

# Modification of Spiny Lobster Management Reference Points Based on SEDAR 57 Stock Assessments



Draft Framework Amendment to the Fishery Management Plans for  
Puerto Rico, St. Thomas and St. John, and St. Croix

**Version 2.0**  
**April 2021**



# Draft Framework Amendment to the Fishery Management Plans for Puerto Rico, St. Thomas and St. John, and St. Croix

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Proposed Action: Modify spiny lobster status determination criteria, management reference points, and accountability measures trigger.

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## Abbreviations and Acronyms Used in this Document

ABC	acceptable biological catch
ACL	annual catch limit
AM	accountability measure
CFMC	(Council); Caribbean Fishery Management Council
EEZ	exclusive economic zone
EIS	environmental impact statement
FMP	fishery management plan
FMSY	fishing mortality rate yielding MSY
MFMT	maximum fishing mortality threshold
MSA	(Magnuson-Stevens Act); Magnuson-Stevens Fishery Conservation and Management Act
MSST	minimum stock size threshold
MSY	maximum sustainable yield
NMFS	National Marine Fisheries Service
OFL	overfishing limit
OY	optimum yield
SDC	status determination criteria
SEDAR	Southeast Data, Assessment, and Review (stock assessment)
SEFSC	Southeast Fisheries Science Center
SSC	Scientific and Statistical Committee
SYL	sustainable yield level
USVI	United States Virgin Islands

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# Chapter 1. Introduction

The Caribbean Fishery Management Council (Council) is one of eight regional fishery management councils established by the Magnuson-Stevens Fishery Conservation and Management Act of 1976. The Council prepares fishery management plans (FMP) and amendments to those FMPs that are designed to manage fishery resources within the federal waters of the U.S. Caribbean, which includes waters off Puerto Rico and the U.S. Virgin Islands (USVI).

The National Marine Fisheries Service (NMFS) is responsible for the stewardship of the nation's ocean resources and their habitat. Specifically, NMFS is responsible for the collection of data and for conducting stock assessments in support of science-based fishery management to prevent overfishing and rebuild overfished fish stocks. The Council develops an amendment and sends it to NMFS, which implements the measures in the amendment on behalf of the Secretary of Commerce. NMFS's Southeast Regional Office is responsible for implementing and enforcing management measures based on the U.S. Caribbean FMPs and amendments.

## 1.1 What Action is Being Proposed?

The Framework Amendment to the Comprehensive FMP for the Puerto Rico Exclusive Economic Zone (EEZ) (Puerto Rico FMP), the St. Thomas and St. John EEZ (St. Thomas and St. John FMP), and the Comprehensive FMP for the St. Croix EEZ (St. Croix FMP) includes an action to update the status determination criteria (SDC) and other management reference points for spiny lobster under each FMP based on the Southeast Data, Assessment, and Review 57 ([SEDAR 57](#)) stock assessments. The Puerto Rico FMP, St. Thomas and St. John FMP, and St. Croix FMP are collectively referred to as the island-based FMPs throughout this Framework Amendment.

SDC are the measurable and objective factors, maximum fishing mortality threshold (MFMT), minimum stock size

Modification of Spiny Lobster  
Management Reference Points

### Status Determination Criteria and Definitions

**Maximum Fishing Mortality Threshold (MFMT)** – The level of fishing mortality (F), on an annual basis, above which overfishing is occurring. The MFMT or reasonable proxy may be expressed either as a single number (a fishing mortality rate or F value), or as a function of spawning biomass or other measure of reproductive potential.

**Minimum Stock Size Threshold (MSST)** – The biomass level below which the capacity of the stock to produce MSY on a continuing basis has been jeopardized. A stock or stock complex is considered overfished when its biomass has declined below MSST.

**Overfishing Limit (OFL)** – The annual amount of catch that corresponds to the estimate of MFMT applied to a stock or stock complex's abundance and is expressed in terms of numbers or weight of fish.

**Overfishing** occurs whenever a stock or stock complex is subjected to a level of fishing mortality or total catch that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis.

**Overfished.** A stock or stock complex is considered "overfished" when its biomass has declined below the MSST.

threshold (MSST), and overfishing limit (OFL), or their proxies, that are used to determine if overfishing has occurred, or if the stock or stock complex is overfished. 50 C.F.R. 600.310(e)(2)(i)(A). Under the National Standard 1 guidelines, SDC, maximum sustainable yield (MSY), optimum yield (OY), acceptable biological catch (ABC), and annual catch limit (ACL) are collectively referred to as “reference points,” 50 C.F.R. 600.310(b)(2)(iv). The SDC and other reference points are collectively referred to as management reference points throughout this Framework Amendment.

The SDC to be updated for spiny lobster under this Framework Amendment to the island-based FMPs (Framework Amendment) include the MFMT, the MSST, and the OFL. Other spiny lobster management reference points to be updated include the MSY, or MSY proxy, ABC, OY, and ACL.

The Framework Amendment includes a second action that would revise the accountability measure (AM) trigger for spiny lobster in each island/island group from the AM trigger described in the island-based FMPs.

## 1.2 Why is the Council Considering Action?

The Council is considering action to update management reference points to incorporate information from the Southeast Data, Assessment, and Review (SEDAR) 57 U.S. Caribbean Spiny Lobster stock assessments, which are considered best scientific information available for the spiny lobster stocks. Following the SEDAR assessments, the spiny lobster stocks would change from Tier 4a (data limited, no accepted assessment available) to Tier 3 (data limited, accepted assessment available) in the Council’s ABC Control Rule, which is included in each island-based FMP. The Council is also considering revising the AM trigger for spiny lobster to (1) respond to landings information available since the AM trigger was developed under the island-based FMPs and (2) anticipate changes to the spiny lobster ACLs going forward, following the spiny lobster stock assessments.

### Other Management Reference Points

**Maximum Sustainable Yield (MSY)** – The largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological, environmental conditions and fishing technology characteristics (e.g., gear characteristics) and the distribution of catch among fleets.

**Acceptable Biological Catch (ABC)** – The catch level recommended by the SSC and set at or below OFL to account for scientific uncertainty.

**Annual Catch Limit (ACL)** – The limit of total annual catch for a stock or stock complex that serves as the basis for invoking accountability measures. The ACL cannot exceed the ABC.

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

### 1.2.1 Spiny Lobster Stock Assessments

In 2019, SEDAR completed three stock assessments for spiny lobster, one for the Puerto Rico spiny lobster stock, one for the St. Thomas and St. John spiny lobster stock, and one for the St. Croix spiny lobster stock (SEDAR 57 2019; <http://sedarweb.org/sedar-57>). Due to the lack of an estimable spawner-recruit relationship, MSY could not be reliably estimated for the three spiny lobster stocks. Therefore, the stock status, OFL and projected landings were presented relative to a provisional MSY proxy of  $F_{SPR30\%}$ .<sup>1</sup> SEDAR 57 used management threshold definitions of  $F_{SPR30\%}$  for the MFMT and 75% of  $S_{SPR30\%}$  for the MSST. The assessments estimated that the fishing mortality was below MFMT and the spawning output was above MSST. Thus, each spiny lobster stock was determined to be not undergoing overfishing and not overfished.

The Council's Scientific and Statistical Committee (SSC) reviewed results from SEDAR 57 and determined that the stock assessments are suitable for management advice. Specifically, the SSC (1) supported the three island-based spiny lobster stock assessments (statistical catch at age models) as providing the best scientific information available relative to the SDC of overfishing status and overfished status; (2) accepted the  $F_{SPR30\%}$  as an MSY proxy; (3) supported the outcome of the SEDAR 57 that overfishing is not occurring relative to the recommended MFMT and that the populations are not overfished relative to the recommended MSST; and (4) supported and recommended the use of the assessments to update the values for management reference points and SDC in each of the island-based FMPs, using the Council's ABC Control Rule included in each the island-based FMPs as described below.

The Council requested that the SSC coordinate with the Southeast Fisheries Science Center (SEFSC) to provide OFLs and ABCs for spiny lobster for each island/island group, based on SEDAR 57, for 2021 to 2023. Council intent would be to request the SEFSC provide an interim assessment<sup>2</sup> by 2023 to update OFL projections and set catch levels for 2024 and later years.

### 1.2.2 Acceptable Biological Catch Control Rule

The ABC is a level of annual catch recommended by the Council's SSC, which accounts for the scientific uncertainty in the estimate of the OFL, any other scientific uncertainty, and the Council's risk policy (50 CFR 600.310(f)(1)(ii)). The Council's risk policy could be based on an acceptable probability (at least 50%) that catch equal to the stock's ABC will not result in overfishing. The Council's choice of a risk policy cannot result in an ABC that exceeds the OFL (50 CFR 600.310(f)(2)(i)). Councils and their SSC should develop a process by which the SSC

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<sup>1</sup> The  $F_{MSY}$  proxy of  $F_{SPR30\%}$  is calculated from spawning-stock-biomass-per-recruit (SPR) analyses. Under conditions of no fishing mortality, 100% of a stock's spawning potential is obtained. A fishing mortality rate, denoted by  $F_{SPR30\%}$  would allow the stock to attain 30% of the maximum spawning potential, which would have been obtained under conditions of no fishing mortality.

<sup>2</sup> An interim assessment would update the model projections used in the SEDAR 57 stock assessments with more recent commercial landings and length-composition data, as available, for each island/island group.

can access the best scientific information available when implementing the ABC Control Rule (i.e., specifying the ABC) (50 CFR 600.310(f)(3)). The SSC must recommend the ABC to the Council.

Each of the Puerto Rico, St. Thomas and St. John, and St. Croix FMPs adopt and apply a newly devised, four-tiered ABC Control Rule to specify SDC (i.e., MFMT, MSST, and OFL or OFL proxy) and management reference points (i.e., MSY or MSY proxy and ABC), depending on differing levels of data availability (see Appendix A). In each FMP, spiny lobster was considered a Tier 4a stock (data limited with no accepted assessment, with relatively low vulnerability to fishing pressure).<sup>3</sup> In the FMPs, the MSY proxy, MFMT, and MSST for Tier 4a stocks were defined (see Appendix A), but due to data limitations, were not quantified. Similarly, under Tier 4a, the OFL could not be quantified. Thus, a new reference point, the sustainable yield level (SYL), which is a level of landings that can be sustained over the long-term, was quantified and used as the OFL proxy and an additional MSY proxy.<sup>4</sup> Under the island-based FMPs, the SSC recommended ABCs, which were derived from the spiny lobster SYLs, and the Council set each spiny lobster ACL at 95% of the respective island’s ABC (Table 1.1).

**Table 1.1.** Spiny lobster SYL, ABC, and ACL specified for federal waters under the Puerto Rico FMP, St. Thomas and St. John FMP, and St. Croix FMP. Values are in pounds whole weight.

Fishery Management Plan	Spiny Lobster SYL*	Spiny Lobster ABC	Spiny Lobster ACL
Puerto Rico	924,968	554,981	527,232
St. Thomas and St. John	367,035	220,221	209,210
St. Croix	346,541	207,925	197,528

\* Under Tier 4 of the ABC Control Rule included in each FMP, the SYL was quantified and used as the OFL proxy.

Based on the uncertainty in the data used in the SEDAR 57 stock assessment models, the SSC in consultation with the SEFSC recommended that spiny lobster be classified as a Tier 3 stock (data limited, accepted assessment available) under the ABC Control Rule for each FMP. Tier 3 of the ABC Control Rule, if the biomass of the stock falls below MSST, which would be set equal to 75% of the long-term spawning stock biomass at MFMT ( $SSB_{MFMT}$ ), the stock would be determined to be overfished (i.e., if  $B/MSST < 1$ ) and the Council would then need to develop a rebuilding plan capable of returning the stock to a level that allows the stock to achieve MSY on

<sup>3</sup> Spiny lobster was considered to be a Tier 4a stock in each FMP due in part to recruitment (the species is found throughout the Caribbean and the duration of the larval stage is several months) and sizes of spiny lobsters that are harvested compared to the minimum size limit in place (average carapace lengths observed were greater than the minimum size limit of 3.5 inches carapace length).

<sup>4</sup> The SYL is intended to be used when the information or resources needed to produce a quantitative stock assessment are not available to determine the MSY or corresponding reference point such as the OFL, and therefore it is specific to Tier 4.

a continuing basis. Additionally, under Tier 3, in years when there is a stock assessment, if fishing mortality (F) exceeds the MFMT, the stock is considered to be undergoing overfishing (i.e., if  $F/MFMT > 1$ ), because this level of fishing mortality, if continued, would reduce the stock biomass to an overfished condition. In years in which there is no assessment, overfishing would occur if landings exceed the OFL.<sup>5</sup>

Under Tier 3 of the ABC Control Rule, the ABC is derived from the OFL, reduced by the SSC's scientific uncertainty<sup>6</sup> buffer (sigma; for spiny lobster stocks  $\sigma = 1.0$ ) and reflecting the acceptable probability of overfishing determined by the Council (P\*; for spiny lobster stocks  $P^* = 0.45$ ).<sup>7</sup> The ACL would then be derived from the ABC, reduced by the Council's management uncertainty<sup>8</sup> buffer (Action 1).

### 1.2.3 Statement of Purpose and Need

The purpose of this framework amendment is to update management reference points for spiny lobster under the Puerto Rico, St. Thomas and St. John, and St. Croix FMPs to account for the SEDAR 57 spiny lobster stock assessments and application of the Council's ABC Control Rule and to revise the AM trigger for spiny lobster stocks.

The need for this framework amendment is to update management measures for spiny lobster stocks based on best scientific information available to prevent overfishing and achieve OY, consistent with the requirements of the Magnuson-Stevens Fishery Conservation and Management Act.

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<sup>5</sup> Under Tier 3 of the ABC Control Rule, overfishing would be determined to be occurring if one year of landings exceeds the annual OFL for the stock.

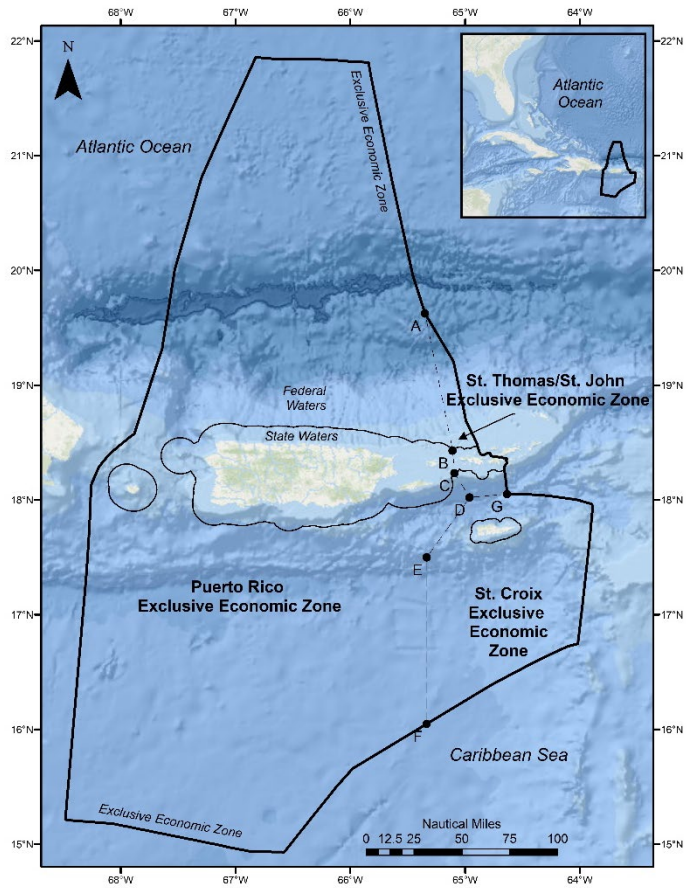
<sup>6</sup> Scientific uncertainty takes into account the deficiencies in and vagaries of reporting, which includes potential biases (over reporting, underreporting, trends), changes in reporting forms, changes in fisher behavior, the contribution of unspecified landings, expansion factors and validation capacity, availability of recreational data (quantity and quality), availability of ancillary data, and life history parameters, focusing on how these deficiencies affected data quality.

<sup>7</sup> The SSC set a sigma value of 1.0 at their May 2020 meeting and the Council set a P\* value of 0.45 at their June 2020 meeting.

<sup>8</sup> Management uncertainty refers to uncertainty in the ability of managers to constrain catch so the ACL is not exceeded, and the uncertainty in quantifying the true catch amounts (i.e., estimation errors).

### 1.3 Where Will the Action Have an Effect?

Under the Puerto Rico FMP (CFMC 2019a), St. Thomas and St. John FMP (CFMC 2019b), and the St. Croix FMP (CFMC 2019c), the Council is responsible for managing fishery resources, including spiny lobster, in federal waters in the U.S. Caribbean region (Figure 1.1). The EEZ around Puerto Rico (Puerto Rico EEZ), described in detail in the Puerto Rico FMP and incorporated herein by reference, ranges from 9-200 nautical miles (17-370 kilometers) from the shore of the Commonwealth of Puerto Rico. The EEZ around St. Thomas and St. John (St. Thomas and St. John EEZ), described in detail in the St. Thomas and St. John FMP and incorporated herein by reference, ranges 3-200 nautical miles (6-370 kilometers) from the shore of St. Thomas and St. John, USVI. The EEZ around St. Croix (St. Croix EEZ), described in detail in the St. Croix FMP and incorporated herein by reference, ranges 3-200 nautical miles (6-370 kilometers) from the shore of St. Croix, USVI.



**Figure 1.1.** U.S. Caribbean region with boundaries between the Puerto Rico, St. Thomas and St. John, and St. Croix management areas.

### 1.4 History of Federal Fisheries Management

The island-based FMPs established management measures for the EEZ around each respective island. The island-based FMPs updated the list of species included for federal management and how those species would be grouped into stocks or stock complexes; specified management reference points for managed stocks and stock complexes; updated accountability measures; described essential fish habitat for managed species; and updated the FMP framework procedures. The island-based FMPs retained other management measures established under the U.S. Caribbean-wide FMPs that apply to the respective island management area (e.g., seasonal and area closures, minimum size limits, recreational bag limits). The Secretary of Commerce

approved the island-based FMPs on September 22, 2020. A proposed rule, followed by a final rule will be published in the near future.

