

**Framework Amendment 2 to the Puerto Rico, St. Croix, and St. Thomas and St. John Fishery Management Plans: Updates to the Spiny Lobster Overfishing Limit, Acceptable Biological Catch, and Annual Catch Limit**



Including Environmental Assessment, Regulatory Impact Review, and Regulatory Flexibility Act Analysis

**Version 3**  
**August 2023**



# Environmental Assessment Cover Sheet

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## Name of Action

Environmental Assessment for Framework Amendment 2 to the Puerto Rico, St. Croix, and St. Thomas and St. John Fishery Management Plans: Updates to the Spiny Lobster Overfishing Limit, Acceptable Biological Catch, and Annual Catch Limit. The updates are based on results from the 2022 Update Assessment to the 2019 Southeast Data, Assessment, and Review 57 Stock Assessments for spiny lobster in Puerto Rico, St. Croix, and St. Thomas and St. John.

## Responsible Agencies and Contact Persons

Caribbean Fishery Management Council (Council)  
270 Muñoz Rivera Ave., Suite 401  
San Juan, Puerto Rico 00918-1903  
(787) 766-5926  
Graciela García-Moliner ([graciela\\_cfm@yahoo.com](mailto:graciela_cfm@yaho.com))  
[Caribbean Council website](#)

National Marine Fisheries Service (Lead Agency)  
Southeast Regional Office (SERO)  
263 13th Avenue South  
St. Petersburg, FL 33701  
(727) 824-5305  
Sarah Stephenson ([sarah.stephenson@noaa.gov](mailto:sarah.stephenson@noaa.gov))  
[SERO website](#)

## Type of Action

Administrative  
 Draft

Legislative  
 Final

This Environmental Assessment (EA) is being prepared using the 2020 CEQ NEPA Regulations. The effective date of the 2020 Council on Environmental Quality National Environmental Policy Act Regulations was September 14, 2020, and reviews begun after this date are required to apply the 2020 regulations unless there is a clear and fundamental conflict with an applicable statute. 85 *Federal Register* at 43372-73 (§§ 1506.13, 1507.3(a)). This EA began on April 18, 2023, and accordingly proceeds under the 2020 regulations.

## Abbreviations and Acronyms Used in this Document

ABC	acceptable biological catch
ACL	annual catch limit
CEA	cumulative effects analysis
CFMC	(Council); Caribbean Fishery Management Council
DNER	Department of Natural and Environmental Resources (Puerto Rico)
DPNR	Department of Planning and Natural Resources (United States Virgin Islands)
DPS	distinct population segment
EA	environmental assessment
EEZ	exclusive economic zone
FMP	fishery management plan
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
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
OFL	overfishing limit
SEDAR	Southeast Data, Assessment, and Review (stock assessment)
SEFSC	Southeast Fisheries Science Center
SSC	Scientific and Statistical Committee
USVI	United States Virgin Islands

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# Chapter 1. Introduction

## 1.1 What Action is Proposed?

Framework Amendment 2 to the Comprehensive Fishery Management Plan (FMP) for the Puerto Rico Exclusive Economic Zone (EEZ) (Puerto Rico FMP), Framework Amendment 2 to the Comprehensive FMP for the St. Croix EEZ (St. Croix FMP), and Framework Amendment 2 to the Comprehensive FMP for the St. Thomas and St. John EEZ (St. Thomas/St. John FMP) (collectively Framework Amendment 2), includes actions to update the overfishing limit (OFL), acceptable biological catch (ABC), and annual catch limit (ACL) for spiny lobster for each FMP consistent with recommendations from the Caribbean Fishery Management Council’s (Council) Scientific and Statistical Committee (SSC). Framework Amendment 2 is available on the Council and National Marine Fisheries Service (NMFS) Southeast Regional Office websites.

## 1.2 Why is the Council Considering Action?

The Council is considering revising the OFL, ABC, and ACL for spiny lobster under each FMP to incorporate information from the 2022 Update Assessment to the 2019 Southeast Data, Assessment, and Review (SEDAR) 57 U.S. Caribbean Spiny Lobster stock assessments for Puerto Rico, St. Croix, and St. Thomas/St. John (SEDAR 57 2019). The 2022 Update Assessment retained all modeling decisions documented in the 2019 SEDAR 57 assessments and used data inputs through terminal year 2021. The 2022 Update Assessment was specifically conducted to revise the OFL and ABC projections for years 2024-2026. Therefore, the management reference points presented in Table 1.1, which are specified in Framework Amendment 1 to the Puerto Rico FMP, St. Croix FMP, and St. Thomas/St. John FMP (Framework Amendment 1), are not proposed to be changed.

