calamus bajonado*
Sea bream, *Archosargus rhomboidalis*
Sheepshead porgy, *Calamus penna*
Pluma, *Calamus pennatula*

Holocentridae--Squirrelfishes

Blackbar soldierfish, *Myripristis jacobus*
Bigeye, *Priacanthus arenatus*
Longspine squirrelfish, *Holocentrus rufus*
Squirrelfish, *Holocentrus adscensionis*

Malacanthidae--Tilefishes

Blackline tilefish, *Caulolatilus cyanops*
Sand tilefish, *Malacanthus plumieri*

Carangidae--Jacks

Blue runner, *Caranx crysos*
Horse-eye jack, *Caranx latus*
Black jack, *Caranx lugubris*
Almaco jack, *Seriola rivoliana*
Bar jack, *Caranx ruber*
Greater amberjack, *Seriola dumerili*
Yellow jack, *Caranx bartholomaei*

Scaridae--Parrotfishes

Blue parrotfish, *Scarus coeruleus*
Midnight parrotfish, *Scarus coelestinus*
Princess parrotfish, *Scarus taeniopterus*
Queen parrotfish, *Scarus vetula*
Rainbow parrotfish, *Scarus guacamaia*
Redfin parrotfish, *Sparisoma rubripinne*
Redtail parrotfish, *Sparisoma chrysopterum*
Stoplight parrotfish, *Sparisoma viride*
Redband parrotfish, *Sparisoma aurofrenatum*
Striped parrotfish, *Scarus croicensis*

Acanthuridae--Surgeonfishes

Blue tang, *Acanthurus coeruleus*
Ocean surgeonfish, *Acanthurus bahianus*
Doctorfish, *Acanthurus chirurgus*

Balistidae–-Triggerfishes

Ocean triggerfish, *Canthidermis sufflamen*
Queen triggerfish, *Balistes vetula*
Sargassum triggerfish, *Xanthichthys rigens*

Monacanthidae-–Filefishes

Scrawled filefish, *Aluterus scriptus*
Whitespotted filefish, *Cantherhines macrocerus*
Black durgon, *Melichthys niger*

Ostraciidae--Boxfishes

Honeycomb cowfish, *Lactophrys polygonia*
Scrawled cowfish, *Lactophrys quadricornis*
Trunkfish, *Lactophrys trigonus*
Spotted trunkfish, *Lactophrys bicaudalis*
Smooth trunkfish, *Lactophrys triqueter*

Labridae--Wrasses

Hogfish, *Lachnolaimus maximus*
Puddingwife, *Halichoeres radiatus*
Spanish hogfish, *Bodianus rufus*

Pomacanthidae--Angelfishes

Queen angelfish, *Holacanthus ciliaris*
Gray angelfish, *Pomacanthus arcuatus*
French angelfish, *Pomacanthus paru*

Aquarium Trade-–The following aquarium trade species are included for data collection purposes only:

Frogfish, *Antennarius spp*.
Flamefish, *Apogon maculatus*
Conchfish, *Astrapogen stellatus*
Redlip blenny, *Ophioblennius atlanticus*
Peacock flounder, *Bothus lunatus*
Longsnout butterflyfish, *Chaetodon aculeatus*
Foureye butterflyfish, *Chaetodon capistratus*
Spotfin butterflyfish, *Chaetodon ocellatus*
Banded butterflyfish, *Chaetodon striatus*
Redspotted hawkfish, *Amblycirrhitus pinos*
Flying gurnard, *Dactylopterus volitans*
Atlantic spadefish, *Chaetodipterus faber*
Neon goby, *Gobiosoma oceanops*
Rusty goby, *Priolepis hipoliti*
Royal gramma, *Gramma loreto*
Creole wrasse, *Clepticus parrae*
Yellowcheek wrasse, *Halichoeres cyanocephalus*
Yellowhead wrasse, *Halichoeres garnoti*
Clown wrasse, *Halichoeres maculipinna*
Pearly razorfish, *Hemipteronotus novacula*
Green razorfish, *Hemipteronotus splendens*
Bluehead wrasse, *Thalassoma bifasciatum*
Chain moray, *Echidna catenata*
Green moray, *Gymnothorax funebris*
Goldentail moray, *Gymnothorax miliaris*

Batfish, *Ogcocepahalus spp.*
Goldspotted eel, *Myrichthys ocellatus*
Yellowhead jawfish, *Opistognathus aurifrons*
Dusky jawfish, *Opistognathus whitehursti*
Cherubfish, *Centropyge argi*
Rock beauty, *Holacanthus tricolor*
Sergeant major, *Abudefduf saxatilis*
Blue chromis, *Chromis cyanea*
Sunshinefish, *Chromis insolata*
Yellowtail damselfish, *Microspathodon chrysurus*
Dusky damselfish, *Pomacentrus fuscus*
Beaugregory, *Pomacentrus leucostictus*
Bicolor damselfish, *Pomacentrus partitus*
Threespot damselfish, *Pomacentrus planifrons*
Glasseye snapper, *Priacanthus cruentatus*
High-hat, *Equetus acuminatus*
Jackknife-fish, *Equetus lanceolatus*
Spotted drum, *Equetus punctatus*
Scorpaenidae--Scorpionfishes
Butter hamlet, *Hypoplectrus unicolor*
Swissguard basslet, *Liopropoma rubre*
Greater soapfish, *Rypticus saponaceus*
Orangeback bass, *Serranus annularis*
Lantern bass, *Serranus baldwini*
Tobaccofish, *Serranus tabacarius*
Harlequin bass, *Serranus tigrinus*
Chalk bass, *Serranus tortugarum*
Caribbean tonguefish, *Symphurus arawak*
Seahorses, *Hippocampus spp.*
Pipefishes, *Syngnathus spp*.
Sand diver, *Synodus intermedius*
Sharpnose puffer, *Canthigaster rostrata*
Porcupinefish, *Diodon hystrix*

Appendix A to Part 622--Caribbean Conch Resources

Queen conch, *Strombus gigas*

Spiny Lobster Fishery of the Gulf of Mexico and South Atlantic, 50 CFR part 640

Panulirus argus, Caribbean spiny lobster

APPENDIX 2 – Scoping Meetings Summaries

The scoping hearings for island specific management were held from 8 p.m. to 10 p.m.

Puerto Rico Scoping Hearings Dates and Locations:

- July 23, 2012, at the Double Tree by Hilton San Juan, 105 De Diego Avenue, San Juan, Puerto Rico 00914.

- July 24, 2012, at the Asociacion de Pescadores, Villa Pesquera Playa Hucar, 66.7 Km Highway 3 Naguabo, Puerto Rico 00718.

- July 25, 2012, at the Holiday Inn Mayaguez, 2701 Highway #2, Mayaguez, Puerto Rico 00680.

- July 26, 2012, at the Ponce Holiday Inn, 3315 Ponce by Pass, Ponce, Puerto Rico 00731.

There were no participants in the San Juan and Mayaguez scoping hearings. There were two attendees in Ponce. There were 21 people that attended the meeting in Naguabo and only one made a deposition.

USVI Scoping Hearings Dates and Locations:

- July 24, 2012, at the Windward Passage Hotel, Veterans Drive, Charlotte Amalie, St. Thomas, U.S. Virgin Islands 00804.

- July 25, 2012, at the Buccaneer Hotel, 5007 Estate Shoys, Christiansted, St. Croix, U.S. Virgin Islands 00820.

In St. Thomas, there were eight people present, three who made a deposition. In addition, there was representation from the St. Thomas Fishermen's Association and there was one written statement submitted to the Caribbean Fishery Management Council. In St. Croix, there were eleven people present and two depositions.

APPENDIX 3 – Other Applicable Laws

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (16 U.S.C. 1801 et seq.) provides the authority for U.S. fishery management. However, fishery management decision-making is also affected by a number of other federal statutes designed to protect the biological and human components of U.S. fisheries, as well as the ecosystems within which those fisheries are conducted. Major laws affecting federal fishery management decision making are summarized below.

Administrative Procedures Act

All federal rulemaking is governed under the provisions of the Administrative Procedure Act (APA) (5 U.S.C. Subchapter II), which establishes a "notice and comment" procedure to enable public participation in the rulemaking process. Under the APA, NOAA's National Marine Fisheries Service (NMFS) is required to publish notification of proposed rules in the *Federal Register* and to solicit, consider and respond to public comment on those rules before they are finalized. The APA also establishes a 30-day wait period from the time a final rule is published until it takes effect.

The action evaluated in this environmental assessment will not result in the development of a proposed rule.

Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. 1451 et seq.) encourages state and federal cooperation in the development of plans that manage the use of natural coastal habitats, as well as the fish and wildlife those habitats support. When proposing an action determined to directly affect coastal resources managed under an approved coastal zone management program, NMFS is required to provide the relevant state agency with a determination that the proposed action is consistent with the enforceable policies of the approved program to the maximum extent practicable at least 90 days before taking final action. The Caribbean Fishery Management Council (Council) and NMFS determined that this action is consistent to the maximum extent practicable with the enforcement policies of the approved coastal management programs of Puerto Rico and the U.S. Virgin Islands (USVI).

Data Quality Act

The Data Quality Act (Public Law 106-443), which took effect October 1, 2002, requires the government for the first time to set standards for the quality of scientific information and statistics used and disseminated by federal agencies. Information includes any communication or representation of knowledge such as facts or data, in any medium or form, including textual,

numerical, cartographic, narrative, or audiovisual forms (includes web dissemination, but not hyperlinks to information that others disseminate; does not include clearly stated opinions). Specifically, the Act directs the Office of Management and Budget (OMB) to issue government wide guidelines that "provide policy and procedural guidance to federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information disseminated by federal agencies." Such guidelines have been issued, directing all federal agencies to create and issue agency-specific standards to 1) ensure information quality and develop a pre-dissemination review process; 2) establish administrative mechanisms allowing affected persons to seek and obtain correction of information; and 3) report periodically to OMB on the number and nature of complaints received.

Scientific information and data are key components of Fishery Management Plans (FMPs) and amendments and the use of best available information is the second national standard under the Magnuson-Stevens Act. To be consistent with the Act, FMPs and amendments must be based on the best information available, properly reference all supporting materials and data, and should be reviewed by technically competent individuals. With respect to original data generated for FMPs and amendments, it is important to ensure that the data are collected according to documented procedures or in a manner that reflects standard practices accepted by the relevant scientific and technical communities. Data must also undergo quality control prior to being used by the agency.

Endangered Species Act

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

NMFS has completed ESA Section 7 consultations on the continued authorization of the Queen Conch, Spiny Lobster, Corals and Reef Associated Plants and Invertebrate, and Reef Fish fisheries under their respective FMPs. In 2011, NMFS completed separate biological opinions evaluating the impacts of the continue authorization of the reef fish (NMFS 2011a) and spiny

lobster fisheries (NMFS 2011b) on ESA-listed species. The reef fish biological opinion stated the fishery was not likely to adversely affect loggerhead sea turtles, sea turtle critical habitat, or marine mammals (see NMFS 2011a for discussion on these species and entities). However, the opinion did state that the reef fish fishery would adversely affect green, hawksbill, and leatherback sea turtles and *Acropora* coral but would not jeopardize their continued existence. The opinion also stated the reef fish fishery would adversely affect *Acropora* critical habitat but would not destroy or adversely modify it. An incidental take statement was issued for green, hawksbill, and leatherback sea turtles, as well as *Acropora* corals. Reasonable and prudent measures to minimize the impact of these incidental takes were specified, along with terms and conditions to implement them.

The spiny lobster biological opinion stated the fishery was not likely to adversely affect elkhorn coral, loggerhead sea turtles, sea turtle critical habitat, or marine mammals (see NMFS 2011b for discussion on these species and entities). However, the opinion did state that the spiny lobster fishery would adversely affect green, hawksbill, and leatherback sea turtles and staghorn coral but would not jeopardize their continued existence. The opinion also stated the spiny lobster fishery would adversely affect *Acropora* critical habitat but would not destroy or adversely modify it. An incidental take statement was issued for green, hawksbill, and leatherback sea turtles, as well as staghorn coral. Reasonable and prudent measures to minimize the impact of these incidental takes were specified, along with terms and conditions to implement them.

NMFS met the ESA Section 7 consultation requirements to evaluate the potential impacts to listed species from the continued authorization of the Corals and Reef Associated Plants and Invertebrate fisheries via informal consultations. In a consultation memorandum dated February 8, 2013, NMFS concurred with the determination that the continued authorization of the fishery was not likely to adversely affect any listed species or critical habitat. That determination was based primarily on the fact that the vast majority of the fishery does not operate in federal waters and because the fishery is highly selective and fishers can easily avoid listed species. The memorandum also concurred with the determination that the essential feature of *Acropora* critical habitat (i.e., consolidated hardbottom or dead coral skeleton that is free from fleshy macroalgae cover and sediment cover, occurring in water depths from the mean high water line to 30 meters (98 feet)), was not likely to be adversely affected by the continued authorization of fishery. The memorandum agreed with the determination that coral reef fishers would not cause consolidated hardbottom to become unconsolidated and would not cause the growth of macroalgae or sedimentation; therefore, any adverse were unlikely to occur and are discountable.

NMFS completed an informal consultation on the continued authorization of the queen conch fishery on November 18, 2010. The memorandum concurred that the previous not likely to adversely affect determinations for sea turtles and marine mammals in 2005 biological opinion

on all Caribbean fisheries remained valid (NMFS 2005). The memorandum also determined the fishery was not likely to adversely affect *Acropora* or their critical habitat. It stated 1) the queen conch fishery in the EEZ is very small; 2) queen conch are most common in seagrass areas where *Acropora* do not occur and *Acropora* critical habitat is not designated; and 3) the hand harvest of queen conch is highly selective. For these reasons the memorandum determined that any adverse effects to *Acropora* and their critical habitat from the collection of queen conch were extremely unlikely to occur and discountable. However, in a June 14, 2013, memorandum, NMFS reevaluated information regarding the occurrence of queen conch on hardbottom habitat and their potential role in mediating macroalgae growth on *Acropora* critical habitat. The memorandum determined that queen conch densities are low in the U.S. Caribbean; they prefer habitats that are not *Acropora* critical habitat; and prefer to eat the non-"fleshy macroalgae", which is a significant threat to *Acropora* critical habitat. The memorandum concluded that because of these factors the harvest of queen conch will have an insignificant effect on *Acropora* critical habitat and request concurrence with that determination. NMFS is currently reviewing this determination and anticipates completion of the consultation prior to the publication of the final rule.

National Marine Sanctuaries Act

Under the National Marine Sanctuaries Act (NMSA) (also known as Title III of the Marine Protection, Research and Sanctuaries Act of 1972), as amended, the Secretary of Commerce is authorized to designate National Marine Sanctuaries to protect distinctive natural and cultural resources whose protection and beneficial use requires comprehensive planning and management. The National Marine Sanctuaries are administered by NOAA's National Ocean Service. NMSA provides authority for comprehensive and coordinated conservation and management of these marine areas. The National Marine Sanctuary System currently comprises 13 sanctuaries around the country, including sites in American Samoa and Hawaii. These sites include significant coral reef and kelp forest habitats, and breeding and feeding grounds of whales, sea lions, sharks, and sea turtles. A complete listing of the current sanctuaries and information about their location, size, characteristics, and affected fisheries can be found at: http://sanctuaries.noaa.gov/

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (Act) protects the quality of the aquatic environment needed for fish and wildlife resources. The Act requires consultation with the Fish and Wildlife Service (FWS) and the fish and wildlife agencies of States where the "waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted . . . or otherwise controlled or modified" by any agency (except Tennessee Valley Authority) under a federal permit or license. NMFS was brought into the process later, as these

responsibilities were carried over, during the reorganization process that created NOAA. Consultation is to be undertaken for the purpose of "preventing loss of and damage to wildlife resources", and to ensure that the environmental value of a body of water or wetland is taken into account in the decision-making process during permit application reviews. Consultation is most often (but not exclusively) initiated when water resource agencies send the FWS or NMFS a public notice of a Section 404 permit. FWS or NMFS may file comments on the permit stating concerns about the negative impact the activity will have on the environment, and suggest measures to reduce the impact.

Executive Orders

E.O. 12114: Environmental Effects Abroad of Major Federal Actions

The purpose of this Executive Order is to enable responsible officials of federal agencies having ultimate responsibility for authorizing and approving actions encompassed by this Order to be informed of pertinent environmental considerations and to take such considerations into account, with other pertinent considerations of national policy, in making decisions regarding such actions. While based on independent authority, this Order furthers the purpose of the National Environmental Policy Act (NEPA), Marine Protection Research and Sanctuaries Act, and Deepwater Port Act consistent with the foreign policy and national security policy of the United States, and represents the United States government's exclusive and complete determination of the procedural and other actions to be taken by federal agencies to further the purpose of NEPA, with respect to the environment outside the United States, its territories, and possessions.

Agencies in their procedures shall establish procedures by which their officers having ultimate responsibility for authority and approving actions in one of the following categories encompassed by this Order, take into consideration in making decisions concerning such actions, a document described in Section 2-4(a):

(1) major federal actions significantly affecting the environment of the global commons outside the jurisdiction of any nation (e.g., the oceans or Antarctica);
(2) major federal actions significantly affecting the environment of a foreign nation not participating with the United States and not otherwise involved in the action;
(3) major federal actions significantly affecting the environment of a foreign nation, which provide to that nation:
    (a) a product, or physical project producing a principal product or an emission or effluent, which is prohibited or strictly regulated by federal law in the United States because its toxic effects on the environment create a serious public health risk; or
    (b) a physical project, which in the United States is prohibited or strictly regulated by federal law to protect the environment against radioactive substances.