Prior to the development of the [island-based FMPs](#), spiny lobster was managed throughout the U.S. Caribbean EEZ under the [Spiny Lobster FMP](#) of Puerto Rico and the USVI (CFMC 1981), as amended. The history of management actions under the Spiny Lobster FMP are summarized in Appendix C of each island-based FMP.

Below is an annotated list of fishery management actions implemented under the island-based FMPs and the Spiny Lobster FMP and its amendments that are specifically related management reference points and AMs for spiny lobster.

### **Puerto Rico FMP, St. Thomas and St. John FMP, and St. Croix FMP**

The FMPs included a new four-tiered ABC Control Rule to define management reference points for spiny lobster. Each FMP updated the AM trigger for spiny lobster.

### **Spiny Lobster FMP ([49 FR 50049](#) December 26, 1984)**

The Spiny Lobster FMP defined MSY and OY for spiny lobster. Under the FMP, MSY was estimated for the three island areas (Puerto Rico, St. Thomas and St. John, St. Croix) and then summed to provide an estimate for the entire management area (U.S. Caribbean EEZ).

#### **Amendment 1 ([56 FR 19098](#) April 25, 1991)**

Amendment 1 implemented definitions for overfished and overfishing and outlined framework actions that could be taken by the Council should overfishing occur.

#### **Amendment 2 ([70 FR 62073](#) October 28, 2005)**

Amendment 2, part of the Caribbean Sustainable Fisheries Act (SFA) Amendment, redefined MSY and OY and defined the MSST and MFMT for spiny lobster.

#### **Amendment 5 ([76 FR 82414](#) December 30, 2011)**

Amendment 5, part of the 2011 Caribbean ACL Amendment, revised the management reference points and status determination criteria established in Amendment 2 and established ACLs (specified for each of Puerto Rico, St. Thomas and St. John, and St. Croix) and AMs for spiny lobster.

#### **Amendment 6 ([81 FR 29166](#) May 11, 2016)**

Amendment 6 revised the language within the FMP to be consistent with language in the implementing regulations at 50 CFR Part 622 describing the application of AMs in the U.S. Caribbean EEZ.

## Chapter 2. Proposed Actions and Alternatives

Framework procedures included in the Comprehensive Fishery Management Plan (FMP) for the Puerto Rico Exclusive Economic Zone (EEZ) (Puerto Rico FMP), the St. Thomas and St. John EEZ (St. Thomas and St. John FMP), and the Comprehensive FMP for the St. Croix EEZ (St. Croix FMP) [island-based FMPs] allow the Caribbean Fishery Management Council (Council) to modify management measures in certain situations, including when a new stock assessment indicates changes should be made to management reference points and status determination criteria (SDC), and to revise accountability measures (AM) (e.g., change AM trigger and AM timing) (See Table 5.12.1 in each FMP).

Based on Southeast Data, Assessment, and Review (SEDAR) 57, this Framework Amendment to the island-based FMPs would update values for the following management reference points for the spiny lobster stock in each FMP: maximum sustainable yield (MSY) or MSY proxy, maximum fishing mortality threshold (MFMT), and minimum stock size threshold (MSST) using definitions specified in the Acceptable Biological Catch (ABC) Control Rule included in the island-based FMPs. Under this Framework Amendment, the MSY proxy, MFMT, and MSST for spiny lobster in each island/island group would be as specified in Table 2.1.

**Table 2.1.** Management reference points from SEDAR 57 spiny lobster stock assessments for each island/island group.

Management Reference Point	Puerto Rico	St. Thomas/St. John	St. Croix
MSY proxy*	432,501	133,601	127,742
MFMT ( $F_{SPR30}$ )	0.197	0.244	0.203
MSST ( $0.75 * SSB_{MFMT}$ ) (1,000 eggs)	8.48 E+07	2.13 E+07	2.30 E+07

\* Values are in pounds whole weight.

Additionally, the Council would take action to update the overfishing limit (OFL), ABC, and annual catch limit (ACL) for spiny lobster in each FMP (Action 1) and to revise the AM trigger for spiny lobster (Action 2).

### 2.1 Action 1 – Spiny Lobster OFLs, ABCs, and ACLs

The Council’s Scientific and Statistical Committee (SSC) recommended both a variable-catch approach and a constant-catch approach for updating spiny lobster OFLs and ABCs for the period of 2021-2023 under each FMP. Both approaches use the island-specific OFLs projected from the stock assessment model and the ABC estimates determined by applying Tier 3 of the Council’s ABC Control Rule.

For the variable-catch approach, the SSC recommended spiny lobster OFLs and ABCs for 2021 to 2023 for each island/island group that would change each year (Table 2.2). For the constant-catch approach, the SSC recommended a constant-catch ABC derived from a constant-catch OFL that was set equal to the average of the 2021-2023 OFLs (Table 2.3). For both the variable-catch and constant-catch approaches, the SSC recommended the spiny lobster OFLs/ABCs for 2024 and subsequent years be set equal to the OFL and ABC values specified for 2023 under the variable-catch approach, until modified by a subsequent amendment.

Through Action 1, the Council would select the process for determining the ACL(s) from the ABC(s) recommended by the SSC for spiny lobster in each island/island group based on the Council’s preferred approach for determining OFLs and ABCs (i.e., variable-catch or constant-catch approach). The Council would also select the level of management uncertainty to derive the ACLs from the ABCs. The ACL would be set equal to OY for the stock. The Council could select a different alternative and sub-alternative for each island/island group.

**Table 2.2.** Variable-catch OFLs and ABCs for spiny lobster for each island/island group, based on SEDAR 57 stock assessments and Tier 3 of the ABC Control Rule included in each island-based FMP. All values are in pounds whole weight.

Year	Puerto Rico OFL	Puerto Rico ABC	St. Thomas/ St. John OFL	St. Thomas/ St. John ABC	St. Croix OFL	St. Croix ABC
2021	444,020	391,587	195,223	172,170	200,020	176,400
2022	440,387	388,383	165,021	145,534	159,452	140,623
2023	438,001	386,279	150,497	132,725	144,219	127,189
2024+ <sup>1</sup>	438,001	386,279	150,497	132,725	144,219	127,189

<sup>1</sup> If subsequent assessments are not completed and an amendment is not implemented by 2024, the OFLs and ABCs would be equal to the values specified for 2023.

**Table 2.3.** Constant-catch OFLs and ABCs for spiny lobster for each island/island group, based on SEDAR 57 stock assessments and Tier 3 of the ABC Control Rule included in each island-based FMP. All values are in pounds whole weight.

Year	Puerto Rico OFL	Puerto Rico ABC	St. Thomas/ St. John OFL	St. Thomas/ St. John ABC	St. Croix OFL	St. Croix ABC
2021 - 2023	440,803	388,750	170,247	150,143	167,897	148,071
2024+ <sup>1</sup>	438,001	386,279	150,497	132,725	144,219	127,189

<sup>1</sup> If subsequent assessments are not completed and an amendment is not implemented by 2024, the OFLs and ABCs under the constant-catch approach would be set equal to the values specified for 2023 under the variable-catch approach (Table 2.2).

### 2.1.1 Proposed Alternatives for Action 1

**Alternative 1** – No Action. The OFL proxy, ABC, and ACL (which equals OY) for spiny lobster would remain as specified under the Puerto Rico FMP, St. Thomas and St. John FMP, and St. Croix FMP (Table 1.1).

**Alternative 2** – Select the variable-catch approach for specifying OFLs and ABCs for spiny lobster (Table 2.2), and use the variable-catch ABCs to derive the spiny lobster variable-catch ACLs (which equals OY) (Table 2.4), under one of the sub-alternatives listed below.

Sub-alternative 2a.  $OY = ACL = ABC$

Sub-alternative 2b.  $OY = ACL = ABC \times 0.95$

Sub-alternative 2c.  $OY = ACL = ABC \times 0.90$

**Alternative 3** – Select the constant-catch approach for specifying the OFL and ABC for spiny lobster (Table 2.3), and use the constant-catch ABC to derive the spiny lobster constant-catch ACL (which equals OY) (Table 2.5), under one of the sub-alternatives listed below.

Sub-alternative 3a.  $OY = ACL = ABC$

Sub-alternative 3b.  $OY = ACL = ABC \times 0.95$

Sub-alternative 3c.  $OY = ACL = ABC \times 0.90$

**Table 2.4.** Variable-catch ACLs for spiny lobster for each island/island group based on the variable-catch ABCs recommended by the SSC as reduced by the Council’s management uncertainty buffer (Alternative 2, Sub-alternatives 2a-2c).

Island/Island Group	Year	Sub-alternative 2a (ACL = ABC)	Sub-alternative 2b (ACL = ABC * 0.95)	Sub-alternative 2c (ACL = ABC * 0.90)
Puerto Rico	2021	391,587	372,008	352,428
	2022	388,383	368,964	349,545
	2023 <sup>+1</sup>	386,279	366,965	347,651
St. Thomas/ St. John	2021	172,170	163,562	154,953
	2022	145,534	138,257	130,981
	2023 <sup>+1</sup>	132,725	126,089	119,453
St. Croix	2021	176,400	167,580	158,760
	2022	140,623	133,592	126,561
	2023 <sup>+1</sup>	127,189	120,830	114,470

<sup>1</sup> If subsequent assessments are not completed and an amendment is not implemented by 2024, the ACLs would be equal to the values specified for 2023.

**Table 2.5.** Constant-catch ACLs for spiny lobster for each island/island group based on the constant-catch ABC recommended by the SSC as reduced by the Council’s management uncertainty buffer (Alternative 3, Sub-alternatives 3a-3c).

Island/Island Group	Year	Sub-alternative 3a (ACL = ABC)	Sub-alternative 3b (ACL = ABC * 0.95)	Sub-alternative 3c (ACL = ABC * 0.90)
Puerto Rico	2021-2023	388,750	369,313	349,875

Island/Island Group	Year	Sub-alternative 3a (ACL = ABC)	Sub-alternative 3b (ACL = ABC * 0.95)	Sub-alternative 3c (ACL = ABC * 0.90)
	2024+ <sup>1</sup>	386,279	366,965	347,651
St. Thomas/ St. John	2021 - 2023	150,143	142,636	135,129
	2024+ <sup>1</sup>	132,725	126,089	119,453
St. Croix	2021 - 2023	148,071	140,667	133,264
	2024+ <sup>1</sup>	127,189	120,830	114,470

<sup>1</sup> If subsequent assessments are not completed and an amendment is not implemented by 2024, the ACLs under the constant-catch approach would be set equal to the values specified for 2023 under the variable-catch approach (Table 2.4).

## 2.1.2 Discussion of Action 1 Alternatives

As stated above, the Council could select a different alternative for specifying OFLs, ABCs, and ACLs for spiny lobster under each of the Puerto Rico, St. Thomas and St. John, or St. Croix FMPs.

**Alternative 1** would not update spiny lobster OFLs, ABCs, and ACLs following the SSC accepted SEDAR 57 stock assessments, and thus would not be based on the best scientific information available, even if it was the best scientific information available at the time the island-based FMPs were developed. The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) states “conservation and management measures shall be based upon the best scientific information available.” 50 C.F.R. 600.315(a). Under **Alternative 1**, the ACLs specified for Puerto Rico, St. Thomas and St. John, and St. Croix would exceed the variable-catch and constant-catch ABCs recommended by the SSC (as based on the SEDAR 57 stock assessments and application of Tier 3 of the ABC Control Rule). The Magnuson-Stevens Act specifies that ACLs cannot exceed the ABC recommended by the Council’s SSC. MSA § 302(h)(6); 50 C.F.R. 600.310(f)(1)(iii). **Alternative 1** would be inconsistent with the requirements of the Magnuson-Stevens Act and National Standard 2 Guidelines. The higher ACLs allowed under **Alternative 1** could offer greater economic benefits if landings of spiny lobster were able to increase to those limits without overfishing the resource. However, that increased harvest could result in reduced biological benefits to the stock through the greater risk of overfishing based on SEDAR 57 outcomes.

Contrary to **Alternative 1**, **Alternatives 2** and **3**, discussed below, would set the OFLs, ABCs, and ACLs for spiny lobster in each island/island group using the best scientific information available (i.e., SEDAR 57, Tier 3 of the ABC Control Rule, and SSC recommendations). Applying the best scientific information available would ensure that federally managed stocks are harvested sustainably while protecting reproductive capacity and maintaining effective ecological contributions. Under **Alternatives 2** and **3**, if an interim assessment is not completed and an amendment is not implemented by 2024, under both the variable-catch and constant-catch

approaches the OFLs, ABCs, and ACLs for 2024 and later would be set equal to the values specified for 2023 under the variable-catch approach (Tables 2.2 and 2.4).

**Alternative 2**, the variable-catch approach, would specify OFLs, ABCs, and ACLs for spiny lobster for 2021-2023, and the values would change each year (Tables 2.2 and 2.4). Under **Alternative 2**, the OFLs for all three islands/island groups would be set at a level above the MSY proxy and would decrease each year from 2021 to 2023, converging down towards the respective MSY proxy (Table 2.1). For each spiny lobster stock, SEDAR 57 stated that the current spawning stock biomass is above the level that produces MSY. Thus, the stock assessment model initially allows for a higher level of catch that in time decreases towards the MSY proxy and so no negative effects to the stocks would be expected from the 2021-2023 OFLs being above the MSY proxy. The ABCs, derived from the OFLs, and the ACLs, derived from the ABCs, would also decrease each year from 2021 to 2023. Decreasing harvest through time would be expected to provide biological benefits to the species through the increased conservation of the stocks. The variable OFLs, ABCs, and ACLs specified for 2021-2023 under **Alternative 2** would be less than the values specified under **Alternative 1**, which could have reduced benefits to the socio-economic environment in the short-term. However, under **Alternative 2** the updated management reference points would be expected to better protect against overfishing in relation to those included in the island-based FMPs, thus ensuring, to the best extent practicable, continued access to the resource in future years, potentially maximizing the biological benefits to the species and associated benefits to the socio-economic environment in the long-term through sustainable fishing.

Under **Sub-alternatives 2a-2c**, the Council would apply a reduction buffer to the ABC to account for their level of management uncertainty for spiny lobster in each island-specific fishery. **Sub-alternative 2a** (no reduction) would set the ACL equal to the ABC, resulting in the greatest harvest allowed of the sub-alternatives (Table 2.4). **Sub-alternative 2b** (5% reduction buffer) and **Sub-alternative 2c** (10% reduction buffer) would result in more conservative ACLs for spiny lobster when compared to **Sub-alternative 2a**, with **Sub-alternative 2c** providing the greatest biological benefits to the stock from reduced harvest.

As under **Alternative 2**, **Alternative 3** would update OFLs, ABCs, and ACLs for spiny lobster in each island/island group using the best scientific information available. The total harvest allowed under **Alternative 3** would be equal to the total harvest allowed under **Alternative 2**, but **Alternative 3** would specify a constant-value OFL, ABC, and ACL for spiny lobster for each island/island group for 2021-2023 (Tables 2.3 and 2.5) based on the OFL and ABC recommendations from the Council's SSC. Specifying constant-catch values under **Alternative 3** could provide greater benefits to the socio-economic environment, when compared to the changing reference points under **Alternative 2**, by stabilizing harvest levels and increasing the predictability of harvest opportunities. Under **Alternative 3**, the OFL for each island/island

group would be greater than the MSY proxy but would not converge towards the respective MSY proxy (Table 2.1). As mentioned above for **Alternative 2**, for each island/island group, the current spiny lobster spawning stock biomass is above the level that produces MSY and no negative effects to the stocks would be expected from the OFLs being above the MSY proxy. For 2024 and later years, **Alternatives 2** and **3** would provide the same benefits to the biological and socio-economic environments as the OFLs, ABCs, and ACLs specified under each alternative would be the same value, which would be set at a constant value until amended. The sub-alternatives under **Alternative 3** would set the ACL from the ABC using the same management uncertainty reduction buffers specified in the sub-alternatives under **Alternative 2**, and the effects described above would be expected to be the same.

### Summary

Reducing catch limits (**Alternatives 2** and **3**) would generally reduce fishing effort and the potential for negative effects to the physical environment from gear and vessel interactions. However, in a multi-species fishery, such as the Puerto Rico, St. Thomas and St. John, and St. Croix fisheries, where fish and spiny lobster are often caught together, reducing harvest of one stock but allowing harvest of others may not reduce overall effort and associated effects to the physical environment. Increased biological and ecological benefits would be expected under **Alternatives 2** and **3** when compared to **Alternative 1** through application of the best scientific information available. Managing based on best scientific information available better ensures the spiny lobster stocks are harvested sustainably. **Alternatives 2** and **3** have a smaller buffer between the OFL and the ABC when compared to the buffer between the OFL proxy and ABC under **Alternative 1**. In general, a smaller buffer would increase the likelihood that OFL could be exceeded if catch rates or effort is higher than expected. If the OFL is exceeded, this would indicate that the stock is experiencing overfishing and would require immediate action to end overfishing. However, the overfishing SDC under **Alternative 1** do not reflect the best scientific information available and the higher ACLs under **Alternative 1** could lead to overfishing as defined under SEDAR 57. Exceeding the ACL could also require AM-based closures in subsequent fishing years to prevent repeated ACL overages. In Puerto Rico, spiny lobster landings in 2018 and 2019 were at a level above the proposed OFLs and ACLs under **Alternatives 2** and **3**, but under the OFL proxy and ACL specified under **Alternative 1**. If future (e.g., post-pandemic) spiny lobster landings are harvested at the 2018 and 2019 levels, then management actions, including reductions to the fishing season, would be required under **Alternatives 2** and **3**. Landings of spiny lobster in both St. Thomas and St. John and St. Croix in 2018 and 2019 have been below the proposed OFLs and ACLs under **Alternatives 1, 2** and **3**, and thus would not be expected to trigger any management actions.

