Comprehensive Amendment to the U.S. Caribbean Fishery Management Plans:

Application of Accountability Measures

Including Draft Environmental Assessment, Regulatory Impact Review, Regulatory Flexibility Act Analysis, and Fishery Impact Statement

Version 3.1, November 2015

Comprehensive Amendment to the U.S. Caribbean Fishery Management Plans: Application of Accountability Measures

Amendment 7 to the Fishery Management Plan for the Reef Fish Fishery of Puerto Rico and the U.S. Virgin Islands

Amendment 6 to the Fishery Management Plan for the Spiny Lobster Fishery of Puerto Rico and the U.S. Virgin Islands

Amendment 5 to the Fishery Management Plan for the Corals and Reef Associated Plants and Invertebrates of Puerto Rico and the U.S. Virgin Islands

Amendment 4 to the Fishery Management Plan for the Queen Conch Resources of Puerto Rico and the U.S. Virgin Islands

Proposed Action::

Resolve the inconsistency between language in the Reef Fish, Queen Conch, Spiny Lobster, and Corals and Reef Associated Plants and Invertebrates fishery management plans and language in federal regulations describing the application of accountability measures in the U.S. Caribbean exclusive economic zone.

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Summary

The Comprehensive Amendment to the U.S. Caribbean Fishery Management Plans (FMPs): Application of Accountability Measures (AMs) would resolve an existing inconsistency between language in the Caribbean Fishery Management Council (Council) FMPs and the implementing regulations describing the application of AMs in the U.S. Caribbean exclusive economic zone (EEZ). The regulations describing AM application in the EEZ specify that AM-based closures are to remain in effect only during the particular fishing year in which they are implemented. However, the FMPs that implemented the AM closure regulatory language state that any AM-based closure will remain in effect until modified by the Council, thereby carrying these closures over from year to year unless, or until revised by subsequent Council action. This amendment would correct this inconsistency by revising the text within the four FMPs describing how AMs are to be applied to be consistent with the language in the regulations. Specifically, the phrase in the four FMPs that states "The needed changes will remain in effect until modified by the Council", which describes how AMs are to be applied, will be removed from the four FMPs. The result of this proposed change would be that within both the FMPs and AM-based closure regulatory language, any AM closure would only apply for the fishing year in which it was implemented, which is consistent with the intent and implementing regulations used by NMFS and the Council to apply AMs in the U.S. Caribbean EEZ.

Abbreviations and Acronyms Used

ACL annual catch limit

AM accountability measure

APA Administrative Procedures Act

CEA cumulative effects assessment

CEQ Council on Environmental Quality

CFMC Caribbean Fishery Management; Council

CZMA Coastal Zone Management Act

DNER Department of Natural and Environmental Resources of Puerto Rico

DPNR Department of Planning and Natural Resources of the USVI

EA environmental assessment

EEZ exclusive economic zone

EFH essential fish habitat

EIS environmental impact statement

ESA Endangered Species Act

FEIS final environmental impact statement

FMP fishery management plan

FMU fishery management unit

GU Grouper Unit

HAPC habitat area of particular concern

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

MMPA Marine Mammal Protection Act

MPA marine protected area

NEPA National Environmental Policy Act

NMFS National Marine Fisheries Service

NOAA National Oceanic and Atmospheric Administration

OMB Office of Management and Budget

PRA Paperwork Reduction Act

RFA Regulatory Flexibility Act

RIR Regulatory Impact Review

SSC Scientific and Statistical Committee

SEFSC Southeast Fisheries Science Center

SEIS supplemental environmental impact statement

SFA Sustainable Fisheries Act

SERO Southeast Regional Office

SU Snapper Unit

USVI United States Virgin Island

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Fishery Impact Statement

The Magnuson-Stevens Fishery Conservation and Management Act requires a Fishery Impact Statement (FIS) be prepared for all amendments to fishery management plans (FMPs). The FIS contains an assessment of the likely biological and socio-economic effects of the conservation and management measures on: 1) fishery participants and their communities; 2) participants in the fisheries conducted in adjacent areas under the authority of another Council; and 3) the safety of human life at sea.

The National Marine Fisheries Service (NMFS), in collaboration with the Caribbean Fishery Management Council (Council), has developed this Comprehensive Amendment to the U.S. Caribbean FMPs to resolve inconsistencies between language in the Reef Fish, Queen Conch, Spiny Lobster, and Corals and Reef Associated Plants and Invertebrates FMPs, as amended in 2012, and language in the implementing regulations at 50 CFR Part 622 describing the application of accountability measures (AMs) in the U.S. Caribbean exclusive economic zone (EEZ). The purpose of the AM Application Amendment is to ensure the regulations governing AMs for Council-managed species are consistent with their authorizing FMPs and to ensure the AMs are appropriately applied.

The affected area of this proposed action encompasses federal waters of the U.S. Caribbean as well as the fishing communities of Puerto Rico and the U.S. Virgin Islands (USVI) dependent on fishing for reef fish, spiny lobster, queen conch, and coral resources and the ecosystem services they provide. Overall, this action is not expected to cause or contribute direct or indirect significant effects on the biological, physical, socio-economic, and administrative environments. This is because the action proposed by the Council's preferred alternative (**Alternative 2**) would not change current fishing activities. The action would revise the text within the four FMPs describing how AMs are to be applied to be consistent with the implementing regulations used by NMFS and the Council to apply AMs in the Caribbean EEZ.

Assessment of Biological Effects

As mentioned above, this action is not expected to have significant beneficial or adverse effects on the physical and biological/ecological environments as it would minimally affect fishing practices (see Sections 4.1.1 and 4.1.2 of this document). Under the Council's **Preferred Alternative 2**, direct effects or additional indirect effects on the biological/ecological environment are not expected because the proposed action simply adjusts the language in the governing amendments to reflect the way the Council and NMFS currently implement AMs in the U.S. Caribbean EEZ (see description in Section 1.2.1) and would therefore not change current fishing activities. In general, **Preferred Alternative 2** is expected to have the same

indirect effects on the biological and ecological environment as the status quo. These are positive indirect biological and ecological effects resulting from the application of AMs, achieved by constraining landings to the ACL and preventing additional ACL overages. The general effects anticipated as a result include a more natural size distribution of individuals and an increase in the abundance of individuals in the population. Another positive albeit minor indirect effect expected from an AM-based reduction in the length of the fishing season, for all Council-managed species, was a reduction in the incidental catch of other co-occurring species. A generally minor but negative effect was the potential increase in regulatory discards resulting from bycatch of species included in the closure while fishers continue harvest of legally available species. But these effects will not be altered by implementation of **Preferred Alternative 2** as proposed here.

In summary, the Council and NMFS expect the net biological and ecological impacts of implementing this action through **Preferred Alternative 2** to be neutral because no substantial change in harvest would occur due to the continued and consistent controlling influence of the established ACL. Accountability measures in U.S. Caribbean EEZ waters were developed to ensure ACLs are not continuously exceeded, benefiting the species/species complex by reducing instances of overfishing. Presently, NMFS and Council staff monitor landings for all Council-managed species using a running three-year average, and annually compare those landings averages against the appropriate ACL. If the ACL for any species or species complex is identified as having been exceeded, the harvest season in the year following that determination is shortened to ensure the ACL is not again exceeded. This process will not change under **Preferred Alternative 2**. As noted above, there is no reason to expect the Council will not use this information to properly update AMs each year as they have done to date.

Assessment of Economic Effects

The action contained in this amendment would continue to implement AMs in response to ACL overages and would benefit fishermen and the public by more clearly defining the extent of any necessary closures. Under **Preferred Alternative 2** both the FMPs and the regulations would state that the reduction would be applied only for the year following the determination that an AM is triggered. Other approaches could result in extended and unnecessary closures. Under **Preferred Alternative 2**, there are no expected economic effects from the status quo. **Preferred Alternative 2** minimizes the potential for confusion about whether the closure will be continued in subsequent years and minimizes the potential for direct short-term minor economic losses in the form of decreased ex-vessel revenues for commercial fishermen and decreased economic value resulting from recreational fishing.

Assessment of the Social Effects

The action proposed in this amendment could benefit fishermen and the public by creating consistent language which would likely eliminate confusion about whether the closure will be continued in subsequent years if an AM is triggered. Under **Preferred Alternative 2** both the FMPs and the regulations would state that the reduction would be applied only for the year following the determination that an AM is triggered. This consistent language could help to create more transparent federal fishery policies, which could help to create positive interactions between fishery managers and fishermen. In addition, under **Preferred Alternative 2**, fishermen would be less likely to base their fishing decisions on information which may not be correct because of confusion over whether fishing might be reduced for more than one year.

Assessment of Effects on Safety at Sea

The action contained in this amendment would not change current fishing operations; therefore, it is not expected to affect safety at sea.

Chapter 1. Introduction

1.1 What Actions are Being Proposed

The Caribbean Fishery Management Council (Council) proposes an action to resolve inconsistencies between language in the Reef Fish, Queen Conch, Spiny Lobster, and Corals and Reef Associated Plants and Invertebrates fishery management plans (FMPs) and language in federal regulations at 50 CFR Part 622 describing the application of accountability measures (AMs) in the Caribbean exclusive economic zone (EEZ).

1.2 Who is Proposing the Action?

The Council proposes the action. The Council develops the plan amendments and submits them to the National Marine Fisheries Service (NMFS) who ultimately approves, disapproves, or partially approves the actions in the amendment on behalf of the Secretary of Commerce, and implements the regulations.

Caribbean Fishery Management Council

- Responsible for conservation and management of U.S. Caribbean fish stocks (except highly migratory species, which are managed directly by NMFS).
- 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 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 for implementation on behalf of the Secretary of Commerce.

1.3 Where is the Project Located?

Fishery resources in federal waters of the U.S. Caribbean are presently managed by the Council under four FMPs. Federal waters in the U.S. Caribbean are located in the 3 - 200 nautical mile (nm) (6 - 370 kilometers [km]) U.S. exclusive economic zone (EEZ) off the U.S. Virgin Islands, and in the 9 - 200 nm (17 - 370 km) EEZ off the Commonwealth of Puerto Rico (Fig. 1.3.1).

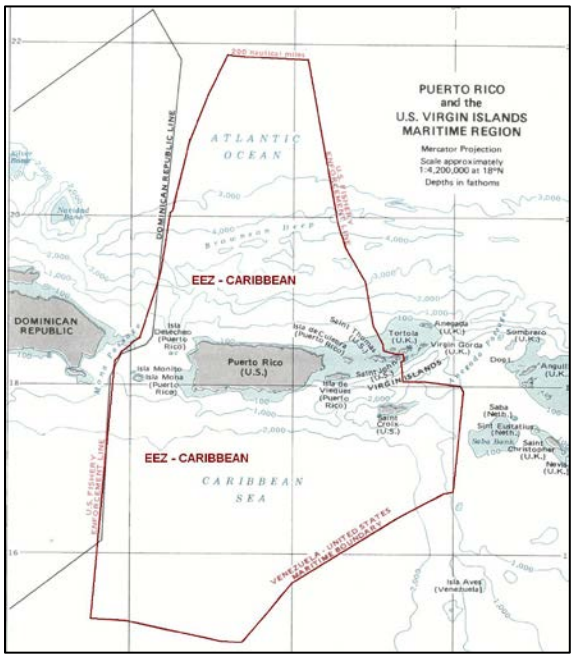

Figure 1.3.1. Jurisdictional boundaries of the Caribbean Fishery Management Council.

1.4 Why is the Council Considering Action?

This action proposes to resolve the existing inconsistency between language in the four Council FMPs, and the implementing regulations at 50 CFR Part 622 regarding inter-annual continuation of Council implemented AMs. NMFS and the Council need to correct this inconsistency to ensure the regulations are consistent with their authorizing FMPs and to ensure AMs for species or species complexes that exceed their annual catch limit (ACL) in a particular year are appropriately applied.

Accountability measures implemented in 2012 were developed in the 2010 Caribbean ACL Amendment for those species/species complexes[1] that were at the time experiencing overfishing (i.e., parrotfish, snapper, grouper) (CFMC 2011a), and in the 2011 Caribbean ACL Amendment for the rest of the Council-managed species/species complexes (e.g., grunts, squirrelfish, jacks) (CFMC 2011b). Currently in U.S. Caribbean federal waters, AMs require NMFS' Assistant Administrator to shorten the length of the fishing season for a species/species complex in the year following a determination that prior year(s) landings exceeded the respective ACL. Annual catch limits are evaluated relative to the most recent multi-year running average of landings. The extent to which fishing

[1] In these sections, the terms fishery management unit and species/species complex may be used interchangeably.

seasons are shortened to account for any overages equals the amount necessary to constrain landings to the ACL. The Council FMPs state that any AM-based closure will remain in place until modified by the Council, thus carrying closures over from year to year unless or until formally ended by subsequent Council action and rulemaking. However, the implementing regulations require such closures to remain in place only during the year in which they are implemented.

The inconsistent text describing the application of AMs was first developed in earlier drafts of the 2010 Caribbean ACL Amendment for species that were at the time undergoing overfishing. The same conflicting text was carried over to the 2011 Caribbean ACL Amendment, where AMs were developed for the remainder of the Council managed species.

Section 304(b) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) requires NMFS to review regulations for consistency with the FMP and other applicable law. In this case, the regulations that were approved implementing AMs for Caribbean Council-managed species are inconsistent with the FMP. The Council and NMFS need to correct that legal inconsistency.

This comprehensive amendment to the four Council FMPs proposes to correct that issue. The alternatives considered include taking no action (**Alternative 1**), modifying the language in the Council FMPs to reflect the regulatory language (**Preferred Alternative 2**), and modifying the regulatory language (and the effective application of AMs) to reflect the approach described in the FMPs (**Alternative 3**).

The following section provides a summary of the process to apply AMs in the U.S. Caribbean EEZ, as implemented on January 30, 2012 (FR 76 82404; FR 76 82414), and provides information about the fishery management units (FMUs) for which AM-based closures have been implemented.

Applicability of Accountability Measures

Accountability measures apply to all species managed by the Council, including prohibited corals and species with harvest moratoria (e.g., goliath and Nassau grouper). As described above, AMs require the NMFS' Assistant Administrator to reduce the length of the fishing season for a given species/species complex if it has been determined that prior year(s) landings exceeded the respective ACL. However, prohibited corals and species with harvest moratoria are not subject reductions in the length of the fishing season because, if an ACL is set equal to zero and the AM for the fishery is a closure that prohibits fishing for a stock, additional AMs are not required if (1) only small amounts of catch or bycatch occur, and (2) that catch or bycatch is unlikely to result in overfishing [see 50 C.F.R. § 310(g)(3)]. For purposes of ACL monitoring, a multi-year average of landings is used. The fishing season is shortened in the year following an overage determination by the length of time necessary to ensure the ACL is not again exceeded. Accountability

measure-based closures are designed to end on December 31st of the closure year and extend backward into the year for the number of days necessary to constrain harvest to the ACL. In calculating the length of the closure, NMFS assumes that the rate of harvest occurring in the most recent year represents the rate of fishing that will occur in the closure year, and that reducing the length of the fishing season will therefore decrease total landings.

If NMFS determines the ACL for a particular species/species complex has been exceeded, based upon a pre-defined average of landings, scientists (in consultation with managers) evaluate the cause of the overage prior to making a determination that actual landings exceeded the ACL. Specifically, they consider whether the reported increase represents an actual increase in landings or just improved data collection and monitoring. The intent of this evaluation is to eliminate any incentive for fishermen to under-report or misreport catches to avoid exceeding ACLs and triggering associated AMs. Fishers may fear that if they improve their reporting, reported landings will increase relative to the established baseline averages even though actual catch has not increased.

For the 2013 fishing season, NMFS determined that ACLs for several FMUs were exceeded based on an analysis of the average landings for previous years, triggering AMs to reduce the length of the fishing seasons by the amount necessary to ensure landings would not again exceed the assigned ACL for each of those FMUs. Thus in 2013, AM-based closures were implemented for the commercial sector of snapper unit 2 (SU2) in Puerto Rico, the recreational sector of wrasses in Puerto Rico, triggerfish and filefish (commercial and recreational) in St. Croix, spiny lobster (commercial and recreational) in St. Croix, and groupers (commercial and recreational) in St. Thomas/St. John (FR 78 18247) (Table 1.4.1).

For the 2014 fishing season, commercial harvest of SU2 in Puerto Rico was found to have again exceeded its assigned ACL based on the average of the three most recent years of available landings data (2010-2012). However, in this case AMs were not applied in 2014. Upon determination that an AM-based closure may be appropriate, the next step is to determine the length of that closure. The length of the closure depends on the catch rate in the most recent year for which landings are available. In the case of SU2, the needed length was determined to be zero days because the catch rate in the most recent year for which landings were available (2012) had decreased so substantially relative to the two previous years. Those two previous years drove average landings above the ACL, despite the substantial drop in effort and landings in that most recent year. Thus, the ACL was exceeded but the catch rate indicated it would not again be exceeded in the year following the determination, even with a full 365 days of commercial access to the resource.

Also for the 2014 fishing year, NMFS determined the Puerto Rico commercial

ACL for wrasses was exceeded, thus triggering an AM that reduced the length of the 2014 fishing season (79 FR 62575). Harvest was closed from October 20, 2014 through December 31, 2014 (Table 1.4.1), again based on the catch rate for that complex in the most recent available year (2012).

None of the FMUs in St. Croix, St. Thomas/St. John, Puerto Rico's recreational sector, or U.S. Caribbean-wide exceeded their corresponding ACLs, and AMs were not triggered in those areas during 2014.

Accountability measure-based closures were not required in 2015 in Puerto Rico, St. Croix, St. Thomas/St. John, or for Caribbean-wide FMUs.

Table 1.4.1. Accountability measure-based closures applied in the U.S. Caribbean exclusive economic zone since the implementation of accountability measures in 2012.

Fishery Management Unit	Island/Island Group	Length of AM closure
Snapper Unit 2 (Commercial)	Puerto Rico	Sep 21 – Dec 31, 2013
Wrasses (Recreational)	Puerto Rico	Oct 21 – Dec 31, 2013
Triggerfish and Filefish (Commercial and Recreational combined)	St. Croix, USVI	Nov 21 – Dec 31, 2013
Spiny Lobster (Commercial and Recreational combined)	St. Croix, USVI	Dec 19 – 31, 2013
Groupers (Commercial and Recreational combined)	St. Thomas/St. John, USVI	Dec 20 – 31, 2013
Wrasses (Commercial)	Puerto Rico	Oct 20 – Dec 31, 2014

* No AM-based closures were required in 2015 in Puerto Rico, St. Croix, St. Thomas/St. John, or for Caribbean-wide FMUs

Purpose for Action

The purpose of this action is to resolve inconsistencies between language in the Reef Fish, Queen Conch, Spiny Lobster, and Corals and Reef Associated Plants and Invertebrates fishery management plans (FMPs), as amended in 2012, and language in 50 CFR Part 622 describing the application of accountability measures (AMs) in the Caribbean exclusive economic zone.

Need for Action

The National Marine Fisheries Service and the Caribbean Fishery Management Council need to correct this inconsistency to ensure the regulations are consistent with their authorizing FMP and to ensure AMs for species or species complexes that exceed their annual catch limit in a particular year are appropriately applied.

1.5 Management History

A summary of federal fishery management actions implemented through 2011, for managed species in the U.S. Caribbean Reef Fish, Queen Conch, Corals and Reef Associated Plants and Invertebrates, and Spiny Lobster FMPs, can be found in the 2010 and 2011 Caribbean ACL Amendments (CFMC 2011a, b) and is incorporated herein by reference.

2005 Caribbean Sustainable Fisheries Act (SFA) Amendment (CFMC 2005)

The Comprehensive Amendment to the FMPs of the U.S. Caribbean to address required provisions of the Magnuson-Stevens Act (2005 Caribbean SFA Amendment) included a supplemental environmental impact statement (SEIS), regulatory impact review (RIR), and regulatory flexibility analysis (RFA) (CFMC 2005). Regulations were implemented in November 2005 (70 FR 62073). The amendment accomplished the following:

- Redefined the FMUs for the four FMPs;
- Established seasonal closures;
- Imposed gear restrictions and requirements;
- Established biological reference points and stock status criteria;
- Established rebuilding schedules and strategies to end overfishing and rebuild overfished stocks. The amendment established rebuilding plans for overfished units: grouper unit (GU)1, GU2, GU4, and queen conch;

- Designated essential fish habitat (EFH) and habitat areas of particular concern (HAPCs); and minimized adverse impacts on such habitat to the extent practicable.

2010 Caribbean ACL Amendment (CFMC 2011a)

Amendment 2 to the FMP for the Queen Conch Fishery of Puerto Rico and the USVI and Amendment 5 to the Reef Fish FMP of Puerto Rico and the USVI (2010 Caribbean ACL Amendment), including EIS, RIR**,** and RFA (CFMC 2011a) became effective on January 30, 2012 (76 FR 82404) and accomplished the following:

- Amended the unit composition in the Reef Fish FMUs;
- Revised management reference points (maximum sustainable yield, optimum yield, overfishing limit, allowable biological catch) for snapper, grouper, parrotfish, and queen conch in the U.S. Caribbean;
- Established island-specific ACLs and AMs in response to harvesting activities on a single island (Puerto Rico, St. Croix) or island group (St. Thomas/St. John) while minimizing the effects of fishing activities on the other islands or island groups;
- Established separate ACLs for each of the commercial and recreational sectors for the Puerto Rico EEZ management area, an area where landings data are available for both the commercial and recreational sectors;
- Set management measures with specific emphasis on harvest prohibition for three parrotfish species (midnight, blue, rainbow) that serve an essential ecological function and that are relatively long-lived;
- Established recreational bag limits for snappers, groupers, and parrotfishes.
- Provided guidelines for triggering AMs and applying those AMs;
- Established framework provisions separately for the Reef Fish and Queen Conch FMPs.

2011 Caribbean ACL Amendment (CFMC 2011b)

Amendment 6 to the Reef Fish FMP, Amendment 5 to the FMP for the Spiny Lobster Fishery, Amendment 3 to the FMP for the Queen Conch Resources, and Amendment 3 to the Coral FMP of Puerto Rico and the USVI (2011 Caribbean ACL Amendment), including an EIS, Biological Assessment, RIR, RFA, and Social Impact Assessment (CFMC 2011b) became effective on January 29, 2012 (76 FR 82414) and accomplished the following:

- Established ACLs and AMs for reef fish and spiny lobster, and for aquarium trade species in the Reef Fish and Coral FMPs that were not determined to be undergoing overfishing.
- Allocated ACLs among island management areas;
- Established recreational bag limits for reef fish and spiny lobster;

- Removed eight conch species from the Queen Conch FMP;
- Established framework procedures for the Spiny Lobster FMP and modified framework measures for the Coral FMP;
- Revised management reference points and status determination criteria for selected reef fish, spiny lobster, and aquarium trade species.

1.5.1 Recent Council Actions

Caribbean actions implemented in 2013 affected the Coral, Queen Conch, and Reef Fish FMPs. Updated management histories for these FMPs can be found in: Amendment 4 to the Coral FMP (CFMC 2013a), Regulatory Amendment 2 to the Queen Conch FMP (CFMC 2013b), and Regulatory Amendment 4 to the Reef Fish FMP (CFMC 2013c), respectively. The new management measures in these amendments are summarized below. There have been no new actions affecting the Spiny Lobster FMP since the 2011 Caribbean ACL Amendment. A complete list of current management measures for Council-managed species can be found in Appendix B.

CORALS AND REEF ASSOCIATED PLANTS AND INVERTEBRATES

Amendment 4 to the Coral FMP of Puerto Rico and the USVI, including an Environmental Assessment (EA), RIR, RFA, and Fisheries Impact Statement (CFMC 2013a)

Amendment 4 removed seagrass species from the Coral FMP. The final rule implementing this amendment published in the *Federal Register* on June 4, 2013 (78 FR 33255), with an effective date of July 5, 2013. In this amendment, the Council determined that federal management of seagrass species was unnecessary because there is no known harvest of seagrasses, and these species occur predominantly in Puerto Rico commonwealth and USVI territorial waters. In addition, seagrasses are designated as EFH and HAPCs in all of the Council FMPs, and would continue to be protected by these designations.

QUEEN CONCH

Regulatory Amendment 2 to the Queen Conch FMP of Puerto Rico and the USVI, including an EA, RIR, and RFA (CFMC 2013b).

This regulatory amendment modified the commercial trip limit for the harvest of queen conch, in those U.S. Caribbean federal waters where queen conch harvest is allowed, to be compatible with the trip limit in USVI territorial waters. The final rule published in the *Federal Register* on September 12, 2013 (78 FR 56171), with an effective date of October 15, 2013. Regulatory Amendment 2 modified the commercial trip limit in federal waters open to queen conch harvest from 150 queen conch per licensed commercial fisher per day to 200 queen conch per vessel per day. The recreational bag limit for the harvest of queen conch in the U.S. EEZ remained the same.

REEF FISH

Regulatory Amendment 4 to the Reef Fish FMP of Puerto Rico and the USVI (Regulatory Amendment 4), including an EA, RIR, and RFA (CFMC 2013c).

Regulatory Amendment 4 established minimum size limits for parrotfish harvest in federal waters off St. Croix, USVI. It did not establish minimum size limits in federal waters off Puerto Rico and St. Thomas/St. John. The final rule published in the *Federal Register* on July 30, 2013 (78 FR 45894), with an effective date of August 29, 2013. Measures in Regulatory Amendment 4 included:

- A commercial and recreational minimum size limit of 8 inches fork length for redband parrotfish (*Sparisoma aurofrenatum*).
- A commercial and recreational minimum size limit of 9 inches fork length for all other allowable parrotfish species: redfin parrotfish (*Sparisoma rubripinne),* redtail parrotfish (*S. chrysopterum*, stoplight parrotfish (*S. viride),* princess parrotfish (*Scarus taeniopterus),* queen parrotfish (*Scarus vetula),* and striped parrotfish (*Scarus iserti*).

Chapter 2. Proposed Action and Alternatives

2.1 What is the Proposed Action?

ACTION: Resolve inconsistencies between language in the Reef Fish, Queen Conch, Spiny Lobster, and Corals and Reef Associated Plants and Invertebrates (Coral) fishery management plans (FMPs) and language in 50 CFR Part 622 describing the application of accountability measures (AMs) in the U.S. Caribbean exclusive economic zone (EEZ).

2.2 List of Alternatives

Alternative 1: No Action. Do not modify the language describing AM applicability in the Caribbean Fishery Management Council (Council) FMPs or in CFR 50 Part 622. Text describing the application of AMs in the Council FMPs would continue to be inconsistent with the regulations and with the Council's approach for implementing AMs in the U.S. Caribbean EEZ.

Alternative 2: **Preferred** Revise the language describing AM applicability in the Council FMPs to reflect the language in the implementing regulations at CFR 50 Part 622. The length of the fishing season for the applicable species or species group that exceeded the annual catch limit (ACL) will be reduced the year following the AM trigger determination by the amount necessary to ensure landings do not again exceed the applicable ACL and the reduced fishing season will remain in effect only during the year in which it is implemented. The statement "The needed changes will remain in effect until modified by the Council" will be removed from the four Council FMPs.