(4) major federal actions outside the United States, its territories and possessions that significantly affect natural or ecological resources of global importance designated for protection under this subsection by the President, or, in the case of such a resource protected by international agreement binding on the United States, by the Secretary of State. Recommendations to the President under this subsection shall be accompanied by the views of the Council on Environmental Quality and the Secretary of State.

E.O. 12866: Regulatory Planning and Review

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

There are no regulatory actions or amendment to existing fishery management plans as a result of this action. The development of an RIR is not triggered by this action.

E.O. 12630: Takings

The Executive Order on Government Actions and Interference with Constitutionally Protected Property Rights, which became effective March 18, 1988, requires that each federal agency prepare a Takings Implication Assessment for any of its administrative, regulatory, and legislative policies and actions that affect, or may affect, the use of any real or personal property. Clearance of a regulatory action must include a takings statement and, if appropriate, a Takings Implication Assessment.

E.O. 13089: Coral Reef Protection

The Executive Order on Coral Reef Protection (June 11, 1998) requires federal agencies whose actions may affect U.S. coral reef ecosystems to identify those actions, utilize their programs and authorities to protect and enhance the conditions of such ecosystems; and, to the extent permitted

by law, ensure that actions they authorize, fund or carry out not degrade the condition of that ecosystem. By definition, a U.S. coral reef ecosystem means those species, habitats, and other national resources associated with coral reefs in all maritime areas and zones subject to the jurisdiction or control of the United States (e.g., federal, state, territorial, or commonwealth waters).

E.O. 13112: Invasive Species

The Executive Order requires agencies to use authorities to prevent introduction of invasive species, respond to and control invasions in a cost effective and environmentally sound manner, and to provide for restoration of native species and habitat conditions in ecosystems that have been invaded. Further, agencies shall not authorize, fund, or carry out actions that are likely to cause or promote the introduction or spread of invasive species in the U.S. or elsewhere unless a determination is made that the benefits of such actions clearly outweigh the potential harm; and that all feasible and prudent measures to minimize the risk of harm will be taken in conjunction with the actions. The actions undertaken in this amendment will not introduce, authorize, fund, or carry out actions that are likely to cause or promote the introduction or spread of invasive species in the U.S. or elsewhere.

E.O. 13132: Federalism

The Executive Order on federalism requires agencies in formulating and implementing policies that have federalism implications, to be guided by the fundamental federalism principles. The Order serves to guarantee the division of governmental responsibilities between the national government and the states that was intended by the framers of the Constitution. Federalism is rooted in the belief that issues that are not national in scope or significance are most appropriately addressed by the level of government closest to the people. This Order is relevant to FMPs and amendment given the overlapping authorities of NMFS, the states, and local authorities in managing coastal resources, including fisheries, and the need for a clear definition of responsibilities. It is important to recognize those components of the ecosystem over which fishery managers have no direct control and to develop strategies to address them in conjunction with appropriate state, tribes and local entities.

E.O. 13158: Marine Protected Areas

Executive Order 13158 (May 26, 2000) requires federal agencies to consider whether their proposed action(s) will affect any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural or cultural resource within the protected area.

E.O. 12898: Environmental Justice

This Executive Order mandates that each federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions. Federal agency responsibilities under this Executive Order include conducting their programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons from participation in, denying persons the benefit of, or subjecting persons to discrimination under, such, programs policies, and activities, because of their race, color, or national origin. Furthermore, each federal agency responsibility set forth under this Executive Order shall apply equally to Native American programs.

Specifically, federal agencies shall, to the maximum extent practicable; conduct human health and environmental research and analysis; collect human health and environmental data; collect, maintain and analyze information on the consumption patterns of those who principally rely on fish and/or wildlife for subsistence; allow for public participation and access to information relating to the incorporation of environmental justice principals in federal agency programs or policies; and share information and eliminate unnecessary duplication of efforts through the use of existing data systems and cooperative agreements among federal agencies and with State, local, and tribal governments.

Marine Mammal Protection Act

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

In 1994, Congress amended the MMPA, to govern the taking of marine mammals incidental to commercial fishing operations. This amendment required the preparation of stock assessments for all marine mammal stocks in waters under U.S. jurisdiction; development and

implementation of take-reduction plans for stocks that may be reduced or are being maintained below their optimum sustainable population levels due to interactions with commercial fisheries; and studies of pinniped-fishery interactions. The MMPA requires a commercial fishery to be placed in one of three categories, based on the relative frequency of incidental serious injuries and mortalities of marine mammals. Category I designates fisheries with frequent serious injuries and mortalities incidental to commercial fishing; Category II designates fisheries with occasional serious injuries and mortalities; Category III designates fisheries with a remote likelihood or no known serious injuries or mortalities.

Under the MMPA, to legally fish in a Category I and/or II fishery, a fisherman must take certain steps. For example, owners of vessels or gear engaging in a Category I or II fishery, are required to obtain a marine mammal authorization by registering with the Marine Mammal Authorization Program (50 CFR 229.4). They are also required to accommodate an observer if requested (50 CFR 229.7(c)) and they must comply with any applicable take reduction plans. All of the Caribbean fisheries (reef fish, spiny lobster, queen conch, and corals and reef associated plants and invertebrate fisheries) are listed as a Category III fishery in the 2012 List of Fisheries because there have been no documented interactions between these gear and marine mammals (76 FR 73912, November 29, 2011).

Paperwork Reduction Act

The Paperwork Reduction Act (PRA) of 1995 (44 U.S.C. 3501 et seq.) regulates the collection of public information by federal agencies to ensure that the public is not overburdened with information requests, that the federal government's information collection procedures are efficient, and that federal agencies adhere to appropriate rules governing the confidentiality of such information. The PRA requires NMFS to obtain approval from OMB before requesting most types of fishery information from the public. This action contains no new collections of information.

Small Business Act

The Small Business Act of 1953, as amended, Section 8(a), 15 U.S.C. 634(b)(6), 636(j), 637(a) and (d); Public Laws 95-507 and 99-661, Section 1207; and Public Laws 100-656 and 101-37 are administered by the Small Business Administration (SBA). The objectives of the act are to foster business ownership by individuals who are both socially and economically disadvantaged; and to promote the competitive viability of such firms by providing business development assistance including, but not limited to, management and technical assistance, access to capital and other forms of financial assistance, business training and counseling, and access to sole source and limited competition federal contract opportunities, to help the firms to achieve competitive viability. Because most businesses associated with fishing are considered small

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

Magnuson-Stevens Act Essential Fish Habitat Provisions

The Magnuson-Stevens Act includes essential fish habitat (EFH) requirements, and as such, each existing, and any new, FMPs must describe and identify EFH for the fishery, minimize to the extent practicable adverse effects on that EFH caused by fishing, and identify other actions to encourage the conservation and enhancement of that EFH. The Council and NMFS have determined there are no adverse effects to EFH in this amendment as discussed in the Environmental Consequences section (Chapter 4.0).

Regulatory Flexibility Act

The purpose of the RFA (1980, 5 U.S.C. 601 et seq.) is to ensure that federal agencies consider the economic impact of their regulatory proposals on small entities, analyze effective alternatives that minimize the economic impacts on small entities, and make their analyses available for public comment. The RFA does not seek preferential treatment for small entities, require agencies to adopt regulations that impose the least burden on small entities, or mandate exemptions for small entities. Rather, it requires agencies to examine public policy issues using an analytical process that identifies, among other things, barriers to small business competitiveness and seeks a level playing field for small entities, not an unfair advantage.

After an agency determines that the RFA applies, it must decide whether to conduct a full regulatory flexibility analysis or to certify that the proposed rule will not "have a significant economic impact on a substantial number of small entities. In order to make this determination, the agency conducts a threshold analysis, which has the following 5 parts: 1) Description of small entities regulated by proposed action, which includes the SBA size standard(s), or those approved by the Office of Advocacy, for purposes of the analysis and size variations among these small entities; 2) Descriptions and estimates of the economic impacts of compliance requirements on the small entities, which include reporting and recordkeeping burdens and variations of impacts among size groupings of small entities; 3) Criteria used to determine if the economic impact is significant or not; 4) Criteria used to determine if the number of small entities that experience a significant economic impact is substantial or not; and 5) Descriptions of assumptions and uncertainties, including data used in the analysis. If the threshold analysis indicates that there will not be a significant economic impact on a substantial number of small entities, the agency can so certify.

There are no regulatory actions or amendment to existing fishery management plans as a result of this action. NMFS will not develop a RFA for this action. The economic impacts of this action are described in Chapter 4.