**Table 1.1.** Management reference points from SEDAR 57 spiny lobster stock assessments for each island/island group.

Management Reference Point	Puerto Rico	St. Croix	St. Thomas/St. John
maximum sustainable yield proxy*	432,501	127,742	133,601
maximum fishing mortality threshold ( $F_{SPR30}$ )	0.197	0.203	0.244
minimum stock size threshold ( $0.75 * SSB_{MFMT}$ ) (1,000 eggs)	8.48 E+07	2.30 E+07	2.13 E+07

\* Values are in pounds whole weight.

At the December 2022 Council meeting, the Council’s SSC recommended both variable OFLs and ABCs (i.e., values change each year for 2024-2026) and a constant-catch OFL and ABC

(based on the 3-year average of 2024-2026) for spiny lobster under each FMP. The Council chose to use the constant-catch OFL and ABC values (Table 1.2), and to set constant-catch ACLs from the constant-catch ABCs. This constant-catch approach is consistent with the previous approach selected in Framework Amendment 1 (CFMC 2022), implemented on April 15, 2023 ([88 FR 16194](#); March 16, 2023). The Council requested staff begin development of Framework Amendment 2 to specify new catch levels for spiny lobster in Puerto Rico, St. Croix, and St. Thomas/St. John based on the ABC and OFL recommendations from the SSC.

**Table 1.2.** Constant-catch overfishing limit and acceptable biological catch values for spiny lobster for fishing years 2024-2026 for each island/island group. Values are in pounds whole weight.

Fishery Management Plan	OFL	ABC
Puerto Rico	426,858	376,452
St. Croix	163,823	144,478
St. Thomas/St. John	158,993	140,218

Source: [SEFSC December 2022](#)