Alternative 3: Modify the AM language in the implementing regulations at CFR 50 Part 622 to reflect language in the Council FMPs, as amended in 2012. The length of the fishing season for the applicable species or species group that exceeded the ACL will be reduced the year following the AM trigger determination by the amount necessary to ensure landings do not again exceed the applicable ACL and the reduced fishing season will remain in effect unless or until modified by the Council.

2.2.1 Discussion of the Proposed Action and Alternatives

In the following sections, the terms fishery management unit (FMU) and species/species complex are used interchangeably.

Alternative 1 is the no action alternative and establishes the administrative baseline. This alternative would continue to apply AMs as described in Chapter 1, Section 1.4. However, **Alternative 1** would not resolve the existing inconsistency between language in the four Council FMPs and the implementing regulations at 50 CFR Part 622 regarding inter-annual continuation of Council implemented AMs. Language in the Council FMPs, as amended in 2012, states that AM-based closures will remain in place until modified by the Council, thus carrying over from year to year until formally changed through subsequent Council action. The applicable regulations at 50 CFR Part 622 contain no such language, and AM-based closures are effective only during the year in which they are implemented.

Preferred Alternative 2 would revise the Coral, Spiny Lobster, Queen Conch, and Reef Fish FMPs to be consistent with the regulations at CFR 50 Part 622. **Preferred Alternative 2** would remove the statement "The needed changes will remain in effect until modified by the Council" from the description of AM applicability contained in the FMPs. As mentioned above, this is the language included in the FMPs, as amended in the 2010 and 2011 Caribbean ACL Amendments, that is inconsistent with language in the federal regulations implementing those FMPs at 50 CFR Part 622. **Preferred Alternative 2** is the status quo alternative and would not change the way the Council and the National Marine Fisheries Service (NMFS) currently apply AMs in the U.S. Caribbean EEZ (see AMs applicability description in Chapter 1, Section 1.4). Under the current approach, AMs stay in effect until the last day of the year they were applied. Under **Preferred Alternative 2**, ACLs would continue to be reviewed annually relative to a moving multi-year average as described in the FMPs and in 50 CFR Part 622, and the length of the fishing season for any species/species complex that exceeded the ACL would be reduced the year following the AM trigger determination by the amount necessary to ensure landings do not again exceed the applicable ACL. The 2010 and 2011 Caribbean ACL Amendments discuss AMs and their applicability and are incorporated herein by reference.

Alternative 3 would revise the current process for implementing AMs in the U.S. Caribbean EEZ and would also modify federal regulations at 50 CFR Part 622 to align them with language included in the Coral, Spiny Lobster, Queen Conch, and Reef Fish FMPs as amended in 2012, regarding AMs remaining in place until modified by the Council. Under **Alternative 3,** the Council would continue to review ACLs annually relative to a moving multi-year average as described in the FMP and 50 CFR Part 622. However, in contrast to **Preferred Alternative 2**, the rulemaking that implemented AMs in response to an ACL overage would maintain those AMs in effect indefinitely, unless and until they were changed by the Council/NMFS through a

subsequent rulemaking. For example, if AMs were applied for a particular species/species complex from September 1st through December 31st of a particular year, then that same closure would apply in subsequent years unless and until changed by the Council/NMFS with further regulatory action.

Under an **Alternative 3** scenario, if an ACL overage occurred for that species/species complex in a subsequent year despite the AM being in place, then the Council and NMFS would need to implement another more restrictive and equally indefinite AM to address that overage. If on the contrary, the AM closure caused the annual harvest to fall below the ACL in a subsequent year for that species/species complex, then fishers would be prevented from harvesting the entire ACL. As a result, fishers could potentially be prevented from achieving the optimum yield, although more fish would be left in the water. In this situation, the Council could consider another amendment to the FMPs and rulemaking to redefine the AM.

The following are examples of potential scenarios under **Alternative 3**. Table 1.4.1 in Section 1.4 of this amendment lists the FMUs that had AMs applied since 2013. In 2013, snapper unit 2 (SU2) FMU for the Puerto Rico commercial sector experienced an AM closure from September 21 through December 31. During the year of AM implementation (2013), reported landings for SU2 stayed below the ACL (Table 2.2.1.1). If the AM application process under **Alternative 3** was in place, then that same AM closure would have been applied during the following year (September 21 through December 31, 2014), an unnecessary closure that could potentially prevent SU2 from harvesting the entire ACL. In contrast, if in the following year after the AM implementation the ACL was again exceeded (based on a multi-year average of landings) despite having the AM closure, then the Council would have had to consider more restrictive measures.

Other FMUs that experienced AMs in the fishing years 2013 or 2014 are listed in Table 2.2.1.1. None of the FMUs for which AMs were applied in the 2013 fishing year experienced ACL overages in subsequent years. The only exception is Puerto Rico commercial SU2, for which an ACL overage was determined based on the average of 2010-2012 that would have triggered AMs in 2014. However, as described on Section 1.4, AMs were not applied to SU2 in 2014 because the most recent information on fishing effort indicated catch rates had declined and were not considered likely to exceed the ACL. If for all of these FMUs in Table 2.2.1.1 the AMs applied in the past would have been applied in subsequent years as proposed under **Alternative 3**, the closure for these species would have been unnecessary, potentially preventing those fisheries from harvesting the entire ACL.

Biological, social, economic, and administrative effects for each of the three proposed alternatives are discussed in Chapter 4.

Based on the history of AM application since their implementation in 2012 (Table 1.4.1) and trends in recent landings (Tables 2.2.1.1 through 2.2.1.8), the application of AMs for Council-managed species is expected to be infrequent. For reference purposes, the following section summarizes recent landings for Council-managed species and provides the ACL value for each FMU.

Recent landings for Species/Species Complexes Managed by the Caribbean Council

Although updated reporting forms and other tools may better enable fishers to provide information regarding where they harvest fish, information on how much of the reported landings is taken from federal versus state waters off Puerto Rico and the USVI is still largely unknown. Therefore, reported landings represent the combined landings from state and federal waters unless stated otherwise. The following tables provide the most recent reported landings, in whole weight, for the Council's FMUs. For purposes of this amendment, the tables for each of Puerto Rico (commercial and recreational sectors), St. Thomas/St. John, St. Croix, and U.S. Caribbean-wide FMUs include only those landings years subsequent to the implementation of AMs, as discussed in Section 1.4 of this amendment. These tables also include the ACL for each FMU. Fishery management units are shown in two groups: those species/species complexes addressed in the 2010 Caribbean ACL Amendment (Tables 2.2.1.2, 2.2.1.4, 2.2.1.6; CFMC 2011a), which were identified as undergoing overfishing during amendment development, and those species/species complexes addressed in the 2011 Caribbean ACL Amendment (Tables 2.2.1.3, 2.2.1.5, 2.2.1.7, 2.2.1.8; CFMC 2011b), which were not identified as undergoing overfishing during amendment development. A full list of species/species complexes by FMP is included in Table 3.2.1.1 in Chapter 3.

Table 2.2.1.1. Comparison of average reported landings evaluated for fishing years 2013-2015 for some FMUs in Puerto Rico and the USVI that experienced AMs and ACL overages in one or more years, ACL values in pounds (lbs) of whole weight, and where applicable, ACL overages (lbs) and length of closure.

Fishery Management Unit	Island/Sector	ACL (lbs)	Fishing Year 2013		Fishing Year 2014		Fishing Year 2015	
			Landings years evaluated and average landings (lbs)[1, 2]	ACL Overage (lbs)	Landings years evaluated and average landings (lbs)	ACL Overage (lbs)	Landings years evaluated and average landings (lbs)	ACL Overage (lbs)
Snapper Unit 2 (SU2)	Puerto Rico Commercial	**145,916**	2010-2011 277,979	132,063 *102 days*	2010-2012 248,830	102,914 No closure[3]	2011-2013 136,646	0
Wrasses	Puerto Rico Recreational	**5,050**	2011 5,539	489 *72 days*	2011-2012 4,338	0	2011-2013 3,128	0
Triggerfish & Filefish	STX All sectors	**24,980**	2011 26,453	1,473 *41 days*	2011-2012 24,554	0	2011-2013 21,024	0
Spiny Lobster	STX All sectors	**107,307**	2011 109,708	2,401 *13 days*	2011-2012 98,334	0	2011-2013 85,365	0
Groupers	STT/STJ All sectors	**51,849**	2010-2011 56,833	4,984 *12 days*	2010-2012 51,720	0	2011-2013 44,419	0
Wrasses	Puerto Rico Commercial	**54,147**	*NA*	*NA*	2011-2012 61,635	7,488 *73 days*	2011-2013 46,044	0

[1] Average landings of multiple years or landings for a single year were used to determine ACL overages. The year(s) used varies depending on if the FMU was addressed in the 2010 Caribbean ACL Amendment (e.g., snapper, groupers) (monitoring of landings started in 2010) or if it was addressed in the 2011 Caribbean ACL Amendment (e.g., wrasses, triggerfish and filefish, spiny lobster, wrasses) (monitoring of landings started in 2011). For 2014 and 2015 fishing year ACL overage determinations, the landings years used depended on the best data available when making those determinations.

[2] Average landings values may vary depending on the data set used to extract landings. For preliminary determinations for the 2015 fishing year, only for purposes of the analysis contained within this amendment, the most recent landings data was used and these are listed below in tables 2.2.1.2 through 2.2.1.7. These values may be different from landings used to make determinations on previous years.

[3] For the 2014 fishing season, although commercial harvest of SU2 in Puerto Rico was found to have again exceeded its assigned ACL based on the average of the three most recent years of available landings data (2010-2012), AMs were not applied because the most recent information (year 2013) on fishing effort indicated catch rates had reduced and were not likely to exceed the ACL.

Table 2.2.1.2. Puerto Rico commercial and recreational landings in pounds of whole weight for the years 2010-2013 for species/species complexes addressed in the 2010 Caribbean ACL Amendment (i.e., snappers, queen conch, groupers, parrotfish) and corresponding ACLs. Landings are combined harvest from federal and state waters. (Source: SEFSC, May 2015 Dataset).

FMU	2010		2011		2012		2013		ACL	
	Comm	Rec	Comm	Rec	Comm	Rec	Comm	Rec	**Comm**	**Rec**
Queen Conch[1]	273,459	--	235,614	--	238,699	--	203,038	--	**0**	--
SU 1	276,528	42,068	148,684	33,477	126,288	36,456	101,209	27,361	**284,685**	**95,526**
SU 2	384,877	10,169	218,804	0	109,544	7,379	81,590	0	**145,916**	**34,810**
SU 3	174,108	35,193	167,478	20,935	153,795	41,069	107,103	90,168	**345,775**	**83,158**
SU 4	215,404	10,147	151,218	9,343	145,690	17,249	105,219	3,247	**373,295**	**28,509**
Grouper	92,162	21,506	59,767	7,863	48,873	18,677	35,426	4,558	**177,513**	**77,213**
Parrotfish	43,909	10,498	38,336	10,656	38,910	9,675	33,930	9,597	**52,737**	**15,263**

[1] Queen conch landings data are provided only for informational purposes as harvest of queen conch is prohibited in Puerto Rico federal waters. Recreational landings data for queen conch are not collected, therefore are not known.

Table 2.2.1.3. Puerto Rico commercial and recreational landings in pounds of whole weight for 2011-2013 for species/species complexes addressed in the 2011 Caribbean ACL Amendment and corresponding ACLs. Landings are combined harvest from federal and state waters. (Source: SEFSC, May 2015 Dataset).

FMU	2011		2012		2013		ACL	
	Comm	Rec	Comm	Rec	Comm	Rec	**Comm**	**Rec**
Angelfish	0	167	0	0	0	379	**8,984**	**4,492**
Boxfish	40,364	2,457	30,665	1,397	21,646	1,571	**86,115**	**4,616**
Goatfishes	6,856	280	9,671	139	4,886	0	**17,565**	**362**
Grunts	40,074	2,108	22,647	3,603	14,574	715	**182,396**	**5,028**
Jacks	35,546	31,477	25,177	57,683	22,568	29,183	**86,059**	**51,001**
Scups & Porgies	19,754	1,899	23,797	1,653	12,582	155	**24,739**	**2,577**
Spiny Lobster[1]	274,271	--	275,803	--	194,489	NA	**327,920**	--
Squirrelfish	6,760	774	5,860	370	4,327	0	**16,663**	**3,891**
Surgeonfish	0	0	0	0	0	0	**7,179**	**3,590**

Triggerfish & Filefish	50,801	1,970	46,885	12,965	43,186	2,429	**58,475**	**21,929**
Wrasses[2]	53,731	5,541	47,272	3,237	37,129	607	**54,147**	**5,050**

[1] Recreational landings for spiny lobster are not monitored, therefore are not known.
[2] Puerto Rico increased landings of wrasses in 2012 were attributed to increased reporting resulting from modifications to the reporting requirements from the Puerto Rico Department of Natural and Environmental Resources (PRDNER) in order for commercial fishermen to keep the fishing license active.

Table 2.2.1.4. St. Thomas/St. John commercial landings in pounds of whole weight for 2010-2013 and corresponding ACL for species/species complexes addressed in the 2010 Caribbean ACL Amendment. Landings are combined harvest from federal and state waters. (Source: SEFSC, May 2015 Dataset).

FMU	St. Thomas/St. John (STT/STJ) Landings and Annual Catch Limit				
	2010	**2011**	**2012**	**2013**	**ACL**
Queen Conch	1,577	1,930	592	88	**0**
Snapper	121,186	76,259	53,966	36,463	**133,775**
Grouper	60,806	53,170	41,412	38,675	**51,849**
Parrotfish	34,010	23,289	17,224	17,653	**42,500**

[1] Queen conch landings data are provided only for informational purposes as harvest of queen conch is prohibited in St. Thomas/St. John federal waters.

Table 2.2.1.5. St. Thomas/St. John commercial landings in pounds of whole weight for 2011-2013 and corresponding ACL for species/species complexes addressed in the 2011 Caribbean ACL Amendment. Landings are combined harvest from federal and state waters. (Source: SEFSC, May 2015 Dataset).

FMU	St. Thomas/St. John (STT/STJ) Landings and Annual Catch Limit			
	2011	**2012**	**2013**	**ACL**
Angelfish[1]	18,337	16,077	16,202	**7,897**
Boxfish	15,757	12,303	10,975	**27,880**
Goatfishes	17	1	34	**320**
Grunts	25,402	16,113	11,562	**37,617**
Jacks	35,049	45,551	25,430	**52,907**
Scups & Porgies	8,498	144	45	**21,819**
Spiny Lobster	84,302	83,157	84,233	**104,199**
Squirrelfish[1]	6,510	9,817	9,502	**4,241**

FMU	St. Thomas/St. John (STT/STJ) Landings and Annual Catch Limit			
	2011	2012	2013	ACL
Surgeonfish	19,294	15,093	12,575	**29,249**
Triggerfish & Filefish	57,067	46,047	45,039	**74,447**
Wrasses[1]	1,959	1,823	1,903	**585**

[1] St. Thomas/St. John increased landings of angelfish, squirrelfish, and wrasses were attributed to enhanced reporting resulting from modifications to the reporting forms that started in 2011.

Table 2.2.1.6. St. Croix commercial landings in pounds of whole weight for 2010-2013 and corresponding ACL for species/species complexes addressed in the 2010 Caribbean ACL Amendment. Landings are combined harvest from federal and state waters. (Source: SEFSC, May 2015 Dataset).

FMU	St. Croix (STX) Landings and Annual Catch Limit				
	2010	2011	2012	2013	ACL
Queen Conch	81,917	53,210	36,771	21,431	**50,000**
Snapper	92,354	84,485	67,520	65,371	**102,946**
Grouper	29,117	30,800	29,866	22,977	**30,435**
Parrotfish	162,623	154,531	118,861	107,437	**240,000**

Table 2.2.1.7. St. Croix commercial landings in pounds of whole weight for 2011-2013 and corresponding ACL for species/species complexes addressed in the 2011 Caribbean ACL Amendment. Landings are combined harvest from federal and state waters. (Source: SEFSC, May 2015 Dataset).

FMU	St. Croix (STX) Landings and Annual Catch Limit			
	2011	2012	2013	ACL
Angelfish[1]	8,510	14,266	8,890	**305**
Boxfish	5,335	1,819	1,755	**8,433**
Goatfishes	712	529	339	**3,766**
Grunts	34,418	24,772	18,644	**36,881**
Jacks	10,341	8,355	14,563	**15,489**
Scups & Porgies	2,479	146	59	**4,638**

FMU	St. Croix (STX) Landings and Annual Catch Limit			
	2011	**2012**	**2013**	**ACL**
Spiny Lobster	109,751	86,947	59,398	**107,307**
Squirrelfish[1]	746	599	490	**121**
Surgeonfish	32,187	21,242	12,641	**33,603**
Triggerfish & Filefish	26,464	22,658	13,950	**24,980**
Wrasses[1]	49	24	3	**7**

[1] St. Croix increased landings of angelfish, squirrelfish, and wrasses were attributed to enhanced reporting resulting from modifications to the reporting forms that started in 2011.

Table 2.2.1.8. Caribbean-wide landings in pounds of whole weight for 2011-2013 and corresponding ACL for the tilefish and aquarium trade species FMUs. Landings are combined harvest from federal and state waters. (Source: SEFSC, May 2015 Dataset).

Caribbean-Wide Landings				
FMU	**2011**	**2012**	**2013**	**ACL**
Tilefish	116	231	187	**14,642**
Aquarium Trade Species	1,499	1,469	299	**8,155**

Chapter 3. Affected Environment

The action considered in this comprehensive amendment and associated environmental assessment would affect the U.S. Caribbean exclusive economic zone (EEZ) of Puerto Rico and the U.S. Virgin Islands (USVI) (Figure 3.1.1). Species affected by the action in this comprehensive amendment include all species included in the Reef Fish, Queen Conch, Corals and Associated Plants and Invertebrates (Coral FMP), and Spiny Lobster Fishery Management Plans (FMPs) of Puerto Rico and the USVI.

The affected environment is divided into five major components:

- **Physical / Habitat Environment** (Section 3.1)
  General description of physical environment and habitat (essential fish habitat)
- **Biological and Ecological Environment** (Section 3.2)
  Examples include description of the affected species and protected species
- **Description of the Fisheries** (Section 3.3)
  Examples include descriptions of the commercial and recreational fisheries in the U.S. Caribbean
- **Economic and Social Environment** (Section 3.4)
  Examples include fishing communities and economic description of the fisheries
- **Administrative Environment** (Section 3.5)
  Example includes the fishery management process

The physical, biological, economic, social, and administrative environments have been described in detail in the 2010 and 2011 Caribbean Annual Catch Limit (ACL) Amendments (CFMC 2011a, b) and associated environmental impact statements (EIS), and in the most recent Caribbean actions affecting reef fish, queen conch, and coral resources including Regulatory Amendment 4 to the Reef Fish FMP (CFMC 2013c), Regulatory Amendment 2 to the Queen Conch FMP (CFMC 2013b), and Amendment 4 to the Coral FMP (CFMC 2-13a). Information from these documents is incorporated herein by reference. These documents can be found on the National Marine Fisheries Service (NMFS) Sustainable Fisheries, Caribbean Branch website, http://sero.nmfs.noaa.gov/sustainable_fisheries/caribbean/index.html. Summaries of the affected environment can be found in Sections 3.1 through 3.5.

3.1 Physical/Habitat Environment

The physical (including geology and climate) and habitat environments of the U.S. Caribbean were described in detail in the Generic Essential Fish Habitat (EFH) Amendment to FMPs of the U.S. Caribbean, the EFH Final Environmental Impact Statement (EFH-FEIS) (CFMC 1998, 2004), the Five -Year review of EFH in the U.S. Caribbean, Vols.1 and 2 (CFMC 2011c), and Regulatory Amendment 2 to the Queen Conch FMP (CFMC 2013a). These documents are incorporated herein by reference and are summarized below.

The U.S. Caribbean is located in the eastern portion of the Caribbean archipelago, about 1,770 kilometers (km) (1,100 miles [mi]) east-southeast of Miami, Florida (Olcott 1999). It comprises the Commonwealth of Puerto Rico in the Greater Antilles and the Territory of the USVI in the Lesser Antilles island chain (Figure 3.1.1), both of which separate the Caribbean Sea from the western central Atlantic Ocean. The U.S. Caribbean EEZ covers an area of approximately 196,029 square kilometers (km^2) (75,687 square miles [mi^2]).

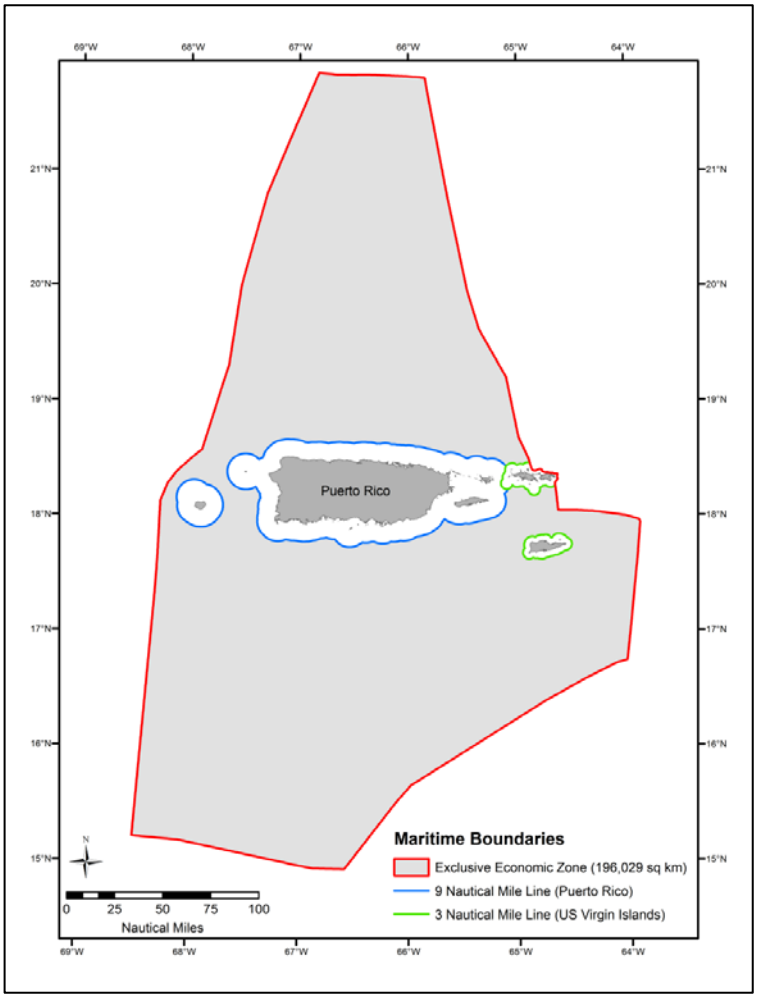

Figure 3.1.1. Boundaries of the U.S. Caribbean EEZ, Puerto Rico waters, and USVI waters.
(Source: NMFS 2014)

The USVI are part of the Virgin Islands chain, which lies in the northeastern Caribbean about 80 km (50 miles) east of Puerto Rico (mainland). The USVI consist of four major islands, St. Thomas, St. John, St. Croix, and Water Island, and about 50 cays (DPNR 2005). Together, the USVI constitutes approximately 347 km^2 (134 mi^2) of land area (Catanzaro et al. 2002).

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 83 km^2 (32 mi^2) and 52 km^2 (20 mi^2) (Catanzaro et al. 2002). The shelf shared by the islands of St. Thomas and St. John has an area of approximately 1,751 km^2 (510 nm^2) with most of the shelf more than 24.4 m (80 ft) deep (Kojis and Quinn 2012).

The island of St. Croix is located about 74 km (46 mi) south of St. Thomas and St. John (CFMC 2004). Covering about 207 km^2 (80 mi^2), St. Croix is entirely surrounded by the Caribbean Sea. The island of St. Croix lies on a different geological platform than the islands of St. Thomas and St. John, and is separated from those islands by a 4 km (2.5 mi) deep trench (CFMC 2004) (Figure 3.1.2). The St. Croix shelf is much narrower and shallower than that of the northern islands (Goenaga and Boulon 1991), extending only 4 km (2.2 nm) wide in the south, less than 0.2 km (0.1 nm) wide on the northwest, and up to several nautical miles wide in the northeast and on Lang Bank (CFMC 2004; CFMC 2011a). In total, the St. Croix shelf has an area of approximately 343 km^2 (99 nm^2) (references in Gordon 2010) with most of the shelf less than 24.4 m (80 ft) deep (Kojis and Quinn 2012).

The island of Puerto Rico is almost rectangular in shape, about 177 by 56 km (110 by 35 mi), and is the smallest and the most eastern island of the Greater Antilles (CFMC 1998, Morelock et al. 2001). Its coast measures approximately 1,227 km (700 mi) 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 isolated islands without permanent populations. Deep ocean waters fringe Puerto Rico. The Mona Passage, which separates the island from Hispaniola to the west, is about 120 km (75 mi) wide and more than 1,000 m (3,300 ft) deep. Off the northern coast is the 8,500 m (28,000 ft) 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.

Puerto Rico shares the same shelf platform as St. Thomas and St. John, and that shelf also extends east to include the British Virgin Islands. The St. Croix platform connects through a deep submerged mountain range (including Grappler Bank and Investigador, among other banks in the EEZ) to the southeast platform of Puerto Rico (Figure 3.1.2).

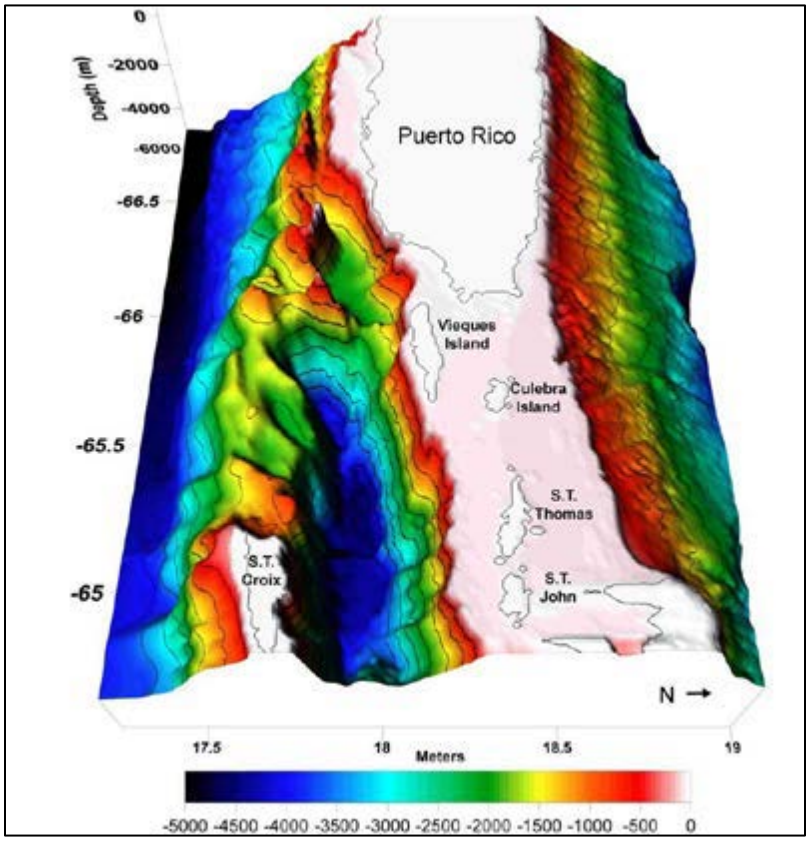

Figure 3.1.2. Shared platform between the east coast of Puerto Rico and St. Thomas/St. John. The deep trough between the Puerto Rico/St. Thomas/St. John platform and St. Croix is clearly seen in this graphic representation of depth (Source: García-Sais et al. 2005).