**Alternative 1** of **Action 1** is the no-action alternative and would have no economic effect beyond the baseline (status quo). **Alternatives 2** and **3** and their sub-alternatives (**2a-2c** and **3a-3c**) would reduce the ACL for spiny lobster in all three island areas.

Table 2.6 states the 5-year maximum decreases of spiny lobster landings (2021 – 2025) for each island area, assuming each island area’s baseline spiny lobster landings equal its current ACL and landings would be reduced to the new lower ACL. Note that some sub-alternatives generate the same or essentially the same 5-year decreases, such as **Sub-alternatives 2a** (-697,293) and **3a** (-697,352) for Puerto Rico and **Sub-alternatives 2b** (-365,964) and **3b** (-365,964) for St. Thomas and St. John. The rankings of the sub-alternatives for each island area are provided below in Table 2.7

**Table 2.6.** Maximum changes in 5-year spiny lobster landings (lbs) (2021-2025) from Action 1.

Island-Area	Alt. 1	Sub-alt. 2a	Sub-alt. 2b	Sub-alt. 2c	Sub-alt. 3a	Sub-alt. 3b	Sub-alt. 3c
PR	0	-697,353	-794,293	-891,234	-697,352	-794,291	-891,233
STX	0	-289,049	-323,979	-358,908	-289,050	-323,978	-358,909
STT/STJ	0	-330,171	-365,964	-401,757	-330,171	-365,964	-401,757

**Table 2.7.** Rankings of changes, from lowest (1) adverse economic effects to highest (6 or 7) adverse economic effects from Action 1.

Island-Area	Alt. 1	Sub-alt. 2a	Sub-alt. 2b	Sub-alt. 2c	Sub-alt. 3a	Sub-alt. 3b	Sub-alt. 3c
PR	1	2	4	6	2	4	6
STX	1	2	4	6	2	4	6
STT/STJ	1	2	4	6	2	4	6

Landings of spiny lobster generate economic benefits, such as revenue and income for commercial fishermen and sales for seafood markets and restaurants, so the smaller the ACL, the smaller the landings and associated economic benefits assuming prices do not change and baseline landings equal or at least are larger than the no-status-quo alternative ACLs. It follows then that the larger the decrease in the ACL, the larger the adverse economic effect because the decrease in landings would be larger. Among the non-status-quo sub-alternatives, **Sub-alternatives 2a** and **3a** would have the least adverse economic effect in Puerto Rico, St. Croix and St. Thomas and St. John (Table 2.7). **Sub-alternatives 2c** and **3c** be tied for the largest adverse economic effect in the three island areas.

Therefore, under Action 1, **Alternative 1** would have no (and the least) adverse economic effect, followed in turn by **Alternatives 2a** and **3a**, **Alternatives 2b** and **3b**, and, finally, **Alternatives 2c** and **3c**, the latter which have the largest adverse economic effect.

Minor negative short-term administrative effects could be expected under **Alternatives 2 and 3**, as effort would be needed to update management reference points for spiny lobster. Additionally, depending on future landings relative to the proposed OFLs and ACLs, long-term negative effects on the administrative environment could be expected from **Alternatives 2 and 3** if the lower OFLs or ACLs are exceeded and require more frequent management responses than **Alternative 1**.

## 2.2 Action 2 – Revise the Spiny Lobster Accountability Measure Trigger

Through Action 2, the Council would revise the AM trigger for the spiny lobster stock under each FMP. The process for applying an AM would remain as described in each FMP:

Process for Applying an AM for Spiny Lobster: If an AM is triggered, National Marine Fisheries Service (NMFS) would reduce the length of the spiny lobster fishing season following the overage determination by the amount necessary to ensure (to the greatest practicable extent) landings do not again exceed the ACL in the year of application. Any fishing season reduction would be applied from September 30 and moving toward the beginning of the fishing year. If the required length of the fishing season reduction exceeds the time period of January 1 through September 30, any additional fishing season reduction would be applied from October 1 and moving toward the end of the fishing year.

The Council could select a different alternative for each island or island group.

### 2.2.1 Proposed Alternatives for Action 2

**Alternative 1. No Action.** Use the AM trigger described in the Puerto Rico FMP, St. Thomas and St. John FMP, and St. Croix FMP for spiny lobster, as follows:

An AM would be triggered if spiny lobster landings exceed the spiny lobster ACL, unless NMFS' SEFSC determines the overage occurred because data collection/monitoring improved rather than because landings increased. Landings from the following years, in order, would be used to evaluate an exceedance of the spiny lobster ACL.<sup>9</sup>

- (1) Landings from 2018
- (2) Landings from 2019
- (3) Two-year average of landings from 2019 and 2020
- (4) Three-year average of landings from 2019, 2020, and 2021
- (5) Thereafter, a progressive running three-year average (2020-2022, 2021-2023, etc.).

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<sup>9</sup> The regulations implementing the island-based FMPs would update the years specified for triggering an AM for spiny lobster, beginning with landings from the most recent year available.

The NMFS Southeast Regional Administrator in consultation with the Council may deviate from the specific time sequences based on data availability.

**Alternative 2.** Use the average of the most recent three years of spiny lobster landings to trigger an AM. An AM is triggered if average landings exceeded average ACLs in place during those years. The years of landings used to trigger an AM can be adjusted to account for the best scientific information available.

**Alternative 3.** Use the most recent single year of spiny lobster landings to trigger an AM. An AM is triggered if landings exceeded the ACL in place during that year. The years of landings used to trigger an AM can be adjusted to account for the best scientific information available.

## 2.2.2 Discussion of Action 2 Alternatives

The National Standard Guidelines describe two general types of AMs, in-season AMs and AMs for when the ACL is exceeded (50 CFR 600.310(g)). Caribbean stocks are managed using the latter, AMs for when the ACL is exceeded. The guidelines state that “as soon as possible after the fishing year,” on an annual basis, the AMs will evaluate whether an ACL was exceeded and take action to correct the issue that caused the ACL overage and remedy any biological consequences, once known. Landings for Puerto Rico and the U.S. Virgin Islands (USVI) are generally available one to two years after the fishing year, thus, all AMs are applied post-season.

In general, using a multi-year average of landings to trigger an AM would be expected to account for any biological (e.g., year-class variability) and economic (e.g., market demand) variability in the landings, thereby reducing the probability that an AM would be triggered. However, if landings in a particular year are very high, when using a multi-year average as the AM trigger, that year of high landings could be used in the AM trigger analysis up to three times, potentially triggering AMs in three consecutive years. Spiny lobster continues to be a highly targeted species in the Puerto Rico, St. Thomas and St. John, and St. Croix fisheries, though spiny lobster landings have fluctuated from island to island following the disastrous 2017 hurricane season. Although landings for 2020 are not available at this time, it is expected that these landings would be less than the previous years’ landings due to the reduced fishing effort in 2020 during the Covid-19 pandemic.

**Alternative 1** (no action) would continue to use the stepwise comparison of landings (i.e., single year, subsequent single year, two-year average, three-year average) specified in the island-based FMPs as the AM trigger for spiny lobster. **Alternative 1** would not use a multi-year average as the AM trigger until the third year after the amendment was implemented, and would not use a three-year average until the fourth year (Table 2.8). Under **Alternative 1**, AMs for spiny lobster could be triggered more frequently in the initial two years, which compare a single year of

landings to the ACL, when compared to years 3 and 4, which compare a multi-year average of landings to the spiny lobster ACL(s) in place during those years. Using a multi-year average could dampen the variability of a high landings year and avoid an AM being triggered. Using a single year would only use that one year of high landings when evaluating the AM trigger. If an AM was triggered more frequently and NMFS determines action is necessary to prevent an ACL exceedance in the year the AM is applied, there could be short-term negative effects to the socio-economic environment through a fishing season reduction, but long-term positive effects through more conservative protection of the stock.

**Alternative 2** would compare the average of the most recent three years of spiny lobster landings, as estimated by NMFS and based on best scientific information available, to the average of the ACLs for those years to determine if an AM is triggered. **Alternative 2** bases the AM trigger on “best scientific information available,” which better defines when NMFS in consultation with the Council may deviate from the specific years of landings used as the AM trigger to include more than “based on data availability” as under **Alternative 1**. This language makes it clearer that if only partial landings for a given year are available, for example if data collection was disrupted due to a hurricane, then NMFS may use different data to evaluate the AM trigger. Though the partial landings may be available for use, NMFS may determine that they are not best available science.

Both **Alternative 1** and **Alternative 2** use a multi-year average of landings as the AM trigger, thus accounting for any variability in the landings. However, **Alternative 1** uses a process to build up to a three year average, starting with a single year of landings, then another single year, then a two-year average, then a three-year average. Because **Alternative 2** immediately uses a three-year average as the AM trigger, and three-year averages can dampen variability, **Alternative 2** would potentially trigger AMs less frequently in the initial years following amendment implementation than **Alternative 1**. As discussed above, there could be short-term negative effects to the socio-economic environment through an AM-based closure, but long-term positive effects through more conservative protection of the stock. With regard to triggering an AM, the effects of **Alternative 1** and **Alternative 2** would be the same beginning in the fourth year, when they both use three-year averages. However, if landings for spiny lobster are not variable, then the effects of a single-year or multi-year average of landings could be the same.

Unlike **Alternatives 1** and **2**, which use an average of landings to trigger an AM, **Alternative 3** would compare the most recent single year of spiny lobster landings, based on best scientific information available, to the ACL for that year to determine if an AM is triggered. **Alternative 3** would be the most straightforward approach to ACL monitoring in that a single year of landings would be compared to the ACL in place during that year (i.e., an additional step to determine average landings and average ACLs would be needed). If the level of spiny lobster harvest was much greater than the ACL in a given year, and triggered an AM, that year of high

landings would only be used once in the ACL monitoring process. This contrasts with the multi-year approach in **Alternatives 1 and 2**, where a year with extremely high landings could be incorporated into the average landings for comparison to the ACL up to three times, potentially resulting in an AM triggered each time. For example, under **Alternative 2**, if the 2022 landings of spiny lobster were abnormally high, then that year of landings would be used in the 2020-2022 average, the 2021-2023 average, and the 2022-2024 average, potentially exceeding the average ACLs and triggering an AM each time. As a result, a fishing season reduction could be triggered over multiple fishing seasons given a single year of high landings. But, as explained above, using a three-year average of landings as in **Alternatives 1 and 2** could dampen (i.e., reduce) any variability in landings that may occur. In addition, as explained above, if landings for spiny lobster are not variable, then the effects of a single-year or multi-year average of landings could be the same.

As in **Alternative 2**, **Alternative 3** would also use the best scientific information available when comparing landings to the ACL in place. Under **Alternative 3**, if the most recent year of data (e.g., 2022) were determined to be incomplete, then NMFS could use the previous year of landings (e.g., 2021) that were considered to be the best scientific information available for comparison to the ACL in place during that year (e.g., 2021).

**Table 2.8.** Years of spiny lobster landings that would be used to trigger an AM under the Action 2 alternatives, assuming that the island-based FMPs and the Spiny Lobster Framework Amendment are both implemented in 2022.

Year Amendment Implemented	Fishing Year	Most Recent Landings Available*	AM Trigger under Alternative 1**	AM Trigger under Alternative 2	AM Trigger under Alternative 3
1	2022	2020	Single year (2020)	Three-year average (2018-2020)	Single year (2020)
2	2023	2021	Single year (2021)	Three-year average (2019-2021)	Single year (2021)
3	2024	2022	Two-year average (2021-2022)	Three-year average (2020-2022)	Single year (2022)
4	2025	2023	Three-year average (2021-2023)	Three-year average (2021-2023)	Single year (2023)
5	2026	2024	Three-year average (2022-2024)	Three-year average (2022-2024)	Single year (2024)

\* For the U.S. Caribbean region, landings are generally available two years after when the fishing occurred (i.e., the fishing year). Data availability may be additionally delayed by rare events such as hurricanes.

\*\* Alternative 1 (no action) identifies a different sequence of years for triggering the spiny lobster AM based on the text in the island-based FMPs, although it would be expected that the Regional Administrator would deviate from that specific time sequence to account for more recent, available data (i.e., start with 2020 as the first, single year of landings assuming amendment implementation date in 2022), as authorized in the FMP.

## Summary

In general, effects to the physical, biological and ecological, and socio-economic environments would be expected from the application of AMs, not in the process used to trigger AMs. However, the choice of alternatives under Action 2 could influence the frequency with which an AM is triggered, and thus could affect the frequency with which an AM-based fishing season reduction is applied for spiny lobster. The frequency of AM triggers, and of NMFS taking action to reduce the fishing season under the AM, depends on the landings, which are difficult to predict. For example spiny lobster landings in Puerto Rico in 2018 and 2019 were above the MSY proxy specified in SEDAR 57 (432,501 lbs), but preliminary landings reported<sup>10</sup> for 2020 are much lower (~150,000 lbs). If future spiny lobster landings recover to the 2018 and 2019 levels, then AMs would likely be triggered every year, regardless of the alternative selected. Similarly, the spiny lobster landings in St. Thomas and St. John and St. Croix have been substantially less than the landings before the 2017 hurricane season, and well below the ACLs proposed under the Action 1 alternatives, and would thus likely not trigger an AM under any of the Action 2 alternatives. Under the Action 2 alternatives, if an AM was triggered NMFS might determine that corrective action is not needed to prevent a future ACL exceedance given differences in the observed fishing effort in the year(s) the landings occurred (the year(s) of landings used to trigger an AM) and the year in which the AM application would occur.

For **Action 2**, in general, the more often an AM is triggered, the more often fishing season reductions could be applied. When fishing season reductions are applied, landings could be reduced and beneficial economic impacts that derive from those landings would also be reduced. Under **Alternative 1**, the status-quo alternative, a multi-year sequence (1-year, 1-year, 2-year, and then 3-year average) would continue to be used to estimate landings in comparison to the ACL, whereas the estimate of landings would be a moving 3-year average under **Alternative 2**, and the most recent single year of landings under **Alternative 3**. **Alternative 3** is likely to have the largest adverse economic effect because its estimate of landings would be the most sensitive to annual fluctuations in landings and, therefore, could result in the most frequent triggers of the AM. It would be followed in turn by **Alternative 1** with the second largest adverse economic effect and then by **Alternative 2**. However, the effects of **Alternative 1** and **Alternative 2** would be the same once they use same moving 3-year average (year 4 in Table 2.8).

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<sup>10</sup> Puerto Rico landings are adjusted each year using an expansion factor determined by DNER staff at the Fisheries Research Laboratory, which is based on intercept sampling of commercial fishermen. Expansion factors for 2020 are not available at this time.

## Chapter 3. Affected Environment

This section describes the environment and resources included within federal waters off Puerto Rico, St. Thomas and St. John, and St. Croix that would be affected by the proposed actions. Additional information on the physical, biological/ecological, economic, social, and administrative environments of Puerto Rico and the U.S. Virgin Islands (USVI) have been described in detail in the Puerto Rico Fishery Management Plan (FMP) (CFMC 2019a), the St. Thomas and St. John FMP (CFMC 2019b), and the St. Croix FMP (CFMC 2019c). These are incorporated herein by reference and summarized below.

### 3.1 Physical Environment

The U.S. Caribbean is located in the eastern portion of the Caribbean archipelago, about 1,100 miles (mi) (1,770 kilometers [km]) east-southeast of Miami, Florida (Olcott 1999). The region is composed of the Commonwealth of Puerto Rico in the Greater Antilles and the USVI in the Lesser Antilles island chains, both of which separate the Caribbean Sea from the western central Atlantic Ocean. The USVI are part of the Virgin Islands chain, which lies in the northeastern Caribbean about 50 mi (80 km) east of Puerto Rico's main island, and consists of four major islands: St. Thomas, St. John, St. Croix, and Water Island (DPR 2005). The U.S. Caribbean exclusive economic zone (EEZ) covers an area of approximately 75,687 mi<sup>2</sup> (196,029 km<sup>2</sup>).

The coastal marine environments of Puerto Rico and the USVI are characterized by a wide variety of habitat types, with 21 distinct benthic habitats types delineated (Kendall et al. 2001). The Essential Fish Habitat Final Environmental Impact Statement (CFMC 2004) summarized the percent distribution for all habitats in the U.S. Caribbean from the 2,121 mi<sup>2</sup> (5,494 km<sup>2</sup>) of total bottom area mapped from aerial photographs. This total included both Puerto Rico (1,934 mi<sup>2</sup> [5,009 km<sup>2</sup>]) and the USVI (187 mi<sup>2</sup> [485 km<sup>2</sup>]), and covered from the shoreline to about 66 feet (ft) (20 meters [m]) depth.

#### 3.1.1 Puerto Rico

The Puerto Rico EEZ is located 9 - 200 nautical miles (17 - 370 km) from the shoreline and covers approximately 65,368 mi<sup>2</sup> (169,303 km<sup>2</sup>). Puerto Rico approximately 110 by 35 mi (177 by 56 km), and is the smallest and the most eastern island of the Greater Antilles (CFMC 1998). Puerto Rico includes the adjacent inhabited islands of Vieques and Culebra as well as various other isolated islands without permanent populations including Mona, Monito, and Desecheo. Puerto Rico is surrounded on three sides by deep ocean waters: the Mona Passage to the west (> 3,300 ft [1,000 m] deep); the Puerto Rico Trench to the north (~28,000 ft [8,500 m] deep); and the Venezuelan Basin of the Caribbean Sea to the south (~16,400 ft [5,000 m] deep). To the east, Puerto Rico shares the shallow-water shelf platform with St. Thomas and St. John, USVI.