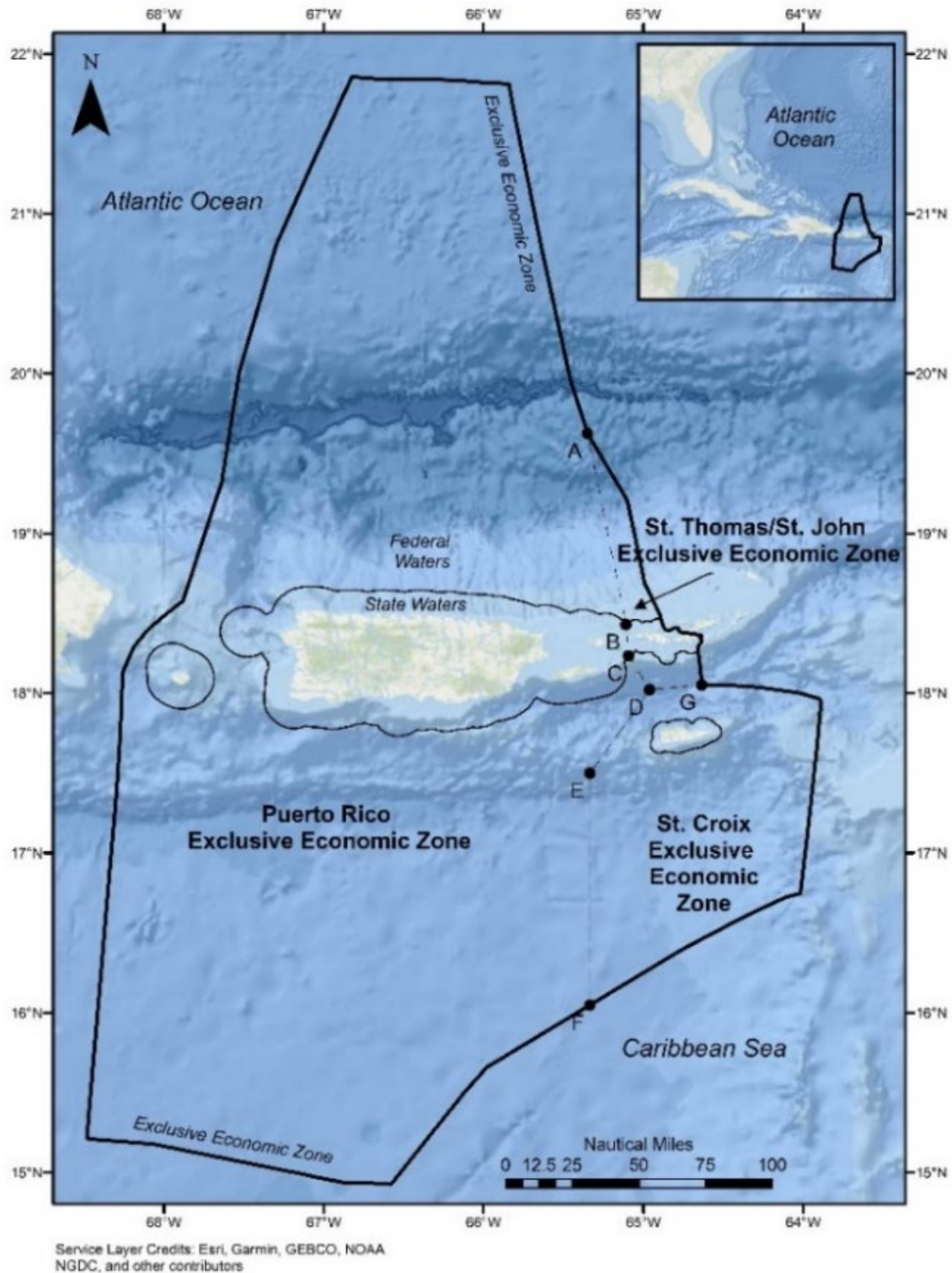
### 1.3 Statement of Purpose and Need

The purpose of Framework Amendment 2 is to update OFLs, ABCs, and ACLs for spiny lobster under the Puerto Rico, St. Croix, and St. Thomas/St. John FMPs to account for the 2022 Update Assessment to the 2019 SEDAR 57 stock assessments.

The need for Framework Amendment 2 is to update management measures for spiny lobster stocks based on best scientific information available to prevent overfishing and achieve optimum yield, consistent with the requirements of the Magnuson-Stevens Fishery Management and Conservation Act.

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

The Council is responsible for managing fishery resources, including spiny lobster, in federal waters in the U.S. Caribbean region (Figure 1.1). Federal waters around Puerto Rico range 9-200 nautical miles (17-370 kilometers) from the shore of the Commonwealth of Puerto Rico to the outer boundary of the U.S. Caribbean EEZ. Federal waters around St. Croix and around St. Thomas/St. John range 3-200 nautical miles (6-370 kilometers) from the shore of the respective United States Virgin Islands (USVI) island/island group to the outer boundary of the U.S. Caribbean EEZ.



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

## 1.5 History of Federal Fisheries Management

The Puerto Rico, St. Croix, and St. Thomas/St. John FMPs and its final rule established management measures for fishing in federal waters around each respective island. Each FMP 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 (AM); described essential fish habitat for managed species; and updated framework procedures. Additionally, the FMPs retained other management measures established under the previous U.S. Caribbean-wide FMPs (Reef Fish FMP of Puerto Rico and the USVI, Spiny Lobster FMP of Puerto Rico and the USVI, Queen Conch FMP of Puerto Rico and the USVI, and Corals and Reef Associated Plants and Invertebrates FMP of Puerto Rico and the USVI) that apply to the respective island management area (e.g., seasonal and area closures, minimum size limits, recreational bag limits).

### **Puerto Rico FMP (CFMC 2019a), St. Croix FMP (CFMC 2019b), and St. Thomas/St. John FMP (CFMC 2019c)**

The Puerto Rico FMP, St. Croix FMP, and St. Thomas/St. John FMP were effective October 13, 2022 ([87 FR 56204](#)). Below is an annotated list of fishery management actions implemented under each of the Puerto Rico, St. Croix, and St. Thomas/St. John FMPs specific to spiny lobster.

- Prohibited harvest of egg-bearing females and required fishermen to land spiny lobster intact;
- Prohibited harvest of spiny lobster with spear and hook gear and with a gillnet or trammel net;
- Included descriptions for spiny lobster trap identification, construction specifications, and tending restrictions;
- Specified a minimum size limit of 3.5 inches (8.9 centimeters) carapace length;
- Specified a recreational bag limit of 3 spiny lobsters per person/day, not to exceed 10 spiny lobsters per vessel/day, whichever is less;
- Included import restrictions;
- Included a four-tiered ABC Control Rule used to define management reference points;
- Specified sustainable yield level (an OFL proxy), ABC, and ACL for spiny lobster;
- Described the AMs and closure provision for spiny lobster; and
- Described the essential fish habitat for spiny lobster.