Habitat

A description of the major habitat types in the U.S. Caribbean EEZ, along with information on their ecological functions and condition, can be obtained in Section 3.2 of the EFH-FEIS (CFMC 2004) and in Section 5.1.3 of the Caribbean Sustainable Fisheries Act (SFA) Amendment (CFMC 2005), are incorporated herein by reference, and are summarized below. A description of the major habitat types of the USVI can be found in the USVI Marine Resources and Fisheries Strategic and Comprehensive Conservation Plan, prepared by the Department of Planning and Natural Resources (DPNR) of the USVI (DPNR 2005) and is incorporated herein by reference. A description of the major habitat types of Puerto Rico may be found in García-Sais et al. (2008).

The coastal marine environments of the USVI and Puerto Rico are characterized by a wide variety of habitat types. Kendall et al. (2001) delineated 21 distinct benthic habitats types. The EFH-FEIS (CFMC 2004) summarized the percent distribution for all habitats in the U.S. Caribbean from the 5,494 km^2 (2,121 mi^2) of total bottom area mapped from aerial photographs.

This total included both Puerto Rico (5,009 km^2 [1,934 mi^2]) and the USVI (485 km^2 [187 mi^2]), and covered from the shore line to about 20 m (66 ft) depth.

In the USVI, 24 km^2 (9 mi^2) of unconsolidated sediment, 161 km^2 (62 mi^2) of SAV, 2 km^2 (0.8 mi^2) of mangroves, and 300 km^2 (116 mi^2) of coral reef and hard bottom were mapped over an area of 485 km^2 (187 mi^2). In Puerto Rico, 49 km^2 (19 mi^2) of unconsolidated sediment, 721 km^2 (278 mi^2) of SAV, 73 km^2 (28 mi^2) of mangroves, and 756 km^2 (292 mi^2) of coral reef and colonized hard bottom were mapped (CFMC 2013).

Essential Fish Habitat (CFMC 2008; 2011c)

Essential fish habitat (EFH) is defined in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S. C. 1802(10)). Specific categories of EFH identified in Puerto Rico and the USVI, which are utilized by federally managed fish and invertebrate species, include both estuarine/inshore and marine/offshore areas. Specifically, estuarine/inshore EFH includes estuarine emergent and mangrove wetlands, submerged aquatic vegetation, intertidal flats, palustrine emergent and forested systems, and the estuarine water column. Additionally, marine/offshore EFH includes live/hard bottom habitats, coral and coral reefs, seagrass and algal plains, sand and shell substrate, and the marine water column. Essential fish habitat includes the spawning area in the water column above the adult habitat. EFH utilized by fish and invertebrate species in this region includes coral reefs, live/hard bottom, and submerged aquatic vegetation.

3.2 Biological and Ecological Environment

3.2.1 Description of the Species: Biology/Ecology

The biological environment of the U.S. Caribbean, including the species addressed in this comprehensive amendment, is described in detail in the 2010 and 2011 Caribbean ACL Amendments (CFMC 2011a, b). Species affected by the action in this amendment include species in the Reef Fish, Coral, Queen Conch, and Spiny Lobster FMPs. Species in these FMPs are managed as stocks or stock complexes in fishery management units (FMUs).

Table 3.2.1.1. Species included in the Reef Fish, Coral, Spiny Lobster, and Queen Conch FMPs.

Fishery Management Unit	
Reef Fish FMP	
Grouper Unit 1 Nassau grouper, *Epinephelus striatus*	**Goatfish FMU** Spotted goatfish, *Pseudupeneus maculatus;* Yellow goatfish, *Mulloidichthys martinicus*
Grouper Unit 2 Goliath grouper, *Epinephelus itajara*	**Tilefishes FMU** Blackline tilefish, *Caulolatilus cyanops* Sand tilefish, *Malacanthus plumieri*
Grouper Unit 3 Red hind, *Epinephelus guttatus*, coney *Cephalopholis fulvus*, rock hind, *Epinephelus adscensionis*, Graysby, *Cephalopolis cruentata*	**Scups and Porgies FMU** Jolthead porgy, *Calamus bajonado*, Sea bream, *Archosargus rhomboidalis*, Sheepshead porgy, *Calamus penna;* Pluma, *Calamus pennatula*
Grouper Unit 4 Black grouper *Mycteroperca bonaci*; Red grouper, *Epinephelus morio*, Tiger grouper, *Mycteroperca tigris*, Yellowfin grouper, *Mycteroperca venenosa*	**Squirrelfish FMU** Blackbar soldierfish, *Myripristis jacobus,* Bigeye, *Priacanthus arenatus*, Longspine squirrelfish, *Holocentrus rufus; S*quirrelfish, *Holocentrus adscensionis*
Grouper Unit 5 Misty grouper, *Epinephelus mystacinus*, Yellowedge grouper , *Epinephelus flavolimbatus*	**Surgeonfish FMU** Blue tang, *Acanthurus coeruleus*, Ocean surgeonfish, *Acanthurus bahianus;* Doctorfish, *Acanthurus chirurgus*
Snapper Unit 1 Black snapper, *Apsilus dentatus*; blackfin snapper, *Lutjanus buccanella*; Silk snapper , *Lutjanus vivanus*, Vermilion snapper *Rhomboplites aurorubens*, Wenchman, *Pristipomoides aquilonaris*	**Grunts FMU** White grunt, *Haemulon plumierii;* Margate, *Haemulon albu;* Tomtate, *Haemulon aurolineatum;* Bluestriped grunt, *Haemulon sciurus;* French grunt, *Haemulon flavolineatum;* Porkfish, *Anisotremus virginicus*
Snapper Unit 2 Cardinal snapper, *Pristipomoides macrophthalmus*, Queen snapper , *Etelis oculatus*	**Wrasses FMU** Hogfish, *Lachnolaimus maximus;* Puddingwife, *Halichoeres radiates;* Spanish hogfish, *Bodianus rufus*
Snapper Unit 3 Gray snapper, *Lutjanus griseus*, Lane snapper, *Lutjanus synagris*, Mutton snapper, *Lutjanus analis*, Dog snapper *Lutjanus jocu*, Schoolmaster , *Lutjanus apodus*, Mahogany snapper, *Lutjanus mahogoni*	**Jacks FMU** 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*
Snapper Unit 4 Yellowtail snapper, *Ocyurus chrysurus*	**Angelfish FMU** Queen angelfish, *Holacanthus ciliaris;* Gray angelfish, *Pomacanthus arcuatus;* French angelfish, *Pomacanthus paru*
Parrotfish Unit 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*	**Boxfish FMU** Honeycomb cowfish, *Acanthostracion polygonius* (formerly Lactophrys polygonia); Scrawled cowfish, *Acanthostracion quadricornis* (formerly *Lactophrys quadricornis*); Trunkfish, *Lactophrys trigonus;*

Fishery Management Unit	
chrysopterum, Stoplight parrotfish, *Sparisoma viride*, Redband parrotfish , *Sparisoma aurofrenatum*, Striped parrotfish, *Scarus iseri* (formerly *Scarus croicencis*)	Spotted trunkfish, *Lactophrys bicaudalis;* Smooth trunkfish, *Lactophrys triqueter*
Aquarium Trade Species[1]	**Triggerfish and Filefish FMU** Ocean triggerfish, *Canthidermis sufflamen;* Queen triggerfish, *Balistes vetula;* Sargassum triggerfish, *Xanthichthys ringens;* Black durgon, *Melichthys niger;* Scrawled filefish, *Aluterus scriptus;* Whitespotted filefish, *Cantherhines macrocerus*
Queen Conch FMP Queen conch, *Strombus gigas*	
Spiny Lobster FMP Spiny lobster, *Panulirus argus*	
Corals and Associated Plants and Invertebrates Prohibited corals and invertebrates[1] Aquarium Trade Species[1]	

[1]A comprehensive list of the species included in these FMUs can be found in 50 CFR Part 622, Appendix A to Part 622–-Species Tables, http://sero.nmfs.noaa.gov/sustainable_fisheries/policy_branch/documents/pdfs/current_50cfr622_regulations.pdf

A complete description of the life history characteristics and ecology of all Council-managed species can be found in the 2005 Caribbean SFA Amendment (CFMC 2005), the 2010 Caribbean ACL Amendment (CFMC 2011a), and the 2011 Caribbean ACL Amendment (CFMC 2011b), and is incorporated herein by reference. The most recent description of the biology and ecology of the parrotfish FMU can be found in Regulatory Amendment 4 to the Reef Fish FMP (CFMC 2013c). Regulatory Amendment 2 to the Queen Conch FMP has the most updated information for the queen conch in federal waters (CFMC 2013b). The biology and ecology of managed corals and reef associated plants and invertebrates were updated through Amendment 4 to the Coral FMP (CFMC 2013a).

3.2.2 Protected Species

At least 17 species of whales and dolphins have been reported in or near U.S. waters in the northeastern Caribbean (Mignucci-Giannoni 1998). All 17 are protected under the Marine Mammal Protection Act (MMPA). Four of these species (i.e., sperm, sei, fin, and humpback whales) are also listed as endangered under the Endangered Species Act (ESA) and are known to occur in this area. In addition to those marine mammals, four species of sea turtles (green, hawksbill, leatherback, and loggerhead), and seven coral species (elkhorn coral, staghorn coral [collectively "*Acropora*"], rough cactus coral, mountainous star coral, lobed star coral, boulder star coral, and pillar coral) are also protected under the ESA. Portions of designated critical

habitat for loggerhead, green, and leatherback sea turtles and for *Acropora* corals, also occur within the U.S. Caribbean. The potential impacts from the continued authorization of fishing under the Reef Fish, Coral, Spiny Lobster, and Queen Conch FMPs of Puerto Rico and the USVI on all ESA-listed species have been considered in previous ESA Section 7 consultations. Summaries of those consultations and their determination are in Appendix A. Those consultations indicate that one or more of those fisheries are likely to interact with sea turtles and *Acropora* coral and *Acropora* critical habitat; these entities are described briefly below. The non-*Acropora* corals listed above received federal protection in the fall of 2014. An evaluation of the impacts from the continued authorization of fishing under the Caribbean FMPs is underway for these species.

Green sea turtle hatchlings are thought to occupy pelagic areas of the open ocean and are often associated with *Sargassum* rafts (Carr 1987; Walker 1994). Pelagic stage green sea turtles are thought to be carnivorous. Stomach samples of these animals found ctenophores and pelagic snails (Frick 1976; Hughes 1974). At approximately 20 to 25 cm (7.9 to 9.8 in) carapace length, juveniles migrate from pelagic habitats to benthic foraging areas (Bjorndal 1997). As juveniles move into benthic foraging areas a diet shift towards herbivory occurs. They consume primarily seagrasses and algae, but are also know to consume jellyfish, salps, and sponges (Bjorndal 1980, 1997; Paredes 1969; Mortimer 1981, 1982). The diving abilities of all sea turtles species vary by their life stages. The maximum diving range of green sea turtles is estimated at 110 m (360 ft) (Frick 1976), but they are most frequently making dives of less than 20 m (65 ft) (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 (8.7-9.8 in) in straight carapace length (Meylan 1988; Meylan and Donnelly 1999). The pelagic stage is followed by residency in developmental habitats (foraging areas where juveniles reside and grow) in coastal waters. Little is known about the diet of pelagic stage hawksbills. Adult foraging typically occurs over coral reefs, although other hard-bottom communities and mangrove-fringed areas are occupied occasionally. Hawksbills show fidelity to their foraging areas over several years (van Dam and Diéz 1998). The hawksbill's diet is highly specialized and consists primarily of sponges (Meylan 1988). Gravid females have been noted ingesting coralline substrate (Meylan 1984) and calcareous algae (Anderes Alvarez and Uchida 1994), which are believed to be possible sources of calcium to aid in eggshell production. The maximum diving depths of these animals are not known, but the maximum length of dives is estimated at 73.5 minutes. More routinely, dives last about 56 minutes (Hughes 1974).

Leatherbacks are the most pelagic of all ESA-listed sea turtles and spend most of their time in the open ocean. Although, they will enter coastal waters and are seen over the continental shelf

on a seasonal basis to feed in areas where jellyfish are concentrated. Leatherbacks feed primarily on cnidarians (medusae, siphonophores) and tunicates. Unlike other sea turtles, leatherbacks' diets do not shift during their life cycles. Because leatherbacks' ability to capture and eat jellyfish is not constrained by size or age, they continue to feed on these species regardless of life stage (Bjorndal 1997). Leatherbacks are the deepest diving of all sea turtles. It is estimated that these species can dive in excess of 1000 m (3,280 ft) (Eckert et al. 1989) but more frequently dive to depths of 50 m to 84 m (174 to 276 ft) (Eckert et al. 1986). Dive times range from a maximum of 37 minutes to more routines dives of 4 to 14.5 minutes (Standora et al. 1984; Eckert et al. 1986; Eckert et al. 1989; Keinath and Musick 1993). Leatherbacks may spend 74% to 91% of their time submerged (Standora et al. 1984).

Acropora cervicornis and *Acropora palmata*, the only two species of acroporids in the Caribbean, are two of the major reef-building corals in the wider Caribbean. Elkhorn colonies form flattened to near-round branches that typically radiate outward from a central trunk that is firmly attached to the sea floor. Staghorn colonies are stag antler-like, with cylindrical, straight, or slightly curved branches. The branching morphology of these species provides important habitat for other reef organisms. Historically, both acroporid species formed dense thickets at shallow (<5 m [16 ft]) and intermediate (10 to 15 m [33 to 49 ft]) depths in many reef systems, including locations in the Florida Keys, western Caribbean (e.g., Jamaica, Cayman Islands, Caribbean Mexico, Belize), and eastern Caribbean. In the 1960s and 1970s in the USVI, elkhorn coral was the main reef-building coral at depths less than 10 m (33 ft) (Rogers et al. 2002). Elkhorn coral grew in nearly monospecific stands on the reef crest and in the upper and lower forereef zones of well-developed fringing and bank barrier reefs, as well as on isolated patch reefs (Rogers et al. 2002). The maximum range in depth reported for elkhorn coral is <1 to 30 m (<3.28 to 98 ft), but historic data for this coral in the USVI indicate that it was common at depths from 1 to 15 m (3.28 to 49 ft) (Bacle 2002; Rogers et al. 2008). The preferred habitat of elkhorn coral is the seaward face of a reef (turbulent shallow water), including the reef crest, and shallow spur-and-groove zone (Shinn 1963; Cairns 1982; Rogers et al. 1982). Historically, staghorn coral was reported from depths ranging from <1 to 60 m (<3.28 to 197 ft) (Goreau and Goreau 1973). It is suspected that 60 m (197 ft) is an extreme situation and that the coral is relatively rare below 20 m (66 ft) depth. The common depth range at which staghorn coral is currently observed is 5 to 17 m (16 to 56 ft). In the USVI, this species was abundant, but not often found in dense thickets or well-defined zones (Rogers et al. 2002); unlike in areas in the western Caribbean where this species was historically the primary constructor of mid-depth (10 to 15 m [33 to 49 ft]) reef terraces (Adey 1978).

Pillar coral (*Dendrogyra cylindrus*) forms cylindrical columns on top of encrusting bases. Colonies are generally grey-brown in color and may reach circa 10 ft (3 m) in height. Polyp tentacles remain extended during the day, giving columns a furry appearance. Pillar coral inhabits most reef environments in water depths ranging from ~3-75 ft (1-25 m), but it is most

common between ~15-45 ft (5-15 m) depth (Acosta and Acevedo 2006; Cairns 1982; Goreau and Wells 1967). Pillar coral is a gonochoric (separate sexes) broadcast spawning species with relatively low annual egg production for its size. Sexual recruitment of this species is low, and reported juvenile colonies in the Caribbean are lacking. Pillar coral can reproduce by fragmentation following storms or other physical disturbance. Average growth rates of 0.7-0.8 in (1.8-2.0 cm) per year in linear extension have been reported in the Florida Keys compared to 0.8 cm per year in Colombia and Curaçao. Feeding rates (removal of suspended particles in seawater) are low relative to most other Caribbean corals, indicating it is primarily a tentacle feeder rather than a suspension feeder. However, pillar coral has a relatively high photosynthetic rate, and it receives substantial amounts of energy from its symbiotic algae. Pillar coral is uncommon but conspicuous with scattered, isolated colonies. In monitoring studies, cover is generally less than 1%. At permanent monitoring stations in the USVI, pillar coral has been observed in low abundance at 10 of 33 sites and, where present, ranged in cover from less than 0.05-0.22% (Smith 2013). It is rarely found in aggregations.

Rough cactus coral (*Mycetophyllia ferox*) forms a thin, encrusting plate that is weakly attached. Maximum colony size is ~20 inches (50 cm) in diameter. It has been reported in reef environments in water depths of ~15 to 300 ft (5 to 90 m), including shallow and mesophotic habitats. Rough cactus coral is a hermaphroditic (simultaneously both sexes) brooding (fertilization occurs within the parent colony and grows for a period of time before release) species. Colony size at first reproduction is greater than 15 in^2 (100 cm^2). Recruitment of rough cactus coral appears to be very low, even in studies from the 1970s. Rough cactus coral has a lower fecundity compared to other species in its genus (Morales Tirado 2006). Over a 10 year period, no colonies of rough cactus coral were observed to recruit to an anchor-damaged site in the U.S. Virgin Islands although adults were observed on the adjacent reef (Rogers and Garrison 2001). Rough cactus coral is usually uncommon or rare, constituting less than 0.1% of all coral species at generally less than 1% of the benthic cover. Benthic cover of rough cactus coral in the Red Hind Marine Conservation District off St. Thomas, USVI, which includes mesophotic coral reefs, was 0.003 ± 0.004% in 2007, accounting for 0.02% of coral cover, and ranking 20th highest in cover out of 21 coral species (Nemeth et al. 2008; Smith et al. 2010). In the USVI between 2001 and 2012, cover of rough cactus coral appeared in 12 of 33 survey sites and accounted for 0.01% of the bottom, and 0.07% of the coral cover, ranking as 13th most common (Smith 2013).

Boulder star coral (*Orbicella franksi*) is one of the three species [mountainous star coral (*Orbicella faveolata*) and lobed star coral (*Orbicella annularis*) are the others] in the *Orbicella annularis* complex. These three species were formerly in the genus *Montastraea*; however, recent work has reclassified the three species in the *annularis* complex to the genus *Orbicella* (Budd et al. 2012). Boulder star coral is distinguished by large, unevenly arrayed polyps that give the colony its characteristic irregular surface. Colony form is variable, and the skeleton is

dense with poorly developed annual bands. Colony diameter can reach up to 16 ft (5 m) with a height of up to 6.5 ft (2 m). Boulder star coral tends to have a deeper distribution than the other two species in the *Orbicella* species complex. It occupies most reef environments and has been reported from water depths ranging from ~16-165 ft (5 to 50 m), with the species complex reported to 250 ft (90 m). *Orbicella* species are a common, often dominant, component of Caribbean mesophotic reefs, suggesting the potential for deep refugia for boulder star coral. Boulder star coral is hermaphroditic (simultaneously having both sexes) broadcast spawners, with spawning concentrated on 6 to 8 nights following the full moon in late August, September, or early October. Boulder star coral spawning is reported to be about one to two hours earlier than lobed star coral and mountainous star coral. Fertilization success measured in the field was generally below 15% for all three species being closely linked to the number of colonies concurrently spawning. In Puerto Rico, minimum size at reproduction for the star coral species complex was 13 in^2 (83 cm^2). Boulder star coral is reported as common. In the USVI, boulder star coral is the second most abundant species by percent cover at permanent monitoring stations. However, because the species complex, which is the most abundant by cover, was included as a category when individual *Orbicella* species could not be identified with certainty, it is likely that boulder star coral is the most abundant. Population estimates of boulder star coral in the ~19 square mile (49 km^2) Red Hind Marine Conservation District are at least 34 million colonies (Smith 2013). Abundance was stable between 1998-2008 at 9 sites off Mona and Desecheo Islands, Puerto Rico. In 1998, 4% of all corals at six sites surveyed off Mona Island were boulder star coral colonies in 1998 and approximately 5% in 2008; at Desecheo Island, about 2% of all coral colonies were boulder star coral in both 2000 and 2008 (Bruckner and Hill 2009).

Lobed star coral (*Orbicella annularis*) is one of the three species within the *Orbicella* complex. Lobed star coral colonies grow in columns that exhibit rapid and regular upward growth. Unlike the other two star coral species, margins on the sides of columns are typically dead. Live colony surfaces usually lack ridges or bumps. Lobed star coral is reported from most reef environments in depths of ~1.5-66 ft (0.5-20 m). The star coral species complex is a common, often dominant component of Caribbean mesophotic (deeper than ~100 ft) reefs, suggesting the potential for deep refuge across a broader depth range, but lobed star coral is generally described with a shallower distribution. Asexual fission and partial mortality can lead to multiple clones of the same colony. The percentage of unique genotypes is variable by location and is reported to range between 18% and 86% (14-82% are clones). Colonies in areas with higher disturbance from hurricanes tend to have more clonality. Although lobed star coral is still abundant, it may exhibit high clonality in some locations. Like the other species in the complex, lobed star coral is a hermaphroditic broadcast spawners, with spawning concentrated on 6-8 nights following the full moon in late August, September, or early October. Lobed star coral is reported to have slightly smaller egg size and potentially smaller size/age at first reproduction that the other two species of the *Orbicella* genus. In Puerto Rico, minimum size at reproduction for the star coral species complex was 12 in^2 (83 cm^2). Lobed star coral has been described as common overall.

Demographic data collected in Puerto Rico over nine years straddling the 2005 bleaching event showed that population growth rates were stable in the pre-bleaching period (2001–2005) but declined one year after the bleaching event. Population growth rates declined even further two years after the bleaching event, but they returned to stasis the following year. Lobed star coral is the third most abundant coral by percent cover in permanent monitoring stations in the USVI. A decline of 60% was observed between 2001 and 2012 primarily due to bleaching in 2005. However, most of the mortality was partial mortality, and colony density in monitoring stations did not change (Smith 2013). At nine sites off Mona and Desecheo Islands, Puerto Rico, no species extirpations were noted at any site over 10 years of monitoring between 1995 and 2008. In 1998, 8% of all corals at six sites surveyed off Mona Island were lobed star coral colonies, dipping to approximately 6% in 2008. At Desecheo Island, 14% of all coral colonies were lobed star coral in 2000 while 13% were in 2008 (Bruckner and Hill 2009).

Mountainous star coral (*Orbicella faveolata*) is one of the three species within the *Orbicella* complex. Mountainous star coral grows in heads or sheets, the surface of which may be smooth or have keels or bumps. The skeleton is much less dense than in the other two star coral species. Colony diameter can reach up to 33 ft (10 m) with heights of 13-16 ft (4-5 m). Mountainous star coral has been reported in most reef habitats and is often the most abundant coral between 33-66 ft (10-20 m) in fore-reef environments. The depth range of mountainous star coral has been reported as ~1.5-132 ft (0.5-40 m), though the species complex has been reported to depths of 295 ft (90 m), indicating mountainous star coral's depth distribution is likely deeper than 132 ft (40 m). Like the other species in the complex mountainous star coral is a hermaphroditic broadcast spawner with spawning concentrated on 6 to 8 nights following the full moon in late August, September, or early October. Fertilization success measured in the field was generally below 15% for all three species being closely linked to the number of colonies concurrently spawning. In Puerto Rico, minimum size at reproduction for the star coral species complex was 12 in^2 (83 cm^2). In many life history characteristics, including growth rates, tissue regeneration, and egg size, mountainous star coral is considered intermediate between lobed star coral and boulder star coral. Reported growth rates of mountainous star coral range between 0.12 and 0.64 in (0.3-1.6 cm) per year (Cruz-Piñón et al. 2003; Tomascik 1990; Villinski 2003; Waddell 2005). Szmant and Miller (2005) reported low post-settlement survivorship for mountainous star coral transplanted to the field with only 3-15% remaining alive after 30 days. Mountainous star coral is the sixth most abundant species by percent cover in permanent monitoring stations in the USVI. Population estimates in the 19-square-mile (49 kilometers squared) Red Hind Marine Conservation District are at least 16 million colonies (Smith 2013). At nine sites off Mona and Desecheo Islands, Puerto Rico, no species extirpations were noted at any site over 10 years of monitoring between 1998 and 2008 (Bruckner and Hill 2009). Both mountainous star coral and lobed star coral sustained large losses during the period. The number of colonies of mountainous star coral decreased by 36% and 48% at Mona and Desecheo Islands, respectively (Bruckner and Hill 2009). In 1998, 27% of all corals at six sites surveyed off Mona Island were mountainous

star coral colonies, but decreased to approximately 11% in 2008 (Bruckner and Hill 2009). At Desecheo Island, 12% of all coral colonies were mountainous star coral in 2000 compared to 7% in 2008.

On November 26, 2008, a final rule designating *Acropora* critical habitat was published in the *Federal Register* and defined the physical or biological features essential to the conservation of the species (also known as essential feature). The essential features to the conservation of *Acropora* species is substrate of suitable quality and availability, in water depths from the mean high water line to 30 m (98 ft), to support successful larval settlement, recruitment, and reattachment of fragments. Substrate of suitable quality and availability means consolidated hardbottom or dead coral skeletons free from fleshy macroalgae or turf algae and sediment cover. Areas containing these features have been identified in the U.S. Caribbean include Puerto Rico, St. Thomas/St. John, and St. Croix (Figures 3.2.2.1 - 3.2.2.3).