Omnibus Public Land Management Act

The Omnibus Public Land Management Act of 2009 (Public Law 111–11, H.R. 146) contains over 150 separate bills covering land protection and other related initiatives in almost every state, and provides significant habitat conservation for many priority bird species. The bill designated over two million acres of wilderness in nine states, enlarged fifteen National Parks, created one new National Monument, ten new National Heritage Areas, three new National Conservation Areas, and four new National Trails, and designated more than 1,000 miles of National Wild and Scenic River. The bill also makes permanent the National Landscape Conservation System, comprising 26 million acres of lands and waters with high conservation and recreation values administered by the Bureau of Land Management.

The fisheries of the U.S. Caribbean, and the management regime governing those fisheries, are not likely to affect areas considered by the Omnibus Public Land Management Act, because the exclusive economic zone is from the state water boundary (9 nm in off Puerto Rico, 3 nm off the USVI) to 200 nm from shore. Thus, the aquatic regime addressed here is spatially separated from the terrestrial regimes covered by the Omnibus Public Land Management Act.

Prime Farmlands Protection and Policy Act

The Prime Farmlands Protection and Policy Act of 1981 (7 U.S.C. 4201) was enacted to minimize the loss of prime farmland and unique farmlands, as a result of Federal actions, by converting these lands to nonagricultural uses. It assures that federal programs are compatible with state and local government policies, and with private programs and policies, designed to protect farmland.

The fishery management actions in the U.S. Caribbean are not likely to affect farmlands, because the EEZ is from the state water boundary extending to 200 nm from shore as described above.

North American Wetlands Conservation Act

The North American Wetlands Conservation Act of 1989 (Public Law 101-233) established a wetlands habitat program, administered by the FWS, to protect and manage wetland habitats for migratory birds and other wetland wildlife in the United States, Mexico, and Canada.

The fishery management actions in the U.S. Caribbean are not likely to affect farmlands, because the EEZ is from the state water boundary extending to 200 nm from shore as described above.

National Historic Preservation Act

The National Historic Preservation Act (NHPA) of 1966, (Public Law 89-665; 16 U.S.C. 470 *et seq.*) is intended to preserve historical and archaeological sites in the United States. Section 106 of the NHPA requires federal agencies to evaluate the impact of all federally funded or permitted projects for sites listed on, or eligible for listing on, the National Register of Historic Places, and aims to minimize damage to such places.

Fishery management actions in the U.S. Caribbean are not likely to affect historic places, as none are identified as occurring in the EEZ.

APPENDIX 4 – History of Federal Fisheries Management in the U.S. Caribbean

History of Federal Fisheries Management

The Caribbean Fisheries Management Council (Council) manages 179 fish stocks under four Fishery Management Plans (FMPs):

- Fishery Management Plan for the Reef Fish Fishery of Puerto Rico and the U.S. Virgin Islands
- Fishery Management Plan for the Corals and Reef Associated Invertebrates of Puerto Rico and the U.S. Virgin Islands
- Fishery Management Plan for the Spiny Lobster Fishery of Puerto Rico and the U.S. Virgin Islands
- Fishery Management Plan for the Queen Conch Resources of Puerto Rico and the U.S. Virgin Islands

Fishery Management Plan for the Reef Fish Fishery of Puerto Rico and the U.S. Virgin Islands (Reef Fish FMP)

The Council's Reef Fish FMP (CFMC 1985; 50 FR 34850) was implemented in September 1985. The FMP, which was supported by an environmental impact statement (EIS), defined the reef fish fishery management unit to include shallow water species only, defined various fishing parameters, described objectives for the shallow water reef fish fishery, and established management measures to achieve those objectives.

Amendment 1 to the Reef fish FMP (CFMC 1990a; 55 FR 46214) was implemented in December 1990. That amendment was supported by an environmental assessment (EA) with a finding of no significant impact (FONSI). Primary management measures included an increase in mesh size, a prohibition on harvest of Nassau grouper, and establishment of a seasonal closure near St. Thomas, USVI. Amendment 1 also defined overfished and overfishing for shallow water reef fish.

A regulatory amendment to the Reef Fish FMP (CFMC 1991; 56 FR 48755) was implemented October 1991. The primary management measures contained in this amendment, which was supported by an EA with a FONSI, included a modification to the mesh size increase implemented through Amendment 1 and a change in the specifications for degradable panels for fish traps.

Amendment 2 to the Reef Fish FMP (CFMC 1993; 58 FR 53145), implemented in November 1993, was supported by a supplemental EIS (SEIS). That amendment redefined the reef fish fishery management unit to include the major species of deep water reef fish and marine aquarium finfish. Primary management measures implemented through this amendment included gear restrictions, prohibition of harvesting goliath grouper and other aquarium trade species, and creation of various seasonally closed areas. Amendment 2 also applied existing definitions of maximum sustainable yield (MSY) and optimum yield (OY) to all reef fish within the revised fishery management unit (FMU), with the exception of marine aquarium finfish. The MSY and OY of marine aquarium finfish remained undefined.

A technical amendment to the Reef Fish FMP (59 FR 11560), implemented in April 1994, clarified the minimum mesh size allowed for fish traps.

An additional regulatory amendment to the Reef Fish FMP (CFMC 1996; 61 FR 64485) was implemented in January 1997. That action, supported by an EA and FONSI, reduced the size of the Tourmaline Bank closed area that was originally implemented in 1993, and established seasonal closures in two areas off the west coast of Puerto Rico (Abrir La Sierra Bank and Bajo de Sico).

Amendment 3 to the Reef Fish FMP was implemented in 2005 with the approval of the Comprehensive Amendment to the FMPs of the U.S. Caribbean to Address Required Provisions of the Magnuson-Stevens Fishery Conservation and Management Act (Caribbean SFA Amendment), in which the Council redefined the FMUs and defined rebuilding plans for overfished species (CFMC 2005). Primary management measures implemented through this amendment are as follows:

- Established new FMUs for reef fish;
- Required that fish traps have an 8 inch by 8 inch panel (with mesh not smaller than the mesh of the trap) on one side of the trap (excluding top, bottom and the side of the door) attached with untreated jute twine (diameter less than 1/8 inch);
- Required that individual traps or pots have at least one buoy attached that floats on the surface;
- Required that traps or pots tied together in a trap line have at least one buoy that floats at the surface at each end of the trap line;
- Prohibited the use of gillnets and trammel nets in the exclusive economic zone (EEZ);
- Established a seasonal area closure in the area known as Grammanik Bank south of St. Thomas;
- Prohibited the use of bottom tending gear (traps, pots, gillnets, trammel nets, bottom longlines) in the seasonally closed areas including Grammanik Bank;

- Required an anchor retrieval system for anyone fishing or possessing Caribbean reef fish species;
- Prohibited the filleting of fish at sea;
- Established seasonal closures (no fishing or possession), every year during the specified months, for Snapper Unit 1 (silk, black, blackfin and vermillion snapper) from October 1 through December 31, Grouper Unit 4 (tiger, yellowfin, yellowedge, red and black) from February 1 through April 30, red hind from December 1 through the last day of February, and lane and mutton snapper from April 1 through June 30, and;
- Established MSY, OY, minimum stock size threshold (MSST), and maximum fishing mortality threshold (MFMT) for the FMUs.

A notice of intent (NOI) to prepare a draft environmental impact statement (DEIS) for Amendment 4 to the Reef Fish FMP was published in the *Federal Register* on October 9, 2007 (72 FR 57307). The proposed alternatives would consider measures to implement escape vents in the trap fishery sector. However, Amendment 4 was postponed until a pilot study could be conducted on the effective size of escape vents.

The Council developed another regulatory amendment to the Reef Fish FMP (CFMC 2010; 50 CFR Part 622). The amendment, which was effective December 2, 2010, extended the seasonal closure of Bajo de Sico. Bajo de Sico has been identified as an important spawning site, especially for red hind and possibly other resident groupers including Nassau and yellowfin, as well as an important foraging site for these and other Caribbean reef fish. The Bajo de Sico closed area has been described as a well-developed and diverse coral and sponge habitat that provides essential fish habitat for Caribbean reef fish. The purpose of the regulatory amendment is to protect red hind spawning aggregations and large snapper and grouper from directed fishing mortality. Primary management measures implemented through this amendment are as follows:

- Modify the length of the seasonal closure to 6 months (October 1 through March 31);
- Prohibit fishing for or possession of Council-managed reef fish; and
- Prohibit anchoring year-round within Bajo de Sico.

Compatible reef fish regulations exist in the U.S. Caribbean for Nassau and goliath grouper; fishing and possession of these species has been prohibited from the shore to the EEZ since 2004 for goliath grouper and since 1990 for Nassau grouper.