### **Framework Amendment 1 (CFMC 2022)**

Framework Amendment 1 to each of the Puerto Rico, St. Croix, and St. Thomas/St. John FMPs, effective April 15, 2023 ([88 FR 16194](#)), updated management reference points for spiny lobster based on the 2019 SEDAR 57 spiny lobster stock assessments for Puerto Rico, St. Croix, and St. Thomas/St. John ([SEDAR 57 Stock Assessment Report](#)) and application of the Council's ABC Control Rule. Framework Amendment 1 used the constant-catch approach, which used the 3-

year average OFL and ABC values from 2021-2023, to specify the OFLs and ABCs for each FMP, and used the constant-catch ABCs to derive the spiny lobster constant-catch ACLs equal to 0.95 of ABCs for years 2021-2023. For years 2024 and later, Framework Amendment 1 specified more conservative OFL, ABC and ACL values. Framework Amendment 1 also revised the process for triggering an AM to compare the average of the most recent three years of spiny lobster landings to the average ACLs in place during those years.

## Chapter 2. Proposed Actions and Alternatives

### 2.1 Action 1: Update the Puerto Rico Spiny Lobster Overfishing Limit (OFL), Acceptable Biological Catch (ABC), and Annual Catch Limit (ACL)

**Alternative 1.** No Action. Retain the OFL, ABC, and ACL (which equals optimum yield [OY]) for spiny lobster specified under Framework Amendment 1 to the Puerto Rico Fishery Management Plan (FMP), which used the constant-catch approach for specifying the OFLs and ABCs and set constant-catch ACLs equal 0.95 of the ABC.

**Alternative 2.** Update the OFL and ABC for spiny lobster for the period of 2024-2026 based on the constant-catch approach selected by the Caribbean Fishery Management Council (Council) and set the ACL equal to the ABC, until modified.

**Alternative 3 (Preferred).** Update the OFL and ABC for spiny lobster for the period of 2024-2026 based on the constant-catch approach selected by the Council and set the ACL equal to 0.95 of the ABC, until modified.

**Alternative 4.** Update the OFL and ABC for spiny lobster for the period of 2024-2026 based on the constant-catch approach selected by the Council and set the ACL equal to 0.90 of the ABC, until modified.

#### Discussion

**Alternative 1** would retain the OFL, ABC, or ACL set for fishing year 2024 and subsequent fishing years in Framework Amendment 1 for spiny lobster in Puerto Rico that were based on 2019 the Southeast Data, Assessment, and Review (SEDAR) 57 stock assessment. **Alternative 1** would not update the OFL, ABC, and ACL based on the 2022 Update Assessment to SEDAR 57, and thus would not be based on the best scientific information available. 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). Framework Amendment 1 to the Puerto Rico FMP specified the OFL, ABC, and ACL values for 2021-2023 and for 2024 and subsequent years (2024+). The Council set the ACLs for the Puerto Rico spiny lobster stock for 2021-2023 and for 2024+ at 95% of the ABC for those respective periods. The Council’s Scientific and Statistical Committee (SSC) recommended a more conservative ABC value for 2024+ due to the greater degree of scientific uncertainty associated with the time between the assessment and the OFL and ABC projections. For Framework Amendment 2, the 2024+ values specified under Framework Amendment 1 are used as the no action alternative (Table 2.1). **Alternative 1** is not



a viable alternative because it would be inconsistent with the requirements of the Magnuson-Stevens Act to base management measures on the best scientific information available.

**Alternative 2, Preferred Alternative 3, and Alternative 4** would update the OFL and ABC for spiny lobster in Puerto Rico based on the average of the 2024-2026 projections from the SEDAR 57 Update Assessment ([SEFSC December 2022](#)), and would set the ACL based on the SSC's ABC recommendation and considering varying degrees of management uncertainty (Table 2.1). Management uncertainty refers to uncertainty in the ability of managers to constrain catch to the ACL, and the uncertainty in quantifying the true catch amounts. Sources of management uncertainty could include late reporting, misreporting, or underreporting of catch amounts, as well as lack of sufficient in-season management, including in-season closure authority. No management uncertainty means that managers believe that the reported landings accurately represent the actual catch for the stock, and the ACL would be set equal to the ABC because there would be little to no variation expected between reported landings and catch targets each year. However, when there is some uncertainty in the reported landings (e.g., higher than or less than the actual catch for the stock), managers may be more conservative and set the ACL at a level lower than the ABC. Where management uncertainty exists, the greater the buffer between the ACL and ABC, the less risk there is of exceeding catch targets and possibly overfishing the stock.