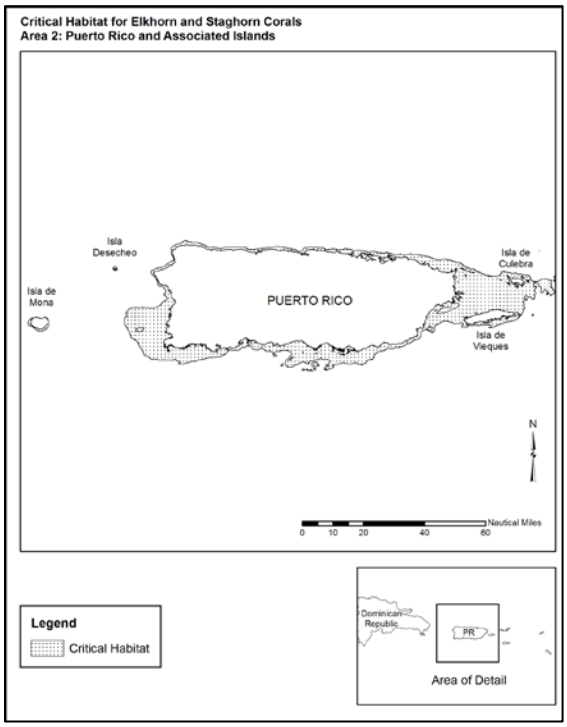

Figure 3.2.2.1. Designated Critical Habitat Area 2 for Elkhorn and Staghorn Corals.

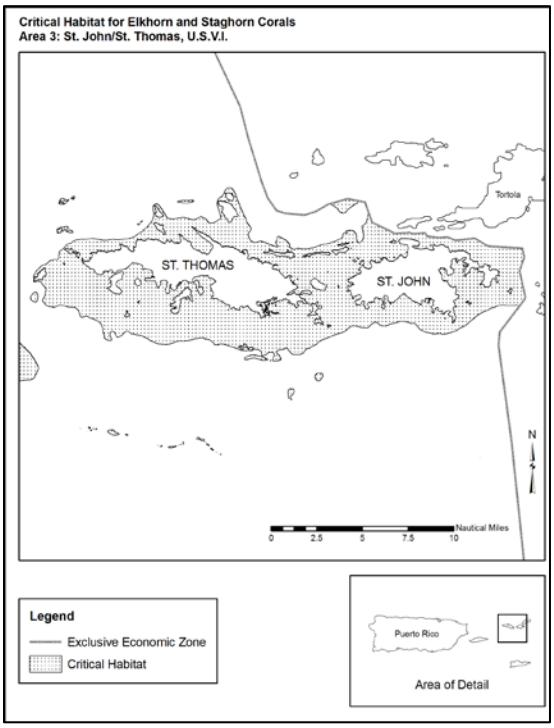

Figure 3.2.2.2. Designated Critical Habitat Area 3 for Elkhorn and Staghorn Coral.

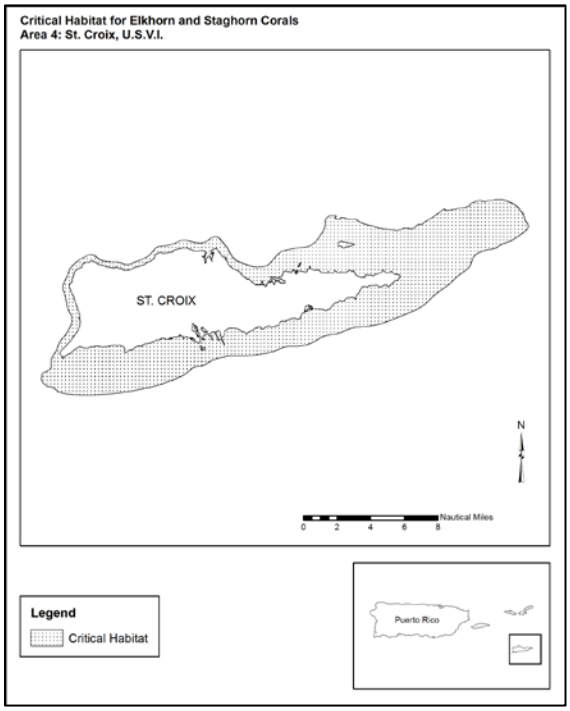

Figure 3.2.2.3. Designated Critical Habitat Area 4 for Elkhorn and Staghorn Corals.

3.3 Description of the Fisheries

Comprehensive descriptions of the commercial and recreational reef fish, spiny lobster, queen conch, and coral fisheries of the U.S. Caribbean are contained in the 2010 and 2011 Caribbean ACL Amendments (CFMC 2011a, b), and are incorporated herein by reference. A summary is provided below.

The fisheries of Puerto Rico and the USVI provide food, livelihoods, and income to Puerto Ricans and U.S. Virgin Islanders. The fisheries in the U.S. Caribbean (federal and state) waters can be divided into commercial, recreational, and subsistence sectors. The commercial fishers of both Puerto Rico and the USVI pursue multiple species, commonly using multiple gear types. These fishers have been characterized as "artisanal"[2] because their commercial fishing vessels tend to be less than (and commonly much less than) 45 feet (13.7 m) long, have small crews, yield small revenues, and their seafood processors are small-scale producers.

Fishing vessel permits are not required to commercially harvest any Council-managed species in federal waters of the U.S. Caribbean (CFMC 2013c). Also there are no federal licenses or

[2] The NOAA Fisheries Glossary Revise Edition June 2006 defines artisanal fishery as a fishery based on traditional or small-scale gear and boats.

permits required for the recreational harvest of reef fish, queen conch, spiny lobster, or aquarium trade species in the EEZ of the U.S. Caribbean. However, a federal permit may be issued to take or possess Caribbean prohibited coral only as a scientific research activity, exempted fishing, or exempted education activity. Efforts are underway to evaluate the development of a federal permit system in federal waters. Since 2010, all anglers fishing recreationally in U.S. Caribbean federal waters are required to be registered through the National Angler Registry (https://www.countmyfish.noaa.gov/register/). In addition, there are Highly Migratory Species (HMS) permit requirements that apply to the commercial and the recreational sectors fishing in the U.S. Caribbean EEZ. For more information on the HMS permit requirements please visit http://www.nmfs.noaa.gov/sfa/hms/Compliance_Guide/index.htm. For more information about the permit requirements in federal and state waters, see Section 3.5 of this document.

A detailed description of the fishing gear and methods used in the U.S. Caribbean reef fish, queen conch, spiny lobster, and coral fisheries is provided in the 2010 and 2011 Caribbean ACL Amendments (CFMC 2011a, b). Gear and methods used in the commercial fishery include hook-and-line, bottom lines, troll lines, rod and reel, longlines, SCUBA and skin diving, traps and pots, and nets (Matos-Caraballo and Agar 2008). Two of the most common gear used in the U.S. Caribbean recreational sector are hook-and-line and SCUBA diving equipment (Griffith et al. 2007).

For more information regarding U.S. Caribbean Fisheries see Section 3.4.2 (Description of the Social and Cultural Environment).

3.4 Economic and Social Environment

3.4.1 Description of the Economic Environment of the Puerto Rico Commercial and Recreational Fishing Industries

3.4 .1.1 Commercial Fisheries

For a comprehensive description of the Caribbean commercial and recreational fisheries, please see the Environmental Assessment for the Development of Island-Based FMPs in the U.S. Caribbean (CFMC 2014), as well as the 2010 Caribbean ACL Amendment (CFMC 2011a) and the 2011 Caribbean ACL Amendment (CFMC 2011b). The economic description information contained in these amendments is incorporated herein by reference.

The tables in this section (Table 3.4.1.1 to Table 3.4.1.20) show updated annual and monthly trips, landings, prices and ex-vessel revenues (2014 USD using CPI deflator) by ACL unit and gear group for Puerto Rico, St. Thomas/St. John, and St. Croix for 2011-2013.

The data presented here for commercial fisheries comes from individual trip reports. All tables showing reported landings are in whole pounds. Puerto Rico historical landings are expanded pounds and ex-vessel revenues for those expanded pounds estimates. Landings data include harvest from state and federal waters combined. If the data represent less than three vessels for any reported stratum, the data are confidential and this is indicated in the table and explained in the table footnotes.

Puerto Rico

Table 3.4.1.1 shows the trend in number of commercial trips, pounds, and associated revenue over the period 2011-2013. Expanded landings (pounds), derived from reported pounds by application of an expansion factor to deal with non-reporting or inaccurate reporting by commercial fishermen, are reported in the table. Expanded pounds were used to establish ACLs. Ex-vessel revenue was estimated based on the expanded pounds and reported ex-vessel prices. The number of trips has not been expanded because there is no agreed upon methodology for doing this, but those data remain useful to show possible trends in number of trips taken.

Table 3.4.1.1. Annual Number of Commercial Trips, Landings (Whole Pounds), and Ex-Vessel Revenue (2014 Dollars) for Puerto Rico, 2011-2013.

Year	Number of Trips	Landings (Whole Pounds)	Estimated Ex-Vessel Revenue (2014 Dollars)
2011	57,676	2,057,216	$9,851,146
2012	62,020	2,836,841	$7,423,386
2013	66,432	2,104,435	$10,652,900
Average	62,043	2,332,831	$9,309,144

Source: Southeast Fisheries Science Center, May 2015.

Note: While pounds have been expanded consistent with the approach taken in determining appropriate ACLs, the estimated ex-vessel revenue column was calculated using ex-vessel prices from reported landings and values. The reader should note that the number of trips have not been expanded but have been taken directly from the trip report data.

Trips

Table 3.4.1.2 provides the number of commercial trips by month for each year.

Table 3.4.1.2. Number of Commercial Trips per Month for Puerto Rico, 2011-2013.

Month	2011	2012	2013
January	4,487	5,380	5,281
February	4,137	5,986	5,795
March	4,423	5,962	5,773
April	4,992	5,119	5,883
May	5,233	6,191	5,857
June	5,299	4,817	5,684
July	5,388	4,881	6,174
August	4,892	5,251	5,809
September	5,061	5,305	5,834
October	4,791	4,206	5,043
November	4,886	4,814	4,945
December	4,087	4,108	4,354

Source: Southeast Fisheries Science Center, May 2015.
Note that the number of trips has not been expanded but has been taken directly from the trip report data.

Table 3.4.1.3 provides the number of commercial trips when a specific species within the ACL unit was caught. The actual number of vessel trips is less than this because multiple species belonging to different ACL units are caught on the same trip. That is, while spiny lobster and snapper might have been caught on the same trip, it is reported in the table as two trips.

Table 3.4.1.3. Number of Commercial Trips by Species Group/Complex for Puerto Rico, 2011-2013.

Species Group/Complex	2011	2012	2013
AQUARIUM TRADE	1	0	0
BOXFISHES	2,820	2,627	2,605
GOATFISHES	335	513	440
GROUPERS	3,142	2,827	2,802
GRUNTS	1,328	1,140	1,156
JACKS	1,235	1,410	1,532
PARROTFISH UNIT	1,565	1,789	2,192
PORGIES	919	1,176	1,229
QUEEN CONCH	5,883	7,070	7,782
SNAPPER UNIT 1	2,819	3,580	3,639
SNAPPER UNIT 2	2,011	1,822	1,584
SNAPPER UNIT 3	5,751	5,856	6,399

Species Group/Complex	2011	2012	2013
SNAPPER UNIT 4	2,879	3,292	3,631
SNAPPER UNIT 5	2,019	1,997	2,046
SPINY LOBSTER	9,336	10,828	11,442
SQUIRRELFISHES	478	495	591
TILEFISHES	0	0	0
TRIGGERFISHES AND FILEFISHES	2,869	2,962	3,652
WRASSES	3,109	3,404	3,554
Misc Species w/o an ACL	9,177	9,232	10,156
Total	57,676	62,020	66,432

Source: Southeast Fisheries Science Center, May 2015.

Landings, Prices, and Revenue

Table 3.4.1.4 provides annual landings by ACL unit, Table 3.4.1.5 shows annual ex-vessel prices revenue, and Table 3.4.1.6 shows annual ex-vessel prices by ACL unit for Puerto Rico for 2011-2013. Both tables reflect estimates of expanded pounds used in the calculation of ACLs.

Table 3.4.1.4. Annual Commercial Landings (Whole Pounds) by Species Group/Complex for Puerto Rico, 2011-2013.

Species Group/Complex	2011	2012	2013
BOXFISHES	40,364	50,020	36,729
GOATFISHES	6,856	11,585	6,190
GROUPERS	59,767	73,813	55,359
GRUNTS	40,074	34,068	24,288
JACKS	35,546	51,750	40,101
PARROTFISH UNIT	38,336	61,252	52,104
PORGIES	19,754	33,145	18,686
QUEEN CONCH	235,618	391,553	326,087
SNAPPER UNIT 1	148,707	213,653	172,316
SNAPPER UNIT 2	218,804	190,600	121,222
SNAPPER UNIT 3	167,478	220,938	156,890
SNAPPER UNIT 4	151,218	215,012	159,453
SNAPPER UNIT 5	38,500	50,830	38,459
SPINY LOBSTER	274,271	394,837	291,650
SQUIRRELFISHES, TILEFISHES, AQUARIUM TRADE	6,761	8,843	7,011
TRIGGERFISHES AND FILEFISHES	50,801	78,186	67,253
WRASSES	53,731	70,006	50,643
Misc Species w/o an ACL	470,629	686,750	479,994
Total	53,731	70,006	50,643

Source: Southeast Fisheries Science Center, May 2015.

Table 3.4.1.5. Annual Commercial Ex-Vessel Prices (2014 Dollars) by Species Group/Complex for Puerto Rico, 2011-2013.

Species Group/Complex	2011	2012	2013
BOXFISHES	$2.25	$2.22	$2.24
GOATFISHES	$2.33	$2.54	$2.54
GROUPERS	$2.59	$2.53	$2.63
GRUNTS	$2.00	$1.80	$1.77
JACKS	$1.99	$1.86	$1.90
PARROTFISH UNIT	$1.82	$1.83	$1.91
PORGIES	$2.04	$1.91	$1.91
QUEEN CONCH	$4.82	$4.87	$4.93
SNAPPER UNIT 1	$3.93	$4.06	$4.39
SNAPPER UNIT 2	$4.27	$4.56	$4.90
SNAPPER UNIT 3	$2.60	$2.59	$2.73
SNAPPER UNIT 4	$2.58	$2.74	$2.87
SNAPPER UNIT 5	$2.42	$2.47	$2.68
SPINY LOBSTER	$6.51	$6.41	$6.41
SQUIRRELFISHES, TILEFISHES, AQUARIUM TRADE	$1.85	$1.67	$1.70
TRIGGERFISHES AND FILEFISHES	$1.70	$1.58	$1.59
WRASSES	$3.19	$3.05	$3.27
Misc Species w/o an ACL	$2.52	$2.58	$2.80

Source: Southeast Fisheries Science Center, May 2015.

Note: To avoid confidentiality issues, Tilefishes FMU and Aquarium Trade Species FMU were combined with the Squirrelfish FMU.

Table 3.4.1.6. Annual Commercial Ex-Vessel Revenue (2014 Dollars) by Species Group/Complex for Puerto Rico, 2011-2013.

Species Group/Complex	2011	2012	2013
BOXFISHES	$127,895	$89,520	$112,036
GOATFISHES	$15,162	$17,389	$29,465
GROUPERS	$239,688	$151,234	$194,379
GRUNTS	$131,372	$72,332	$60,291
JACKS	$134,058	$66,170	$98,251
PARROTFISH UNIT	$80,259	$70,310	$117,228
PORGIES	$32,193	$37,822	$63,285
QUEEN CONCH	$1,318,408	$1,148,142	$1,930,271
SNAPPER UNIT 1	$1,087,054	$603,114	$938,066
SNAPPER UNIT 2	$1,657,586	$997,851	$933,091
SNAPPER UNIT 3	$452,594	$433,046	$603,714

Species Group/Complex	2011	2012	2013
SNAPPER UNIT 4	$555,630	$414,191	$618,088
SNAPPER UNIT 5	$128,309	$95,105	$136,187
SPINY LOBSTER	$1,887,277	$1,759,270	$2,530,572
SQUIRRELFISHES, TILEFISHES, AQUARIUM TRADE	$13,969	$11,282	$15,067
TRIGGERFISHES AND FILEFISHES	$77,391	$80,277	$124,427
WRASSES	$189,915	$164,054	$228,723
Misc Species w/o an ACL	$1,722,386	$1,212,276	$1,919,759
Total	$9,851,146	$7,423,386	$10,652,900

Source: Southeast Fisheries Science Center, May 2015.
Note: To avoid confidentiality issues, Tilefishes Unit and Aquarium Trade Unit were combined with the Squirrelfish Unit.

Gear Usage

Tables 3.4.1.7 and 3.4.1.8 provide landings and ex-vessel revenue, respectively, by gear type for 2011-2013. Handline and spearfishing have been used to bring in the most landings and ex-vessel revenue.

Table 3.4.1.7. Annual Commercial Landings (Whole Pounds) by Gear Type for Puerto Rico, 2011-2013.

Gear Type	2011	2012	2013
Seine Nets	44,108	27,342	37,845
Pots and Traps	317,296	455,849	271,032
Gill Nets	130,193	198,591	143,651
Trammel Nets	16,407	32,799	40,640
Hand Line	793,030	875,936	625,814
Rod and Reel	1,227	0	64,417
Troll	83,378	278,959	125,936
Longline	34,758	28,972	23,471
Cast Net	26,787	72,631	44,557
Spearfishing	573,077	735,505	569,733
Snare	31,577	127,043	155,636
By Hand	5,378	3,214	1,703

Source: Southeast Fisheries Science Center, May 2015.

Table 3.4.1.8. Annual Commercial Ex-Vessel Revenue (2014 Dollars) by Gear Type for Puerto Rico, 2011-2013.

Gear Type	2011	2012	2013
Seine Nets	$110,603	$47,817	$92,208
Pots and Traps	$1,102,625	$1,666,481	$1,030,269
Gill Nets	$282,475	$425,693	$318,484
Trammel Nets	$52,933	$102,984	$139,311
Hand Line	$2,099,181	$2,467,190	$1,886,530
Rod and Reel	$2,634	$0	$0
Troll	$149,059	$614,307	$280,835
Longline	$110,975	$98,803	$73,825
Cast Net	$38,259	$101,881	$67,230
Spearfishing	$2,040,927	$2,765,794	$2,449,398
Snare	$185,653	$801,483	$955,294
By Hand	$23,815	$16,393	$9,019

Source: Southeast Fisheries Science Center, May 2015.
Note: Ex-vessel revenue was calculated using expanded pounds for each year multiplied by annual ex-vessel prices (from non-expanded pounds) in 2014 dollars for each gear type.

St .Thomas/St. John

Table 3.4.1.9. Annual Number of Commercial Trips, Landings (Whole Pounds), and Ex-Vessel Revenue (2014 Dollars) for St. Thomas/St. John, 2011-2013.

Year	Number of Trips	Landings (Whole Pounds)	Estimated Ex-Vessel Revenue (2014 Dollars)
2011	16,292	468,778	$2,696,281
2012	15,980	392,581	$2,356,765
2013	13,458	348,106	$2,080,919
Average	15,243	403,155	$2,377,988

Source: Southeast Fisheries Science Center, May 2015.

Trips

Table 3.4.1.10. Number of Commercial Trips per Month for St. Thomas/St. John, 2011-2013.

Month	2011	2012	2013
January	1,511	1,456	1,397
February	1,143	1,522	1,075
March	1,430	1,364	1,160
April	1,279	1,224	996
May	1,273	1,482	1,236
June	1,274	1,344	930

Month	2011	2012	2013
July	1,314	1,245	1,305
August	1,387	1,387	1,277
September	1,386	1,375	1,243
October	1,544	1,342	1,276
November	1,419	1,203	784
December	1,332	1,036	779

Source: Southeast Fisheries Science Center, May 2015.

Landings, Prices, and Revenue

Table 3.4.1.11. Annual Commercial Landings (Whole Pounds) by Species Group/Complex for St. Thomas/St. John, 2011-2013.

Species Group/Complex	2011	2012	2013
Angelfishes	18,337	16,077	16,202
Boxfishes	15,757	12,303	10,975
Groupers	53,170	41,412	38,675
Grunts	25,402	16,113	11,562
Jacks	35,049	45,551	25,430
Parrotfish	23,289	17,224	17,653
Aquarium Trade, Goatfishes & Porgies	8,515	145	132
Queen Conch	1,930	592	88
Snappers	76,258	53,965	36,462
Squirrelfishes	6,510	9,817	9,502
Surgeonfishes	19,294	15,093	12,575
Triggerfishes and Filefishes	57,067	46,047	45,039
Wrasses	1,959	1,823	1,903
No ACL	41,903	33,045	37,611

Source: Southeast Fisheries Science Center, May 2015.
Note: Aquarium Trade, Goatfishes and Porgies units have been combined to avoid confidentiality issues.

Table 3.4.1.12. Annual Commercial Ex-Vessel Revenue (2014 Dollars) by Species Group/Complex for St. Thomas/St. John, 2011-2013.

Species Group/Complex	2011	2012	2013
Angelfishes	$57,908	$49,754	$49,413
Boxfishes	$67,856	$53,302	$46,844
Groupers	$335,760	$256,208	$235,813
Grunts	$142,753	$96,350	$68,151
Jacks	$168,051	$234,843	$129,213
Parrotfish	$109,990	$88,811	$89,708

Species Group/Complex	2011	2012	2013
Aquarium Trade, Goatfishes & Porgies	$35,880	$869	$571
Queen Conch	$14,219	$4,273	$626
Snappers	$481,545	$333,869	$222,326
Squirrelfishes	$26,201	$40,159	$38,311
Surgeonfishes	$89,927	$77,818	$63,905
Triggerfishes and Filefishes	$268,401	$237,404	$228,849
Wrasses	$11,832	$11,277	$11,600
No ACL	$223,559	$184,847	$210,494

Source: Southeast Fisheries Science Center, May 2015.
Note: Aquarium Trade, Goatfishes and Porgies units have been combined to avoid confidentiality issues.

Gear Usage

Table 3.4.1.13. Annual Commercial Landings (Whole Pounds) by Gear Type for St. Thomas/St. John, 2011-2013.

Gear Type	2011	2012	2013
Line Fishing	70,580	59,324	51,036
Traps	337,197	285,855	270,464
By Hand	3,409	944	2,011
Seine Net	35,768	33,689	14,286
SCUBA	3,589	2,716	923
Nets	2,638	9,167	8,430
Castnet	1,213	536	955
Free Diving	1,829	0	0
Gillnet	29	350	0
Unknown	12,526	0	0

Source: Southeast Fisheries Science Center, May 2015.

Table 3.4.1.14. Annual Commercial Ex-Vessel Revenue (2014 Dollars) by Gear Type for St. Thomas/St. John, 2011-2013.

Gear Type	2011	2012	2013
Line Fishing	$418,077	$351,236	$306,331
Traps	$1,942,184	$1,743,128	$1,626,778
By Hand	$18,148	$5,699	$10,995
Seine Net	$191,583	$184,537	$80,058
SCUBA	$22,690	$17,507	$6,017
Nets	$13,685	$50,014	$45,562
Castnet	$4,966	$2,840	$5,178
Free Diving	$9,287	$0	$0

Gear Type	2011	2012	2013
Gillnet	$92	$1,804	$0
Unknown	$75,570	$0	$0

Source: Southeast Fisheries Science Center, May 2015.

St. Croix

Table 3.4.1.15. Annual Number of Commercial Trips, Landings (Whole Pounds), and Ex-Vessel Revenue (2014 Dollars) for St. Croix, 2011-2013.

Year	Number of Trips	Landings (Whole Pounds)	Estimated Ex-Vessel Revenue (2014 Dollars)
2011	24,272	629,025	$3,709,266
2012	22,551	478,604	$2,956,653
2013	18,712	427,345	$2,588,949
Average	21,845	511,658	$3,084,956

Trips

Table 3.4.1.16. Number of Commercial Trips per month for St. Croix, 2011-2013.

Month	2011	2012	2013
January	2,211	1,759	1,856
February	2,081	1,777	1,568
March	2,163	2,033	1,782
April	2,513	1,959	1,720
May	2,129	2,123	1,682
June	1,727	1,944	1,334
July	1,909	1,913	1,722
August	2,047	2,118	1,590
September	1,695	1,684	1,309
October	2,296	1,841	1,654
November	1,768	1,862	1,463
December	1,733	1,538	1,032

Source: Southeast Fisheries Science Center, May 2015.

Landings, Prices, and Revenue

Table 3.4.1.17. Annual Commercial Landings (Whole Pounds) by Species Group/Complex for St. Croix, 2011-2013.

Species Group/Complex	2011	2012	2013
Angelfishes	8,174	13,358	8,137
Boxfishes	3,941	1,729	1,669

Species Group/Complex	2011	2012	2013
Groupers	29,732	27,553	20,985
Grunts	33,711	22,875	17,111
Jacks	8,179	7,226	11,565
Parrotfish	151,649	110,810	97,029
Queen Conch	52,785	34,684	19,547
Snapper	84,261	62,373	60,363
Spiny Lobster	108,159	81,279	54,714
Surgeonfishes	31,523	20,232	11,450
Triggerfishes and Filefishes	25,960	21,160	12,529
Aquarium Trade, Goatfishes, Porgies, Squirrelfishes, and Wrasses	3,990	1,157	1,045
No ACL	86,391	73,172	110,961

Source: Southeast Fisheries Science Center, May 2015.

Notes: Aquarium Trade, Goatfishes, Porgies, Squirrelfishes, and Wrasses units have been combined to avoid confidentiality issues.

Table 3.4.1.18. Annual Commercial Ex-Vessel Revenue (2014 Dollars) by Species Group/Complex for St. Croix, 2011-2013.

Species Group/Complex	2011	2012	2013
Angelfishes	$25,808	$41,321	$24,807
Boxfishes	$16,958	$7,467	$7,115
Groupers	$187,749	$170,465	$127,952
Grunts	$190,695	$136,845	$100,866
Jacks	$39,013	$37,258	$58,763
Parrotfish	$694,733	$571,284	$493,015
Queen Conch	$388,876	$250,338	$139,051
Snapper	$532,086	$385,892	$368,062
Spiny Lobster	$834,868	$670,461	$444,813
Surgeonfishes	$147,575	$104,307	$58,179
Triggerfishes and Filefishes	$118,719	$109,090	$63,659
Aquarium Trade, Goatfishes, Porgies, Squirrelfishes, and Wrasses	$15,107	$5,523	$4,440
No ACL	$514,048	$461,547	$697,061

Source: Southeast Fisheries Science Center, May 2015.

Notes: Aquarium Trade, Goatfishes, Porgies, Squirrelfishes, and Wrasses units have been combined to avoid confidentiality issues.

Gear Usage

Table 3.4.1.19. Annual Commercial Landings (Whole Pounds) by Gear Type for St. Croix, 2011-2013.

Gear Type	2011	2012	2013
Line Fishing	118,425	90,360	119,701
Traps	99,495	77,675	66,490
By Hand	17,792	27,870	21,273
Seine Net	15,759	2,612	1,465
SCUBA	367,326	298,294	231,226
Nets	925	2,567	6,717
Castnet	1,806	3,363	5,008
Free Diving	8,399	0	0
Gillnet	1,682	8,871	17,828
Unknown	13,568	0	0

Source: Southeast Fisheries Science Center, May 2015.