### 3.1.2 St. Thomas and St. John

The St. Thomas and St. John EEZ is located 3 - 200 nautical miles (6 – 370 km) from the shoreline and covers approximately 1,103 mi<sup>2</sup> (2,856 km<sup>2</sup>). The islands of St. Thomas and St. John are bordered by the Atlantic Ocean to the north and the Caribbean Sea to the south. The island of St. Thomas is bordered to the west by the Puerto Rico islands of Vieques and Culebra, and to the east by St. John, which is bordered on the east by the British Virgin Islands. The shelf shared by the islands of St. Thomas and St. John is about 8 mi (12.9 km) wide on the south and 20 mi (32.2 km) wide on the north (Goenaga and Boulon 1992) with an area of approximately 510 nm<sup>2</sup> (1751 km<sup>2</sup>). Most of the shelf area is greater than 80 ft (24.4 m) deep (Kojis and Quinn 2011).

### 3.1.3 St. Croix

The St. Croix EEZ is located 3 - 200 nautical miles (6 – 370 km) from the shoreline and covers approximately 9,216 mi<sup>2</sup> (23,870 km<sup>2</sup>). The island of St. Croix is surrounded by the Caribbean Sea. St. Croix is located about 46 mi (74 km) south of St. Thomas and St. John and lies on a different geological platform than Puerto Rico, St. Thomas, and St. John. St. Croix is separated from those islands by a 2.5 mi (4 km) deep trench (CFMC 2004). The St. Croix shelf is much narrower and shallower than that of the northern islands (Goenaga and Boulon 1992), and has a total area of approximately 99 nm<sup>2</sup> (343 km<sup>2</sup>) (Gordon 2010). Most of the shelf area is less than 80 ft (24.4 m) deep (Kojis and Quinn 2011).

### 3.1.4 Essential Fish Habitat (EFH)

In Puerto Rico, St. Thomas and St. John, and St. Croix, EFH for spiny lobster consists of all waters from mean high water to the outer boundary of the U.S. Caribbean EEZ (habitats used by phyllosome larvae) and seagrass, benthic algae, mangrove, coral, and live/hard bottom substrates from mean high water to 100 fathoms depth (habitats used by other life stages).

## 3.3 Biological and Ecological Environments

The Puerto Rico FMP (CFMC 2019a), St. Thomas and St. John FMP (CFMC 2019b), and St. Croix FMP (CFMC 2019c) include a description of the biological and ecological environments for the species managed in federal waters in the respective island/island group management area, including spiny lobster, which is incorporated herein by reference and summarized below.

### 3.3.1 Description of the Species

The species directly affected by actions proposed in this framework amendment is spiny lobster.

### 3.3.1.1 Life History

The Caribbean spiny lobster, *Panulirus argus* (hereafter referred to as spiny lobster), occurs in the Western Central and South Atlantic Ocean, including the Caribbean Sea and the Gulf of Mexico, ranging from North Carolina in the north to Brazil in the south. The spiny lobster occurs from the extreme shallows of the littoral fringe to depths exceeding 328 feet (100 meters) (Kanciruk 1980; Munro 1974). The distribution of spiny lobster extends to the edge of the shelf, which is described as the 100-fathom contour (183 meters) (CFMC 1981).

Shallow-water areas with mangroves and seagrass (*Thalassia testudinum*) beds serve as nursery areas (Munro 1974), with the spiny lobsters generally moving offshore when they reach reproductive size (Phillips et al. 1980). Adult spiny lobsters are found on shelf areas that offer adequate shelter in the form of reefs, wrecks or other forms of cover (Munro 1974). Spiny lobster animals are primarily carnivores, feeding upon smaller crustaceans, molluscs, and annelids (Cobb and Wang 1985). This species shelters communally by day and emerge to feed at night (Munro 1974).

Spiny lobster are targeted by commercial and recreational fishermen in each of the Puerto Rico, St. Thomas and St. John, and St. Croix fisheries. Spiny lobster accounted for 29% of the total dollar amount of commercial landings reported in 2018 for both Puerto Rico and the USVI (NMFS 2020a). In each island/island group, the majority of spiny lobster commercial landings that were reported through 2016 were harvested via diving, fish traps, and lobster traps (SEDAR 57 2019). Recreational landings for spiny lobster are not available for any of the island/island groups, but spiny lobster are generally harvested via diving (e.g., by hand or snare).<sup>11</sup> Recreational data (catch per unit effort, total effort, landings, and discards) were previously collected in Puerto Rico through the Marine Recreational Fisheries Statistical Survey (MRFSS). However, MRFSS sampling exclusively focused on finfish and the program permanently ended in mid-2017 (SEDAR 57 2019).

### 3.3.1.2 Commercial Landings

For Puerto Rico and St. Thomas and St. John, commercial landings of spiny lobster have generally been increasing since ACLs were implemented in 2012 (Table 3.1). Accountability measures (i.e., a reduction to the length of the fishing season) were applied for the spiny lobster in Puerto Rico in 2016 and 2017 and in St. Croix in 2013 to account for overages of their respective ACLs.

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<sup>11</sup> For commercial and recreational fishermen: (1) spear or hook gear are prohibited for harvesting spiny lobster in federal and territorial waters off Puerto Rico and the USVI and (2) gill nets and trammel nets are prohibited in all federal waters off Puerto Rico and the USVI and territorial waters off USVI. For recreational fishermen, trap gear are prohibited in territorial waters off Puerto Rico and USVI.

**Table 3.1.** Commercial landings (in pounds) of spiny lobster in Puerto Rico, St. Thomas and St. John, and St. Croix from 2012 – 2019.

Year	Puerto Rico*	St. Thomas and St. John	St. Croix
2012	385,811	83,157	87,073
2013	275,424	84,513	59,398
2014	376,779	92,261	39,724
2015	418,273	109,455	44,963
2016	449,233	121,695	31,582
2017	283,221	91,911	26,193
2018	520,829	86,708	10,970
2019	488,968	88,100	15,721

\* Puerto Rico landings are adjusted using an expansion factor determined by DNER staff at the Fisheries Research Laboratory, which is based on intercept sampling of commercial fishermen. (Source: NMFS-SERO 2021)

In 2017, Hurricanes Irma and Maria devastated the islands of the U.S. Caribbean as well as their fisheries. Reported landings of spiny lobster since that time have been greatly reduced for the USVI fisheries, which are still recovering. In Puerto Rico, spiny lobster landings decreased in 2017, but have since recovered. In 2020, recovery of the fisheries was impeded by the COVID-19 pandemic, which limited fishing effort. Ninety-four percent of Puerto Rico commercial fishermen and 81% of USVI fishermen stopped fishing for some period in the first half of 2020 (NMFS 2021a).

### 3.3.1.3 Stock Status

Previous stock assessments for spiny lobster in the U.S. Caribbean have attempted to quantify stock status using both traditional as well as data-limited stock assessment procedures (SEDAR 57 2019). SEDAR 8 (2016) was the most recent data-limited assessment (e.g. mean-length, indicator-based control rules) prior to the SEDAR 57 stock assessments. Prior to the current assessment (SEDAR 57), nearly all evaluations have resulted in unsatisfactory determination of stock status.

The SEDAR 57 assessment applied an integrated statistical catch-at-age (Stock Synthesis version 3.30) model using data through 2016. Stocks in both St. Croix and St. Thomas and St. John approached the levels corresponding to  $F_{SPR30\%}$  and  $S_{SPR30\%}$  during the mid to late 2000s. Since that time, a reduction in fishing mortality has allowed the stock spawning output to increase. In Puerto Rico, the stocks were already exploited when the time series began (1983). Fishing mortality was initially above  $F_{SPR30\%}$ , but declined and remained below that threshold after 1986, with exceptions, particularly during the period 1999-2005. Spawning output remained below  $S_{SPR30\%}$  from the initial year through 1992, but has since remained above  $S_{SPR30\%}$ , except between 2000 and 2007.

Based on the management thresholds (i.e., MSST and MFMT) from in SEDAR 57, the spiny lobster stocks in Puerto Rico, St. Thomas and St. John, and St. Croix were not considered overfished and were not undergoing overfishing.

### 3.3.2 Bycatch

Each of the Puerto Rico, St. Thomas and St. John, and St. Croix FMPs include a bycatch practicability analysis for the species managed under each FMP, which is incorporated herein by reference, and pertinent portions are summarized below.

Fisheries that are noted for producing large amounts of bycatch (e.g., trawling) are essentially absent from the U.S. Caribbean. Thus, bycatch is not as significant an issue in Puerto Rico, St. Thomas and St. John, and St. Croix, compared to other regions. What little bycatch that does occur is generally confined to regulatory discards. Under the island-based management approach, regulatory discards specific to spiny lobster include:

- Sublegal lobsters: federal laws prohibit the harvest of spiny lobster under 3.5 inches (8.9 cm) in carapace length; and
- Egg-bearing female spiny lobsters (i.e., berried).

In Puerto Rico, St. Thomas and St. John, and St. Croix, spiny lobster are harvested commercially in federal waters using trap gear (both fish trap and spiny lobster trap) and by hand or snare collection while diving. Recreational harvest of spiny lobster in federal waters is thought to mostly be conducted while diving, though recreational data are not available at this time. All legal spiny lobsters caught by commercial fishermen in the Puerto Rico, St. Thomas and St. John, and St. Croix fisheries are assumed to be retained and assumed discards include sublegal and berried spiny lobsters (SEDAR 57 2019). Consensus opinion during the SEDAR 57 data workshop was that discard mortality of spiny lobsters was negligible.

The actions in this framework amendment are not expected to significantly increase or decrease the magnitude of bycatch or bycatch mortality in the Puerto Rico, St. Thomas and St. John, and St. Croix fisheries that target spiny lobster.

### 3.3.3 Protected Species

Within the U.S. Caribbean, some species and their habitats are protected under the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), or both. At least 17 species of whales and dolphins have been reported in or near U.S. waters in the northeastern Caribbean (Mignucci-Giannoni 1998), including waters around Puerto Rico. All 17 species are protected under the MMPA. Three of these species (i.e., sperm, sei, and fin whales) are also

listed as endangered under the ESA.<sup>12</sup> In addition to these three marine mammals, five species or distinct population segments (DPS) of sea turtles (green - North Atlantic DPS and the South Atlantic DPS; hawksbill; leatherback; loggerhead - Northwest Atlantic DPS); four species or DPSs of fish (Nassau grouper; scalloped hammerhead shark - Central and Southwest Atlantic DPS; oceanic whitetip shark; giant manta ray); and seven species of coral (elkhorn coral, staghorn coral, rough cactus coral, pillar coral, lobed star coral, mountainous star coral, and boulder coral) occur in the U.S. Caribbean and are also protected under the ESA. ESA designated critical habitat for the green sea turtle, hawksbill sea turtle, leatherback sea turtle, and *Acropora* corals also occur within the Council's jurisdiction.

The National Marine Fisheries Service (NMFS) completed a biological opinion on September 21, 2020, evaluating the impacts of the Puerto Rico, St. Thomas and St. John, and St. Croix fisheries on Endangered Species Act (ESA)-listed species that occur in the U.S. Caribbean region (NMFS 2020b). In the biological opinion, NMFS determined that the authorization of the fisheries conducted under each of the island-based FMPs is not likely to jeopardize the continued existence of the Northwest Atlantic distinct population segment (DPS) of green sea turtle, South Atlantic DPS of green sea turtle, hawksbill sea turtle, Nassau grouper, oceanic whitetip shark, Central and Southwest Atlantic DPS of scalloped hammerhead shark, elkhorn coral, staghorn coral, rough cactus coral, pillar coral, lobed star coral, mountainous star coral, or boulder star coral, or result in the destruction or adverse modification of designated *Acropora* critical habitat.

An incidental take statement for select ESA species was included in the biological opinion, and reasonable and prudent measures to minimize the impact of the incidental takes were specified, along with terms and conditions to implement them.

The actions contained in this Framework Amendment are not anticipated to modify the operation of the Puerto Rico, St. Thomas and St. John, or St. Croix fisheries in a manner that would cause effects to ESA-listed species or critical habitat that were not considered in the 2020 biological opinion.

## 3.4 Economic Environment

### 3.4.1 Introduction

The 2017 hurricane season was disastrous for both the Puerto Rico and USVI economies. In a span of a few weeks in September, Hurricane Irma and Hurricane Maria devastated the island areas.

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<sup>12</sup> Five DPSs of humpback whales are listed under the ESA; however, the West Indies DPS, which is the only DPS present in the U.S. Caribbean, is not listed as endangered or threatened (81 FR 62259).

Irma was estimated to have caused \$1 billion in damages in Puerto Rico (Sullivan and Fieser 2017). Hsiang and Houser (2017) from the Climate Impact Lab estimated the impact of Hurricane Maria using an econometric model of the costs of cyclones over the past 60 years and applied it to the characteristics of Hurricane Maria and the economic conditions before the hurricane in Puerto Rico. They found that Maria could lower Puerto Rican incomes by 21% over a 15-year period - a cumulative \$180 billion in lost economic output. They concluded that it could take 26 years for Puerto Rico to return to its pre-Maria economic conditions.

The Puerto Rican consulting firm Estudios Técnicos (2017) estimated the capital loss from Hurricane Maria in the range of \$16 to \$20 billion. Damages to the island's electric and communication infrastructures were estimated to be as high as \$1.6 billion and \$567 million, respectively. Estudios Técnicos also estimated a loss of income by employees of at least \$1 billion. NOAA National Centers for Environmental Information estimated damages caused by Hurricane Maria of \$90.0 billion in Puerto Rico<sup>13</sup>.

The USVI economy is small and extremely vulnerable to natural disasters - windstorms, earthquakes, tsunamis - as well as external economic shocks due to the high degree of trade dependence and lack of economic diversification (USVI Bureau of Economic Research [BER] 2020). Hurricane Irma passed over St. Thomas as a Category 5 storm on September 6, 2017, with peak winds of 178 miles per hour. Two weeks later, on September 20, Hurricane Maria hit St. Croix, to the southeast, as a Category 5 storm. Damages from Irma exceeded \$2.4 billion in the USVI (USDA National Resources Conservation Service Caribbean Area).<sup>14</sup>

Maria damaged or destroyed 70% of the buildings on St. Croix, including schools and the island's only hospital. Public revenues, according to estimates based on USVI fiscal data, were halved after the two hurricanes (Congressional Research Service 2018/2020). The USVI government borrowed funds to cover some budget deficits, which raised concerns over levels of public debt and unfunded pension liabilities. Local policymakers proposed tax increases and austerity measures.

Descriptions of the economies of the island areas (Puerto Rico, St. Croix and St. Thomas and St. John) prior to the 2017 hurricanes are found in the Environmental Assessments for the Comprehensive Fishery Management Plans and are incorporated by reference. The remainder of this section focuses on the post-hurricane economies of the island areas.

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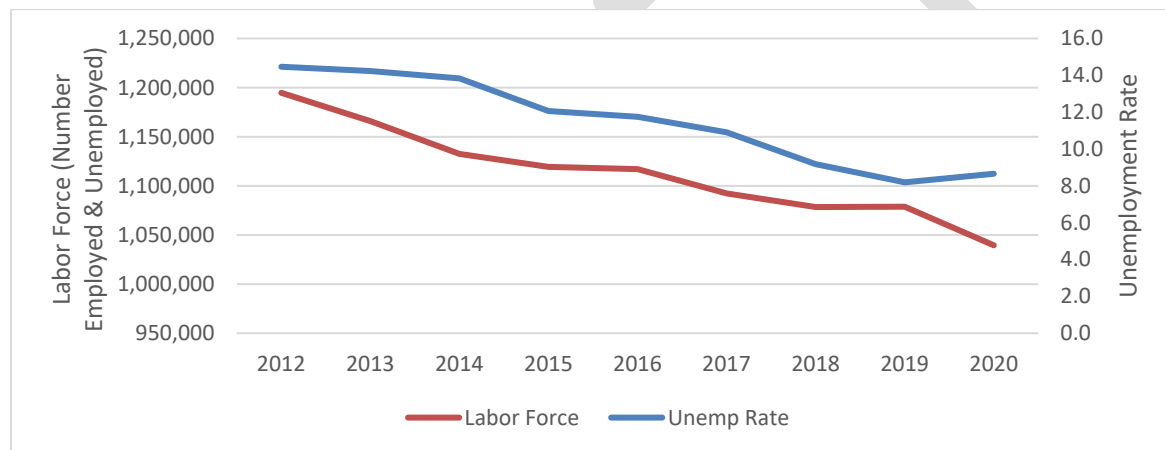
<sup>13</sup> <https://www.ncdc.noaa.gov/billions/events.pdf>

<sup>14</sup> <https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/pr/newsroom/features/?cid=nrcseprd1420889>

### 3.4.2 Puerto Rico

The number of Puerto Ricans leaving for the mainland increased to 301,304 in 2017; however, many returned later. Net out migration in 2017 was 77,321 persons, meaning 223,983 persons migrated to the island that year (U.S. Census Bureau 2020).

Despite the adverse impacts of the 2017 hurricane season, the annual unemployment rate fell in 2018 and 2019, but it rose again in 2020. However, the labor force continued its general declining trend after 2017 despite the bump in 2019 as shown in Figure 3.4.1. Note that the unemployment rate in 2020 was substantially lower than it had been from 2012 through 2016, when it was never fell below 11.8% (U.S. Department of Labor [USDOL] Bureau of Labor Statistics [BLS]).



**Figure 3.4.1.** Labor force and unemployment rate in Puerto Rico, 2012 – 2020.  
(Source: USDOL BLS)

Most of Puerto Rico’s farms are located in the central and western municipalities, and Hurricane Maria’s path took it through much of the island’s prime farmland. Puerto Rico’s Secretary of Agriculture stated to the New York Times that 80% of the island’s crops with a preliminary estimated value of \$780 million were wiped out by the hurricane (Robles and Ferré-Sadurní 2017). Plantain, banana, and coffee crops were hit the hardest. Approximately half of the coffee plants were lost (Ayala 2017).