**Alternative 2** would set the ACL equal to the ABC, and would reflect no management uncertainty. **Preferred Alternative 3** would set the ACL at 95% of the ABC, which reflects the same level of management uncertainty as in Framework Amendment 1. **Alternative 4** would set the ACL at 90% of the ABC, which reflects a greater level of management uncertainty than **Preferred Alternative 3**. The ACL under **Alternative 2** would allow for the largest annual catch of spiny lobster, followed by **Alternative 1**, and then **Preferred Alternative 3** and **Alternative 4**, respectively. **Alternative 4** would provide for the largest reduction between the ACL and the ABC, providing less of a risk of overfishing, but potentially triggering an accountability measure (AM) more frequently if catch exceeds the ACL.

Since 2018, annual commercial landings (adjusted) of spiny lobster in Puerto Rico have ranged between 350,000 and 550,000 pounds whole weight (lbs ww) ([SEFSC December 2022](#)). Thus, the low end of the annual harvest of this top-targeted species is close to the current and proposed ACLs under each alternative (Table 2.1). Harvest of spiny lobster in territorial waters is not prohibited when a fishing season closure is applied in federal waters.

**Table 2.1.** Overfishing limit, acceptable biological catch, and annual catch limit for spiny lobster in Puerto Rico under the Action 1 alternatives. All values are in pounds whole weight.

<b>Alternative</b>	<b>OFL</b>	<b>ABC</b>	<b>ACL</b>
Alt. 1 (no action)	438,001	386,279	366,965
Alt. 2 (ACL=ABC)	426,858	376,452	376,452
Preferred Alt. 3 (ACL=ABC x 0.95)	426,858	376,452	357,629
Alt. 4 (ACL=ABC x 0.90)	426,858	376,452	338,807

## 2.2 Action 2: Update the St. Croix Spiny Lobster OFL, ABC, and ACL

**Alternative 1.** No Action. Retain the OFL, ABC, and ACL (which equals OY) for spiny lobster specified under Framework Amendment 1 to the St. Croix FMP, which used the constant-catch approach for specifying the OFLs and ABCs and set constant-catch ACLs equal 0.95 of the ABC.

**Alternative 2.** Update the OFL and ABC for spiny lobster for the period of 2024-2026 based on the constant-catch approach selected by the Council and set the ACL equal to the ABC, until modified.

**Alternative 3 (Preferred).** Update the OFL and ABC for spiny lobster for the period of 2024-2026 based on the constant-catch approach selected by the Council and set the ACL equal to 0.95 of the ABC, until modified.

**Alternative 4.** Update the OFL and ABC for spiny lobster for the period of 2024-2026 based on the constant-catch approach selected by the Council and set the ACL equal to 0.90 of the ABC, until modified.

### Discussion

**Alternative 1** would retain the OFL, ABC, or ACL set for fishing year 2024 and subsequent fishing years in Framework Amendment 1 for spiny lobster in St. Croix that were based on 2019 the SEDAR 57 stock assessment. **Alternative 1** would not update the OFL, ABC, and ACL based on the 2022 Update Assessment to SEDAR 57, and thus would not be based on the best scientific information available. The Magnuson-Stevens Act states “conservation and management measures shall be based upon the best scientific information available.” 50 C.F.R. 600.315(a). Framework Amendment 1 to the St. Croix FMP specified the OFL, ABC, and ACL values for 2021-2023 and for 2024 and subsequent years (2024+). The Council set the ACLs for the St. Croix spiny lobster stock for 2021-2023 and for 2024+ at 95% of the ABC for those respective periods. The Council’s SSC recommended a more conservative ABC value for 2024+ due to the greater degree of scientific uncertainty associated with the time between the assessment and the OFL and ABC projections. For Framework Amendment 2, the 2024+ values specified under Framework Amendment 1 are used as the no action alternative (Table 2.1). **Alternative 1** is not a viable alternative because it would be inconsistent with the requirements of the Magnuson-Stevens Act to base management measures on the best scientific information available.