Table 3.4.1.20. Annual Commercial Ex-Vessel Revenue (2014 Dollars) by Gear Type for St. Croix, 2011-2013.

Gear Type	2011	2012	2013
Line Fishing	$740,974	$582,965	$774,814
Traps	$574,692	$474,743	$394,050
By Hand	$113,258	$177,108	$132,918
Seine Net	$67,381	$13,466	$7,444
SCUBA	$2,140,556	$1,834,772	$1,382,468
Nets	$4,876	$13,234	$34,130
Castnet	$9,504	$17,339	$25,444
Free Diving	$50,101	$0	$0
Gillnet	$8,847	$45,727	$90,586
Unknown	$95,301	$0	$0

Source: Southeast Fisheries Science Center, May 2015.

3.4.1.2 Recreational Sector

This section presents information from the Marine Recreational Information Program from the NOAA Office of Science and Technology website (see: http://www.st.nmfs.noaa.gov/recreational-fisheries/access-data/run-a-data-query/index).

Puerto Rico

Catch and Harvest

Table 3.4.1.21 provides the number of fish harvested and released through recreational fishing.

Table 3.4.1.21. Total Recreationally Harvested and Released Numbers of Fish in Puerto Rico, 2010-2014.

Year	Harvested	Released
2010	392,623	156,115
2011	387,306	58,980
2012	477,723	48,664
2013	497,202	101,692
2014	1,164,740	173,376

Source: MRIP (http://www.st.nmfs.noaa.gov/recreational-fisheries/access-data/run-a-data-query/index)

Effort (Angler Trips)

Table 3.4.1.22 provides the total number of angler trips in Puerto Rico while Table 3.4.1.23 breaks down the number of angler trips by mode (shore, charter boat and private/rental boat).

Table 3.4.1.22. Total Recreational Angler Trips in Puerto Rico, 2010-2014.

Year	Angler Trips
2010	536,183
2011	424,587
2012	350,568
2013	510,262
2014	534,500

Source: MRIP (http://www.st.nmfs.noaa.gov/recreational-fisheries/access-data/run-a-data-query/index)

Table 3.4.1.23. Total Recreational Angler Trips by Mode in Puerto Rico, 2010-2014.

Year	Shore	Charter Boat	Private/Rental Boat
2010	219,651	4,113	312,419
2011	232,917	4,730	186,939
2012	140,266	1,839	208,462
2013	275,132	6,470	228,661
2014	275,636	Unavailable	258,864

Source: MRIP (http://www.st.nmfs.noaa.gov/recreational-fisheries/access-data/run-a-data-query/index)

Participation

Table 3.4.1.24 provides individual participation in recreational fishing in Puerto Rico.

Table 3.4.1.24. Recreational Participation by Region (individuals) in Puerto Rico, 2009-2013.

Year	Coastal Resident	Out of State
2009	110,236	22,352
2010	92,191	11,096
2011	98,662	13,795
2012	83,837	10,003
2013	122,002	5,515

Source: Marine Recreational Information Program (MRIP) (http://www.st.nmfs.noaa.gov/recreational-fisheries/access-data/run-a-data-query/index)

Economic Value and Expenditures

Information on the economic value and expenditures of recreational fishing in the U.S. Caribbean is unavailable as of the date of this report.

Summary

There have been fluctuations over the past five years in harvest, releases, number of trips, and recreational fishing participation (coastal residents only) with large increases in the most recent years of data available. This may be a result of the slow recovery of the larger U.S. economy from the economic recession but a much slower rate of recovery for Puerto Rico. Some of the increases could result from the recent decrease in diesel prices, making fishing excursions less expensive.

3.4.2 Description of the Social and Cultural Environment

Comprehensive descriptions of the social environment of reef fish, queen conch, spiny lobster, and coral fisheries are included in CFMC (2011a) and CMFC (2011b) and are incorporated by reference. In addition, detailed descriptions of the social environment of specific fisheries are included in recent amendments including CFMC (2013b) (Queen Conch FMP) and CFMC (2013a) (Reef Fish FMP) and are incorporated herein by reference. Detailed descriptions of USVI and Puerto Rican fishing communities are included in Stoffle et al. (2009 and 2011), Impact Assessment Inc. (IAI) (2007), and Griffith et al. (2007) and are incorporated herein by reference; however, some elements of these reports are summarized in the following text.

This comprehensive amendment proposes changes to the AMs for the reef fish, coral, queen conch, and spiny lobster FMPs (including snappers, groupers, spiny lobster, boxfish, goatfish, grunts, wrasses, jacks, scups and porgies, squirrelfish, triggerfish and filefish, tilefish, angelfish, surgeonfish, parrotfish, queen conch, and aquarium trade species). Therefore, this section includes a description of fishermen and fishing communities in Puerto Rico and the USVI in relation to their involvement in the included fisheries. Additional fisheries not managed by the Caribbean Council (such as highly migratory species) are also included in the narrative to provide context on the dependence on Council-managed species. For recent commercial and recreational landings (for Puerto Rico only) of the FMUs or species in the reef fish, coral, queen conch, and spiny lobster FMPs, the reader is directed to refer to Tables 2.2.1.1 – 2.2.1.7 in Section 2.2.1. Additional narratives on the impacted fisheries, which may be used to supplement this section, are included in Section 3.3 (Description of the Fisheries) of this document.

Data are presented at the community level, when possible, in order to meet the requirements of National Standard 8 (NS 8) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). The National Standard 8 requires the consideration of the importance of fishery resources to human communities when changes in fishing regulations are considered. For the following analysis, the majority of data are presented at the island, commonwealth, or territory level because these data are not available at the place-based community level of analysis.

Puerto Rico Fishing Community

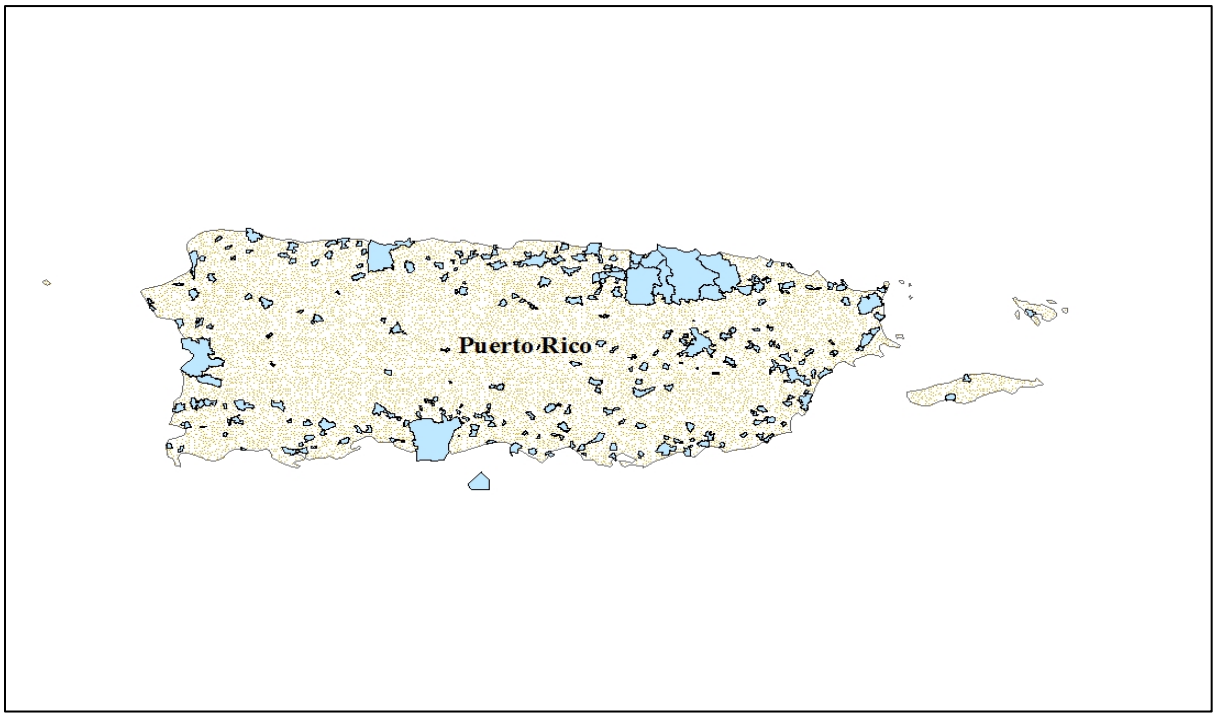

Figure 3.4.2.1. Map of Puerto Rico with census designated places.
Source: NMFS SERO Fisheries Social Science Branch, M. Jepson.

Fishing traditions in coastal communities in Puerto Rico are visible through the celebration of the Vírgen del Carmen, the patron saint of fishers, which derives from the fishing and maritime tradition of Spain. In addition, more recent traditions are visible through the Festival Del Pescao (Seafood Festival) in Cabo Rojo, a festival which was created during the 1970s and occurs during Lent. Fish are important and culturally significant to the Puerto Rican diet. Fish are particularly important among Catholics during Lent, which includes one of the most brisk seasons for seafood sales. Fish is both a high-priced food enjoyed by tourists and coastal visitors and a low-cost and high quality protein which is sold to working people (Griffith et al. 2007).

As with most island coastal economies, there are three main types of fisheries in Puerto Rico: commercial, recreational, and subsistence. The commercial sector is responsible for the majority of landings. Puerto Rico's commercial sector 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. (2007) 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 and reel, longline, bottomline, fish traps, lobster traps, gill nets, trammel nets, cast nets and SCUBA gear (Matos-Caraballo and Agar 2011).

Determining the number of active commercial fishermen has proven difficult. According to the most recent census conducted in Puerto Rico, there were approximately 868 active commercial fishermen in 2008 (Matos-Caraballo and Agar 2011). However, after completing the 2008 survey, Matos-Caraballo and Agar received an additional report in February of 2009 from the Puerto Rico Department of Natural and Environmental Resources (PRDNER), the agency responsible for the administration of the commonwealth fishing licenses, with a database of commercial fishing licenses showing 1,129 valid licenses. The number of active fishers has been highly contested, as pointed out in Griffith et al. (2007), and in the past even a range of 1,500 to 2,500 has been suggested too low by fishermen. The confusion could be attributed to what an active fisherman is considered to be. Nevertheless, the number of fishermen has decreased from an earlier census conducted in 1988 when there were over 1,700 fishermen or the 2003 census which counted 1,132.

In 2011 and 2012, the number of licensed commercial fishermen in Puerto Rico greatly increased (E. Piñeiro, personal communication). Two factors may have contributed to that increase in the number of licensed commercial fishermen including: 1) a relaxation of the requirement to submit tax forms when applying for a full or part-time commercial license and 2) an extension of the beginner fisher license to an additional year of eligibility. These factors appear to have allowed fishermen in the recreational sector to move into the commercial sector so that they are able to use additional fishing gear (such as bandit gear) and are able to sell their catch, both of which are prohibited for recreational fishers. Historically, commercial fishermen in Puerto Rico were required by PRDNER to show their tax return forms when applying for a full- or part-time commercial fishing license. PRDNER would use the tax forms to determine what amount of each fisher's income originated from commercial fishing and determine which license (part or full) the fisher could apply. However, the 2010 Puerto Rico fishing regulations relaxed the tax return requirement for applying for a commercial license, allowing the applicant to show, instead, an affidavit if tax returns could not be provided. Also in 2010, beginner fishers, who after one year had to apply for the commercial fishing license, now had the opportunity to extend the beginner permit for one more year if they were not able to comply with the requirements to obtain a full/part- time license. The relaxation of these requirements may have led to the entry of a new cohort of fishers into the commercial sector. Currently, the number of active fishers in the Puerto Rico commercial sector is estimated to be between 1,000 and 1,200 fishers (Personal communication, PRDNER 2015).

During the 2008 census, nearly 7% of fishermen reported that they worked full-time as fishermen; whereas 25% reported that they worked part-time as fishermen and held other occupations or received retirement benefits (Matos-Caraballo and Agar 2011).

Out of the 868 commercial fishermen interviewed in 2008, reef fish was the top category in terms of importance with 77.3% of respondents targeting reef fish (Table 3.4.2.1) (Matos-

Caraballo and Agar 2011). Deepwater snapper was the second most commonly targeted category (55.5%), and spiny lobster was the third (49.3%). Ornamental fish were targeted to a much lesser degree with only 1.6% of fishermen reporting that they targeted ornamental fish.

The number of commercial fishermen targeting specific species varied by coastal region with top species (species targeted by more than half of respondents) for the north coast including reef fish (88.3%), deep-water snapper (71.6%), and pelagic species (65.4%). Whereas, top species for the east coast included reef fish (75.5%), deep-water snapper (71.6%), pelagic species (66.5%), and spiny lobster (64.5%). Along the south coast, the top species were reef fish (88.0%) and spiny lobster (57.1%). Along the west coast of Puerto Rico, the top species were reef fish (64.8%) and deep-water snapper (51.3%).

Table 3.4.2.1. Target species by coastal region. Source: Matos-Caraballo and Agar (2011).

Percentage of commercial fishermen who target the following species	**North Coast**	**East coast**	**South coast**	**West coast**	**Puerto Rico**
Reef fish	88.3%	75.5%	88.0%	64.8%	77.3%
Deep-water snapper	71.6%	71.6%	39.5%	51.3%	55.5%
Pelagic species	65.4%	66.5%	30.0%	26.4%	41.8%
Spiny lobster	27.8%	64.5%	57.1%	47.2%	49.3%
Queen conch	13.0%	34.8%	45.1%	34.6%	33.4%
Baitfish	53.1%	32.9%	30.9%	17.9%	30.7%
Octopus	1.9%	0.0%	19.3%	1.3%	6.0%
Sirajo goby	8.0%	0.0%	0.9%	0.0%	1.7%
Land crab	9.3%	10.3%	6.0%	2.2%	6.0%
Ornamental fish	0.6%	1.9%	0.9%	2.5%	1.6%

The top ten municipalities by commercial landings include, in order, Cabo Rojo, Lajas, Vieques, Aguadilla, Guánica, Fajardo, Naguabo, Rincón, Juana Díaz, and Ponce (for years 1999-2003, Griffith et al. 2007). Puerto Rico fishermen target multiple species and a variety of species are important to each municipality. Rarely did more than one to two species account for more than 10% of the landings in a specific municipality, and in many cases the third most important species listed accounted for less than 10% of the landings (Tables 3.4.2.2).

Table 3.4.2.2. Three most important species by municipality, 1999-2003. Percentages of landings by species are included as the numerical value. Source: Griffith et al. (2007).

Municipality	1st Species	2nd Species	3rd Species
San Juan	Yellowtail Snapper 15.0	Jacks 8.0	Lane Snapper 6.4
Cataño	Jacks 7.9	Mojarras 6.9	White Grunt 5.5
Toa Baja	Jacks 7.9	Mojarras 6.9	White Grunt 5.5
Mayagüez	Yellowtail Snapper 12.6	Lane Snapper 11.1	King Mackerel 7.5
Añasco	Silk Snapper 41.0	Lane Snapper 9.6	Lobster 6.0
Rincón	Queen Snapper 28.6	Silk Snapper 25.1	Dolphin 5.1
Ponce	Yellowtail Snapper 18.1	Lane Snapper 13.5	Snappers (generic) 9.1
Juana Díaz	Lobster 32.2	Lane Snapper 17.5	Other fishes 7.5
Santa Isabel	Lane Snapper 22.2	Lobster 9.3	Yellowtail and Mutton Snappers 8.7
Salinas	Lane Snapper 15.7	Yellowtail and Mutton Snappers 9.5	White Grunt/Lobster 9.0
Guayama	Lobster 9.0	White Grunt 8.4	Lane Snapper 8.3
Patillas	Lobster 11.8	Lane Snapper 6.8	Parrotfish 6.0
Arroyo	Parrotfish 15.1	Lobster 10.4	Ballyhoo 7.0
Peñuelas	Lobster 26.0	Hogfish 16.3	Octopus 11.6
Guayanilla	White Grunt 12.1	Mutton Snapper 8.6	Lane Snapper 8.4
Guánica	Lobster 14.0	Yellowtail Snapper 12.0	Hogfish 9.0
Isabela	Lobster 20.7	Nasau Grouper 14.1	Silk Snapper 12.1
Camuy	Yellowtail Snapper 18.1	Mutton Snapper 10.5	King Mackerel 9.2
Arecibo	Silk Snapper 32.9	King Mackerel 8.7	Lobster 8.0
Barceloneta	Silk Snapper 14.3	Triggerfish 8.8	Lane Snapper 7.1
Manatí	Herrings 5.7	White Mullet 5.6	Jacks 4.9
Vega Baja	Silk Snapper 10.2	Red Hind 7.4	Bar Jack 5.7
Vega Alta	Silk Snapper 10.3	Bar Jack 6.4	Red Hind 6.2
Dorado	Silk Snapper 10.0	Triggerfish 6.8	Schoolmaster 6.4
Carolina	Jacks 8.0	White Mullet 7.6	Yellowtail Snapper 7.6
Loíza	Silk Snapper 10.5	Vermilion Snapper 8.5	Yellowtail Snapper 6.6
Rio Grande	Yellowtail Snapper 11.1	Vermilion Snapper 9.9	White Grunt 9.3

Municipality	1st Species	2nd Species	3rd Species
Luquillo	White Grunt 10.3	Lane Snapper 7.2	King Mackerel 6.2
Fajardo	Yellowtail Snapper 17.9	Lobster 7.7	King Mackerel 5.4
Ceiba	White Grunt 12.5	Lobster 7.7	Boxfishes 5.4
Vieques	Lobster 15.4	Yellowtail Snapper 8.7	Triggerfish 6.5
Culebra	Nasau Grouper 17.2	Lobster 15.4	Triggerfish 15.1
Naguabo	Lobster 18.7	1st class fish 16.1	3rd class fish 13.7
Humacao	Lobster 13.7	Yellowtail Snapper 9.3	White Grunt 7.8
Yabucoa	Yellowtail Snapper 12.7	Lane Snapper 10.8	White Grunt 10.8
Maunabo	Lane Snapper 12.3	White Grunt 11.9	Lobster 9.3
Lajas	Lobster 8.2	White Grunt 7.8	Lane Snapper 6.5
Cabo Rojo	Lobster 17.8	Boxfishes 9.8	Lane Snapper 6.7
Aguada	Silk Snapper 13.0	Skipjack Tuna 8.5	King Mackerel 7.6
Aguadilla	Silk Snapper 12.9	Skipjack Tuna 10.0	King Mackerel 9.9

Puerto Rico's recreational fishing sector involves for-hire fishing businesses to individuals who fish with a can, line, and a hook. As reported in Section 3.4.1.2 (Recreational), an estimated total of 127,517 marine recreational participants embarked on 510,262 fishing trips in 2013. The majority of trips were conducted on the shore (53.9%), followed by private or rental boat (44.8%), and charter boat (1.3%, Tables 3.4.1.22 -3.4.1.24). Coastal residents made up the majority of participation in the marine recreational sector (95.7% in 2013); whereas a smaller portion of recreational participation included those from outside Puerto Rico (4.3%, Table 3.4.1.24).

Subsistence fishing, people who fish primarily for food for their households, in Puerto Rico is primarily a working class family activity and fish are considered a source of high quality protein for their family (Griffith et al. 2007). Subsistence fishermen differ in some respects from their commercial and recreational counterparts with regards to key aspects in that they may often be retired or unemployed (Griffith et al. 2007). Subsistence fishermen target snapper-grouper species (40%) and pelagic species including species such as dolphin (7.4%) and king mackerel (5.9%), but nearly no shellfish. The varieties of gear used by subsistence fishers are similar to those of recreational fishers; however few use SCUBA gear (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 Community

Fishing on the island of St. Croix has a long history. Historically, it has 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 (Valdés-Pizzini et. al 2010).

Commercial fishing on St. Croix is much like that of Puerto Rico in that is "artisanal." Most fishermen construct and repair their gear and boats, as well as market their fish (Kojis and Quinn 2012; Valdés-Pizzini et. al 2010). The number of active commercial fishers is elusive, as in Puerto Rico, but recent estimates place the number of active fishermen in the range of 200-250. This does not include those who may provide support services for registered fishermen or those who may not be registered to fish (Valdés-Pizzini et. al 2010). The commercial fisher registration list placed the number of St. Croix licensed commercial fishermen at 177 as of March 2011 (Kojis and Quinn 2012).

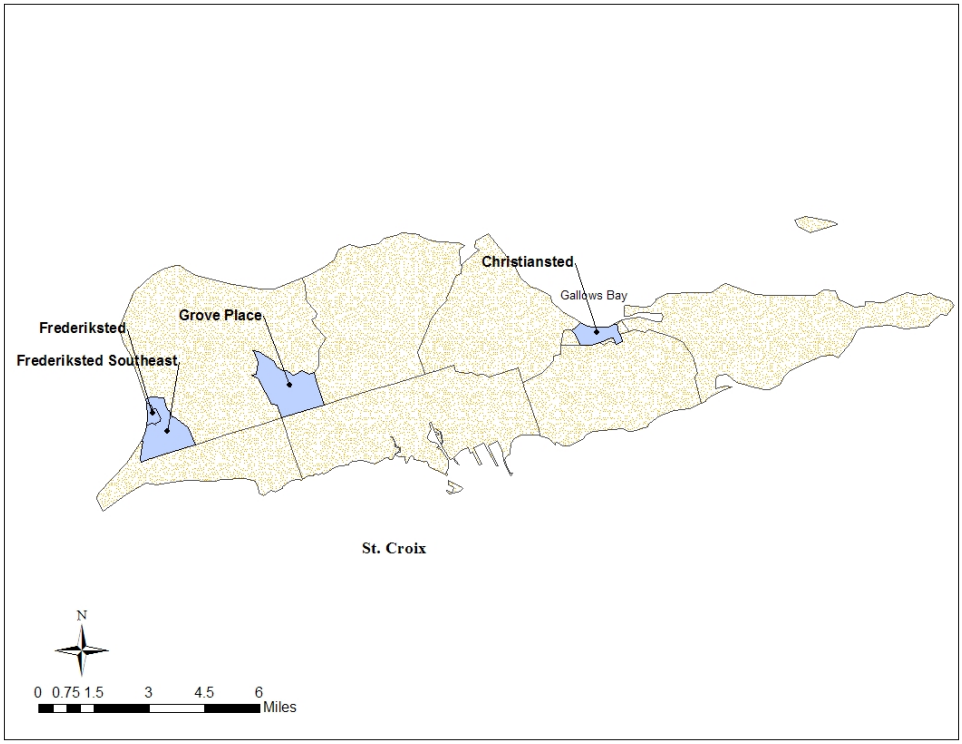

Figure 3.4.2.2. Map of St. Croix with census designated places.
Source: NMFS SERO Fisheries Social Science Branch, M. Jepson.

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. About 41 percent are full-time fishermen putting in over 36 hours a week (Kojis and Quinn 2012). Many seek work outside of fishing, as it is increasingly difficult to make a living from just fishing (Valdés-Pizzini et. al 2010); however, it has been reported that it is difficult for fishermen to find other paid work (58.2% of fishermen interviewed indicated it was very hard or hard to find other paid work [Kojis and Quinn 2012]). Many fishers hold other occupations in addition to fishing. These fishers continue to fish in addition to their other occupations and intend to continue to engage in fishing for as long as they are physically capable (Grace-McCaskey 2012).

The dominant gear type used is hook and line with diving second. Trap fishing is third, and many fishermen indicated that they fish several gear types throughout the year (Kojis and Quinn 2012). Vessels are usually small and are hauled on trailers transported to different parts of the island according to the type of fishery prosecuted seasonally.

Licensed fishermen land their fish at many landing locations around the island (16 different locations on St. Croix were reported by interviewed fishermen); however, the top three most

important landing sites by the number of fishers using the site as their primary landing site were Altona Lagoon in Christiansted, the Molasses Pier, and Frederiksted Fish Market (Kojis and Quinn 2012). St. Croix fishermen commonly market their fish themselves (Kojis and Quinn 2012).

Commonly in St. Croix, commercial fishermen keep part of their catch to be consumed by their families. Fishermen also commonly give away part of their catch to friends (Kojis and Quinn 2012).

A variety of species are caught by commercial fishermen in St. Croix and fishermen commonly target more than one category of fish. Out of the 154 fishermen interviewed in a recent census, reef fish was the top category in terms of importance with 79.9% of respondents targeting reef fish (Table 3.4.2.3). Spiny lobster was the second most commonly targeted category with 57.8 % of interviewed fishermen targeting spiny lobster, deep pelagic was the third most commonly targeted category with 48.1% of fishermen targeting deep pelagic species, and queen conch was the fourth most commonly targeted category with 42.2% of fishermen targeting queen conch (Table 3.3.2.3).

Table 3.4.2.3. Relative importance of categories of fish, mollusks, and crustaceans to St. Croix licensed commercial fishers. Frequency includes the number of fishermen who answered that they harvest a particular category. Percentages can equal more than 100% because fishermen harvested more than one category. Source: Kojis and Quinn (2012).

Categories of Fish	Frequency	Percent
Reef fish	123	79.9%
Coastal pelagic	48	31.2%
Deep pelagic	74	48.1%
Deepwater snapper	58	37.7%
Bait fish	10	6.5%
Queen conch	65	42.2%
Whelk/West Indian top shell	20	13.0%
Spiny lobster	89	57.8%
Total # of fishers	154	316.2%

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 according to Valdés-Pizzini et al. (2010). Dive fishing occurs mostly off the eastern end of the island and along the

southern shore, which are the most productive fishing grounds and the focus of conservation initiatives (Valdés-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. Several categories of recreational fishing in the USVI have been identified, for-hire (charter boat), private boat (both inshore and offshore), and shore and pier (Jennings 1992; Mateo 2004, in Arnold and García-Moliner 2012). 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). The recreational line fishery in the USVI targets offshore and inshore and reef fish fisheries, as well as invertebrates (Adams 1996; Mateo et. al. 2000; Toller et al. 2005, in Arnold and García-Moliner 2012). Valdés-Pizzini et al. (2010) report that about 11% of St. Croix residents participate in recreational fishing. The 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 (Valdés-Pizzini et al. 2010). The ongoing effort to conduct the MRIP in the USVI is expected to improve the collection of recreational data.