The chicken and egg industry lost 60% of its production (Ayala 2017). Approximately 2 million of the island’s 2.6 million chickens were killed, many of them drowned, and poultry housing and processing equipment were destroyed (Dorell 2017). Dairy cows died and surviving cows have been less productive than before. Communities and households lost gardens and family livestock. The federal government’s response to the losses incurred by dairy farm operations included \$12 million to the island’s 253 licensed dairy operations to purchase feed for their

estimated combined 94,000 cows for 30 days (U.S. Department of Agriculture [USDA] Farm Service Agency [FSA] 2017).

The 2018 Puerto Rico USDA Census of Agriculture (USDA 2020) shows a sharp decline in the number of farms and their land (cuerdas) from 2012 to 2018. The sharpest decline in the number of farms were those with one to nine cuerdas (Table 3.2).

**Table 3.2.** Number of farms, total amount of farmland, and number of farms by land size, 2012 and 2018.

Year	Number of Farms	Total Amount of Farm Land	Number Farms with 1 - 9 Cuerdas	Number Farms with 10 - 19 Cuerdas	Number Farms with 20 - 49 Cuerdas	Number Farms with 50 - 99 Cuerdas	Number Farms with 100 - 175 Cuerdas	Number Farms with 175 - 259 Cuerdas	Number Farms with 260 or more Cuerdas
2012	13,159	584,988	5,129	2,859	2,872	940	563	401	395
2018	8,230	487,775	2,213	1,853	1,950	952	579	330	353
Change	-37.46%	-16.62%	-56.85%	-35.19%	-32.10%	1.28%	2.84%	-17.71%	-10.63%

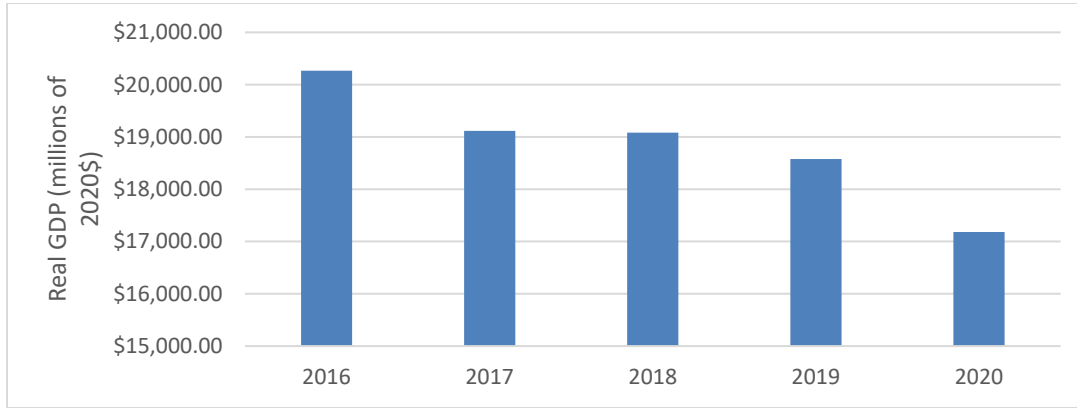
(Source: Puerto Rico USDA 2018 Census of Agriculture)

The Puerto Rico Planning Board estimated that Hurricane Maria had a \$43.1 billion impact on the island’s economy as of October 12, 2018 (Lloréns Vélez 2018). The Planning Board said losses for the private sector alone totaled \$30 billion, with manufacturing reporting the highest loss of income and agriculture among the highest damage to infrastructure and equipment. After taking Federal Emergency Management Administration (FEMA) and private insurer disbursements into account, the net adverse impact to the economy was \$30.3 billion.

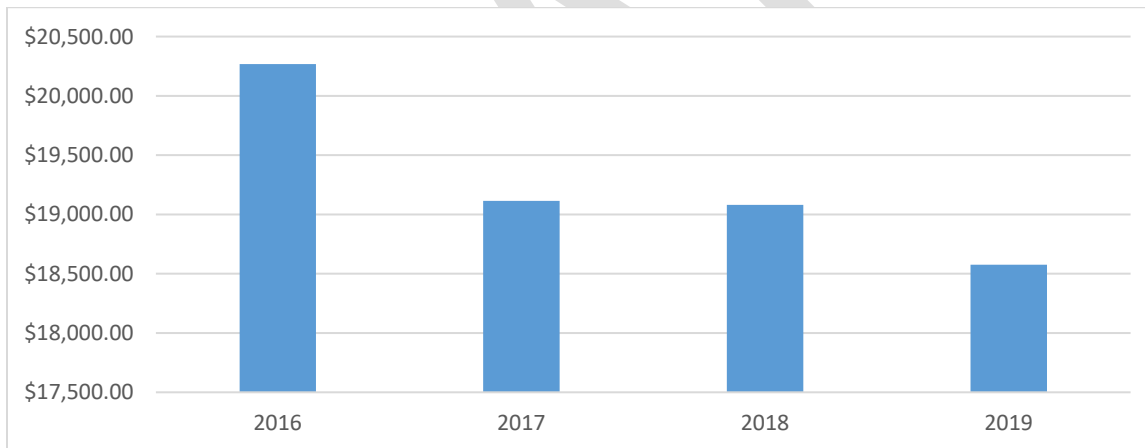
Hurricane Maria did not cause damages to the territory’s pharmaceutical industry. In 2018, five of the world’s top ten selling drugs (Humira, Eliquis, Opdivo, Enbrel and Xarelto) were manufactured there, and internationally, eight of the 15 top-selling pharmaceutical products are made in Puerto Rico (Miller 2020). In 2019, nine out of Puerto Rico’s top 10 commodity exports to the rest of the world were pharmaceutical or medical device products (Census U.S. International Trade Data). In 2020, there were 50 pharmaceutical and 30 medical-device manufacturing sites dotted throughout the island. In 2019, pharmaceutical exports totaled more than \$44 billion, and, of that, \$30.89 billion of that total was exported to the U.S. market.

Puerto Rico’s real gross domestic product (GDP) declined in 2019 and 2020 (Figure 3.4.2), which is consistent with its declining trend since 2006. Real GDP in 2019 was 12% lower than it was in 2016, and in 2020, it was 7.5% less than it was in 2019 due in part to a series of earthquakes and the COVID-19 pandemic. Public debt represented 59% of GDP in 2019 and 65% of GDP in 2020.

Gross national income (GNI) per capita declined by 8.35% from 2016 through 2019 (Figure 3.4.3). The World Bank has not yet reported a 2020 estimate of GNI per capita.



**Figure 3.4.2.** Puerto Rico real GDP (constant 2020 U.S. dollars), 2016 – 2020.  
(Source: [World Bank](#) for GDP 2016 – 2019, Knoema for GDP for 2020, and BEA for implicit price deflator)



**Figure 3.4.3.** Puerto Rico’s GNI per capita (constant 2020 U.S. dollars), 2016 – 2019.  
(Source: [World Bank](#) for GNI per capita and BEA for implicit price deflator)

Because Puerto Rico lies on the boundary between the North American and Caribbean plates, the archipelago is prone to earthquakes and tsunamis. There were three significant earthquakes in January 2020 and each had many strong aftershocks. On January 6, 2020, there was a 5.8 magnitude earthquake, followed the next day by a 6.4 magnitude earthquake, which was centered off the southern coast, 6 miles south of Indios. It knocked out all power and caused at least \$110 million in damages according to Reuters (Valentin Ortiz 2020). Another estimate put that figure at \$3.1 billion (Kaske and Levin 2020). More than 600 homes and other buildings were destroyed, one person died, and there were damages to bridges and roads. Also, thousands of

homes and other buildings were damaged. The iconic Punta Ventana, a natural formation that is a popular destination for tourists, collapsed.

Approximately 70% of Puerto Rico's power is generated along the south coast, while approximately 70% of its demand is along the north coast. The territory's largest power plant, the Costa Sur power plant with a capacity of 970 megawatts, was knocked out of service from cracked foundations, ruptured pipes, split water tanks, a damaged turbine and damages to the plant's control room. Puerto Rico Electric Power Authority (PREPA) shut down the power grid as a safety precaution, and two-thirds of the utility's 1.4 million customers were without power for days. The Costa Sur plant was not back online until August 2020. On January 11, there was an aftershock that registered at 5.9 magnitude.

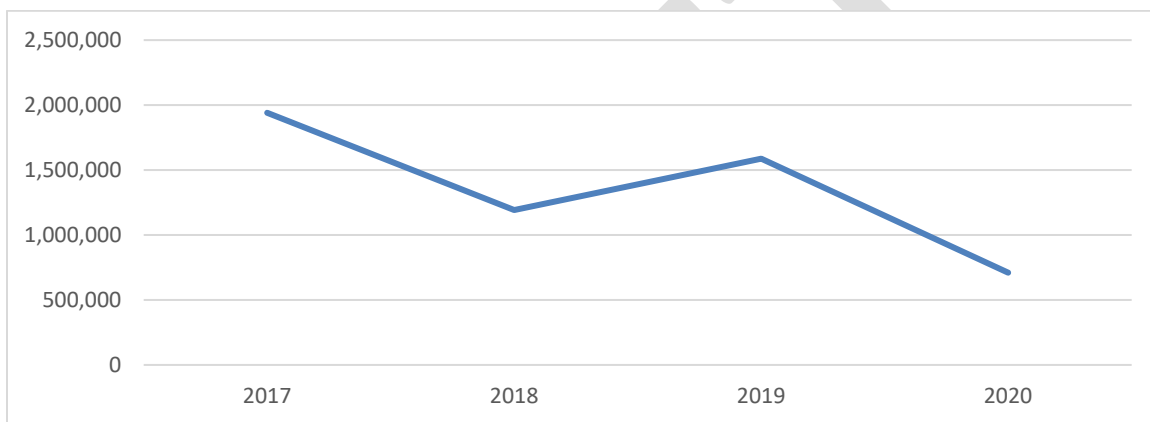
Many of these aftershocks were of significant magnitude and made relief and recovery difficult. Over two dozen quakes had a magnitude of 4.5 or more. On January 15, there was a 5.2 earthquake and ten days later, a 5.0 magnitude earthquake hit near Guayanilla. On 14 January, PREPA said service had been restored for 99% of its customers. On May 2, 2020, the same area was rocked by a magnitude 5.4 earthquake that caused new damage in Ponce. The United States Geological Survey (USGS) stated that it was an aftershock of the January 7 magnitude 6.4 earthquake, and USGS included it in the earthquake swarm that they had been tracking since January. Another magnitude 4.8 aftershock struck the area at the beginning of August, causing further damage and slowing repairs. A USGS report predicts that the aftershocks could continue for a decade (van der Elst et al. 2020). The continuance of aftershocks and damages from the aftershocks complicates estimates of the economic impacts of the damages in 2020.

Most renewable energy-generating facilities survived Hurricane Maria with modest amounts of damage, but a solar photovoltaic farm at Humacao and the Punta Lima wind farm at Naguabo - both on Puerto Rico's east coast where the eye of the storm came ashore - were badly damaged. The solar photovoltaic farm was rebuilt, while the Punta Lima wind farm remained non-operational as of May 2020 (U.S. Energy Information Administration [USEIA]). The earthquakes in early 2020 did not damage any renewable generating facilities. The solar micro grids using rooftop solar panels that were installed primarily by private, federal, and non-profit organizations after the hurricanes in 2017, were able to maintain power supply in some communities following the earthquakes.

Although Puerto Rico has, on average, more than 65% sunny hours per day and 22 miles per hour winds year-round, less than 3% of all the energy produced there is through renewable energy. Under the Puerto Rico Energy Public Policy Act, which was signed into law in May 2019, that has to change. PREPA must obtain 40% of its electricity from renewable resources by 2025, 60% by 2040, and 100% by 2050 (USEIA). The territory's renewable resources include wind, hydropower, and solar energy. For fiscal year 2020, 2.5% of PREPA's electricity came

from renewable energy, with solar photovoltaic accounting for half and wind accounting for one-third of total renewable generation. The remainder came from hydroelectric and landfill gas facilities (USEIA).

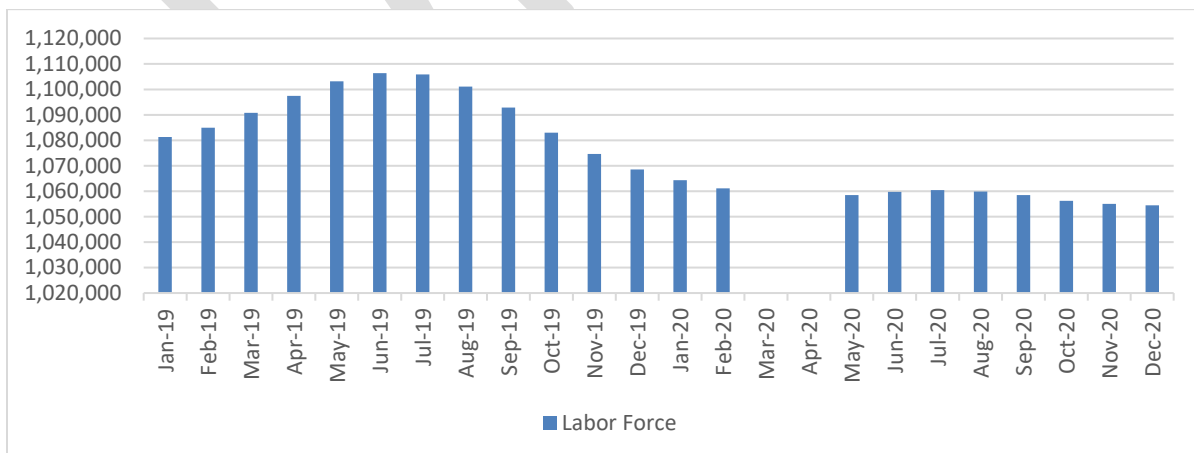
Tourism’s contribution to GDP fell from 5.68% in 2016 to 5.50% in 2017 and 4.82% in 2018 (Puerto Rico Tourism Company). Both the earthquakes and SARS pandemic (COVID-19) of 2020 (and that continues into 2021) has greatly affected island tourism. In 2019, there were approximately 1.11 million tourist arrivals; however, that fell to approximately 0.523 million in 2020. Figure 3.4.4 shows the number of arrival guests through August of each year since 2017 and note the sharp declines in 2018 and 2020.



**Figure 3.4.4.** Arrival guests through August of each year, 2017 – 2020.

(Source: Puerto Rico Tourism Company, Registrations and Occupancy Report)

The labor force continues to shrink as shown in Figure 3.4.5. Note that there is no data for the size of the labor force in March or April 2020.



**Figure 3.4.5.** Monthly labor force, January 2019 – December 2020.

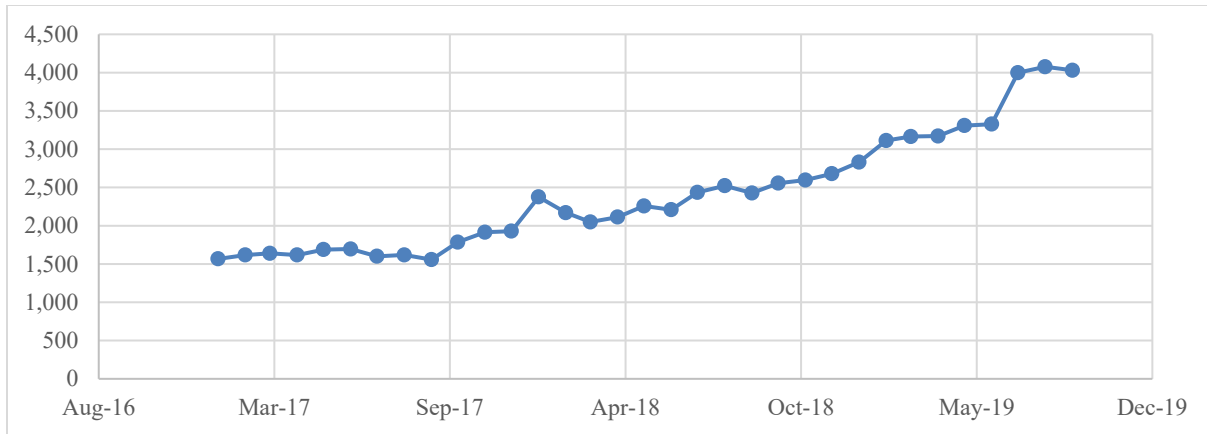
(Source: USDOL BLS)

After years of wrangling with its creditors, the territory disclosed a plan in September 2019 for resolving the biggest governmental bankruptcy in United States history, by cutting \$129 billion in debts to about \$86 billion - a reduction of 33 percent (New York Times September 27, 2019). In June 2020, the Supreme Court unanimously ruled that the financial oversight board, which was established by Congress to oversee Puerto Rico's finances after the 2014 bankruptcy, was constitutional (Coleman 2021).

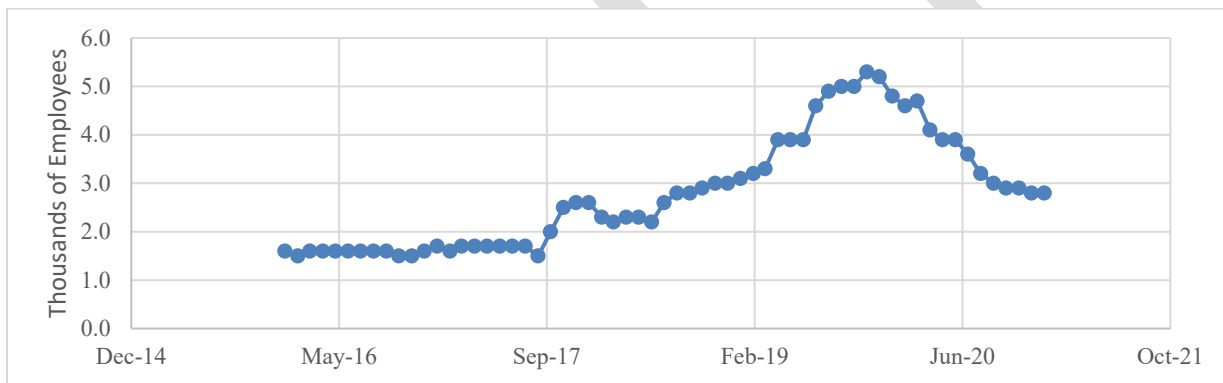
In February 2021, the board announced that it has reached an agreement in principal with creditors to reduce a portion of the U.S. territory's more than \$70 billion public debt load. However, Governor Pedro Pierluisi rejected the agreement for reasons that it overburdened pensioners. The board responded with a revised plan in March that includes a proposed cut of up to 8.5% to monthly pensions of at least \$1,500. That has long been a point of contention between the board and the governor, who has repeatedly said he would not approve such cuts. Ultimately, the plan also has to be approved by a judge overseeing Puerto Rico's bankruptcy-like process. If that occurs, the plan would reduce Puerto Rico's outstanding debt from \$35 billion to \$7.4 billion, an 80% cut. Among other things, it also would cut total debt service payments by more than 60%, which the board said would save the government nearly \$60 billion in debt service payments. Governor Pierluisi who has previously said he would reject any plan with high pension cuts, said the government will declare in court that it does not fully support the plan, but still, he called the proposal a step in the right direction.