**Alternative 2, Preferred Alternative 3, and Alternative 4** would update the OFL and ABC for spiny lobster in St. Croix based on the average of the 2024-2026 projections from the SEDAR 57

Update Assessment ([SEFSC December 2022](#)), and would set the ACL based on the SSC’s ABC recommendation and considering varying degrees of management uncertainty (Table 2.2). Management uncertainty refers to uncertainty in the ability of managers to constrain catch to the ACL, and the uncertainty in quantifying the true catch amounts. Sources of management uncertainty could include late reporting, misreporting, or underreporting of catch amounts, as well as lack of sufficient in-season management, including in-season closure authority. No management uncertainty means that managers believe that the reported landings accurately represent the actual catch for the stock, and the ACL would be set equal to the ABC because there would be little to no variation expected between reported landings and actual catch targets each year. However, when there is some uncertainty in the reported landings (e.g., higher than or less than the actual catch for the stock), managers may want to be more conservative and set the ACL at a level lower than the ABC. Where management uncertainty exists, the greater the buffer between the ACL and ABC, the less risk there is of exceeding catch targets and possibly overfishing the stock.

**Alternative 2** would set the ACL equal to the ABC, and would reflect no management uncertainty. **Preferred Alternative 3** would set the ACL at 95% of the ABC, which reflects the same level of management uncertainty as in Framework Amendment 1. **Alternative 4** would set the ACL at 90% of the ABC, which reflects a greater level of management uncertainty than **Preferred Alternative 3**. Each of the **Alternatives 2-4** would provide a greater ACL than **Alternative 1**. The ACL under **Alternative 2** would allow for the largest annual catch of spiny lobster, followed by **Preferred Alternative 3**, then **Alternative 4**, and then **Alternative 1**. Among the action alternatives, **Alternative 4** would offer the largest reduction between the ACL and the ABC, providing less of a risk of overfishing, but potentially triggering an accountability measure more frequently if catch exceeds the ACL.

Annual commercial landings of spiny lobster in St. Croix since 2014 have been less than 50,000 lbs ww ([SEFSC December 2022](#)), which is well below the current and proposed ACL values under each alternative (Table 2.2).

**Table 2.2.** Overfishing limit, acceptable biological catch, and annual catch limit for spiny lobster in St. Croix under the Action 2 alternatives. All values are in pounds whole weight.

Alternative	OFL	ABC	ACL
Alt. 1 (no action)	144,219	127,189	120,830
Alt. 2 (ACL=ABC)	163,823	144,478	144,478
Preferred Alt. 3 (ACL=ABC x 0.95)	163,823	144,478	137,254
Alt. 4 (ACL=ABC x 0.90)	163,823	144,478	130,030

## 2.3 Action 3: Update the St. Thomas and St. John Spiny Lobster OFL, ABC, and ACL

**Alternative 1.** No Action. Retain the OFL, ABC, and ACL (which equals OY) for spiny lobster specified under Framework Amendment 1 to the St. Thomas/St. John FMPs, which used the constant-catch approach for specifying the OFLs and ABCs and set constant-catch ACLs equal 0.95 of the ABC.

**Alternative 2.** Update the OFL and ABC for spiny lobster for the period of 2024-2026 based on the constant-catch approach selected by the Council and set the ACL equal to the ABC, until modified.

**Alternative 3 (Preferred).** Update the OFL and ABC for spiny lobster for the period of 2024-2026 based on the constant-catch approach selected by the Council and set the ACL equal to 0.95 of the ABC, until modified.

**Alternative 4.** Update the OFL and ABC for spiny lobster for the period of 2024-2026 based on the constant-catch approach selected by the Council and set the ACL equal to 0.90 of the ABC, until modified.

### Discussion

**Alternative 1** would retain the OFL, ABC, or ACL set for fishing year 2024 and subsequent fishing years in Framework Amendment 1 for spiny lobster in St. Thomas/St. John that were based on 2019 the SEDAR 57 stock assessment. **Alternative 1** would not update the OFL, ABC, and ACL based on the 2022 Update Assessment to SEDAR 57, and thus would not be based on the best scientific information available. The Magnuson-Stevens Act states “conservation and management measures shall be based upon the best scientific information available.” 50 C.F.R. 600.315(a). Framework Amendment 1 to the St. Thomas/St. John FMP specified the OFL, ABC, and ACL values for 2021-2023 and for 2024 and subsequent years (2024+). The Council set the ACLs for the St. Thomas/St. John spiny lobster stock for 2021-2023 and for 2024+ at 95% of the ABC for those respective periods. The Council’s SSC recommended a more conservative ABC value for 2024+ due to the greater degree of scientific uncertainty associated with the time between the assessment and the OFL and ABC projections. For Framework Amendment 2, the 2024+ values specified under Framework Amendment 1 are used as the no action alternative (Table 2.1). **Alternative 1** is not a viable alternative because it would be inconsistent with the requirements of the Magnuson-Stevens Act to base management measures on the best scientific information available.