In terms of fishing communities on the island, it seems to be the consensus of Valdés-Pizzini et al. (2010) that the geographical dispersion of fishermen throughout the island and a similar dispersion of their fishing activities make it difficult to identify any particular community as a fishing community. Gallows Bay historically has been considered a fishing community, but has recently undergone significant change including impacts from government programs, gentrification, and the geographic distribution of its dwellers who now engage in various occupations. These changes bring to question whether this area could be considered a fishing community. Fishermen land fish on the community beach and there's an open air market in the community; however most fishermen that land fish in Gallows Bay do not live in the community, although most grew up there (Valdés-Pizzini et al. 2010). Fishermen commonly trailer their vessels, providing the flexibility to move to a different location based on weather conditions, target species, target area, or gear preference (Stoffle et al. 2009). Commercial fishermen in St. Croix do not typically live in areas that are close to the coast but instead tend to live along a "diagonal line that extends from the north to the southwest coinciding with the Centerline Road." The current pattern of commercial fishers' residences is based on historical factors, such as the process of homesteading after 1936 where the government provided land to farmers in order to try to revitalize the sugar industry (Valdés-Pizzini et al. 2010). Alternatively, the current pattern of residence may represent a decision to move to a newly developed area or other preferred location. Stoffle et al (2009) discuss that factors such as these fishermen residence patterns throughout the island, the sites of fishing locations, the locations of launching and landing sites and the ability to trailer vessels and move locations, direct and indirect ties of commercial fishing to other industries, and the fact that nearly 100 % of marine resources harvested in St. Croix are

landed, purchased, and consumed in St. Croix provides a rationale for recommending the island of St. Croix to be designated as a fishing community.

St. Thomas and St. John Fishing Community

Both commercial and recreational fishing are important aspects of the island economies of St. Thomas and St. John, although the tourism sector may significantly dwarf their contributions in terms of economic activity. 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 (IAI 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), is still undetermined.

Two areas where concentrations of commercial fishing activity are located on St. Thomas are the north side and south side of the island. Hull Bay on the north side provides a protected area with a boat ramp where many commercial vessels are moored. Frenchtown on the south side has docking facilities along with a covered market that has considerable activity throughout the week but especially on Saturdays (IAI 2007). The top reported commercial landing sites in St. Thomas include Frenchtown, Hull Bay, and Water Bay (Kojis and Quinn 2012). Top commercial landing sites for St. John include Coral Bay and Cruz Bay (Kojis and Quinn 2012). The top ports for boat storage in St. Thomas and St. John include Frenchtown, Hull Bay, and Water Bay in St. Thomas and Coral Bay in St. John. A sizable portion of fishermen keep their boat stored at home (6.9% of St. Thomas and St. John fishers) (Kojis and Quinn 2012). Full-time commercial fishermen in St. Thomas and St. John spend a lot of time harvesting, offloading, and marketing their seafood and preparing, maintaining, and repairing their vessels and gear. These tasks may be completed at different locations on the island and do not necessarily relate to residence or fishing related business (IAI 2007).

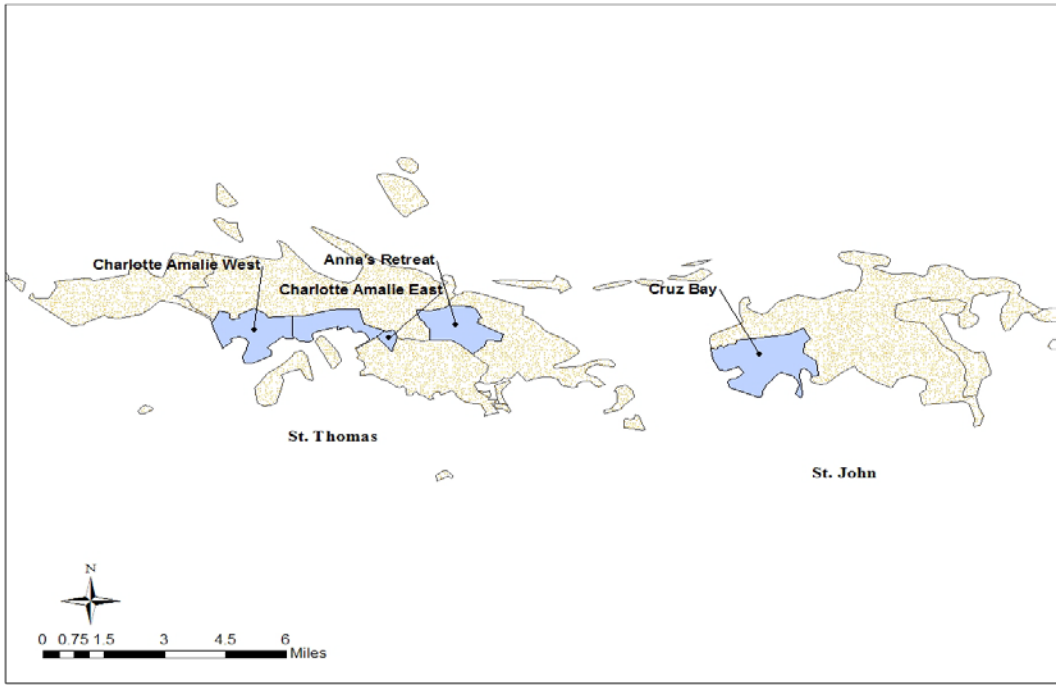

Figure 3.4.2.3. Map of St. Thomas and St. John with census designated places.
Source: NMFS SERO Fisheries Social Science Branch, M. Jepson.

Like St. Croix and Puerto Rico, commercial fishing on St. Thomas and St. John is much like that of the other islands in that 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 places the number of active fishermen at around 102 on both islands combined (Kojis and Quinn 2012).

The majority of commercial fishermen of St. Thomas and St. John classify themselves as of 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 putting in over 36 hours a week, those putting in 15-36 hours a week, and those spending less than 15 hours a week (Kojis and Quinn 2012).

The dominant gear type used 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 hauled on trailers to different parts of the island according to the type of fishery prosecuted seasonally. However, both the north side and south side provide mooring and dockage, as do other marinas and protected bays around the island where vessels are kept (IAI 2007).

According to IAI (2007), the primary trap fishing areas for lobster and finfish are located to the south and north of the islands. The primary handline fishing area is to the south, with a small

area north of St. Thomas, while net fishing is almost exclusively conducted on the north side of St. Thomas (IAI 2007). The primary target of fishermen from St. Thomas/St. John was reef fish (84.6%). Coastal pelagics were second (50.5%), with spiny lobster third (29.7%, Table 3.4.2.4).

Table 3.4.2.4. Relative importance of categories of fish, mollusks, and crustaceans to St. Thomas/St. John interviewed licensed commercial fishers. Frequency includes the number of fishermen who answered that they harvest a particular species category. Percentages can equal more than 100% because fishermen harvest more than one category. Source: Kojis and Quinn (2012).

Categories of Fish	Frequency	Percent
Reef fish	77	84.6%
Coastal pelagic	46	50.5%
Deep pelagic	9	9.9%
Deepwater snapper	7	7.7%
Bait fish	3	3.3%
Queen conch	8	8.8%
Whelk/West Indian top shell	9	9.9%
Spiny lobster	27	29.7%
Total # of fishers	91	204.4%

Recreational fishing is likely more important in St. Thomas than on the other islands in the USVI. Recreational fishing infrastructure on St. Thomas is provided through eight marinas, four on the southside and four on the eastside (Crown Bay Marina, Frenchtown Marina, Yacht Haven Marina, American Yacht Harbor Marina, Sapphire Beach Marina, Saga Haven Marina, Pirate's Cove Marina, and Boater's Haven) and twelve anchorage sites (Benner Bay, Charlotte Amalie Harbor, Red Hook, Cowpet Bay, Water Bay, Hull Bay, Jersey Bay, Long Bay, Vessup Bay, Bolongo Bay, Elephant Bay, and Secret Harbor) (Stoffle et al. 2011). 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 (IAI 2007). Again, there seems to be little, if any, description of subsistence fishing in either St. Thomas or St. John, although subsistence fishing does exist and is likely an important source of food for many, we do not have sufficient information to provide a complete description.

In terms of fishing communities on the island, it seems that the geographical dispersion of fishermen throughout the island and the similar 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 suggested 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.

3.4.3. Environmental Justice Considerations

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

Minority populations: The Hispanic origin group, which is considered a minority in the continental U.S., is the majority ethnic group in Puerto Rico. In the year 2010, 16.3% of the population of the continental U.S. was comprised of residents that identified as Hispanic or Latino; however, for the same year, 99% of the population of Puerto Rico identified itself as Hispanic or Latino (U.S. Census Bureau, 2010 Census). In the USVI, the majority of the population is Black or African American (72% including those of two or more races) according to the year 2000 Census, whereas the percentage of the population comprised of Black or African American residents of the continental U.S. was 12.9% for the same year. The minority (minority is commonly interpreted for the U.S. as White, non-Hispanic) rates for all of Puerto Rico and the USVI are substantially higher than that of the continental United States.

Low-income populations: Low-income populations in the U.S. Caribbean make up a much greater percentage of the general population than in the continental United States. The percentage of people below poverty included 45.2% of the population in Puerto Rico for the year 2010, significantly higher than that of the continental U.S., which included 15.3% of the population below poverty (U.S. Census Bureau, 2010 Census). For the year 2010, the poverty rate for the USVI was 22.2%, also significantly higher than the rate for the continental U.S. (U.S. Census Bureau, 2010 Census). These overall higher poverty rates indicate that the U.S. Caribbean includes more individuals that are likely to be more vulnerable and experience higher levels of effects when changes in fisheries management are conducted.

Because this proposed action is expected to impact fishermen in the U.S. Caribbean, and information is not available in most cases to link these fishermen to the communities in which they reside, all communities in Puerto Rico and the USVI have been examined using census data to see if they have poverty rates that exceed EJ thresholds.

The threshold for comparison that was used was 1.2 times the average of the USVI or Puerto Rico such that, if the value for the community was greater than or equal to 1.2 times the average of the greater area, then the community was considered an area of potential EJ concern (EPA 1999).

As mentioned above, the poverty rate for Puerto Rico for the year 2010 was 45.2%. This value translates into an EJ poverty threshold of approximately 54.2%. The communities listed in Table 3.4.3.1 exceeded this poverty threshold and are the most likely to be vulnerable to EJ concerns.

Table 3.4.3.1. Puerto Rico communities which exceeded poverty threshold for year 2010. Source: U.S. Census Bureau 2010.

Community	Percent of Population Below Poverty Level
Adjuntas	57.2
Aguada	56.5
Barranquitas	54.7
Ciales	59.3
Coamo	55.8
Comerío	58.4
Corozal	58.4
Guánica	58.2
Guayanilla	56.5
Isabela	57.1
Lajas	55.7
Lares	58.1
Las Marías	58.2
Maricao	65.7
Maunabo	55.6
Moca	57.0
Morovis	62.0
Naranjito	55.3
Orocovis	62.6
Patillas	57.0
Peñuelas	57.7
Quebradillas	60.6

Community	Percent of Population Below Poverty Level
Salinas	58.5
San Sebastián	58.5
Utuado	57.6
Villalba	57.1
Yauco	56.8

As mentioned above, the poverty rate for the USVI in 2010 was 22.2%. This value translates into an EJ poverty threshold of approximately 26.6%. The communities listed in Table 3.4.3.2 exceeded this poverty threshold and are likely the most vulnerable to EJ concerns.

Table 3.4.3.2. USVI communities which exceeded poverty threshold for year 2010. Source: U.S. Census Bureau 2010.

Community	Poverty Rate
Charlotte Amalie	27.3
Charlotte Amalie East	30.7
Christiansted	41.1
Frederiksted	45.9
Frederiksted Southeast	38.9

Based on the information provided above, Puerto Rico and the USVI have minority or economic profiles that include higher rates than that of the continental United States. EJ issues could arise as a result of this proposed amendment for fishermen that are dependent on FMUs or species which could experience multiple years of AM closures, such as under Alternative 3, particularly in regard to poverty. Food insecurity is a large issue in the U.S. Caribbean and these vulnerable low-income populations could be impacted to a greater extent because of their dependence on the fish they receive through fishing efforts and utilize as food to supplement their income.

The general participatory process used in the development of fishery management measures (e.g., public hearings and open Caribbean Council meetings) is expected to provide opportunity for meaningful involvement by potentially affected individuals to participate in the development process of this amendment and have their concerns factored into the decision process. In addition, the proposed actions section of this amendment will be translated into Spanish to

provide local populations with access to the information and the ability to participate in the development of this amendment.

3.5 Administrative Environment

3.5.1 Federal Fishery Management

Federal fishery management is conducted under the authority of the Magnuson-Stevens Act (16 U.S.C. 1801 et seq.), originally enacted in 1976 as the Fishery Conservation and Management Act. The Magnuson-Stevens Act claims sovereign rights and exclusive fishery management authority over most fishery resources within the U.S. EEZ, an area extending from the seaward boundary of each coastal state to 200 nautical miles from shore, as well as authority over U.S. anadromous species and continental shelf resources that occur beyond the U.S. Caribbean EEZ.

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 (600 ft; 183 m). The fishable habitat within the EEZ is 1,218 km^2 (355 nm^2) or 14.39% of the U.S. Caribbean total, with 398 km^2 (116 nm^2) (4.7%) occurring off Puerto Rico and 823 km^2 (240 nm^2) (9.7%), occurring off the USVI. The vast majority of the fishable habitat in federal waters off Puerto Rico is located off the west coast (CFMC 2005).

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 fishing activity for Council-managed species occurs in that area, except for fishing for deep-water snappers, which occurs primarily in the EEZ at depths greater than 100 fathoms (600 ft; 183 m) (CFMC 2005).

Responsibility for federal fishery management decision-making is divided between the Secretary of Commerce 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) 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. The Council is responsible for fishery resources in federal

waters of the U.S. Caribbean. These waters extend to 200 nautical miles 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.

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 U.S. Coast Guard, and various Puerto Rico commonwealth and USVI territory authorities. To better coordinate enforcement activities, federal and commonwealth 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 highly migratory species (HMS), including tunas, oceanic sharks, marlins, sailfishes, and swordfish, to the Secretary from the Fishery Management Councils. In 2012, Amendment 4 to the Consolidated Atlantic Highly Migratory Species Fishery Management Plan: Caribbean Fishery Management Measures re-evaluated the management measures for commercial and recreational HMS fisheries operating in the U.S. Caribbean. The rule implementing this amendment became effective on January 2, 2013. This rule had the purpose of improving permitting of and data collection from vessels operating in the U.S. Caribbean to better manage the traditional small-scale commercial HMS fishing fleet in the U.S. Caribbean Region, enhance fishing opportunities, and improve profits for the fleet, and to provide improved capability to monitor and sustainably manage those fisheries. 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/) and Amendment 4 to the HMS FMP (http://www.nmfs.noaa.gov/sfa/hms/FMP/AM4.htm).

Recreational fishing in the EEZ requires fishermen register in the National Registry. For information, please visit the Recreational Fisheries Statistics Web site at http://www.countmyfish.noaa.gov/.

3.5.2 Territory and Commonwealth Fishery Management

The governments of the Territory of the USVI and the Commonwealth of Puerto Rico have the authority to manage their respective state fisheries. The USVI is an unincorporated territory with a semi-autonomous government and its own constitution. As a commonwealth, Puerto Rico has an autonomous government, but is voluntarily associated with the U.S. The USVI has jurisdiction over fisheries in waters extending up to three nautical miles 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 USVI DPNR is the USVI's fishery management agency. The DPNR regulates commercial and recreational fishing activities with the advice of the Division of Fish and Wildlife and the St. Thomas/St. John and St. Croix Fisheries Advisory Committees (Uwate 2002 in DPNR 2005). The DPNR/Division of Environmental Enforcement is responsible for enforcing regulations within USVI waters (Uwate 2002 in DPNR 2005). Puerto Rico has jurisdiction over fisheries in waters extending up to nine nautical miles from shore. Those fisheries are managed by Puerto Rico's Department of Natural and Environmental Resources. 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.

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 the 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, beginner, and non-resident commercial fishers, ornamental fisheries, and owners of rental boats, including charter and party/head boats. Additional commercial permits are required for the harvest of spiny lobster, queen conch, common land crab, incidental catch, and sirajo goby (i.e., cetí) fisheries. Although Puerto Rico fishing regulations state that a license for all recreational fishermen 13 years and older (excluding fishermen on charter or head boats) is required, this requirement is not currently enforced. Recently, the PRDNER announced that a pilot recreational fishing license program will start during the summer of 2015.

In the USVI, any person that trades any part of his catch, including charter boat operators who sell or trade their catch, must obtain a commercial license (DPNR 2012). USVI commercial

fishermen are required to report their catch (all species) and effort for every trip (USVI 2008 in CFMC 2010). Catch report forms must be submitted to the DPNR on a monthly basis, no later than 15 days after the end of the fishing month. The level of non-reporting, under-reporting, and delayed reporting is not well known. However, the DPNR has been working with the fishermen to improve accuracy of reports and the reporting rate. A moratorium on new commercial fishing licenses has been in place since 2001.

In the USVI, permits are not required for recreational fishing. Recreational fishers are not allowed to sell their catch or to use certain fishing gear to catch fish (i.e., traps, pots, haul seines and set-nets). Subsistence fishermen that do not use pots, traps, haul seines, and set-nets (commercial gear) are not required to have a license (DPNR 2012). However, fishing permits are required to fish in some areas in the USVI (DPNR 2012). A recreational shrimp permit is needed to fish in Altona Lagoon and in Great Pond on St. Croix (commercial fishing not allowed). Permits are also required for fishing activities in the Great St. James Marine Reserve and Cas Cay/Mangrove Lagoon Marine Reserves in St. Thomas.

Additional information regarding fishery management in state or federal waters can be found in Section 2.1 of the 2005 Caribbean SFA Amendment (CFMC 2005), and in the 2010 Caribbean ACL Amendment (CFMC 2011a). Additional information about commercial and recreational fisheries in the USVI and Puerto Rico can be found in Sections 3.3 and 3.4.2.

Chapter 4. Environmental Effects

Chapter 4 describes the effects to the physical, biological and ecological, economic, social, and administrative environments from the alternatives in the proposed action**.** In the following sections, the terms fishery management unit (FMU) and species/species complex may be used interchangeably.

4.1 Proposed Action and Alternatives

Action: Revise inconsistencies in the description of accountability measure (AM) language in the Caribbean Council FMPs and federal regulations at 50 CFR Part 622.

Summary of Management Alternatives

Alternative 1

No Action. Inconsistencies between FMPs and regulations would not be corrected and would continue to be legally deficient.

Alternative 2 (Preferred)

Revise the language describing AM applicability in the Council FMPs to reflect language in CFR 50 Part 622. The statement "The needed changes will remain in effect until modified by the Council" will be removed from the FMPs. The current process of implementing AMs will remain unchanged.

Alternative 3

Modify the language describing AM applicability in CFR 50 Part 622 to reflect language in the Council FMPs, as amended in 2012. Accountability measures will remain in effect until modified by the Council.

4.1.1 Direct and Indirect Effects on the Physical Environment

The proposed action in this amendment would not have any direct physical effects. However, indirect effects on the physical environment are expected depending on the alternative, as described below. These effects depend on the degree to which the proposed action changes fishing effort.

Management actions that affect the physical environment mostly relate to the interactions of fishing gear with the sea floor. The degree or magnitude of the effects would depend on whether an action increases or decreases fishing gear interactions with the bottom habitat. It also depends on the vulnerability of a particular habitat to disturbance and the rate at which the habitat can recover from such disturbances (Barnette 2001). The primary gear types used in the reef fish, queen conch, spiny lobster, and coral fisheries are described in Section 3.3. These include vertical line gear, traps, spear fishing, and hand harvest. Vertical line gear has the potential to snag and entangle bottom structures, which can result in breakage and abrasions (Barnette 2001). Traps can break and damage vulnerable corals, including Endangered Species Act (ESA) listed species, which offer significant benthic structure and essential fish habitat (EFH) in the U.S. Caribbean (Barnette 2001). Hand harvest while free diving or SCUBA diving, commonly used in the queen conch fishery and to some extent in the spiny lobster fishery, and spear fishing, is expected to have little to no adverse direct effects on the physical environment in general. The proposed action would not change the primary gear types or how they are currently used in the reef fish, spiny lobster, corals, and queen conch fisheries.

The cumulative effects of repeated anchoring by fishermen using any harvest method, including spear guns and hand harvest, as well as the use of fishing traps, can also damage (e.g., reduce vertical relief) hard bottom areas where fishing occurs (Barnette 2001 in CFMC 2011a). The cumulative effects of anchoring and trap fishing would depend on how much the proposed action causes an increase or decrease in the quantity and time spent in fishing activities (fishing effort). Increases in fishing effort increase the interaction of fishing gear with the bottom.

Alternative 1 is the no action alternative and would have no physical effects because it would not change the way the Caribbean Fishery Management Council (Council) and the National Marine Fisheries Service (NMFS) currently implement AMs in the U.S. Caribbean exclusive economic zone (EEZ). In this amendment, taking no action would not change current fishing activities; therefore, no changes in fishing effort are expected, and interactions between fishing gear and the habitat remain unchanged. **Alternative 1** would not add any additional physical effects other than those already evaluated in the 2010 and 2011 Caribbean ACL Amendments (CFMC 2011 a,b). Indirect physical effects from the establishment and implementation of AMs were discussed in those amendments and are incorporated herein by reference and summarized as follows. Indirect physical effects from the status quo reflect the reduction in fishing effort

resulting from reducing the length of the fishing season for a particular species/species complex when AMs are applied. Reducing fishing effort reduces the opportunity for interactions from fishing gear and anchors with the sea bottom, benefiting the physical environment.

Similar to **Alternative 1**, **Preferred Alternative 2** would not have any direct physical effects because it would not change the way the Council and NMFS currently implement AMs in the U.S. Caribbean EEZ (as described in Section 1.4) or change current fishing activities. **Preferred Alternative 2** would not add any additional indirect physical effects other than those already evaluated in the 2010 and 2011 Caribbean ACL Amendments, which were summarized above for **Alternative 1**.

The majority of the positive indirect effects on the physical environment discussed above for **Alternatives 1** and **2** would also apply to **Alternative 3** because the process of evaluating ACLs and applying AMs through shortening the season (i.e., reducing fishing effort) would still apply under this alternative. However, given that **Alternative 3** would modify the AM process in the regulations by maintaining AMs in effect indefinitely (until modified by subsequent Council/NMFS action), it could result in additional indirect positive effects on the physical environment in the form of reduced interactions between fishing gear and anchors with the bottom. These result from the interannual continuation of AM-based season shortenings (i.e. reduction in fishing effort) after initial AM application for a particular species/species complex. If in a subsequent year, despite the AM being in place, the species/species complex experience another ACL overage and the Council needs to implement a more restrictive and indefinite AM, then the same or increased positive indirect effects on the physical environment would be expected.

In summary, none of the alternatives proposed are expected to have any direct physical effects. When compared to **Alternatives 1** and **2**, modifying the AM process in **Alternative 3** may provide greater minor beneficial indirect effects to the physical environment because the fishing season may be shortened more than otherwise necessary in a subsequent year(s), reducing the interactions between fishing gear and anchors with the bottom more. This positive indirect effect to the physical environment could only be realized if the harvest season is shortened more than would otherwise occur if the AM were properly updated, thereby leaving in place a season closure longer than was actually necessary to ensure the ACL is not again exceeded. However, this continuation assumes NMFS and the Council fail to monitor updated landings against the ACL and/or fail to adjust AMs in response to that update. Given their past performance, and the charge assigned them, this failure is unlikely. The positive effects on the physical environment provided by **Preferred Alternative 2** are expected to be neutral, and essentially identical to the status quo outcome resulting from **Alternative 1**, because that outcome simply revises language in the governing amendment to reflect the manner in which the Council is presently managing AMs.

4.1.2 Direct and Indirect Effects on the Biological and Ecological Environment

Although this action would affect all Council-managed fisheries conducted in the U.S. Caribbean EEZ, it is not expected to have direct biological or ecological effects or substantially modify fishing activities in federal waters. The extent of indirect effects on the biological and ecological environment would depend on how much the proposed alternative causes an increase or decrease in the quantity and time spent in fishing activities.

Alternative 1 is the no action alternative and is not expected to have any direct biological or ecological effects because it would not change how AMs are currently applied in the U.S. Caribbean EEZ. **Alternative 1** would not add any additional biological or ecological effects beyond those indirect effects already evaluated in the 2010 and 2011 Caribbean ACL Amendments (CFMC 2012 a,b), which established AMs for Caribbean Council-managed species. Those are incorporated herein by reference and summarized as follows. In the 2010 Caribbean ACL Amendment, the establishment of AMs was expected to result in positive indirect biological and ecological effects achieved by constraining landings to the ACL and preventing additional ACL overages for those fisheries that at the time were undergoing overfishing. The general effects anticipated as a result include a more natural size distribution of individuals and an increase in the abundance of individuals in the population. However, the rate and extent of those changes could not be determined at that time. An additional positive albeit minor indirect effect expected from an AM-based reduction in the length of the fishing season for all Council-managed species was a reduction in the incidental catch of other co-occurring species. A generally minor but negative indirect effect was the potential increase in regulatory discards resulting from bycatch of species included in the closure while fishers continue harvest of legally available species.

Preferred Alternative 2 is also not expected to have any direct biological/ecological effects because it simply adjusts the language in the governing amendments to reflect the way the Council and NMFS currently implement AMs in the U.S. Caribbean EEZ (as described in Section 1.2.1) and would therefore not change current fishing activities. **Preferred Alternative 2** is expected to have the same indirect effects on the biological and ecological environment as **Alternative 1**. These were discussed in the 2010 and 2011 Caribbean ACL Amendments and are summarized above.

Alternative 3 proposes to potentially modify the interannual duration of AMs by continuing an established AM from year to year unless and until modified by the Council. Thus, **Alternative 3** may have indirect biological and ecological benefits in addition to those already discussed above for **Alternative 1** and **Preferred Alternative 2**. Given that **Alternative 3** would modify the AM process in the regulations by maintaining an AM-based closure indefinitely (until modified by

subsequent Council/NMFS action), it may result in additional indirect beneficial biological/ecological effects in the form of additional reduced harvest for the species/species complex that experienced the AM. The magnitude of those indirect effects would depend on the level of the harvest restriction of a particular species/species complex in a given year as a result of the subsequent application of AMs. For example, having indefinite AMs could benefit a target species previously affected by the AM by reducing fishing mortality during subsequent closure years, if the continuing closure results in harvest levels below that which would be realized if the AM-based closure season for the target species/species complex was not continued in subsequent years. If in response to a scenario where annual harvest falls under the ACL in subsequent year, the Council through another rulemaking redefines the ACL, then those effects may vary or disappear completely depending on the change in the allowed harvest. Given NMFS' and the Council's past performance in monitoring landings against each ACL and adjusting AMs accordingly, and given the charge assigned these agencies, this failure is unlikely.

Another indirect effect expected from **Alternative 3** could be an increase in the harvest of other species as fishermen shift effort to mitigate the loss of fishing opportunities for those species that experience indefinite AM closures. However, U.S. Caribbean fishers usually fish for other species (e.g., reef fish, lobster, pelagics), and these species also have harvest limits, so additional impacts on other species are not expected to be significant.