### 3.4.3 St. Croix and St. Thomas and St. John

Since after the devastating twin hurricanes of 2017, the most dynamic sector of the USVI economy has been construction. Federal disaster assistance is spurring reconstruction, infrastructure repair, and several hazard mitigation activities, resulting in high demand for construction workers. As shown in Figure 3.4.6, the number of jobs in construction more than doubled from 2017 to 2019: 1,618 in August 2017 and 4,076 in August 2019. However, the COVID-19 pandemic caused a decline in construction in 2020 and early 2021. Employees in the construction, mining and logging sector, which are essentially all in construction (96%) in the USVI, declined in 2020 and early 2021, but stayed above the numbers prior to the hurricanes as seen in Figure 3.4.7.



**Figure 3.4.6.** Construction jobs in USVI, January 2017 – September 2019.  
(Source: USVI DOL, Labor Market Basket)



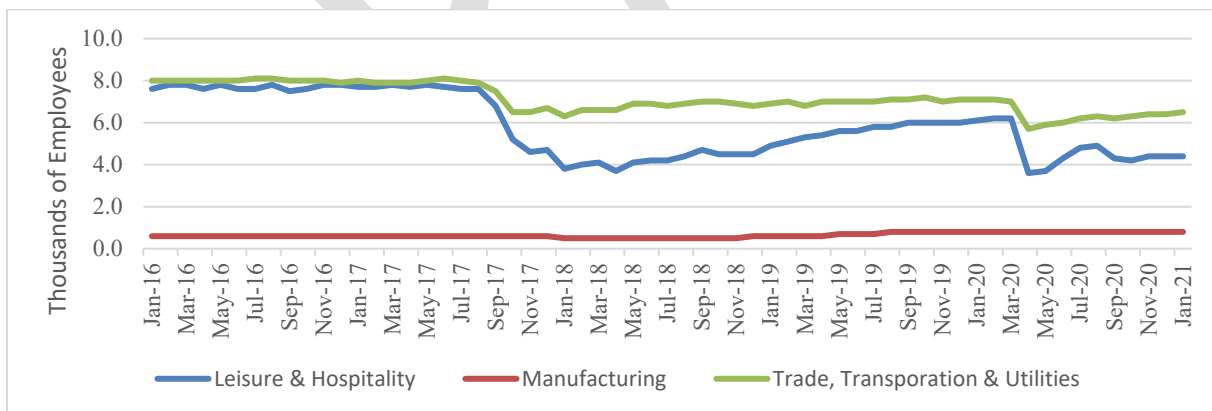
**Figure 3.4.7.** Employees in construction, mining and logging sector in USVI, January 2016 to January 2021.  
(Source: U.S. BLS)

In March 13, 2020, Governor Bryan issued an Executive Order and Proclamation declaring a State of Emergency in response to the pandemic. Ten days later the Governor issued a “stay-at-home” order and ordered all non-essential businesses to remain closed, beginning March 25. The order also officially limited gatherings to 10 persons or fewer, closed all bars, prohibited restaurants from offering dining room service, and limited taxis and safaris to half-capacity passenger loads.<sup>15</sup> On April 6, Governor Bryan ordered the closure of all beaches through April 20. On April 13, 2020, the Governor announced that the U.S. Department of the Interior’s Office of Insular Affairs has given the U.S. Virgin Islands \$7,863,776 in funding from the Coronavirus Aid, Relief, and Economic Security (CARES) Act Federal COVID-19 stimulus bill. Also on that day, the Federal Aviation Administration awarded the USVI \$41,145,247 to maintain the territory’s airports as part of the CARES Act Federal stimulus bill. On May 4, the

<sup>15</sup> On April 2, 2020, the U.S. President declared that a major disaster existed in the USVI based on COVID-19, which opened the door to getting Federal assistance to mitigate the virus.

USVI began to allow some non-essential businesses to reopen; however, the State of Emergency was extended on May 7 for another 60 days, which meant it would not expire until July 12. On May 21, 2020, Governor Bryan announced he was easing restrictions on bars and restaurants, allowing bars to reopen and restaurants to serve dine-in customers beginning the Tuesday after Memorial Day. Seven days later the Governor announced that the USVI would move to the “Open Doors” phase, which would allow all business to reopen. With that, hotels, villas and Airbnb vendors were able to begin taking reservations and hospitality-related businesses had restrictions lifted. Thermal scanners were installed at the airports and other measures were put into place to track visitors and their health. On July 9, 2020, Governor Bryan tightened restrictions on travelers and set a 10% positivity rate as the threshold, affecting visitors from any state at that rate or higher, which at that date were: Alabama; Arizona; Florida; Georgia; Idaho; Kansas; Mississippi; Nevada; South Carolina; and Texas.

Even before the pandemic affected travel and tourism, Hurricanes Irma and Maria were disastrous to USVI tourism. In the immediate aftermath of the hurricanes, the number of stay-over tourist arrivals declined, and employment in the leisure and hospitality sector plummeted, as several large hotel properties closed for renovations. The number of employees in the leisure and hospitality and trade, transportation and utilities sectors began to recover in 2019, but they declined again in 2020 (Figure 3.4.8). Employment in the manufacturing sector was not similarly affected, and it rose from 0.6 thousand (566) employees in August 2017 to 0.8 thousand (760) in August 2019 and has stayed relatively constant since then despite the pandemic.



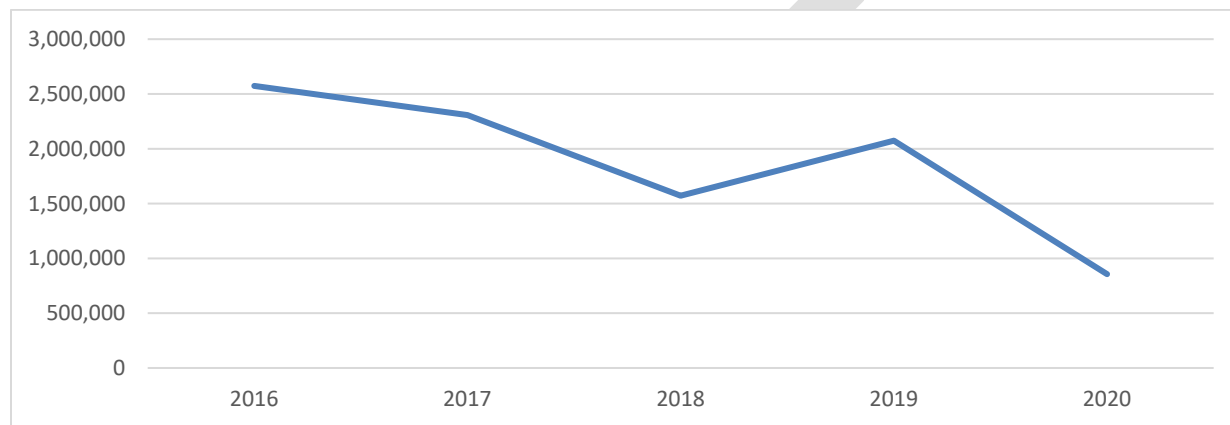
**Figure 3.4.8.** Employees in the leisure and hospitality, manufacturing, and trade, transportation and utilities sectors in USVI, January 2016 to January 2021.

(Source: U.S. BLS)

Charlotte Amalie in St. Thomas, which is one of the most popular cruise destinations in the Caribbean, suffered severe damage, and two cruise ports were closed for weeks. From 2014 through 2016, an average of 23 ships made call in September and another 29 in October. There were only two cruise ship calls to St. Thomas in September and none in October of 2017.

Modification of Spiny Lobster Management Reference Points

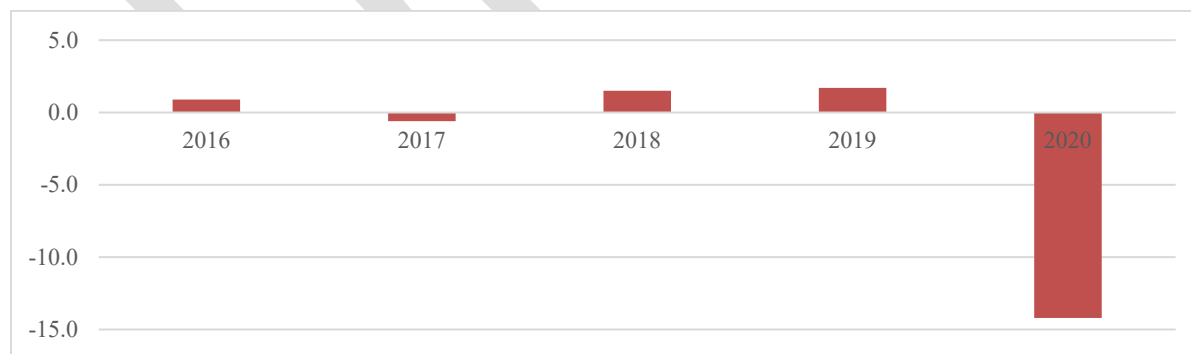
The peak cruise season runs from December through April. Although the numbers of monthly cruise passenger arrivals and ship calls rebounded in December 2017, the numbers of passengers and ship calls from January through April of 2018 were less than they had been the previous four years. Total annual visitor arrivals declined in 2018, but rebounded in 2019 and forecasts for 2020 were optimistic; however, that optimism was short-lived and visitor arrivals declined dramatically in 2020<sup>16</sup> (Figure 3.4.9).



**Figure 3.4.9.** Total USVI visitor arrivals, 2016 – 2020.

(Source: USVI BER)

Real GDP grew by 1.5% in 2018 and then by 1.7% in 2019, which generated optimism for the USVI economy in 2020, but that was before the pandemic. Real GDP fell by 14.2% in 2020 (USVI BER) (Figure 3.4.10).



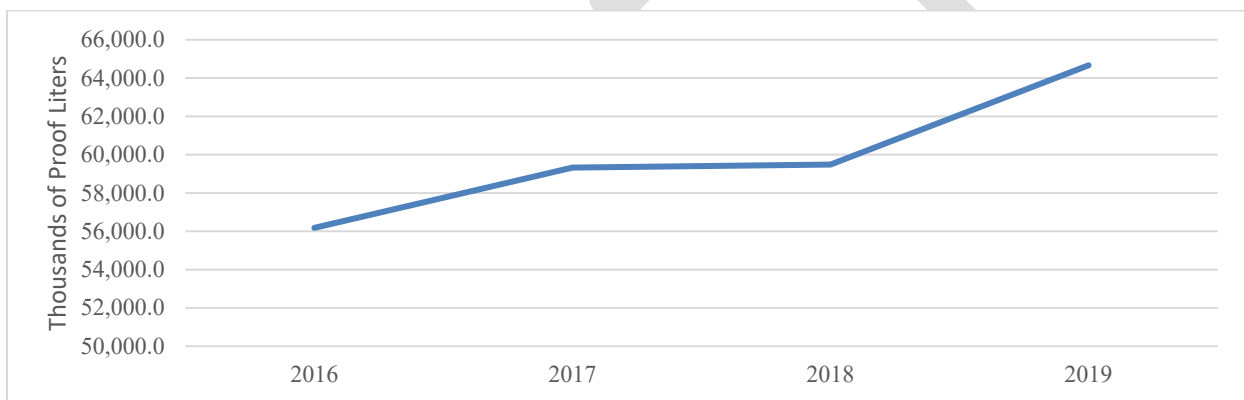
**Figure 3.4.10.** Annual change in real GDP, 2016 – 2020.

(Source: USVI BER, November 2020)

<sup>16</sup> In 2016, there were approximately 2.57 million visitor arrivals, in 2020 there were approximately 0.86 million.

Petroleum products account for 42% of total exports in 2018. However, that was largely a re-export business, and little value was added in the territory. That is expected to change since St. Croix’s long-idled refinery, now the Limetree Refinery, restarted in February 2021. Although it has brought back jobs, it is also bringing back memories of the pollution produced by the former HOVENSA refinery. According to Reuters (March 8, 2021), the U.S. Environmental Protection Agency (EPA) wants the refinery’s owners, Limetree Bay Ventures, to increase its monitoring of air quality due to emissions affecting the nearby neighborhoods, but the owners have so far balked.

After tourism and petroleum, the next most important sector is the production and export of rum. Rum constituted 41% of total exports in 2018 by value. Rum exports to the mainland increased from 2017 to 2019 (Figure 3.4.11).



**Figure 3.4.11.** Annual change in rum exports to U.S.  
(Source: USVI BER, Annual Economic Indicators, May 20, 2020)

The USVI economy performed better in 2018 and 2019, exhibiting positive real economic growth, higher revenues, decreasing unemployment, and improving fiscal balances and liquidity positions for the central government. However, the improvement in economic performance was primarily due to an infusion of Federal disaster relief assistance that is helping rebuild the economy.

Despite the positive achievements and progress on reconstruction, the economy still faces many weaknesses and vulnerabilities that could result in the return of significant deficits and financial distress, namely the pending insolvency of Government Employee Retirement System (GERS) and the mounting liquidity issues at Water and Power Authority (WAPA), a semi-autonomous government-owned electric, water, and sewer utility. To minimize these risks, the quality of financial management and governance has to improve across the public sector, new economic growth needs to be stimulated, tourism products need to be revitalized and differentiated, and

credible plans shaped to stabilize GERS and improve the management and financial performance of WAPA.

The main internal threats to the USVI economy are the massive unfunded liabilities of the GERS and the illiquidity of WAPA. The likely consequences of the dire financial situations of these two entities would be a reduction in the benefits paid to retirees after 2023 in the case of GERS and demands for more transfers from the central government in the case of WAPA.

In 2019, the main driver in the economy was government spending. Government spending increased dramatically after 2017, with an influx of federal disaster assistance. In 2018, government spending was estimated to be 42% of GDP, when for the decade before the hurricanes (2007-2016), the average government share of GDP was 26.36%.<sup>17</sup> Although the official GDP for 2019 has not yet been calculated, the expected 2019 government spending as a share of GDP is likely to be in the 30% range (USVI BER March 25, 2020).

### 3.5 Description of the Social Environment

The social environments of Puerto Rico and the USVI have been described in detail in the Puerto Rico Fishery Management Plan (FMP) (CFMC 2019a), the St. Thomas/St. John FMP (CFMC 2019b), and the St. Croix FMP (CFMC 2019c), and are summarized below.

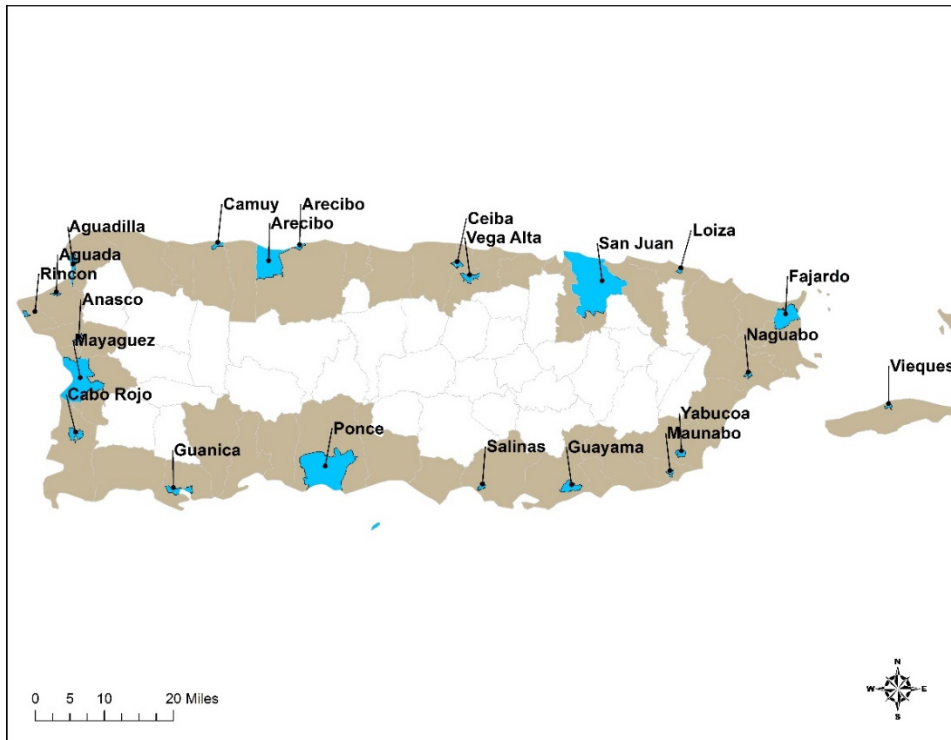
#### 3.5.1 Puerto Rico

There is insufficient data to isolate specific communities where lobster fishing is important for Puerto Rico and the USVI. This description of the social environment will be more general in its description of fishing overall and will provide specific detail about lobster fishing where possible.