**Alternative 2, Preferred Alternative 3, and Alternative 4** would update the OFL and ABC for spiny lobster in St. Thomas/St. John based on the average of the 2024-2026 projections from the

SEDAR 57 Update Assessment ([SEFSC December 2022](#)), and would set ACLs based on the SSC’s ABC recommendation considering varying degrees of management uncertainty (Table 2.3). Management uncertainty refers to uncertainty in the ability of managers to constrain catch to the ACL, and the uncertainty in quantifying the true catch amounts. Sources of management uncertainty could include late reporting, misreporting, or underreporting of catch amounts, as well as lack of sufficient in-season management, including in-season closure authority. No management uncertainty means that managers believe that the reported landings accurately represent the actual catch for the stock, and the ACL would be set equal to the ABC because there would be little to no variation between the reported landings and the catch targets each year. However, when there was some uncertainty in the reported landings (e.g., higher than or less than the actual catch for the stock), then managers would want to be more conservative and set the ACL at some reduced level of the ABC. Where management uncertainty exists, the greater the buffer between the ACL and ABC, the less of exceeding catch targets and possibly overfishing the stock.

**Alternative 2** would set the ACL equal to the ABC, and would reflect no management uncertainty. **Preferred Alternative 3** would set the ACL at 95% of the ABC to reflect the same level of management uncertainty as in Framework Amendment 1. **Alternative 4** would set the ACL at 90% of the ABC to reflect a greater level of management uncertainty than **Preferred Alternative 3**. Each of the **Alternatives 2-4** would provide a greater ACL than **Alternative 1**. The ACL under **Alternative 2** would allow for the largest annual catch of spiny lobster, followed by **Preferred Alternative 3**, then **Alternative 4**, and then **Alternative 1**. Among the action alternatives, **Alternative 4** would offer the largest reduction between the ACL and the ABC, providing less of a risk of overfishing, but potentially triggering an accountability measure more frequently if catch exceeds the ACL.

Annual commercial landings of spiny lobster in St. Thomas/St. John since 2018 have been near 100,000 lbs ww ([SEFSC December 2022](#)), which is slightly below the current and proposed ACL values under each alternative (Table 2.3).

**Table 2.3.** Overfishing limit, acceptable biological catch, and annual catch limit for spiny lobster in St. Thomas/St. John under the Action 3 alternatives. All values are in pounds whole weight.

Alternative	OFL	ABC	ACL
Alt. 1 (no action)	150,497	132,725	126,089
Alt. 2 (ACL=ABC)	158,993	140,218	140,218
Preferred Alt. 3 (ACL=ABC x 0.95)	158,993	140,218	133,207
Alt. 4 (ACL=ABC x 0.90)	158,993	140,218	126,196

## Chapter 3. Affected Environment

This section describes the environment and resources in federal waters around Puerto Rico, St. Croix, and St. Thomas/St. John that would be affected by the proposed actions. Information on the physical, biological/ecological, economic, social, and administrative environments of Puerto Rico and the U.S. Virgin Islands (USVI) are described in detail in the Puerto Rico Fishery Management Plan (FMP) (CFMC 2019a), the St. Croix FMP (CFMC 2019b), and the St. Thomas/St. John FMP (CFMC 2019c) (collectively the Island-based FMPs), and in Framework Amendment 1 (CFMC 2022), which are incorporated herein by reference and summarized below.

### 3.1 Description of the Physical Environment

The U.S. Caribbean Exclusive Economic Zone (EEZ) covers approximately 75,687 mi<sup>2</sup> (196,029 km<sup>2</sup>), which, for management purposes, is divided into the Puerto Rico, St. Croix, and St. Thomas/St. John management areas (see Figure 1.1).

#### 3.1.1 Puerto Rico

Federal waters around Puerto Rico extend 9 - 200 nautical miles (17 - 370 km) from the shoreline, covering approximately 65,368 mi<sup>2</sup> (169,303 km<sup>2</sup>). 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.