In summary, the Council and NMFS expect the net biological and ecological impacts of implementing this action through any of the alternatives proposed to be neutral or minimal because no substantial change in harvest would occur due to the continued and consistent controlling influence of the established ACL. Accountability measures in U.S. Caribbean EEZ waters were developed to ensure ACLs are not continuously exceeded, benefiting the species/species complex by reducing instances of overfishing. Presently, NMFS and Council staff monitor landings for all Council-managed species using a running three-year average, and annually compare those landings averages against the appropriate ACL. If the ACL for any species or species complex is identified as having been exceeded, the harvest season in the year following that determination is shortened to ensure the ACL is not again exceeded. This process will not change regardless of the alternative chosen. As noted above, there is no reason to expect the Council will not use this information to properly update AMs each year as they have done to date.

4.1.3 Direct and Indirect Effects on the Economic Environment

In this action, **Alternative 1** (no action) and **Preferred Alternative 2** are not expected to have direct economic effects on fishing activities in federal waters. However, **Alternative 3** could potentially have a direct effect on fishing activities if it were to prevent fishers from harvesting

their ACL or optimum yield. Any direct effects on the economic environment would depend on how much the proposed action causes an increase or decrease in the quantity and time spent in fishing activities which could potentially have an effect on ex-vessel revenues and costs associated with commercial fishing and the economic value associated with recreational fishing. Although, under **Alternative 3**, the Council is able to formally address the closure by reducing or removing the closure if a need is recognized. Therefore, negative economic effects under **Alternative 3** are likely to be minor.

The economic effects from the establishment and implementation of AMs were discussed in the 2010 and 2011 Caribbean ACL Amendments (CFMC 2011a, b) and are incorporated herein by reference. In general, the establishment of AMs was expected to result in positive indirect economic effects by constraining fisheries to their ACLs and preventing overages of FMUs. Accountability measures result in long-term economic benefits in the form of increased ex-vessel revenues for commercial fishermen and increased economic value resulting from recreational fishing in the future. However, the economic effects are expected to vary depending on whether the majority of landings took place in state or federal waters.

Accountability measures were implemented in order to constrain harvest of any species/species complex to its assigned ACL. Under this objective, an AM closure triggered in one year should prevent an overage and subsequent closure the following year. Table 2.2.1.1 shows the instances where AMs were triggered and therefore required closures in 2013-2014. In 2013, five FMU closures occurred (Puerto Rico Commercial Snapper Unit 2, Puerto Rico Recreational Wrasses, St, Croix Triggerfish and Filefish, St. Croix Spiny Lobster, and St. Thomas Grouper). In 2014, only one FMU, Puerto Rico Commercial Wrasse, experienced a closure. The other fisheries did not experience closures in subsequent years. The lack of 2014 closures in four of the fisheries experiencing AM-based closures in 2013 may indicate management success and positive long-term economic benefits. One can conclude, therefore, that AMs have been successful thus far in preventing consecutive year closures and increasing long-term economic benefits.

Under **Alternative 1**, the text in the FMPs would continue to be inconsistent with the regulations and general approach used to apply AMs in the U.S. Caribbean. Currently, the FMPs include the language that a seasonal closure triggered by an AM would remain in place until modified by the Council, which would result in a continuing seasonal closure unless and until the Council acts to rescind that closure. Such language suggests uncertainty regarding if and for how many years a fishing season would be reduced, beyond that necessary to constrain landings to the ACL, which would affect fishers' short- and long-term expectations and behavior. Current regulations and the general approach used to apply AMs, however, establish definite time periods for seasonal closures, which eliminates that uncertainty. The Council expects that fishers' expectations and behaviors are consistent with existing regulations. Consequently, no additional direct or indirect economic effects would be expected from **Alternative 1**.

Preferred Alternative 2 would not make changes to the codified regulatory requirements but would instead revise language within the FMPs to be consistent with the language in the regulations and the general approach used by NMFS and the Council to apply AMs. Under **Preferred Alternative 2**, the length of the fishing season for the applicable species or species complex that exceeded the ACL would be reduced the year following the AM trigger determination by the amount necessary to ensure landings do not exceed the applicable ACL for that year. The AM-based closure would only apply to that year. Landings would continue to be monitored and compared to the ACL each year, and if there is a subsequent exceedance, another closure would be planned. **Preferred Alternative 2** has no effect on the current approach taken toward implementation. **Preferred Alternative 2** proposes a change in FMP language only, which has no additional direct or indirect economic effects.

Alternative 3 would retain the current language in the FMPs and instead would revise the regulations and general approach taken to apply AMs so as to be consistent with the FMPs. Under **Alternative 3**, any AM-triggered seasonal closure implemented to avoid an overage in the year following an exceedance of the ACL, would continue each and every year until modified by the Council. Under **Alternative 3**, the Council would need to formally address a reduction or removal of a closure each year. If they chose not to, the most substantial effect of **Alternative 3** would be the potential for allowable annual landings in the years following an AM-triggered closure to be less than the harvest that should be allowed based on updated average landings and the applicable ACL. These reduced landings would result in annual economic losses in the form of foregone ex-vessel revenues for commercial fishermen and foregone economic benefits for recreational fishermen for as long as the closure remains in effect. In addition, over time, fishermen might be more mistrustful of managers. Some fishermen might under report landings to prevent a closure. A decline in data quality would negatively affect long-term management of the fishery. Also, regulatory change could create uncertainty regarding recurrence of a closure year after year if the Council did not make changes to the closure, which could affect fishers' short- and long-term expectations and behaviors. However, the Council could, and likely would, avoid any unnecessary closure by removing or adjusting the closure to reflect updated landings. Also, fishermen may be able to mitigate any short-term losses by increasing landings of other species/species complexes but those increases may be limited by ACLs for those species/species complexes targeted. Long-term indirect economic benefits could result from increased future annual landings and ex-vessel revenues realized from increases in the health of the biological stock from any closures that result in a failure to land the entire ACL. As noted in the sections addressing physical and biological impacts, such an outcome is not expected given the past performance of NMFS and the Council to annually monitor landings and to adjust AMs accordingly. Therefore, any economic effects are expected to be minor.
To illustrate **Alternative 3**, consider the case of Puerto Rico's Snapper Unit 2 (queen and cardinal snapper), which experienced an AM closure in 2013 (Table 1.4.1). If the process in

Alternative 3 had been adopted prior to this closure and the Council had elected not to change the rulemaking that implemented the AMs in response to an overage, then the closure would have also been applied during the 2014 season and during subsequent seasons until the Council made a change. As explained on Section 1.4 of this document, a closure of Puerto Rico commercial Snapper Unit 2 did not occur, after all, in federal waters during 2014 because harvest rates were reduced for the species that compose this unit. If the 2013 closure had been imposed again in 2014, short-term minor negative economic effects (average ex-vessel revenues from 2011-2013 were $1,196,176 or 13% of total PR ex-vessel revenues) would have been realized even though the closure was unnecessary. The cumulative negative short-term economic effects due to consecutive AM closures could result in minor positive long-term economic effects from increased health of the biological stock. However, the Council would likely respond to any unnecessary closure by removing or adjusting the closure and therefore avoid any economic effects. The other FMUs that experienced closures include: 1) Puerto Rico Commercial Wrasses, which contributed an average of $194,231 in ex-vessel revenues in 2014 Dollars from 2011-2013 or 2% of total average ex-vessel revenues; 2) St. Croix Triggerfish and Filefish, which contributed an average of $97,156 in 2014 Dollars from 2011-2013 or about 3% of total average ex-vessel revenues; 3) St. Croix Lobster, which contributed an average of $650,047 in 2014 Dollars from 2011-2013 or about 21% of total average ex-vessel revenues; and 4) St. Thomas Groupers, which contributed an average of $275,927 in 2014 Dollars from 2011-2013 or about 16% of total average ex-vessel revenues (Tables 3.4.1.6, 3.4.1.12, and 3.4.1.18).

In summary, **Alternative 1** (no action) and **Preferred Alternative 2** are not expected to have any additional direct or indirect economic effects. All three alternatives would continue to implement AMs in response to ACL overages. When compared to **Alternative 1** (no action) and **Preferred Alternative 2**, **Alternative 3** could result in direct short-term minor economic losses in the form of decreased ex-vessel revenues for commercial fishermen and decreased economic value resulting from recreational fishing. At the same time, indirect long-term minor economic benefits may occur under **Alternative 3** as a result of an increase in the health of the biological stocks and consequent higher ex-vessel revenues and increase economic value from recreational fishing. However, under **Alternative 3**, the Council may, and likely would, address any unnecessary closures annually by reducing or removing the closure, if needed, and thereby avoid any short-term losses and prevent additional long-term economic benefits from occurring.

4.1.4 Direct and Indirect Effects on the Social Environment

Effects from fishery management changes on the social environment are difficult to analyze due to complex human-environment interactions and a lack of quantitative data about those interactions. Generally, social effects can be categorized according to changes in: human behavior (what people do), social relationships (how people interact with one another), and

human-environment interactions (how people interact with other components of their environment, including enforcement agents and fishery managers). It is generally accepted that a positive correlation exists between economic effects and social effects. Thus, in Section 4.1.3 (Economic Effects), alternatives predicting positive or negative economic effects are expected to have correlating positive or negative social effects.

Alternative 1 (No action) would retain the current language describing AM applicability in the Caribbean Council FMPs. Under **Alternative 1** (No action), the language in the FMPs and in the regulations (CFR 50 Part 622) would continue to be inconsistent. Language in the Caribbean Council FMPs would continue to state that once AMs are triggered and the season length is reduced during the following fishing year (by the amount needed to prevent such an overage from occurring again) for the species/species complex, then "the needed changes will remain in effect until modified by the Council", whereas the language in the regulations does not include a continuation clause.

Maintaining inconsistent language under **Alternative 1** (No action) could negatively impact fishermen and the public by creating confusion as to the inter-annual continuation of an AM-based closure for a specific species/species complex. Although the FMPs state that the changes will remain in effect until modified by the Council, the regulations make no such statement and are followed in practice. In practice, when AMs are triggered, the season length is reduced for the following fishing year and the changes remain in effect until December 31 of that year. But because contrary language exists, fishermen could be confused as to whether a fishery could be reduced for more than the following fishing year if the Council does not take any action after the reduction is applied. This perception could impact fishing behavior (fishermen could decide to change their involvement in fishing for that particular fishery based on the belief that it may be reduced for additional years) and could impact interactions between fishermen and fishery managers in a negative manner (could perpetuate mistrust and regulations could be perceived as not being transparent).

The social effects from the establishment and implementation of AMs were discussed in the 2010 and 2011 Caribbean ACL Amendments (CFMC 2011a, b) and are incorporated herein by reference. In general, it was expected that if AMs are triggered and the following fishing season is reduced (and fishing for the particular impacted species is conducted in federal waters), then fishermen who target that fishery, their families and households, and fishing communities to which these fishermen are connected could be impacted in a negative manner by the reduction in allowable fishing days during the following fishing year. These impacts were expected to vary by area or community depending on where the greatest landings for the specific species or FMU occur. In addition, these impacts were expected to vary by territory or state with more fishable habitat available in the territorial waters of Puerto Rico (than in the USVI) which could result in the ability to mitigate loses from a reduction in Federal fishing.

Preferred Alternative 2 would revise the language describing AM applicability in the Council FMPs to match the language in the regulations. The phrase stating that "The needed changes will remain in effect until modified by the Council" will be removed from the FMPs under **Preferred Alternative 2**. Creating consistent language would likely eliminate confusion that fishermen or the public may have about whether the closure will be continued in subsequent years if an AM is triggered because both the FMPs and the regulations would state that the reduction would be applied only for the year following the determination that an AM is triggered. This consistent language could help to create more transparent federal fishery policies which could help to create positive interactions between fishery managers and fishermen. In addition, under **Preferred Alternative 2**, fishermen would be less likely to base their fishing decisions on information which may not be correct because of confusion over whether fishing might be reduced for more than one year.

Alternative 3 would modify the language in the regulations to match that of the FMPs regarding AM guidance. The language would specify that when AMs are applied and the length of the fishing season is reduced, then the changes would remain in effect until modified by the Council. As in **Preferred Alternative 2**, consistent language would be created under **Alternative 3** which would likely eliminate some confusion that fishermen or the public may have about the inter-annual duration of the AM closure for a species/species complex because it would be known that the reduction would continue to be in effect until modified by the Council. However, under **Alternative 3**, fishing behavior might be impacted (fishermen could decide to change their involvement in fishing for that particular fishery based on the belief that it may be reduced for an additional year after the following fishing year). Although the language would be consistent between the FMPs and the regulations regarding AM guidance under **Alternative 3**, some confusion might still exist by fishermen and the public as to how many years the reduction in allowable catch would last.

Under **Alternative 3**, if AMs are triggered then fishermen could be directly impacted in a negative manner by the reduction in allowable fishing days during additional years for which a closure may not be needed, if the rulemaking is not changed by the Council. It is difficult to determine the magnitude of the impacts with the information available; however, it is expected that resulting minimal to moderate negative impacts could potentially be experienced in the fishing communities to which these fishermen are connected. The range of possible effects could depend on the number of years of the closure, whether landings are reduced, and to what extent they are reduced. The more years a fishery is closed, the more substantial the effects could be expected to be (because the fishery would be unavailable during the closure each year). And under **Alternative 3** there is a possibility that annual landings could be less in a year following an AM closure than what is taken under the ACL each year. This loss of landings could result in a loss of income and result in negative social effects. Under **Alternative 3**, the

direct negative social effects to fishermen and fishing communities could be more substantial than those experienced under **Alternative 1** (No Action) or **Preferred Alternative 2** because the fishing season for the relevant species could be reduced for more than one year under **Alternative 3**. However, under **Alternative 3**, the Council has the ability to respond by reducing or removing the closure during additional years if the closure is unnecessary. It is likely that the Council will take action to remove an unnecessary closure. If an unnecessary closure were removed then these more substantial negative social effects would not be experienced under **Alternative 3**.

As an example of possible impacts resulting from an unnecessary continuation of an AM-based closure, Puerto Rico's Snapper Unit 2 (queen and cardinal snapper) experienced an AM closure in 2013 from September 21 through December 31 (Table 1.4.1). If the language in **Alternative 3** had been adopted prior to this closure and the Council had elected not to change the rulemaking that implemented the AMs in response to an overage, then the closure would have also been applied during the 2014 season and during additional seasons until the rulemaking was changed. As it turned out, no closure of Puerto Rico commercial Snapper Unit 2 occurred in federal waters during 2014 due to reduced harvest rates for the species included in the unit (see Section 1.4). Had the 2013 closure been continued into 2014 (i.e., had the stock complex closed again on September 21, 2014), that closure would have been unnecessary. This is an example of how fishermen in communities such as Rincón (queen snapper is the most important species in Rincón by percentage of landings, Table 3.4.2.2) would continue to experience negative impacts from an unnecessary continuation of the AM-based closure. The cumulative negative social and cultural effects of several years of excessive or unnecessary AM closures would likely be more substantial for those fishermen and fishing communities dependent on queen and cardinal snapper, than if a one year closure occurred (as under **Alternative 1** (No Action) or **Preferred Alternative 2**). The magnitude of these effects would depend on the magnitude of the continued closure relative to the magnitude (if any) of the closure that would have been required based on updated landings relative to the ACL, and on a failure of NMFS and the Council to properly manage within the context of updated annual landings, ACLs, and AMs.

Additional FMUs that have experienced AM-based closures since the implementation of AMs include Puerto Rico Commercial Wrasse, Puerto Rico Recreational Wrasse, St. Croix Triggerfish and Filefish, St. Croix Spiny Lobster, and St. Thomas/St. John Groupers (Table 1.4.1 and Table 2.2.1.1). Places (including communities or areas, if possible) that could be expected to experience the most substantial negative impacts from an unnecessary continuation of the AM-based closure for these FMUs under **Alternative 3** are provided as an example for each of these groups. These effects could potentially be minimal to moderate in severity (as explained above).

<u>Puerto Rico Commercial Wrasses</u>: Because reef fish are a highly targeted group for all of Puerto Rico (88.3% of fishermen target reef fish along Puerto Rico's north coast, 75.5% along the east

coast, 88.0% along the south coast, 64.8% along the west coast, and 77.3% for Puerto Rico in general, Table 3.4.2.1) fishermen in communities located along any Puerto Rican coast could potentially experience negative impacts from an unnecessary continuation of the AM-based closure for wrasses under **Alternative 3**.

Puerto Rico Recreational Wrasses: Detailed information about recreational catch area in Puerto Rico is not available. However, due to the importance of commercial reef fish along all coasts of Puerto Rico, it can be assumed that recreational reef fish is also important throughout Puerto Rico. Therefore, recreational fishers along any Puerto Rican coast could potentially experience negative impacts from an unnecessary continuation of the AM-based closure for wrasses under **Alternative 3**.

St. Croix Triggerfish and Filefish: Reef fish are the most important category of fish targeted by commercial fishermen in St. Croix (79.9% of St. Croix fishermen harvest reef fish, Table 3.4.2.3). In addition, Pot fish/reef fish are the most important category of fish identified by commercial fishermen as being consumed by fishermen or given away to friends (32.7% said they consumed pot fish/reef fish or gave it away to friends), and at least one fisherman specifically identified that they consumed or gave away triggerfish to friends (Kojis and Quinn 2012). Also, recreational fishermen in St. Croix target reef fish. Because reef fish are such an important category of fish in St. Croix, in the absence of community-level information and detailed species specific information (rather than just general information about reef fish), it can be assumed that any negative effects resulting from an unnecessary continuation of an AM-based closure for triggerfish and filefish under **Alternative 3** could potentially impact fishermen throughout St. Croix.

St. Croix Spiny Lobster: Areas of importance for types of gear used in the harvest of spiny lobster in St. Croix include the major trap grounds located off the southwestern part of the island and dive fishing which occurs most on the East End and along the southwestern coastline (Valdés-Pizzini et al. 2010). Fishermen in communities located adjacent to these areas might be the most impacted by an unnecessary continuation of an AM-based closure for spiny lobster under **Alternative 3**. However, fishers usually haul vessels on trailers and transport them throughout different parts of the island, so effects might be experienced throughout St. Croix.

St. Thomas/St. John Groupers: Reef fish are the most important category of fish targeted by commercial fishermen in St. Thomas/St. John (84.6% of St. Thomas/St. John fishermen harvest reef fish, Table 3.4.2.4). In addition, grouper is the third most important category of fish identified by commercial fishermen as being consumed by fishermen or given away to friends (39.3% said they consumed grouper or gave it away to friends, Kojis and Quinn 2012). Because reef fish are such an important category of fish in St. Thomas/St. John, in the absence of community-level information and detailed species specific information on groupers (rather than

just general information about reef fish), it can be assumed that any negative effects resulting from an unnecessary continuation of an AM-based closure for groupers under **Alternative 3** might impact fishermen throughout St. Thomas/St. John.

However, the fishery resource could be expected to benefit from the reduction in allowable fishing which could result in healthier stocks and which could lead to some indirect long-term benefits to fishermen. Information is not available to determine the exact magnitude of these impacts to the social environment, but it is assumed these benefits would be minimal. If the fishing season reduction was continued for more than one year under **Alternative 3**, it could be expected that the resource might benefit more than under **Alternative 1** (No Action) or **Preferred Alternative 2** because less fishing would be allowed and fish mortality would be reduced, which could lead to a healthier stock and more fish. This could indirectly benefit fishermen dependent on this fishery in the long-term because of the availability of more fish, if they were allowed to harvest these fish.

4.1.5 Direct and Indirect Effects on the Administrative Environment

Alternative 1 (no action) would not require additional rulemaking; therefore, it would not have an effect on the administrative environment. However, **Alternative 1** would not resolve the existing inconsistencies between the FMPs and the implementing regulations.

The direct administrative effects of **Preferred Alternative 2** would be procedural and very minor, involving the revision of the Reef Fish, Queen Conch, Coral, and Spiny Lobster FMPs to be consistent with CFR 50 Part 622. However, regulations would not need to be modified in **Preferred Alternative 2**. Consistent language could help to create more transparent federal fishery policies which could help to create positive interactions between fishery managers and fishermen.

Alternative 3 would have direct effects on the administrative environment because it would involve revising the current process for implementing AMs and modifying the AMs in the existing regulations so they can be maintained in effect indefinitely, until modified by the Council. The administrative effect of revising the regulations would be minor. If the Council chooses to accept the indefinite approach to implementing and updating AMs, that would involve another administrative action through rulemaking to evaluate and revise application of the AM for the coming year. However, NMFS and the Council already evaluate and adjust AMs each year in response to updated landings, so the additional administrative effort required to determine if AMs should be modified or instead continued by default, as required under **Alternative 3**, also would be minor.

In summary, both **Preferred Alternative 2** and **Alternative 3** would have direct minor negative effects on the administrative environment because they would add a minor administrative burden to the Council and NMFS to revise either the FMPs or the regulations to resolve the inconsistencies in the language describing AMs applicability for Caribbean-managed species. Because **Alternative 3** may trigger other changes to modify AMs in the future, the direct effects on the administrative environment would be larger than the ones expected from **Preferred Alternative 2** and **Alternative 1**. However, these additional administrative impacts also would be expected to be minor because NMFS and the Council already review landings, compare them against the applicable ACL for each species/species group, and modify AMs accordingly each year.

4.2 Cumulative Effects Assessment

The Cumulative Effects Assessment (CEA) included in the 2010 Caribbean ACL Amendment (CFMC 2011a) analyzed cumulative effects to the queen conch and reef fish, and the CEA included in the 2011 Caribbean ACL Amendment (CFMC 2011b) analyzed cumulative effects to the spiny lobster and coral resources, in the U.S. Caribbean EEZ. Both of these CEAs also described baseline economic and social conditions for fishing communities in Puerto Rico and the USVI. These CEAs described the effects of the establishment of ACLs, AMs, and the redefinition of management reference points for queen conch, reef fish, spiny lobster, and corals and associated plants and invertebrates in the U.S. Caribbean and how those actions would serve to restore and stabilize natural trophic and competitive relationships, rebuild species abundances, re-establish natural sex ratios, contribute to the long-term health of the ecosystem, and reinvigorate sustainable fisheries while minimizing to the extent practicable negative socioeconomic impacts. The analyses of cumulative effects listed in each of the 2010 and 2011 Caribbean ACL Amendments are still considered to be accurate and useful at the present time and are incorporated herein by reference.

Additional pertinent actions are summarized in the history of management (Section 1.5). The Council is considering two present and reasonably foreseeable future actions that would directly affect Council managed species and the application of AMs. The Council is currently developing island-based FMPs for the U.S. Caribbean. These will replace the present Reef Fish, Spiny Lobster, Queen Conch, and Coral FMPs. This action could affect the way the queen conch, reef fish, spiny lobster, and coral resources are managed in the U.S. Caribbean, as management could be tailored to each island or island group. It is likely that through these FMPs, management reference points, ACLs, and/or AMs will be revisited and possibly revised. How the action proposed in this comprehensive amendment would be affected by the creation of Island-based FMPs is currently unknown.

The Council is presently developing an amendment to their FMPs that would modify the timing for AM implementation in a given year. This action would directly affect AMs. The effects of modifying the timing for the implementation of AMs are expected to be generally positive. However, the actions considered in that amendment are not expected to contribute to the effects expected from this action, and vice-versa.

The affected area of this proposed action encompasses federal waters of the U.S. Caribbean as well as the fishing communities of Puerto Rico and the USVI dependent on fishing for reef fish, spiny lobster, queen conch, and coral resources and the ecosystem services they provide. The proposed action would correct an inconsistency between the language describing AM applicability in the FMPs and the implementing regulations. This action is not expected to have significant beneficial or adverse cumulative effects on the physical and biological/ecological environments as it would minimally affect fishing practices (see Sections 4.1.1 and 4.1.2). If the Council would have selected and NMFS implemented **Alternative 3,** then the effects to these environments would likely be beneficial compared to **Alternative 1** and **Preferred Alternative 2** because fishing effort potentially would be further reduced by having indefinite AMs. However, the social and economic environments would most likely experience short-term adverse effects from the additional and potentially unnecessary harvest constraint resulting from those subsequent closures (see Sections 4.1.3 and 4.1.4) or shorter seasons for the affected species and this may result in economic impacts to fishing communities. However, in the long term, the social and economic effects are expected to be positive through healthier fish stocks. In all cases, these effects are expected to be minor because ACLs ultimately govern the total allowable harvest of any species/species group, so the total available harvest remains the same. Moreover, NMFS and the Council annually review AMs relative to updated landings and adjust those AMs accordingly, and there is no expectation that this practice will be discontinued.

This action, combined with past and reasonably foreseeable future actions is not expected to have substantial adverse effects on public health or safety. Because the U.S. Caribbean contains multiple fisheries and some multi-species fisheries, in the event there are indefinite AM closures for a specific species/species complex (**Alternative 3**), fishers can always compensate for the lost fishing opportunities by fishing for other species, at least to the extent those species are available for harvest. No additional cumulative effects are expected for **Alternative 1** (no action) or **Preferred Alternative 2** (status quo).

Stresses affecting fishery resources and protected resources as well as the human communities that depend on those resources include but are not limited to natural events, habitat quality, human population growth, and anthropogenic threats (e.g., habitat loss and degradation, sedimentation, pollution, water quality, overharvest, climate change). Some managed species may be more sensitive to the quality of their environment than others. For example, any changes

in benthic conditions resulting from land based increases in sedimentation or turbidity will adversely affect the available productive habitat for queen conch (Appeldoorn et al. 2011) and corals.

Other factors directly affecting human communities include high fuel costs, increased seafood imports, restricted access to traditional fishing grounds, and regional economies. 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 be difficult for fishery participants to regain those channels (WPFMC 2009). Effects on the regional economy, for example the closure of the Hovensa Petroleum Refinery Plant of St. Croix in 2012, which left more than 1,200 people without work, may increase the community dependence on 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/).

Environmental changes (e.g., potential threats from climate change, ocean acidification) can also affect fishery populations, protected resources, and the people and communities that depend on those resources. New and recent information about climate change has begun to shed light on how global climate change will affect, and is already affecting, reef fish, spiny lobster, queen conch, and coral resources. Climate change can affect marine ecosystems through ocean warming by increased thermal stratification, changes to upwelling patterns, sea level rise, increases in wave height and frequency, loss of sea ice, and increased risk of diseases in marine biota, among other things. Potential vulnerabilities for coastal zones include increased shoreline erosion leading to alteration of the coastline, loss of coastal wetlands, and changes in the profiles of fish and other marine life populations (Lorde et al. 2013). Changes in ocean temperatures have been linked to shifting fish stock distributions and abundances in many marine ecosystems, and these impacts are expected to increase in the future (NMFS 2014). Any of these could affect the local or regional seafood output and thus the local economy (Carter et al. 2014). In the U.S. Caribbean region and throughout the southeastern U.S., the major climate induced ecosystem concerns are: 1) Threats to coral reef ecosystems - coral bleaching, disease, and ocean acidification; 2) Threats to habitat from sea level rise – loss of essential fish habitat; and 3) Climate induced changes to species phenology and distribution (Osgood 2008).