Seasonal closures established in the EEZ since 2005 have been also established for some of the same species groups in the territorial and state waters. Fishing for and possession of yellowfin, yellowedge, red, tiger, and black grouper is prohibited in the territorial waters of the USVI and in the EEZ from February 1st to April 30th each year, in Puerto Rico only one species from this group (yellowfin) is regulated during this period; lane and mutton from April 1st to June 30th in

the EEZ and USVI, but only for mutton snapper from April 1st to May 31st in Puerto Rico; red hind from December 1st to last day of February in the EEZ and Puerto Rico but not in the USVI; black, blackfin, vermilion, and silk snapper from October 1st to December 31st in the EEZ and USVI and only 2 species within this group (silk and blackfin) are regulated during these months in Puerto Rico.

Size regulations for yellowtail snapper have been implemented in the EEZ and Puerto Rico but not in the USVI.

Gear restrictions (e.g., mesh size in traps) also provide additional protection to the reef fish resources in the U.S. Caribbean. The mesh size for traps in the U.S. Caribbean is 2 inches (5.1 cm) rectangular and 1.5 inches (3.8 cm) hexagonal mesh; the same requirements apply for escape panels, and tying materials have been specified across the jurisdictions. Trammel and gillnets are prohibited in the EEZ and in the USVI; Puerto Rico has regulated the mesh size and length of the nets.

Amendment 5 to the Reef Fish FMP (CFMC 2011a; 76 FR 82404) was implemented in January 2012. Primary management measures implemented through this amendment are as follows:

- It amended the stock complexes in the Reef Fish Fishery Management Units. It separated the Grouper Unit 4 into Grouper Unit 4 (yellowfin, red, tiger, plus black grouper) and Grouper Unit 5 (yellowedge and misty grouper). In addition, it moved creole fish from Grouper Unit 3 into the "data collection category only: unit. And lastly it modified the snapper FMU by adding cardinal snapper to Snapper Unit 2 and moving wenchman to Snapper Unit 1;
- Specified annual catch limits (ACLs) and accountability measures (AMs) to prevent overfishing of these species/species groups;
- Established Reference Points: MSY; and OY
- Status Determination Criteria: MSST; and MFMT
- Established framework measures to facilitate regulatory modifications; and
- Adjusted management measures as needed to constrain harvest to specified ACLs.

Amendment 6 to the Reef Fish FMP (CFMC 2011b; 76 FR 82414), was implemented in January 2012. Primary management measures implemented through this amendment are as follows:

- Established ACLs and AMs for ref fish which are not determined to be undergoing overfishing;
- Allocated reef fish ACLs among island management areas;
- Established recreational bag limits for selected reef fish; and

- Revised management reference points and status determination criteria for selected reef fish.

Regulatory Amendment 4 to the Reef Fish FMP (CFMC 2013; 78 FR 45894)

The Council completed Regulatory Amendment 4 in 2013 to establish a commercial and recreational minimum size limit for parrotfish harvest in the U.S. Caribbean EEZ. A minimum size limit would allow juveniles to mature into reproductively active individuals and have a chance to spawn prior to harvest. The Council chose an 8-in fork length (FL) for redband parrotfish and a 9 inches FL for all other parrotfish species. The Council chose a smaller FL for redband because it is a relatively smaller fish and the fish would reach sexual maturity at a smaller size than the other allowable parrotfish species.

Fishery Management Plan for the Spiny Lobster Fishery of Puerto Rico and the U.S. Virgin Islands (Spiny Lobster FMP)

The Council's Spiny Lobster FMP (CFMC 1981; 49 FR 50049) was implemented in January 1985, and was supported by an EIS. The FMP defined the Caribbean spiny lobster fishery management unit to include *Panulirus argus* (Caribbean spiny lobster), described objectives for the spiny lobster fishery, and established management measures to achieve those objectives. Primary management measures included:

- The definition of MSY as 830,000 lbs per year;
- The definition of OY as "all the non-[egg-bearing] spiny lobsters in the management area having a carapace length (CL) of 3.5 inches or greater that can be harvested on an annual basis," which was estimated to range from 582,000 to 830,000 lbs per year;
- A prohibition on the retention of egg-bearing (berried) lobsters (berried female lobsters may be kept in pots or traps until the eggs are shed), and on all lobsters with a carapace length of less than 3.5 inches;
- A requirement to land lobster whole;
- A requirement to include a self-destruct panel and/or self-destruct door fastenings on traps and pots;
- A requirement to identify and mark traps, pots, buoys, and boats; and
- A prohibition on the use of poisons, drugs, or other chemicals, and on the use of spears, hooks, explosives, or similar devices to take spiny lobsters.

The plan further acknowledges that "conclusive data regarding genetics between various geographic areas…not available…establishment of an international coalition will eventually be necessary to effectively manage this migratory species throughout its range" (pg. 5). The plan addresses only the species *P. argus* where it is limited to the geological platforms of Puerto Rico

and the USVI essentially inside the 100-fathom isobath. It continues "these shelf areas include not only the Commonwealth of Puerto Rico and the territory of the U.S. Virgin Islands, but also the entire chain of the British Virgin Islands. The lobster population recognizes none of these political entities nor the limits of territorial seas" (pg. 6).

The stock unit is defined as:

> "The question of whether or not biologically distinct stocks of *P. argus* may be identified is not resolved. For purposes of this plan three biological assessments areas (distinguished by their user groups and geography) were assumed; (1) Puerto Rico, (2) St. Thomas and St. John, and (3) St. Croix. A single optimum yield is established. There is nominally one species and the source(s) of recruitment are not verified" (Section 4.2)".

The original FMP analyzed several different potential minimum sizes, ranging from 2.75 to greater than 3.5 inches CL. As in the Gulf of Mexico and South Atlantic FMP, the smaller minimum sizes were eliminated because they would not protect the spawning stock. The larger sizes were deemed to cost the fishery too much economically and socially, therefore, the 3.5 inch CL was chosen (see below for rationale for differences in minimum size between the two FMPs).

Amendment 1 to the Spiny Lobster FMP (CFMC 1990b; 56 FR 19098), implemented in May 1991, added to the FMP definitions of overfished and overfishing, and outlined framework actions that could be taken should overfishing occur. The amendment defined "overfished" as a biomass level below 20 percent of the spawning potential ratio (SPR). It defined "overfishing" as a harvest rate that is not consistent with a program implemented to rebuild the stock to the 20 percent SPR. That amendment was supported by an EA and a FONSI.

Amendment 2 to the Spiny Lobster FMP (CFMC 2005; 70 FR 62073), implemented in 2005 was part of the Caribbean SFA Amendment. This comprehensive amendment included a final supplemental environmental impact statement, which examined the impacts of amending the FMPs of the Council to comply with several provisions of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) related to establishing biological reference points and stock status determination criteria, preventing overfishing and rebuilding overfished fisheries, and assessing and minimizing to the extent practicable bycatch.

A NOI to prepare a DEIS for Amendment 3 to the Spiny Lobster FMP was published in the *Federal Register* on October 9, 2007 (72 FR 57307). The proposed alternatives would consider measures to implement escape vents in the trap fishery sector. However, Amendment 3 was postponed until a pilot study could be conducted on the effective size of escape vents.

Amendment 4 to the Spiny Lobster FMP (CFMC 2008; 74 FR 1148), was implemented in February of 2009 to restrict spiny lobster imports into the U.S. to minimum conservation standards to achieve and increase in spawning stock biomass and increase long term yield of the fishery. The amendment prohibited any person from importing spiny lobster less than 5 ounces tail weight. If imported into Puerto Rico or the USVI, prohibit importing spiny lobster less than 6.0 ounces tail weight.

As with the South Atlantic and Gulf of Mexico FMP, since the 1980's the Caribbean FMP has been amended consistent with new requirements of the Magnuson-Stevens Act, but those amendments have not affected the above definitions or the minimum size regulations of the spiny lobster fishery.

Amendment 5 to the Spiny Lobster FMP (CFMC 2011b; 76 FR 82414), was implemented in January 2011 as part of the 2011 Caribbean ACL Amendment. Primary management measures implemented through this amendment are as follows:

- Established ACLs and AMs for spiny lobster which are not determined to be undergoing overfishing;
- Allocated spiny lobster ACLs among island management areas;
- Established recreational bag limits for spiny lobster;
- Established framework procedures for the spiny lobster; and
- Revised management reference points and status determination criteria for spiny lobster.

Fishery Management Plan for the Queen Conch Resources of Puerto Rico and the U.S. Virgin Islands (Queen Conch FMP)

The Council's Queen Conch FMP (CFMC 1996a; 61 FR 65481) was implemented in January 1997, and was supported by an EIS.