In Figure 3.5.1 a number of Puerto Rico communities are identified that have “villa pesqueras” located within or near the community. These organizations provide infrastructure, such as docking facilities and other resources to assist fishermen with their fishing business and activities. Not all fishermen belong to these organizations, but majority of them do according to Matos-Caraballo and Agar 2011. The majority of fishermen in Puerto Rico sell most of their catch but do reserve a small quantity for household consumption (Griffith et al. 2007).

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<sup>17</sup> In 2018, the USVI’s commercial fishing fleet landed 445,184 pounds of finfish and shellfish, generating approximately \$2.96 million in commercial value (NMFS 2020a), which in turn generated approximately \$15.2 million in total value added that accounted for approximately 0.38% of GDP, whereas it accounted for approximately 0.64% of GDP in 2014.



**Figure 3.5.1.** Puerto Rico coastal communities with villas pesqueras.  
 (Source: SERO Social Science Branch/U.S. Census Bureau Tigerline Shapefiles 2018)

Fishermen in Puerto Rico are older with an average age of 50 and have long tenures in commercial fishing with an average of 29 years. Fishermen were also highly dependent upon fishing as a source of household income with those in the western region most dependent (83%), those in the east (78%), south (77%) and north (55%) (Matos-Caraballo and Agar 2011).

Lobster fishermen in Puerto Rico are likely spread throughout many of the communities in Figure 3.5.1. A little over 49% of fishermen in Puerto Rico fished for lobster according to Matos Caraballo and Agar (2011) with the highest percentages on the South and East coasts.

The number of traps fished follows the number of fishermen reporting fishing for lobster with the highest average number of traps being fished in the South and East coasts (Matos-Caraballo and Agar 2011).

Fishermen overall sell their fish through multiple avenues with a little over a third peddling their catch themselves, a third sold to wholesalers and a little less than a third sold to fishing associations. Few fishermen sell their catch directly to fish stores or restaurants. Lobster is not likely to be peddled as much as other species as it is most likely targeted for the tourist market, which is likely through restaurant sales (Matos-Caraballo and Agar 2011).

Certainly, several events that are more recent have had significant impacts on the fishermen of Puerto Rico since the Census of 2008 has occurred. Both hurricanes Maria and Irma and the more recent COVID Pandemic have affected the livelihoods of fishermen and their families. The economic loss, including damages, from Hurricane Maria to Puerto Rico fishermen was estimated to be in the range of \$20 million and a loss of jobs at the time close to 146 (J. Agar, NMFS Southeast Fisheries Science Center, personal communication). There was some concern as to whether the fishing industry would be able to recover to pre-storm levels. In their study one year later, Agar et al. 2020 found that fishery landings did improve and that landings had contracted by \$1.4 million in value over the last quarter of 2017, however, losses did vary considerably. Spiny lobster had accounted for close to 14% of those losses, yet fish and lobster traps accounted for most of the revenue losses during that time and the east coast was hit the hardest losing nearly 55% of the total of 6,700 traps reported being lost. Employment losses did seem to recover, as after about 6 months, a large majority of fishermen reported returning to pre Maria workforce levels (Agar et al. 2020).

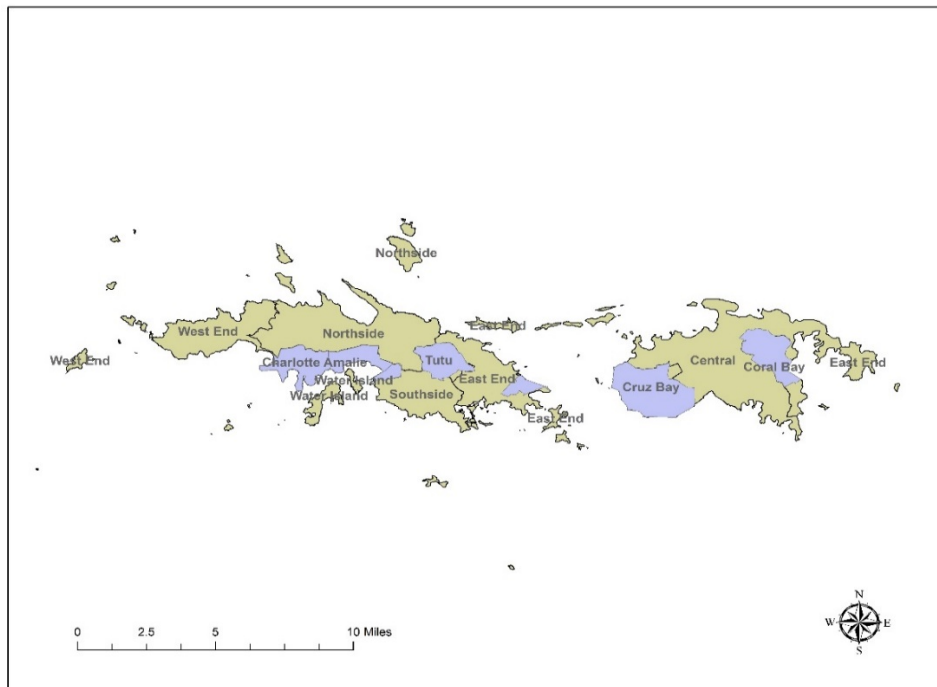
### **COVID 19 Pandemic**

While there has been some recovery from hurricanes, the most recent disaster is concerning as the COVID 19 Pandemic has now compounded the impacts of previous disasters and has imposed a significant economic hardship on fishermen from the island. A survey conducted by NOAA (2021) found that of the 318 commercial fishermen who responded, 96 % reported that they had suffered impacts to their fishing operations as a result of the pandemic during the first six months of 2020. Loss of revenue was reported by 87% of those who responded when compared to the first six months of last year as more than 90% stopped fishing operations for a period of time. Many lost crew as a result with approximately 25 % reporting some reduction in the number of helpers. Seafood dealers also suffered impacts from the pandemic with 98% reporting impacts from the pandemic. Revenues were decreased by an average of 56% by over 90% of those reporting and at the time of the survey were operating at about 33% of capacity.

#### **3.5.2 St. Thomas and St. John**

Commercial fishing St. Thomas and St. John is relatively small scale with vessels averaging approximately 25 ft. in length. Most vessels are fiberglass or fiberglass and wood with outboard motors. More vessels have inboard motors than in the past and are more likely to have more horsepower (Kojis et al. 2017).

In the most recent census for St. Thomas and St. John, fishermen targeted lobster with about 30% of the time with shellfish only accounting for approximately 23% of the overall landings. Fishermen used traps and SCUBA gear to catch lobster and most sales were to hotels and restaurants (Kojis et al. 2017).



**Figure 3.5.2.** St. Thomas and St. John coastal communities and subdistricts.

(Source: SERO Social Science Branch/US Census Tigerline Shapefiles 2018)

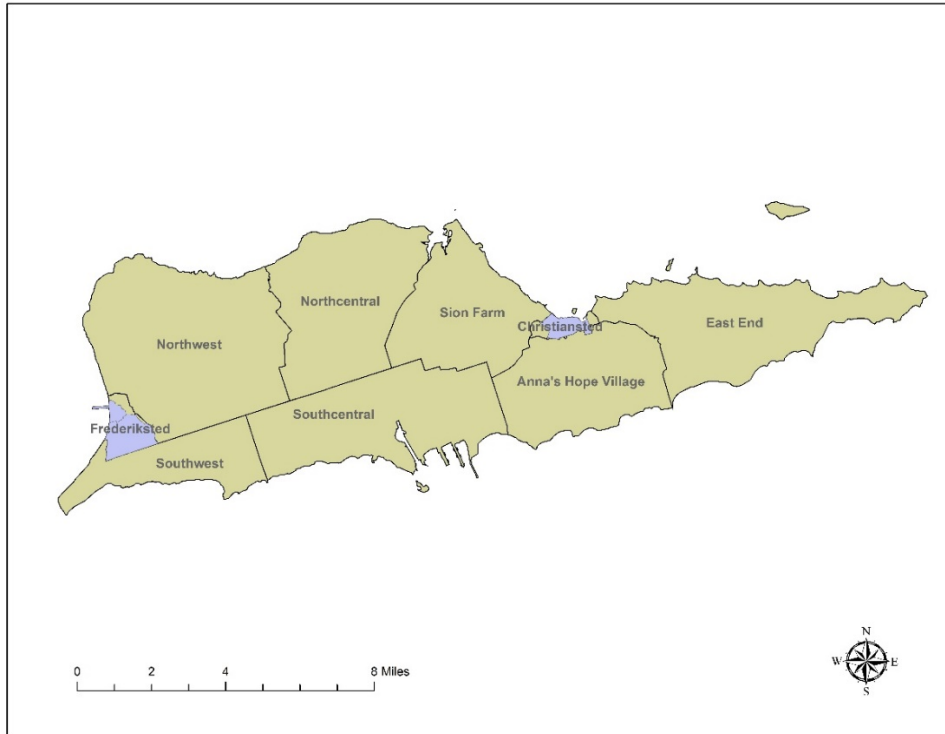
The majority of fishermen keep their vessels moored along the coast, both on the Northside and Southside of St. Thomas, and the east end of St. John and near Cruz Bay (Figure 3.5.2).

Frenchtown on the Southside was the most popular location to moor vessels on St. Thomas (Kojis et al. 2017). Fishermen in St. Thomas and St. John live in 37 different estates on the two islands; however, there were two primary locations that fishers lived: Frenchtown and St. Peter.

### 3.5.3 St. Croix

Fishing on St. Croix is also smaller in scale like the other islands. Vessels are small and most fishermen own one boat with only a few owning more than one. The average vessel size in St. Croix was less than 22 ft. with the longest being 45 feet in length. Engines are primarily outboards and may be used on several different vessels if a fisherman owns more than one (Kojis et al. 2017).

Fishermen of St. Croix resided in three primary zipcodes corresponding to the following areas on the island: Christiansted, Fredricksted and Kingshill, but were scattered over 50 different estates (Figure 3.5.3). The two estates with the most fishermen were Frederikstead and Clifton Hill, which is more southcentral. Another docking facility often used was at Gallows Bay near Christiansted (Kojis et al. 2017).



**Figure 3.5.3.** St. Croix coastal communities and subdistricts.  
 Source: SERO Social Science Branch/US Census Tigerline Shapefiles 2018

Fishermen of St. Croix also had a higher than average age at 57 with active fishermen slightly lower. Their average tenure in fishing was also high with an average of 27 years and the majority of fishermen identified themselves as Hispanic with another large percentage identifying as West Indian (Kojis et al. 2017).

Most fishermen used several types of gear to fish with, although trap fishermen were more dependent on one type of gear. Trap fishing was the third most common type of fishing gear used by fishermen on St. Croix with fewer than one third using traps. However, close to 60% of fishermen in St. Croix said that spiny lobster was an important species. Lobster ranked 2<sup>nd</sup> in importance to reef fish which is ranked 1<sup>st</sup> on all the USVI islands (Kojis et al. 2017). Because tourists and visitors prefer lobster, commercial fishermen find ready customers in hotels and restaurants catering to tourists (Valdes Pizzini et al., 2010; Stoffle et al., 2009).

### **COVID 19 Pandemic**

To understand the effects of the COVID 19 pandemic, NOAA Fisheries (NMFS 2021b) social scientists conducted phone surveys with 87 commercial and charter fishermen on the islands of St. Croix, St. Thomas, and St. John. Of those that responded, 87% reported revenue losses during the first six months of 2020. Approximately 30% of fishermen reported losing some crew

members. When comparing their fishing activity to the first six months of 2019, they reported on average operating at about 48% of capacity at the time of the survey.

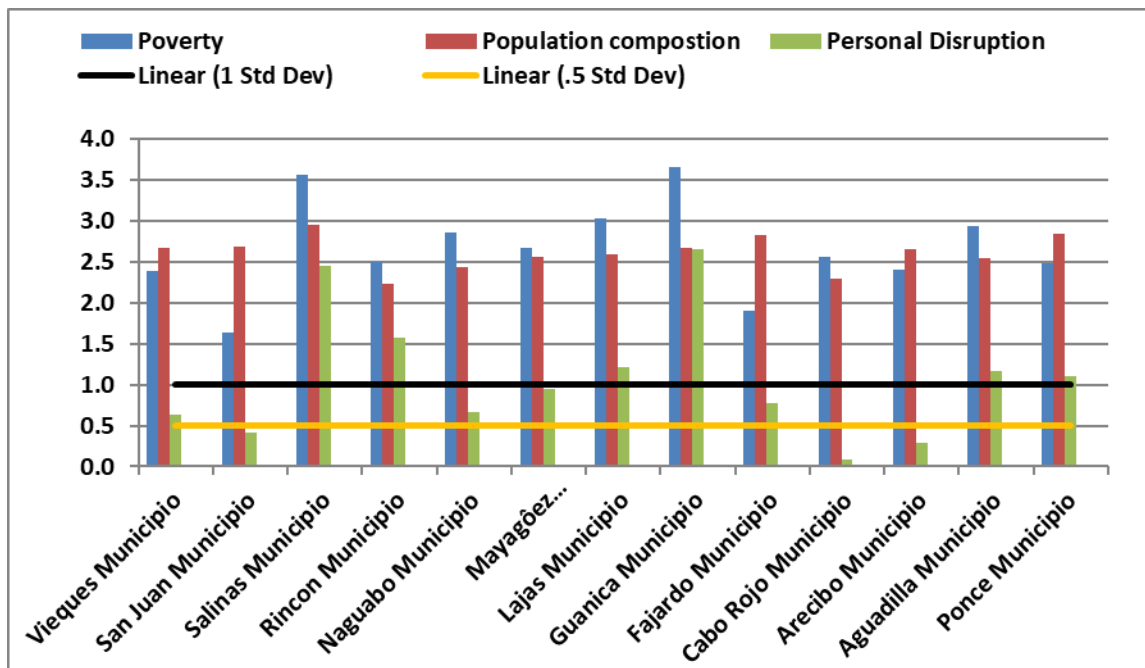
### 3.5.4 Environmental Justice (EJ) Considerations

In order to assess whether a community may be experiencing EJ issues, a suite of Community Social Vulnerability Indices (CSVIs) created to examine the social vulnerability of coastal communities was developed for the majority fishing communities in the U.S (Colburn and Jepson 2012). Using a unit of analysis at the county rather than census designated places a viable suite of social vulnerability indices were successfully created using the same methodology for all counties within the coastal Southeast including Puerto Rico and the USVI. Using the same variables with minor adjustments, a principal component factor analysis was conducted with results meeting the same criteria used previously in creating the CSVIs. The resulting index factor scores for each community will be reported here.

The three indices reported most often in the Southeast Region are poverty, population composition, and personal disruptions. The variables included in each of these indices have been identified through the literature as being important components that contribute to an individual's or community's vulnerability. Indicators such as increased poverty rates for different groups, more single female-headed households and children under the age of 5, disruptions such as higher separation rates, and unemployment all are signs of vulnerable populations. These indicators are closely aligned to previously used measures of EJ, which used thresholds for the number of minorities and those in poverty, but are more comprehensive in their assessment. For those municipalities (Puerto Rico) or subdistricts (USVI) that exceed the threshold it would be expected that they would exhibit vulnerabilities to sudden changes or social disruption that might accrue from regulatory change.

#### 3.5.4.1 Puerto Rico

As is evident in Figure 3.5.4, the majority of municipalities show substantial vulnerabilities with most exceeding both thresholds of  $\frac{1}{2}$  and 1 standard deviation for two of the indices and some exceeding both thresholds for all indices. Cabo Rojo, Aricebo and San Juan are the only municipalities that do not exceed the  $\frac{1}{2}$  standard deviation for personal disruption. However, these vulnerabilities do not take into consideration the recent devastation from Hurricanes Irma and Maria. It is expected that even though these municipalities have high vulnerabilities depicted here, they could now have even higher vulnerability scores as a result of the impacts from recent hurricanes.



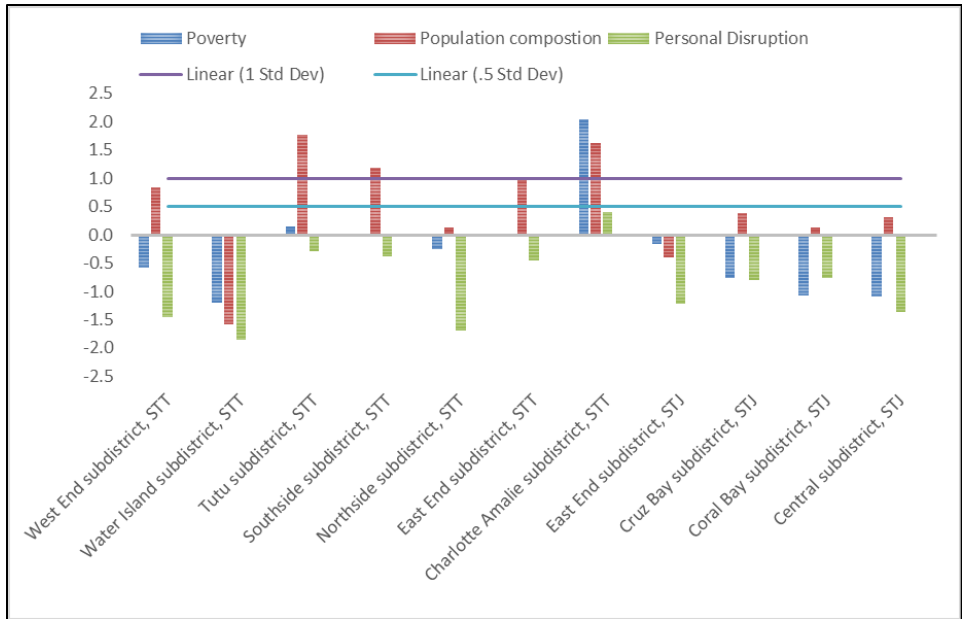
**Figure 3.5.4.** Social vulnerability indices for Puerto Rico coastal municipalities. (Source: SERO County Social Vulnerability Indicators database (ACS 2010) 2018)

The vulnerabilities that are depicted here do not mean that any actions within this amendment will have negative impacts, only that if there are any negative effects most municipalities may have a difficult time absorbing the impacts and their recovery may be hindered.