Climate variability is also a factor that needs to be considered when addressing climate effects, and in the reasonable foreseeable future it may be far more influential than unidirectional climate change (B. Arnold, personal communication). For example, interannual or El Niño scale changes in the ocean environment may result in changes in the distribution patterns of migratory fishes and can affect reproduction and recruitment in other species (NOAA PFL Climate Variability and Marine Fisheries, http://www.pfeg.noaa.gov/research/climatemarine/cmffish/cmffishery.html, accessed May

2015). Additionally, cyclical water temperature patterns may result in relatively short-term (i.e., decadal) decreases in water temperature despite the evident long-term pattern of temperature increase. Such decadal-scale events may be far more influential with respect to fishery management regulations such as those included in this amendment than are long-term climate change events, because these decadal-scale events operate on the time frame of the fishery management action.

Extreme weather events in the Caribbean, such as hurricanes and storms, in combination with poor land-use planning and deficient ecosystem management and restoration, can be a source of additional pressure to marine ecosystems and to species affected by the proposed action. Moreover, climate change impacts appear to be more substantial or at least more noticeable so far, as one moves away from the equator. Thus, impacts of climate change may be less measurable in the Caribbean than in the higher latitudes (B. Arnold, personal communication), although impacts could be greater in the tropics due to organisms being less well adapted to temperature fluctuations. Nevertheless, when the potential effects of the proposed action and alternatives in this amendment are considered within the context of climate change, the interactive effects are considered to be insignificant relative to other impacts of the proposed action.

Excess carbon dioxide (CO_2) dissolves into the ocean and is converted to corrosive carbonic acid, resulting in the phenomenon known as "ocean acidification" (Oceanus 2013). At the same time, the CO_2 also supplies carbon that combines with calcium already dissolved in seawater to provide the main ingredient for shells, calcium carbonate ($CaCO_3$) (Oceanus 2013). The net responses of organisms to rising CO_2 concentration will vary depending on often opposing sensitivities to decreased seawater pH, carbonate concentration, and carbonate saturation state, and to elevated oceanic total inorganic carbon and gaseous CO_2 (Cooley and Doney 2009). Increased ocean acidity caused by elevated CO_2 could directly damage organisms by partially dissolving their shells (Oceanus 2013, https://www.whoi.edu/oceanus/viewArticle.do?id=52990) or by decreasing growth rates. Other species with more protective coverings on their shells and skeletons, such as crustaceans, temperate urchins, mussels, and coralline red algae may be less vulnerable to decreasing seawater pH (Oceanus 2013). However, the specifics of how ocean acidification affects these species are not well understood.

In general, specific levels of impacts resulting from climate change, climate variation, and ocean acidification cannot be quantified at this time, nor is the exact timeframe known in which these impacts will occur. However, projections based on the Intergovernmental Panel on Climate Change's (IPCC) Special Report on Emissions Scenarios (SRES) give a reduction in average global surface ocean pH of between 0.14 and 0.35 units during the 21st century (Climate Change 2007).

None of the alternatives proposed in this comprehensive amendment are expected to increase or decrease the potential impacts of climate change and ocean acidification on fishery resources and other protected resources. Other anthropogenic impacts to reef fish, spiny lobster, coral resources, and queen conch in the affected area may be more pressing than climate change or even decadal-scale climate variability. Continued monitoring of the effects of climate change, climate variability, and ocean acidification should be a priority of national and local programs. For more information about climate impacts in U.S. marine living resources concerning NMFS, see Osgood (2008). For additional information about climate change in the Caribbean and Southeast region, please see Chapter 17 of the Third National Climate Assessment: *Climate Change Impacts in the United States*; http://nca2014.globalchange.gov/report/regions/southeast, (Carter et al. 2014).

The effects of the proposed action will be monitored through collection of fisheries-dependent and fisheries-independent data by NMFS and the Puerto Rico and USVI governments. In the USVI, commercial landings data are collected by the Department of Planning and Natural Resources. Recreational landings data for managed species are not currently collected in the USVI. In Puerto Rico, commercial and recreational landings data are collected by the Department of Natural and Environmental Resources. Additional information of the effects of this proposed action will be obtained through stock assessments and stock assessment updates, life history studies, economic and social analyses, and other scientific observations, and by direct communication with affected constituents.

The proposed action would not result in the introduction or spread of any non-indigenous species because it does not change existing fishing operations. Additionally, it does not propose any activity associated with the introduction or spread on non-indigenous species (e.g. increased ballast water discharge from foreign vessels).

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 4.1.1, 4.1.2, and 4.1.4 of this document.

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.

Chapter 5. Regulatory Impact Review

Introduction

The National Marine Fisheries Service (NMFS) requires a Regulatory Impact Review (RIR) for all regulatory actions that are of public interest. The RIR does three things: (1) it provides a comprehensive review of the level and incidence of impacts associated with a regulatory action; (2) it provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problem; and (3) it ensures the regulatory agency systematically and comprehensively considers all available alternatives so the public welfare can be enhanced in the most efficient and cost effective way.

The RIR also serves as the basis for determining whether any proposed regulations are a "significant regulatory action" under certain criteria provided in Executive Order 12866 (E.O. 12866) and whether the approved regulations will have a "significant economic impact on a substantial number of small business entities" in compliance with the Regulatory Flexibility Act of 1980.

Problems and Objectives

The purpose and need, issues, problems, and objectives of the action are presented in **Section 1.4** and are incorporated herein by reference.

Methodology and Framework for Analysis

This RIR assesses management measures from the standpoint of determining the resulting changes in costs and benefits to society. To the extent practicable, the net effects of the actions for an existing fishery can be stated in terms of producer and consumer surplus, changes in profits, and employment in the direct and support industries.

Description of the Fishery

A description of the fishery is contained in **Chapter 3** and incorporated herein by reference.

Economic Impacts of Management Measures

The Caribbean Fishery Management Council's (Council) Comprehensive Amendment to the U.S. Caribbean Fishery Management Plans (FMPs): Application of Accountability Measures (AMs) proposes a single action that would resolve the existing inconsistency between language in the four Council FMPs, and the implementing regulations at 50 CFR Part 622 regarding

interannual continuation of Council implemented AMs. NMFS and the Council need to correct this inconsistency to ensure the regulations are consistent with their authorizing FMPs and to ensure AMs for species or species complexes that exceed their annual catch limit (ACL) in a particular year are appropriately applied. The overarching goal of this proposed modification is to establish consistency between the FMP and regulatory language so that confusion does not ensue regarding how long a closure resulting from application of AMs will last.

Action 1

Action 1 proposes to modify inconsistencies between language in the Reef Fish, Queen Conch, Spiny Lobster, and Corals and Reef Associated Plants and Invertebrates (Coral) FMPs and language in 50 CFR Part 622 describing the application of AMs in the U.S. Caribbean exclusive economic zone (EEZ). This action would reduce confusion about the length of any necessary closures as a result of the application of AMs. **Preferred Alternative 2**, which is also the status quo alternative, would not change the way the Council and NMFS currently apply AMs in the U.S. Caribbean EEZ (see AMs applicability description in Chapter 1, Section 1.4). Under the current approach, AMs stay in effect until the last day of the year they were applied. Under **Preferred Alternative 2**, the length of the fishing season for any species or species complex that exceeded the ACL would be reduced the year following the AM trigger determination by the amount necessary to ensure landings do not exceed the applicable ACL for that year. The AM-based closure would only apply to that year. Landings would continue to be monitored and compared to the ACL each year, and if there were a subsequent exceedance, another closure would be planned. **Preferred Alternative 2** proposes a change in FMP language only, which has no additional direct or indirect economic effects.

Private and Public Costs

The preparation, implementation, enforcement, and monitoring of this or any Federal action involves the expenditure of public and private resources, which can be expressed as costs associated with the regulations. Costs associated with this action include, but are not limited to, Council document preparation, meeting, and other costs; NMFS administrative costs of document preparation, meetings and review; and annual law enforcement costs.

Determination of Significant Action

Pursuant to E.O. 12866, a regulation is considered a “significant regulatory action” if it is expected to: 1) result in an annual effect of $100 million or more or adversely effect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities; 2) create a serious

inconsistency or otherwise interfere with an action taken or planned by another agency; 3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights or obligations of recipients thereof; or 4) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this executive order.

This action is not expected to have an adverse effect of $100 million or more, create a serious inconsistency or otherwise interfere with an action taken by another agency, materially alter the budgetary impact of programs or rights or obligations of recipients, or raise novel legal or policy issues.

Chapter 6. Regulatory Flexibility Analysis

6.1 Introduction

The purpose of the Regulatory Flexibility Act (RFA) is to establish a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and applicable statutes, to fit regulatory and informational requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure that such proposals are given serious consideration. The RFA does not contain any decision criteria; instead, the purpose of the RFA is to inform the agency, as well as the public, of the expected economic impacts of the alternatives contained in the FMP or amendment (including framework management measures and other regulatory actions) and to ensure that the agency considers alternatives that minimize the expected impacts while meeting the goals and objectives of the Fishery Management Plan (FMP) and applicable statutes.

With certain exceptions, the RFA requires agencies to conduct a regulatory flexibility analysis for each proposed rule. The regulatory flexibility analysis is designed to assess the impacts various regulatory action alternatives would have on small entities, including small businesses, and to determine ways to minimize the adverse impacts.

6.2 Threshold Analysis

This rule would directly apply to anglers and commercial fishing businesses that own and/or operate fishing vessels that harvest U.S. Caribbean Council-managed species within the U.S. Caribbean Exclusive Economic Zone (EEZ). Anglers, however, are not considered small entities as that term is defined in 5 U.S.C. 601(6), whether aboard a for-hire fishing or private and leased vessel.

Currently, there are estimated to be between 1,000 and 1,200 active commercial fishers in Puerto Rico. In 2008, approximately 74% of licensed commercial fishers were captains and the remaining 26% helpers. This analysis presumes those percentages currently apply and each captain represents a unique business. Consequently, it is estimated that 740 to 888 commercial fishing businesses in Puerto Rico would be directly affected by the rule. When added to the estimated 297 licensed commercial fishers in the USVI (Kojis and Quinn 2011), this rule would directly apply to 1,037 to 1,185 commercial fishing businesses in the U.S. Caribbean.

A business is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates), and has combined annual receipts for all of its affiliated operations worldwide not in excess of the Small Business Administration's (SBA's) small business size standards for its industry. Commercial fishing businesses in the U.S. Caribbean tend not to specialize in either finfish or shellfish fishing. The SBA size standards for the finfish fishing (NAICS code 114111) and shellfish fishing (NAICS code 114112) industries are $20.5 million and $5.5 million, respectively. It is anticipated that all of the above commercial fishing businesses in the U.S. Caribbean have annual revenues less than the size standards and are, therefore, small businesses.

The action would revise the language within U.S. Caribbean FMPs to make it consistent with current regulations concerning the application of accountability measures (AMs). It would not change current regulations, and because it would produce no regulatory change, the action would have no economic impact on small businesses.

The rule would also include regulatory text to clarify the minimum size requirements for queen conch and a clarification of closure provisions for AMs, both unrelated to the amendment. Because those clarifications would not affect current fishing practices, they would not have an economic impact on small businesses.

6.3 Certification

Based on the above analysis, NMFS hereby certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities.

Chapter 7. List of Preparers

Table 7.1. List of Interdisciplinary Plan Team (IPT) Members

Name	Agency	Title
María del Mar López	NMFS/SF	IPT Lead / Fishery Biologist
Bill Arnold	NMFS/SF	Caribbean Branch Chief / Fishery Biologist
Graciela García-Moliner	CFMC	Fishery Biologist
Jose A. Rivera	NMFS/HC	EFH Specialist
Kate Quigley	CFMC	Economist
Christina Package-Ward	NMFS/SF	Anthropologist
Denise Johnson	NMFS/SF	Economist
Andrew Herndon	NMFS/PR	Fishery Biologist
Michael Larkin	NMFS/SF	Data Analyst
Meaghan Bryan	NMFS/SEFSC	Fishery Biologist
Shepherd Grimes	NOAA/GC	Attorney
Iris Lowery	NOAA/GC	Attorney
Scott Sandorf	NMFS/SF	Technical Writer
Heather Blough	NMFS/SER	Regional Acting NEPA Coordinator
Brent Stoffle	NMFS/SEFSC	Anthropologist
Lynn Rios	NOAA/OLE	Enforcement Officer
Noah Silverman	NMFS/SER	Regional NEPA Coordinator

NMFS = National Marine Fisheries Service, CFMC = Caribbean Fishery Management Council, SF = Sustainable Fisheries Division, PR = Protected Resources Division, SERO = Southeast Regional Office, SER = Southeast Region, HC = Habitat Conservation Division, GC = General Counsel, SEFSC = Southeast Fisheries Science Center, OLE= Office of Law Enforcement

Chapter 8. List of Agencies, Organizations 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)
(787) 766-6239 (Fax)
http://www.caribbeanfmc.com/
National Marine Fisheries Service (NMFS), Southeast Region 263 13th Avenue South
St. Petersburg, Florida 33701
(727) 824-5301 (Telephone)
(727) 824-5320 (Fax) 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 Headquarters Office
National Marine Fisheries Service Office of Law Enforcement Southeast Division
United States Coast Guard
United States Department of the Interior
U.S. Virgin Islands Department of Planning and Natural Resources
Puerto Rico Department of Natural and Environmental Resources
Puerto Rico Junta de Calidad Ambiental (Puerto Rico Environmental Quality Board)

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Appendices

Appendix A. Other Applicable Law

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) (16 U.S.C. 1801 et seq.) provides the authority for fishery management in federal waters of the exclusive economic zone. 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 that support those fisheries. Major laws affecting federal fishery management decision-making are summarized below.

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

Coastal Zone Management Act (CZMA)
The 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. NMFS may presume State agency concurrence if the State agency's response is not received within 60 days from receipt of the agency's consistency determination and supporting information as required by 15 C.F.R. §930.41(a).

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. They should also properly reference all supporting materials and data, and 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 will also undergo quality control prior to being used by the agency and a pre-dissemination review.

Endangered Species Act (ESA)

The 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 formal and/or informal ESA Section 7 consultations on the continued authorization of the Queen Conch, Spiny Lobster, Corals and Reef Associated Plants and Invertebrates (Coral), and Reef Fish fisheries under their respective FMPs. In 2011, NMFS completed separate biological opinions evaluating the impacts of the continuing authorization of the reef fish (NMFS 2011d) and spiny lobster fisheries (NMFS 2011e) 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 2011d for discussion on

these species and entities). However, the opinion did state that 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 2011e, 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 coral reef resources fishery 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 resources 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 concurred with this determination in a memorandum dated August 2, 2013.

On September 10, 2014, NMFS published a final rule (79 FR 53852) listing 20 new coral species under the ESA. Five of those new species (*Mycetophyllia ferox, Dendrogyra cylindrus, Orbicella annularis, Orbicella faveolata,* and *Orbicella franksi*) occur in the Caribbean and all of these are listed as threatened. The two previously listed *Acropora* coral species (*Acropora palmata* and *Acropora cervicornis*) remain protected as threatened. NMFS is evaluating potential effects of the action proposed and will complete any required Section 7 analysis prior to promulgation of a final rule implementing this comprehensive amendment.

Marine Mammal Protection Act (MMPA)

The MMPA established a moratorium, with certain exceptions, on the taking of marine mammals in U.S. waters and by U.S. 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.

In 1994, Congress amended the MMPA, to govern the taking of marine mammals incidental to commercial fishing operations. 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. To legally fish in a Category I and/or II fishery, a fisherman must obtain a marine mammal authorization certificate by registering with the Marine Mammal Authorization Program (50 CFR 229.4) and accommodate an observer if requested (50 CFR 229.7(c)) and they must comply with any applicable take reduction plans.

NMFS has determined that fishing activities conducted under this amendment will have no adverse impact on marine mammals. According to the List of Fisheries for 2015 published by NMFS, all gear (dive, hand/mechanical collection fisheries) used in the reef fish, queen conch, spiny lobster, and coral resources fisheries are considered Category III (79 FR 77919), meaning annual mortality and serious injury of marine mammals in these fisheries is less than or equal to one percent of the potential biological removal level.

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 the Office of Management and Budget before requesting most types of fishery information from the public. This action does not contain a collection-of-information requirement for purposes of the PRA.

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. 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 assess how those regulations will affect small businesses.

Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) Provisions

The Magnuson-Stevens Act includes 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 areas affected by the proposed action have been identified as EFH for queen conch, spiny lobster, corals, and reef fish. As specified in the Magnuson-Stevens Act, EFH consultation is required for federal actions which may adversely affect EFH.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 et seq.) requires federal agencies to consider the environmental and social consequences of proposed major actions, as well as alternatives to those actions, and to provide this information for public consideration and comment before selecting a final course of action. This document contains an Environmental Assessment to satisfy the NEPA requirements. The Purpose and Need can be found in Section 1.4, Alternatives are found in Chapter 2, the Environmental Consequences are found in Chapter 4, the List of Preparers is in Chapter 7, and a list of the agencies/people consulted is found in Chapter 8.

Regulatory Flexibility Act (RFA)

The purpose of the Regulatory Flexibility Act (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 (Initial Regulatory Flexibility Analysis [IRFA] and Final Regulatory Flexibility Analysis [FRFA]) 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 the 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. The RFA for this action is found in Chapter 6.

Executive Orders

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. The NOAA Office of General Counsel will determine whether a Takings Implication Assessment is necessary for this amendment.

E.O. 12866: Regulatory Planning and Review

Executive Order 12866, 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 fishery management plan 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 analysis.

E.O. 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations

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. See Section 3.4.3 for Environmental Justice considerations as they relate to this regulatory amendment.

E.O. 12962: Recreational Fisheries

This Executive Order requires federal agencies, in cooperation with States and Tribes, to improve the quantity, function, sustainable productivity, and distribution of U.S. aquatic resources for increased recreational fishing opportunities through a variety of methods including, but not limited to, developing joint partnerships; promoting the restoration of recreational fishing areas that are limited by water quality and habitat degradation; fostering sound aquatic

conservation and restoration endeavors; and evaluating the effects of federally-funded, permitted, or authorized actions on aquatic systems and recreational fisheries, and documenting those effects.

Additionally, it establishes a seven-member National Recreational Fisheries Coordination Council responsible for, among other things, ensuring that social and economic values of healthy aquatic systems that support recreational fisheries are considered by federal agencies in the course of their actions, sharing the latest resource information and management technologies, and reducing duplicative and cost-inefficient programs among federal agencies involved in conserving or managing recreational fisheries. The Council also is responsible for developing, in cooperation with federal agencies, States and Tribes, a Recreational Fishery Resource Conservation Plan - to include a five-year agenda. Finally, the Order requires NMFS and the U.S. Fish and Wildlife Service to develop a joint agency policy for administering the ESA.

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).

The action in this amendment will have no direct impacts on coral reefs. Regulations are already in place to limit or reduce impacts to coral reef habitat in the U.S. Caribbean EEZ. In addition, NMFS approved and implemented the 2011 Annual Catch Limit (ACL) Amendment, which established ACLs and accountability measures for species within the Corals and Reef Associated Plants and Invertebrates FMP. These actions aim to prevent overfishing of coral reef resources, which contain species that play important roles on coral reef ecosystems of the U.S. Caribbean.

E.O. 13132: Federalism

The Executive Order on Federalism requires agencies, when formulating and implementing policies, 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 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 amendments 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 international, State, Tribal, and local entities. No Federalism issues have been identified relative to the action proposed in this regulatory amendment. Therefore, consultation with state officials under Executive Order 13132 is not necessary.

E.O. 13112: Invasive Species

This Executive Order requires agencies to use their authority 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. 13158: Marine Protected Areas (MPAs)

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. This action is not expected to affect any MPA in federal waters of the U.S. Caribbean.

Appendix B. Summary of Regulations in Federal, U.S. Virgin Islands, and Puerto Rico Waters

Revised 8.3.2015 – NMFS/Sustainable Fisheries/Caribbean Branch. This is a summary of current regulations for informational purposes only. For current official regulations go to: http://sero.nmfs.noaa.gov/sustainable_fisheries/policy_branch/documents/pdfs/current_50cfr622_regulations.pdf

QUEEN CONCH	Closed	Open
Federal (only applies to Lang Bank, STX. Season closes when STX territorial limit is reached)	Jun 1 – Oct 31	Nov 1 – May 31
Puerto Rico	Aug 1 – Oct 31	Nov 1 – Jul 31
USVI (50,000 lbs STX & 50,000 lbs STT/STJ) Season closes when limit is reached	Jun 1 – Oct 31	Nov 1 – May 31

SNAPPERS		
Snapper Unit 1: (1) silk, (2) black, (3) blackfin, (4) vermillion, (5) wenchman*		
	Closed	Open
Federal	Oct 1 – Dec 31	Jan 1 – Sept 30
Puerto Rico (only applies to silk and blackfin)	Oct 1 – Dec 31	Jan 1 – Sept 30
USVI (only applies to STT/STJ)	Oct 1 – Dec 31	Jan 1 – Sept 30
*Wenchman was transferred from Snapper Unit 2 to Snapper Unit 1 (Effective January 30, 2012. Seasonal closure does not apply to wenchman).		
Snapper Unit 2: (1) queen , (2) cardinal *new		
Federal	No restrictions	
Puerto Rico		
USVI		
*Cardinal was added to Snapper Unit 2 (Effective January 30, 2012)		
Snapper Unit 3: (1) mutton, (2) lane, (3) gray, (4) dog, (5) schoolmaster, (6) mahogany		
	Closed	Open
Federal (only applies to mutton and lane)	Apr 1 – Jun 30	July 1 – Mar 31
Puerto Rico (only applies to mutton)	Apr 1 – May 31	June 1 – Mar 31
USVI (only applies to mutton and lane)	Apr 1 – Jun 30	July 1 – Mar 31
Snapper Unit 4: (1) yellowtail snapper		
No seasonal closures. Size limits apply year-round		
Federal	12 inches (in) Total Length (TL)	
Puerto Rico	10.5 in Fork Length (FL)	
USVI	No size limit	

PARROTFISH	
Federal	• No harvest of midnight, blue, and rainbow parrotfish. • 8 in (FL) min. size for redband parrotfish only applies to STX • 9 in (FL) min. size all other parrotfish (princess, queen, striped, redtail, stoplight, redfin) only applies to STX
Puerto Rico	No restrictions
USVI	No harvest of midnight, blue, and rainbow parrotfish (*unofficial)

GROUPERS		
Grouper Unit 1: (1) Nassau grouper		
Federal	PROHIBITED SPECIES	
Puerto Rico		
USVI		
Grouper Unit 2: (1) goliath grouper		
Federal	PROHIBITED SPECIES	
Puerto Rico		
USVI		
Grouper Unit 3: (1) red hind, (2) coney, (3) rock hind, (4) graysby		
	Closed	Open
Federal (only applies to red hind fishing and possession west of 67°10' W. longitude)	Dec 1 – Last day Feb	Mar 1 – Nov 30
Puerto Rico (only applies to red hind)	Dec 1 – Feb 28	Mar 1 – Nov 30
USVI	------	--------
*Creole fish was removed from Grouper Unit 3 and from federal management (Effective January 30, 2012).		
Grouper Unit 4*: (1) yellowfin, (2) red, (3) tiger, (4) black		
	Closed	Open
Federal	Feb 1 – Apr 30	May 1 – Jan 31
Puerto Rico (only applies to yellowfin)	Feb 1 – Apr 30	May 1 – Jan 31
USVI	Feb 1 – Apr 30	May 1 – Jan 31
*Yellowedge and misty groupers were transferred from Grouper Unit 4 to Grouper Unit 5. Black grouper was added into Grouper Unit 4 (Effective January 30, 2012).		
Grouper Unit 5*: (1) yellowedge, (2) misty		
	Closed	Open
Federal (only applies to yellowedge)	Feb 1 – Apr 30	May 1 – Jan 31
Puerto Rico	No restrictions	
USVI (only applies to yellowedge)	Feb 1 – Apr 30	May 1 – Jan 31
*New unit (Effective January 30, 2012)		

CORALS	
Federal	No harvest of corals allowed (stony corals, octocorals, live rock), except by permit for scientific, educational purposes.
Puerto Rico	
USVI	

SPINY LOBSTER	
Federal	No seasonal closures. Must be landed whole. Size limit (> 3.5 in (8.9 cm) carapace length) and gear restrictions apply. No harvest of egg bearing females.
Puerto Rico	
USVI	

AQUARIUM TRADE SPECIES	
Federal	List of allowed species
Puerto Rico	List of allowed species; state permit required
USVI	Territorial permit required

FEDERAL RECREATIONAL BAG LIMITS	
Aggregate bag limit for:	**Allowed quantity:**
snapper **grouper** **parrotfish**	5 fish per person/day, or if 3 or more persons are aboard, 15 fish from aggregate per vessel/day; but not to exceed: 2 parrotfish per person/day or 6 parrotfish per vessel/day.
Angelfish, boxfish, goatfish, grunts, wrasses, jacks, scups and porgies, squirrelfish, triggerfish and filefish, tilefish	5 fish per person/day or, if 3 or more persons are aboard, 15 fish from aggregate per vessel/day, but not to exceed: 1 surgeonfish per person/day or 4 surgeonfish per vessel/day.
Spiny lobster	3 spiny lobsters per fisher/day, no more than 10 spiny lobsters per vessel/day.

QUEEN CONCH RECREATIONAL AND COMMERCIAL LIMITS	
RECREATIONAL BAG LIMIT	
Federal	3 conch per person/day, or if > than 4 persons aboard, 12 conchs per vessel
Puerto Rico	3 conch per person/day, 12 per vessel/day
USVI	6 conch per fisher/day, no more than 24 per vessel/day
COMMERCIAL LIMIT	
Federal	200 conch per vessel per day
Puerto Rico	150 conch person/day, 450 per vessel/day
USVI	200 conch per vessel/day

OTHER SPECIES RESTRICTIONS		
		Min. Size (FL)
Puerto Rico	White grunt (*Haemulon plumieri*)	8 in (203 mm)
	Honeycomb cowfish (*Acanthostracion polygonia*)	7 in (78 mm)
	Scrawled cowfish (*A. quadricornis*)	7 in (78 mm)
	Cero (*Scomberomorus regalis*)	16 in (406 mm)
	King mackerel (*S. cavalla*)	20 in (508 mm)
	Snook (*Centropomus undecimalis*)	22 in (559 mm)

SEASONAL AREA CLOSURES

Grammanik Bank, STT – NO fishing any fish from **Feb 1 - Apr 30**, except for HMS
Hind Bank, STT - Closed year-round to all fishing and anchoring
Mutton Snapper Spawning Aggregation, STX – NO fishing any fish from **Mar 1 - Jun 30**
Bajo de Sico , PR – NO fishing of Council managed reef fish species from **Oct 1 - Mar 31**
NO anchoring year-round
Tourmaline Bank and Abrir la Sierra Bank, PR – NO fishing any fish from **Dec 1 - Feb 28**