The FMP defined the queen conch fishery management unit, described objectives for the queen conch fishery, and established management measures to achieve those objectives. Primary management measures included:

- The definition of the MSY of queen conch as 738,000 lbs per year;
- The definition of the OY of queen conch as "all queen conch commercially and recreationally harvested from the EEZ landed consistent with management measure set forth in this FMP under a goal of allowing 20 percent of the spawning stock biomass to remain intact;"
- A prohibition on the possession of queen conch that measure less than 9 inches total length or that have a shell lip thickness of less than 3/8 inches;

- A requirement that all conch species in the fishery management unit be landed in the shell;
- A prohibition on the sale of undersized queen conch and queen conch shells;
- A recreational bag limit of three queen conch per day, not to exceed 12 per boat;
- A commercial catch limit of 150 queen conch per day;
- An annual spawning season closure that extends from July 1 through September 30; and
- A prohibition on the use of hookah gear to harvest queen conch.

In 2005, the Caribbean SFA Amendment provided a rebuilding plan for queen conch as Amendment 1 to the Queen Conch FMP. To implement the rebuilding plan, the Council prohibited commercial and recreational harvest and possession of queen conch in federal waters of the U.S. Caribbean, with the exception of Lang Bank near St. Croix. More specifically, the amendment:

- Established a new Fishery Management Unit for the queen conch by removing the Caribbean helmet, *Cassis tuberosa*; Caribbean vase, *Vasum muricatum*; flame helmet, *Cassis flammea*; and whelk (West Indian top shell), *Cittarium pica*,;
- Nine species remained in the FMU (Table 4.4.1)
- Prohibits the harvest and possession of queen conch from the EEZ, west of 64°34'W East of this coordinate, fishing and possession are prohibited between July and September;
- Where fishing is allowed in the EEZ, conch must be maintained intact and all other regulations of bag limits, gear restrictions, and minimum size apply;
- Prohibits all fishing on Grammanik Bank, south of St. Thomas, from February 1 through April 30 of each year, and;
- Specified an MSY proxy, OY, MSST, and MFMT for the FMUs.

The Council completed Amendment 2 to the Queen Conch FMP, which established management reference points including ACL's for the queen conch.

The Council developed another regulatory amendment to the Queen Conch FMP to establish quota and seasonal closures that are compatible with the USVI (CFMC 2011; 76 FR 23907). The final rule published in the *Federal Register* on April 29, 2011 and was effective May 31, 2011. Under previous regulations, fishing for and possession of queen conch was prohibited in the Caribbean EEZ, with the exception of Lang Bank east of St. Croix, which was open to harvest of queen conch from October 1 through June 30. Prior to the new regulation, when the territorial waters of St. Croix reach their 50,000 pound quota for queen conch, Lang Bank would remain open to queen conch harvest through the end of the fishing season. With the implementation of the new rule, when the territorial waters of St. Croix reach their 50,000 pound quota for queen conch, it will trigger the closure of Lang Bank to queen conch until the start of the next fishing season. Additionally, the Lang Bank seasonal closure was changed from the

previous closure of July 1 through September 30, to the new closure of June 1 through October 31, each year.

Amendment 3 to the Queen Conch FMP (CFMC 2011b; 76 FR 82414), was implemented in January 2011. This amendment removed eight conch species from the Queen Conch FMP. The species removed included the Milk conch (*Strombus costatus),* West Indian Fighting Conch *(S. pugilis),* Roostertail Conch (*S. gallus),* Hawkwing Conch (*S. raninus),* True Tulip (*Fasciolaria tulipa),* Atlantic Triton‟s Trumpet (*Charonia variegate),* Cameo Helmet (*Cassis madagascarensis),* and Green Start Shell (*Astrea tuber).*

Regulatory Amendment 2 to the Queen Conch FMP (CFMC 2013; 76 FR 23907),

The Council implemented Regulatory Amendment 2 to the Queen Conch FMP to address compatibility issues in the harvest of queen conch in the U.S. Caribbean EEZ. Fishing and possession of queen conch in the U.S. Caribbean EEZ is only allowed in the area of Lang Bank, to the east of St. Croix, USVI. However, regulations regarding commercial trip limits and recreational bag limits for the harvest of queen conch in federal waters were not compatible with the USVI regulations. The previous trip limit in federal waters allowed a licensed commercial fisherman to harvest up to 150 queen conch per day, but did not establish a harvest limit per vessel. The USVI regulations allowed the harvest of 200 queen conch per vessel per day regardless of the number of licensed fishermen on board. The daily recreational bag limit in federal waters allowed for the harvest of three queen conch per person and a maximum of 12 queen conch per vessel. In contrast, the USVI daily recreational bag limit consisted of six queen conch per person and a maximum of 24 per vessel.

The USVI has expressed interest in having federal regulations modified to make them compatible with the territorial limits to facilitate enforcement efforts, enhance compliance by fishers, and allow for more efficient management of queen conch resources in the U.S. Caribbean. The Council chose to establish a daily commercial trip limit of 200 queen conch per vessel and left the recreational bag limit unchanged. However, because the federal recreational bag limit is less than the territorial limit, the Council chose to maintain that lower bag limit in the EEZ.

Fishery Management Plan for the Corals and Reef Associated Invertebrates of Puerto Rico and the U.S. Virgin Islands (Coral FMP)

The Council's Coral FMP (CFMC 1994; 60 FR 58221) was implemented in December 1995. The FMP, which was supported by an EIS, defined the coral FMU (Table 4 of the 2005 SFA), described objectives for Caribbean coral resources, and established management measures to achieve those objectives. Primary management measures included:

- A prohibition on the take or possession of gorgonians, stony corals, and any species in the fishery management unit if attached or existing upon live rock;
- A prohibition on the sale or possession of any prohibited coral unless fully documented as to point of origin;
- A prohibition on the use of chemicals, plants, or plant-derived toxins, and explosives to take species in the coral fishery management unit; and
- A requirement that dip nets, slurp guns, hands, and other non-habitat destructive gear types be used to harvest allowable corals.

The FMP also required that harvesters of allowable corals obtain a permit from the local or federal government.

Amendment 1 to the Coral FMP (CFMC 1999; 64 FR 60132) was implemented in December 1999. Supported by a SEIS, that amendment established a closed area in the U.S. EEZ southwest of St. Thomas, USVI. That area is known as the Hind Bank Marine Conservation District (MCD). Fishing for any species, and anchoring by all fishing vessels, is prohibited in the Hind Bank MCD year round.

The Caribbean SFA Amendment mandated the collection of "data collection only" on aquarium trade species under the Reef Fish and Coral FMPs, and removes these species from the purview of federal regulations. Consequently, existing regulations defining a marine aquarium fish as "a Caribbean reef fish that is smaller than 5.5 inches (14.0 cm) total length" and restricting the harvest of a marine aquarium fish to hand-held dip nets or hand-held slurp guns (50 CFR 622.41§(b) were eliminated. The regulation prohibiting the harvest and possession of butterflyfish and seahorses from federal waters of the U.S. Caribbean (50 CFR §622.32(b)(1)(ii)) also was eliminated. Furthermore, inclusion in a data collection only category results in no specification of MSY, OY, or other stock status determination criteria for these species due to no real need for federal conservation and management of these species. Therefore, they are excluded from discussion in those sections.

Amendment 3 to the Coral FMP (CFMC 2011b; 76 FR 82414), was implemented in January 2011. Primary management measures implemented through this amendment are as follows:

- Established ACLs and AMs for aquarium trade species which are not determined to be undergoing overfishing;
- Allocated U.S. Caribbean wide aquarium trade species ACLs;
- Established framework procedures for the aquarium trade species; and
- Revised management reference points and status determination criteria for the aquarium trade species.

Amendment 4 to the Coral FMP (CFMC 2013, 78 FR 33255)

The Council prepared Amendment 4 to address the Magnuson-Stevens Act requirement to establish ACLs and AMs for seagrass species in the Coral FMP. Seagrasses provide essential habitat for many important fishery species in the U.S. Caribbean, however there is no directed harvest of these species. If seagrasses remained in the coral reef resources FMU of the Coral FMP, the establishment of ACLs and AMs was required. These were not established for seagrasses in the 2011 Caribbean ACL Amendment. Through Amendment 4, the Council chose to remove seagrassess from the Coral FMP as there was no known targeted or indirect harvest of any seagrass species from the EEZ or from Puerto Rico and USVI state waters, and future harvest was not anticipated.

Generic FMP amendments

The Council submitted the Generic Essential Fish Habitat Amendment to the Spiny Lobster, Queen Conch, Reef Fish, and Coral FMPs (Generic EFH Amendment) to NMFS in 1998 to comply with the EFH provisions of the Magnuson-Stevens Act (CFMC 1998). NMFS partially disapproved that amendment on March 29, 1999, finding that it did not evaluate all managed species or all fishing gears with the potential to damage fish habitat (64 FR 14884). The document was subsequently challenged by a coalition of environmental groups and fishing associations on the grounds that it did not comply with the requirements of the Magnuson-Stevens Act and NEPA (American Oceans Campaign et al. v. Daley et al., Civ. No. 99-982 [D.D.C.]). The federal court opinion upheld the plaintiffs' claim that the Generic EFH Amendment was in violation of NEPA, but determined that the amendment was in accordance with the Magnuson-Stevens Act. The Council completed the final EIS (FEIS) for the Generic EFH Amendment to comply with the September 14, 2000 court order (CFMC 2004). The Generic EFH Amendment was implemented by the Caribbean SFA Amendment of 2005.