### 3.5.4.2 St. Thomas and St. John

As is evident in Figure 3.5.5, the majority of subdistricts for St. Thomas and St. John show few vulnerabilities with only one exceeding both thresholds of  $\frac{1}{2}$  and 1 standard deviation for at least two of the indices. Charlotte Amalie is the only subdistrict that has two indices exceeding both thresholds. Most other communities show few if any vulnerabilities. Several communities do exceed the threshold for population composition, which is likely a reflection of a higher population of minorities. However, these vulnerabilities do not take into consideration the devastation from Hurricanes Irma and Maria and the recent COVID 19 Pandemic. It is expected that even though these municipalities have high vulnerabilities depicted here, they could now have higher vulnerability scores as a result of the impacts from the disasters that have occurred recently.

The vulnerabilities depicted here do not mean that any actions within this amendment will have negative impacts, only that if there are any negative effects many communities that are experiencing high vulnerabilities may have a difficult time absorbing the impacts and their recovery may be hindered.



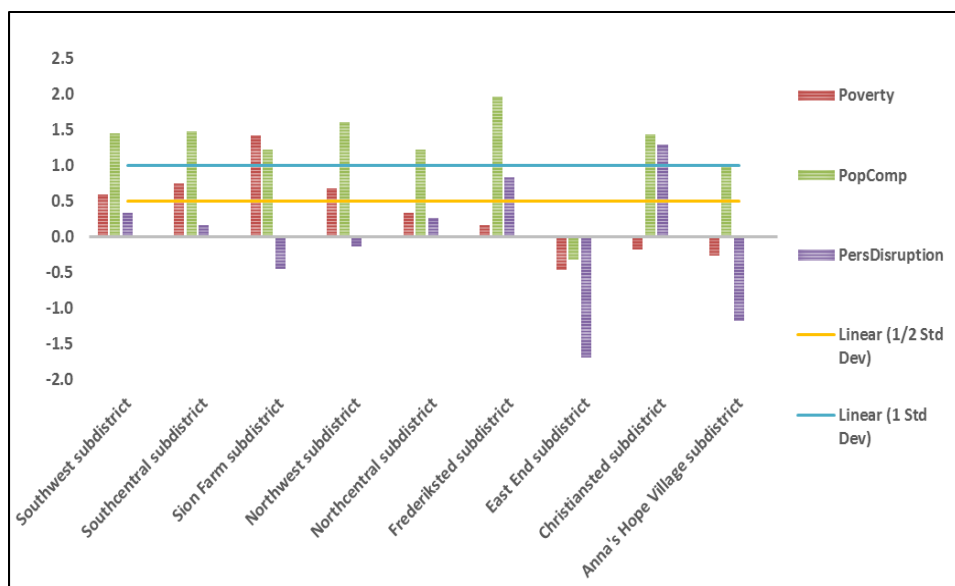
**Figure 3.5.5.** Social vulnerability indices for St. Thomas (STT) and St. John (STJ) coastal subdistricts.

(Source: SERO County Social Vulnerability Indicators database (ACS 2014) 2018)

**3.5.4.3 St. Croix**

As is evident in Figure 3.5.6, the majority of subdivisions show vulnerabilities with most exceeding both thresholds of ½ and 1 standard deviation for at least two of the indices. Northcentral, East End and Anna’s Hope are the only subdistricts that have fewer than two indices exceeding the thresholds. However, these vulnerabilities do not take into consideration the devastation from Hurricanes Irma and Maria or the recent COVID 19 Pandemic. It is expected that even though these municipalities have high vulnerabilities depicted here, they could now have even higher vulnerability scores as a result of the impacts from recent hurricanes.

The vulnerabilities depicted here do not mean that any actions within this amendment will have negative impacts, only that if there are any negative effects that those communities experiencing high vulnerabilities may have a difficult time absorbing the impacts and their recovery may be hindered.



**Figure 3.5.6.** Social vulnerability indices for St. Croix coastal subdistricts. (Source: SERO County Social Vulnerability Indicators database (ACS 2014) 2018)

### 3.5 Administrative Environment

The administrative environment was discussed in detail in the Puerto Rico, St. Thomas and St. John, and St. Croix FMPs, which is incorporated herein by reference and summarized below.

#### 3.5.1 Federal Fishery Management

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

Responsibility for federal fishery management decision-making is divided between the U.S. Secretary of Commerce (Secretary) and eight regional Fishery Management Councils that represent the expertise and interests of constituent states. Regional Fishery Management 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 proposed plans and amendments after ensuring that management measures are consistent with the Magnuson-Stevens Act, and with other applicable laws summarized in Appendix B. In most cases, the Secretary has delegated this authority to NMFS.

The Caribbean Fisheries Management Council (Council) is responsible for the conservation and management of fishery stocks within federal waters surrounding Puerto Rico, St. Thomas and St. John (USVI), and St. Croix (USVI). These waters extend to 200 nautical miles offshore from the seaward boundaries of Puerto Rico (9 nm from shore) and the USVI (3 nm from shore). The Council consists of seven voting members: four members appointed by the Secretary, at least one of whom is appointed from each of the Commonwealth of Puerto Rico and the USVI; the principal officials with marine fishery management responsibility and expertise for the Commonwealth of Puerto Rico and the USVI, who are designated as such by their Governors; and the Regional Administrator of NMFS for the Southeast Region.

The Council's Scientific and Statistical Committee reviews the data and science used in assessments, FMPs, and amendments. Regulations contained within FMPs are enforced through actions of the NOAA's Office for Law Enforcement, the U.S. Coast Guard, and various state authorities.

The public is involved in the fishery management process through participation at public meetings, on advisory panels and through council meetings that, with few exceptions for discussing personnel matters, are open to the public. The regulatory process is in accordance with the Administrative Procedure 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.

### 3.5.2 Territorial Fishery Management

The purpose of state<sup>18</sup> representation at the Council level is to ensure state participation in federal fishery management decision-making and to promote the development of compatible regulations in state and federal waters. The state governments have the authority to manage their respective fisheries including enforcement of fishing regulations, and exercises legislative and regulatory authority over their states' natural resources through discrete administrative units. Although each agency listed below is the primary administrative body with respect to the state's natural resources, all states cooperate with numerous state and federal regulatory agencies when managing marine resources.

#### 3.5.2.1 Commonwealth of Puerto Rico

The Commonwealth of Puerto Rico has jurisdiction over fisheries in state waters extending up to 9 nm from shore. Those fisheries are managed by Puerto Rico's Department of Natural and

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<sup>18</sup> State means each of the several states, the District of Columbia, the Commonwealth of Puerto Rico, American Samoa, the Virgin Islands, Guam, the Northern Mariana Islands, and any other Commonwealth, territory, or possession of the United States (50 CFR 600.10).

Environmental Resources (DNER) per Puerto Rico Law 278 of November 29, 1998 as amended, known as Puerto Rico's Fisheries Law, which establishes public policy regarding fisheries. Section 19 of Article VI of the Constitution of the Commonwealth of Puerto Rico provides the foundation for the fishery rules and regulations. Puerto Rico Fishing Regulations 6902, implemented in 2004, included regulations for the management of marine managed areas for fisheries purposes and imposed regulations for the protection of several species such as the Nassau grouper and the red hind. Puerto Rico Regulations 7949, implemented in 2010, is the current regulatory mechanism for management of fishery resources in Puerto Rico state waters as well as for those resources and areas with shared jurisdiction with the U.S. government through the Council.

#### 3.5.2.2 U.S. Virgin Islands

The USVI has jurisdiction over fisheries in state waters extending up to 3 nm from shore. The USVI's Department of Planning and Natural Resources (DPNR) is responsible for the conservation and management of USVI fisheries and enforcement of boating and fishing regulations. The DPNR's Division of Fish and Wildlife (DFW) is responsible for data collection pertaining to the fisheries of the USVI. The DFW monitors commercial and recreational fisheries and provides recommendations to the DPNR Commissioner on matters relating to fisheries management. Rules and regulations for the USVI fisheries are codified in the Virgin Islands Code, primarily within Title 48 Chapter 12.

More information about these agencies can be found from the following web pages:

Puerto Rico DNER: <https://www.drna.pr.gov/>

USVI DPNR: <https://dpp.vi.gov/agency/department-planning-and-natural-resources>

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# Appendix A. Island-based Fishery Management Plans Acceptable Biological Catch Control Rule

Tier 1: Data Rich	
<b>Condition for Use</b>	Full stage-structured stock assessment available with reliable time series on (1) catch, (2) stage composition, and (3) index of abundance. The assessment provides estimates of minimum stock size threshold (MSST), maximum fishing mortality threshold (MFMT), and the probability density function (PDF) of the overfishing limit (OFL).
<b>MSY</b>	MSY = long-term yield at $F_{MSY}$ (or, MSY proxy = long-term yield at $F_{MSY}$ proxy); assumes spawner-recruit relationship known.
<b>SDC</b>	MFMT = $F_{MSY}$ or proxy MSST = 0.75*long-term Spawning Stock Biomass at MFMT ( $SSB_{MFMT}$ ) OFL = Catch at MFMT
<b>ABC</b>	ABC = OFL as reduced (buffered) by scientific uncertainty <sup>1</sup> and reflecting the acceptable probability of overfishing <sup>2</sup> . The buffer is applied to the PDF of OFL ( $\sigma$ ), where the PDF is determined from the assessment (where $\sigma > \sigma_{min}$ ) <sup>3</sup> . $ABC = d * OFL \text{ where } d = \begin{cases} \text{Scalar} & \text{if } B \geq B_{MSY} \\ \text{Scalar} * (B - B_{critical}) / (B_{MSY} - B_{critical}) & \text{if } B < B_{MSY} \end{cases}$ Scalar = 1 if acceptable probability of overfishing is specified (<0.5), < 1 if not specified (=0.5). $B_{critical}$ is defined as the minimum level of depletion at which fishing would be allowed.
Tier 2: Data Moderate	
<b>Condition for Use, MSY, SDC</b>	Data-moderate approaches where two of the three time series (catch, stage composition, and index of abundance) are deemed informative by the assessment process, and the assessment can provide MSST, MFMT, and PDF of OFL.
<b>ABC</b>	Same as Tier 1, but variation of the PDF of OFL ( $\sigma$ ) must be greater than $1.5 \sigma_{min}$ (in principle there should be more uncertainty with data-moderate approaches than data-rich approaches).
Tier 3: Data Limited: Accepted Assessment Available	
<b>Condition for Use</b>	Relatively data-limited or out-of-date assessments
<b>MSY</b>	MSY proxy = long-term yield at proxy for $F_{MSY}$
<b>SDC</b>	MFMT = $F_{MSY}$ proxy MSST = 0.75* $SSB_{MFMT}$ or proxy OFL = Catch at MFMT
<b>ABC</b>	ABC determined from OFL as reduced (buffered) by scientific uncertainty <sup>4</sup> and reflecting the acceptable probability of overfishing <sup>2</sup> a. Where the buffer is applied to the PDF of OFL when the PDF is determined from the assessment (with $\sigma \geq 2\sigma_{min}$ ) <b>OR</b> b. Where ABC = buffer * OFL, where buffer must be $\leq 0.9$
Tier 4: Data Limited: No Accepted Assessment Available	
<b>MSY</b>	MSY proxy = long-term yield at proxy for $F_{MSY}$ .
<b>SDC</b>	MFMT = $F_{MSY}$ proxy MSST = 0.75* $SSB_{MFMT}$ Sustainable yield level (SYL) <sup>5</sup> = a level of landings that can be sustained over the long-term. OFL proxy = SYL
<b>Tier 4a</b>	No accepted <sup>6</sup> assessment, but the stock has relatively low vulnerability to fishing pressure. A stock's vulnerability to fishing pressure is a combination of its productivity and its susceptibility to the fishery. Productivity refers to the capacity of the stock to produce MSY and to recover if the population is depleted. Susceptibility is the potential for the stock to be impacted by the fishery. If SSC consensus <sup>7</sup> cannot be reached on the use of Tier 4a, Tier 4b should be used.
<b>Conditions for Use</b>	
<b>SYL</b>	SYL = Scalar * 75 <sup>th</sup> percentile of reference period landings, where the reference period of landings is chosen by the Council, as recommended by the SSC in consultation with the SEFSC. Scalar $\leq 3$ depending on perceived degree of exploitation, life history and ecological function.
<b>ABC</b>	ABC = buffer * SYL, where buffer must be $\leq 0.9$ (e.g., 0.9, 0.8, 0.75, 0.70...) based on the SSC's determination of scientific uncertainty <sup>8</sup> .
<b>Tier 4b</b>	No accepted <sup>6</sup> assessment, but the stock has relatively high vulnerability to fishing pressure (see definition in Tier 4a Condition for Use), or SSC consensus <sup>7</sup> cannot be reached on the use of Tier 4a.
<b>Conditions for Use</b>	
<b>SYL</b>	SYL = Scalar * mean of the reference period landings, where the reference period of landings is chosen by the Council, as recommended by the SSC in consultation with the SEFSC. Scalar < 2 depending on perceived degree of exploitation, life history, and ecological function.
<b>ABC</b>	ABC <sup>9</sup> = buffer * SYL, where buffer must be $\leq 0.9$ (e.g., 0.9, 0.8, 0.75, 0.70...) based on the SSC's determination of scientific uncertainty <sup>8</sup> .
<b>Footnotes</b>	<sup>1</sup> Scientific uncertainty would take into account, but not be limited to, the species life history and ecological function. <sup>2</sup> Acceptable probability of overfishing determined by Council. <sup>3</sup> $\sigma_{min}$ could be equal to coefficient of variation; $\sigma_{min}$ is in a log scale. <sup>4</sup> Scientific uncertainty would take into account, but not be limited to, the species life history and ecological function, the perceived level of depletion, and vulnerability of the stock to collapse. <sup>5</sup> MSY $\geq$ SYL. See Appendix G for a detailed explanation of SYL. <sup>6</sup> Accepted means that the assessment was approved by the SSC as being appropriate for management purposes. <sup>7</sup> The SSC defines consensus as having 2/3 of the participating members in favor of a Tier 4a assignment, otherwise the assignment would be Tier 4b of the ABC CR. <sup>8</sup> Scientific uncertainty would take into account, but not be limited to, deficiencies in landings data, availability of ancillary data, species life history, and ecological function, perceived level of depletion, and vulnerability of the stock to collapse. <sup>9</sup> The ABC for a Tier 4b stock should not exceed mean landings during the reference period.

## Appendix B. 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 Procedure Act (APA)**

All federal rulemaking is governed under the provisions of the APA (5 U.S.C. Subchapter II), which establishes a “notice and comment” procedure to enable public participation in the rulemaking process. 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, which can be waived in certain instances.

The proposed rule associated with this framework amendment will include a request for public comment, and if approved, upon publication of the final rule, there will most likely be a 30-day wait period before the regulations are effective in compliance with the APA.

### **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).

Upon submission to the Secretary of Commerce, NMFS will determine if this framework amendment is consistent with the Coastal Zone Management programs of Puerto Rico and the U.S. Virgin Islands (USVI), to the maximum extent possible. Their determination will then be submitted to the responsible agencies under Section 307 of the CZMA administering approved Coastal Zone Management programs.

## **Information Quality Act (IQA)**

The IQA (Public Law 106-443) effective October 1, 2002, requires the government 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 IQA 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 disseminate 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 IQA, 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 that federal agencies must ensure actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or destroy or adversely modify the habitat designated as critical habitat (habitat essential to the species’ conservation). 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 critical habitat. Consultations are necessary to determine the potential impacts of the proposed action. They conclude 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 designated critical habitat.

NMFS completed a biological opinion on September 21, 2020, evaluating the impacts of the Puerto Rico, St. Thomas and St. John, and St. Croix fisheries on ESA-listed species. Refer to Section 3.2.2 for additional information.

### **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 the Puerto Rico, St. Thomas and St. John, and St. Croix FMPs will have no adverse impact on marine mammals. In the 2020 List of Fisheries published by NMFS, all gear (dive, hand/mechanical collection fisheries) used in the Puerto Rico, St. Thomas and St. John, and St. Croix fisheries are considered Category III (85 FR 21079). This classification indicates the annual mortality and serious injury of a marine mammal stock resulting from any fishery is less than or equal to one percent of the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock, while allowing that stock to reach or maintain its optimum sustainable population. This Framework Amendment does not change the list of authorized gear and will not alter this determination.

### **Paperwork Reduction Act (PRA)**

The 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.

### **Essential Fish Habitat (EFH)**

The Magnuson-Stevens Act includes EFH requirements, and as such, each existing and 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 managed species, as described under the Puerto Rico, St. Thomas and St. John, and St. Croix FMPs. As specified in the Magnuson-Stevens Act, EFH consultation is required for federal actions, which may adversely affect EFH. Any required consultation requirements will be completed prior to implementation of any new management measures.

### **National Environmental Policy Act (NEPA)**

The 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.

## **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.

NMFS has preliminarily determined that the proposed action would not have a significant economic impact on a substantial number of small entities.

### **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. Federal agency responsibilities under this Executive Order include conducting their programs, policies, and activities that substantially affect human health or the environment, in a manner that ensures that such programs, policies, and activities do not have the effect of excluding persons from participation in, denying persons the benefit of, or subjecting persons to discrimination under, such, programs policies, and activities, because of their race, color, or national origin. Furthermore, each federal agency responsibility set forth under this Executive

Order shall apply equally to Native American programs. Environmental justice considerations are discussed in Chapter 3.

The action in this framework amendment is not expected to negatively impact minority or low-income populations.

#### **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 actions in this framework amendment would not be expected to have direct impacts on coral reefs.

#### **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 framework amendment.

#### **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.

This action 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 will not affect any MPAs in federal waters off Puerto Rico, St. Thomas and St. John, or St. Croix.