Finding of No Significant Impact (FONSI) for the Development of Island-Based Fishery Management Plans (FMPs) in the U.S. Caribbean: Transition from Species-Based FMPs to Island-Based FMPs

National Marine Fisheries Service (NMFS)

November 2014

Introduction

This FONSI was prepared in accordance with National Oceanic and Atmospheric Administration Administrative Order 216-6 (NAO 216-6; May 20, 1999) and National Marine Fisheries Service Instruction 30-124-1, July 22, 2005, Guidelines for the Preparation of a Finding of No Significant Impact, for determining the significance of impacts of a proposed management action. This introduction provides a brief description of the proposed management action and alternatives and summarizes why measures contained in the environmental assessment (EA) would not have a significant effect on the human environment. Attached is the EA, titled *Development of Island-Based Fishery Management Plans (FMPs) in the U.S. Caribbean: Transition from Species-Based FMPs to Island-Based FMPs*, dated October 2014.

The purpose of this action is to facilitate management of U.S. Caribbean fishery resources by reorganizing the federal fishery management strategy to better account for biological, social, and economic differences among the islands comprising the U.S. Caribbean.

The EA contains one action with four alternatives **(Table 1).** Throughout this FONSI, the "proposed action" refers to the preferred alternative (**Alternative 3**).

Alternative 1 (no action) would maintain the existing species-based fisheries management approach in the U.S. Caribbean exclusive economic zone (EEZ). The Caribbean Fishery Management Council (Caribbean Council) would continue to manage federal fisheries in the U.S. Caribbean EEZ via amendments to each of the existing Spiny Lobster FMP, Reef Fish FMP, Queen Conch FMP, and Corals and Reef Associated Plants and Invertebrates FMP as appropriate.

Under **Alternatives 2-4**, the Caribbean Council would develop separate FMPs to manage the EEZ resources of each of the major islands of the U.S. Caribbean. **Alternative 2** would require the development of four new FMPs; one each for Puerto Rico, St. Croix, St. Thomas, and St. John. **Preferred Alternative 3** requires the development of three new FMPs; one each for Puerto Rico and St. Croix, and a combined FMP for St. Thomas/St. John. **Alternative 4** would require the development of two new FMPs. This alternative results in combined management of Puerto Rico, St. Thomas, and St. John EEZ resources within a single FMP, whereas the EEZ resources of St. Croix would be managed under a separate FMP.

Table 1. Summary of alternatives considered in the EA.

Alternative Number	Preferred	Alternative Description[1]
1 (no action)		Continue managing fishery resources in the U.S. Caribbean EEZ under the Spiny Lobster FMP, Reef Fish FMP, Queen Conch FMP, and Corals and Reef Associated Plants and Invertebrates FMP.
2		Develop four new island-based FMPs (Puerto Rico, St. Croix, St. Thomas, and St. John).
3	X	Develop three new island-based FMPs (Puerto Rico, St. Croix, and St. Thomas/St. John).
4		Develop two new island-based FMPs. The first FMP would combine management for Puerto Rico, St. Thomas, and St. John into a single FMP. A second FMP would be developed for St. Croix.
[1]See Chapter 2 of the EA for a more detailed description of the alternatives.		

Under **Alternative 1 (no action)**, the underlying purpose (as described in Chapter 1 in the attached EA) would not be addressed. **Alternatives 2-4** would meet the purpose by developing and implementing island-based FMPs that account (but to different degrees) for the unique characteristics of each of the U.S. Caribbean islands with respect to culture, markets, fishing gear, ecology, and seafood preferences.

Finding of No Significant Impact

National Oceanic and Atmospheric Administration Administrative Order 216-6 (NAO 216-6; May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality (CEQ) regulations at 40 CFR 1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant in making a FONSI and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and the CEQ's context and intensity criteria.

1) **Can the proposed action reasonably be expected to jeopardize the sustainability of any target species that may be affected by the action?**

Response: No. The proposed action would not be expected to jeopardize the sustainability of any target species. Instead, the action allows for continued harvest of target species without negatively impacting the stock. This action will not alter any of the current management measures and regulations in place and considered appropriate for the conservation of the target species in the U.S. Caribbean. This action would not modify current fishing practices or restrictions on fisheries occurring in federal waters of the U.S. Caribbean, thus would not affect any target species. The biological impacts on target species resulting from the proposed action are described in Section 4.2 of the EA.

2) **Can the proposed action reasonably be expected to jeopardize the sustainability of any non-target species?**

Response: No. This action will not result in additional impacts to non-target species even though fishery management actions can adversely impact non-target species by increasing interactions between fishing gear and the species, increasing bycatch, and/or increasing, reducing, or redistributing fishing effort to areas where these species or critical habitat for these species occur.. This action will not alter any of the current management measures in place and considered appropriate for the conservation of non-target species in the U.S. Caribbean. Therefore, the action will not alter fishing practices in U.S. Caribbean federal waters, and thus, any indirect biological/ecological effects on non-target species would not be different from those currently occurring in the fisheries. The biological impacts resulting from this action, including impacts to non-target species, are described in Section 4.2 of the EA.

3) **Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and defined in the FMPs for Spiny Lobster, Reef Fish, Queen Conch, and Corals and Reef Associated Plants and Invertebrates in the U.S. Caribbean?**

Response: No. Although fishery management actions can cause substantial damage to ocean and coastal habitats and/or essential fish habitat by increasing fishing gear interactions with the seafloor and/or redistributing fishing effort over more vulnerable habitat, the proposed action is not anticipated to have such effects. The proposed action is not expected to cause substantial damage to ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in the Caribbean Council's FMPs. Additionally, the Caribbean Council has implemented a number of gear restrictions designed to minimize adverse effects of the managed fisheries on particularly vulnerable or valuable habitat, and those gear restrictions will not be altered. The physical and biological environments are discussed in Sections 3.1 and 3.2 of the EA; the physical and biological impacts are discussed in Section 4.1 and 4.2 of the EA; and the different gear restrictions to protect habitat are included in Appendix 4 (History of Federal Fisheries Management in the U.S. Caribbean) of the EA.

4) **Can the proposed action reasonably be expected to have a substantial adverse impact on public health or safety?**

Response: No. Although fishery management actions can affect public safety by eliminating or minimizing fishermen's flexibility to decide when, where, and how to fish, the proposed action is not expected to have such an effect. The proposed action is administrative in nature in that it merely restructures existing management measures and will not modify any existing regulation or management measure in the U.S Caribbean that could result in adverse impacts to public health or safety. For example, this action does not result in any vessel being forced to participate in a fishery under adverse weather or ocean conditions as a result of the imposition of management regulations proposed in this EA. Therefore, no safety-at-sea issues would be created. The cause and effect relationship between this action and public health and safety is further discussed in Section 4.6 of the EA.

5) Can the proposed action reasonably be expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?

Response: No. Fishery management actions can adversely affect species and/or habitat protected by the Endangered Species Act (ESA) and/or Marine Mammal Protection Act. Fishery management actions can increase bycatch and/or fishing gear interactions with these species, for example, by redistributing fishing effort to areas where protected species and/or critical habitat occurs. However, the proposed action is unlikely to alter fishing in ways that would cause new adverse effects to species not previously considered. The outcomes of the formal consultations describing potential impacts to protected species from the continued authorization of the fishery are discussed in Section 3.2.2 and Appendix 3 (Other Applicable Law) of the EA.

Alternative 1 (no action) would perpetuate the existing level of risk for interactions between endangered or threatened species, marine mammals, or critical habitat of these species and the fishery as discuss in Section 3.2.2. The impacts from **Alternatives 2-4** on protected resources (e.g., sea turtles and corals) are not likely to cause new effects not previously considered. Regardless of which alternative is selected, each would fall within the level of effort and scope of the action analyzed in the EA. Additionally, regardless of the alternative selected, the proposed action will not change gear usage patterns previously evaluated in the Section 7 consultation. Thus, no new effects from the fishery are anticipated.

On September 10, 2014, NMFS listed 20 new coral species under the ESA. Five of those new species (*Mycetophyllia ferox, Dendrogyra cylindrus, Orbicella annularis, O. faveolata,* and *O. franksi*) occur in the Caribbean and all of these are listed as threatened. The two previously-listed *Acropora* coral species (*Acropora palmata* and *A. cervicornis*) remain protected as threatened. We have reinitiated Section 7 consultation to evaluate the potential impacts of the continued authorization of the Caribbean fisheries on these species. We do not anticipate that the implementation of this action will change the operation of any fishery in any way that would alter our on-going impact analysis for these species, or any interim conclusions relating to fishery impacts on the newly listed species.

6) Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g. benthic productivity, predator-prey relationships, etc.)?

Response: No. The proposed action is not expected to have any substantial impact on biodiversity and/or ecosystem function within the affected area. The proposed action is administrative in nature and would not change any current fishing operations or activities. Therefore, impacts on benthic productivity, predator-prey relationships, and other ecosystem functions, are not expected. The effects of the proposed action on the physical and biological/ecological environments are discussed in Sections 4.1 and 4.2 of the EA.

7) **Are significant social or economic impacts interrelated with natural or physical environmental effects?**

Response: No. The proposed action will not trigger significant social or economic impacts interrelated with natural or physical environmental effects. The action may indirectly increase benefits derived from long-term management of the resources by improving assessments of the interdependent costs and benefits of alternative actions on fishermen, their families and communities, which would improve regulatory decision-making. However, any future impacts to the economic environment are speculative, because future impacts depend on the nature of the specific future management actions implemented under the reorganized FMPs.

The physical, economic, and social impacts of this action are described in Sections 4.1, 4.3, and 4.4 of the EA. By allowing for more island-centric management, each locale may be able to take advantage of the historical trends that have created each unique social and cultural environment that may offer more streamlined and efficient management. This may bring about more participation as stakeholders see management as being more responsive to their local needs. Increased cooperation between users and managers of the resource may lead to better compliance with the regulations and resultant enhancement to the management of natural and physical environmental effects, which should benefit the biological, economic, and social environments in an interactive manner. Again, these outcomes are speculative.

8) **Are the effects on the quality of the human environment likely to be highly controversial?**

Response: No. As discussed in Sections 1.5, 3.3, 4.3 and 4.4 of the EA, the effects of the proposed action on the quality of the human environment are not likely to be highly controversial. The proposed action responds to frequent requests by fishers, fishing community representatives, and the local governments of Puerto Rico and the USVI to consider the differences (e.g., ecosystems, culture, markets, gear, and seafood preferences) between the islands or island groups when addressing fisheries management in the U.S. Caribbean. Public hearings were held in St. Thomas, St. Croix, and Puerto Rico during the summer of 2012. During the hearings, the public presented their opinions and suggestions on the proposed action to shift from species-based to island-based FMPs. The majority of stakeholders were in favor of the shift in management and with the development of new island-specific FMPs. Based on this information, it is anticipated that the majority of the Caribbean Council's constituents support this action.

9) **Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas?**

Response: No. The proposed action is not reasonably expected to result in substantial direct, indirect, or cumulative effects to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas. The Buck Island Reef National Monument, Salt River Bay National Historic Park, Virgin Islands Coral Reef National Monument, and Virgin Islands National Park are within the boundaries of the U.S.

Caribbean EEZ. The proposed action is not likely to result in substantial impact in these unique areas because the action is not expected to result in appreciable changes to current fishing practices. Additional discussion about the potential effects to the physical, biological, and cultural environments can be found in Sections 4.1, 4.2, 4.6, and Appendix 3 of the EA.

10) Are the effects on the human environment likely to be highly uncertain or involve unique and unknown risks?

Response: No. As discussed in Sections 4.1 through 4.5 of the EA, this proposed action is not likely to result in significant effects on the human environment. The action proposed is administrative in nature, in that it will merely restructure existing management measures. Therefore, a shift from species-based FMPs to island-based FMPs will not change current fishing activities, regulations or management measures. It is therefore unlikely that any additional risks to the human environment, uncertain, unique, or unknown, will result.

11) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

Response: No. The proposed management action itself, as discussed in Chapter 2 of the EA, would not modify the current federal regulations in the U.S. Caribbean. The proposed action is administrative in nature, in that it will merely restructure existing management measures and does not change current fishing activities or affect current fishing operations in federal waters of the U.S. Caribbean; therefore, it would not pose additional significant impacts or affect other fisheries as a result of implementing any of the alternatives. The impacts of the proposed alternatives, including the preferred alternatives, on the human environment are described in Chapter 4 of the EA. The cumulative effects assessment of the proposed action revealed no significant, cumulative adverse effects on the biological/ecological and socio-economic environments. The cumulative effects assessment is detailed in Section 4.6 of the EA.

The proposed action is not dependent on but is related to the FMPs that will eventually result from the decision analyzed in the EA. The impacts of the actions ultimately taken in creating the FMPs are unknown at this time. If no substantive management changes are made as a result of moving from fishery-based FMPs to place-based FMPs, there will be no changes to the status quo impacts. If major changes in management result from the process, significant changes may follow. It is currently impossible to predict what the final decisions will be relative to potential future changes, but any such changes will be analyzed and explained in the new island-based fishery management plans and associated National Environmental Policy Act (NEPA) analyses.

12) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources?

Response: No. As discussed in Section 4.6, the proposed action would not adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places. This action is not likely to result in additional direct, indirect, or cumulative effects to unique areas, such as significant scientific, cultural, or historical resources,

park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas as the proposed action is not expected to substantially increase fishing effort or the spatial and/or temporal distribution of current fishing effort within the U.S. Caribbean region. Appendix 3 (Other Applicable Laws) discusses in further detail any adverse effects to districts, sites, highways, structures or objects listed in or eligible for listing in the National Register of Historic Places.

13) Can the proposed action reasonably be expected to result in the introduction or spread of a non-indigenous species?

Response: No. The proposed action would not result in the introduction or spread of any non-indigenous species because it does not change existing fishing operations. There is no evidence that current fishing practices in the U.S. Caribbean have resulted in the introduction or spread of non-indigenous species. The proposed action is not expected to substantially change fishing effort, alter fishing methods, or affect the spatial and/or temporal distribution of current fishing effort. The biological impacts are discussed in Section 4.2 of the EA.

14) Is the proposed action likely to establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration?

Response: No. As discussed in the Section 1.5 of the EA, the proposed action does not establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration. A precedent has been set by the Western Pacific Fishery Management Council who shifted from species-based FMPs to island-based FMPs in 2010 and set the stage for other Councils and regions to follow a similar placed-based management scheme.

Predictions regarding potential future indirect impacts of this action are speculative, because it depends on what changes the Caribbean Council and NMFS implement in future actions. If future actions are taken and result in significant improvements to management, those impacts would be meaningfully analyzed when those future actions are proposed. The proposed action, conducted in accordance with regulations established under the FMPs, as amended to date, in no way constitutes a decision in principle about a future consideration. FMPs and their implementing regulations are always subject to future changes. The Caribbean Council and the NMFS have discretion to amend the FMP and accompanying regulations and may do so at any time, subject to the Administrative Procedure Act, NEPA, and other applicable laws. The potential cumulative effects are discussed in Section 4.6 of the EA.

15) Can the proposed action reasonably be expected to threaten a violation of Federal, State or local law requirements imposed for the protection of the environment?

Response: No. The proposed action is not likely to impose or cause a violation of federal, state, or local law or requirements imposed for the protection of the environment. The proposed action is consistent with applicable state and federal law. An analysis of other applicable laws related to the implementation of the proposed action and alternatives was conducted and the analysis is contained in Appendix 3 of the EA. Appendix 3 of the EA discusses major laws, including

federal statutes designed to protect the environment, which affect federal management decision-making. In addition, there has been close collaboration with the Territory of the United States Virgin Islands and the Commonwealth of Puerto Rico through their representatives to the Caribbean Fisheries Management Council throughout this process, ensuring their environmental laws also will not be threatened.

16) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target or non-target species?

Response: No. The proposed action is not expected to result in any cumulative adverse effects that could have a substantial effect on the target species or non-target species. The impacts of the proposed alternatives on the biological, physical, and human environment are described in Chapter 4 of the EA. The cumulative effects of the proposed action on target and non-target species are detailed in Section 4.6 of the EA. The cumulative effects analysis revealed no significant, cumulative adverse effects on the biological environment. Furthermore, the proposed action is not expected to substantially change fishing effort or the spatial and/or temporal distribution of current fishing effort within the U.S. Caribbean region.

Determination

In view of the information presented in this document and the analysis contained in the supporting EA, I have determined that the preferred alternative will not significantly impact the quality of the human environment as described above and in the supporting EA. In addition, all beneficial and adverse impacts of the proposed action have been identified and analyzed to reach the conclusion of no significant impacts. Accordingly, preparation of an environmental impact statement for this action is not necessary.

Miles M Croom for 11/5/2014

Roy E. Crabtree, Ph.D. Date
Regional Administrator
National Marine Fisheries Service
Southeast Regional Office