For Puerto Rico, the following areas have been designated as Habitat Areas of Particular Concern (HAPC) by the Caribbean Fishery Management Council (Council) for coral and reef fish species, which are managed with seasonal closures that are also applicable to spiny lobster:

- Tourmaline Bank - closed December 1 through the last day of February, each year, to all fishing, including spiny lobster; and
- Abrir la Sierra Bank - closed December 1 through the last day of February, each year, to all fishing, including spiny lobster.

#### 3.1.2 St. Croix

Federal waters around St. Croix extend 3 - 200 nautical miles (6 - 370 km) from the shoreline, covering approximately 9,216 mi<sup>2</sup> (23,870 km<sup>2</sup>). St. Croix is located about 46 mi (74 km) south of St. Thomas/St. John and lies on a different geological platform than Puerto Rico, St. Thomas, and St. John.

For St. Croix, the following areas have been designated as HAPC by the Council for coral and reef fish species, which are managed with seasonal closures that are also applicable to spiny lobster:

- Red Hind Spawning Aggregation Area (Lang Bank) - closed December 1 through the last day of February, each year, to all fishing, including spiny lobster; and
- Mutton Snapper Spawning Aggregation Area - closed March 1 through June 30, each year, to all fishing, including spiny lobster.

### 3.1.3 St. Thomas and St. John

Federal waters around St. Thomas/St. John extend 3 - 200 nautical miles (6 – 370 km) from the shoreline, covering approximately 1,103 mi<sup>2</sup> (2,856 km<sup>2</sup>).

For St. Thomas/St. John, the following areas are managed with year-round or seasonal closures that are applicable to spiny lobster:

- Hind Bank Marine Conservation District - closed year-round to all fishing, including spiny lobster; and
- Grammanik Bank - closed February 1 through April 30, each year, to all fishing, including spiny lobster.

### 3.1.4 Essential Fish Habitat (EFH)

EFH is defined in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) as “those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity” (16 U.S. C. 1802(10)). EFH for spiny lobster was identified in the Caribbean Sustainable Fisheries Act (SFA) Amendment (CFMC 2005) and mapped in the EFH Amendment (CFMC 2004), described in the Island-based FMPs (CFMC 2019a, CFMC 2019b, CFMC 2019c) and Framework Amendment 1 (CFMC 2022), and incorporated here by reference.

In Puerto Rico, St. Croix, and St. Thomas/St. John, 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).

## 3.2 Description of the Biological and Ecological Environments

The Island-based FMPs (CFMC 2019a-c) and Framework Amendment 1 (CFMC 2022) include a description of the biological and ecological environments for the species managed in federal waters in the respective island/island group, including spiny lobster, which is incorporated herein by reference and summarized below.



## 3.2.1 Description of the Species

### 3.2.1.1 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. Spiny lobster occur from the extreme shallows of the littoral fringe to depths exceeding 328 ft (100 m) (Kanciruk 1980; Munro 1974). In the U.S. Caribbean, the distribution of spiny lobster extends to the edge of the shelf, which is described as the 100-fathom contour (183 m) (CFMC 1981).

### 3.2.1.2 Status of the Stocks

Using the same management thresholds (i.e., minimum stock size threshold [MSST] and maximum fishing mortality threshold [MFMT]) that were accepted for use in the 2019 SEDAR 57 assessments (SEDAR 57 2019), the 2022 Update Assessment found that (1) the Puerto Rico stock in 2021 was undergoing overfishing (i.e., current fishing mortality is above MFMT) and was not considered overfished (i.e., current Spawning Output is above MSST); (2) the St. Croix stock in 2021 was not undergoing overfishing and was not considered overfished; and (3) the St. Thomas/St. John stock in 2021 was not undergoing overfishing and was not considered overfished.

### 3.2.1.3 Responses to Climate Change

Climate change can affect spiny lobster populations as the coral reef ecosystems in which they reside shift due to increases in water temperatures and extreme weather events (e.g., hurricanes). These climate change-related shifts can also affect the food chain that the spiny lobsters rely on. Additionally, the extended larval phase of spiny lobsters makes them particularly vulnerable to climate variability, specifically the warming of surface temperatures.<sup>1</sup> Ross and Behringer (2019) found that in addition to affecting the survival and size at metamorphosis of spiny lobsters, especially post-larval and juvenile lobsters, changes in temperature and salinity also altered the spiny lobsters ability to identify chemosensory cues, such as selecting suitable shelters, which may result in decreased survivorship due to impaired behaviors.

## 3.2.2 Bycatch

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. Croix, and St. Thomas/St. John, compared to other regions. SEDAR 57 concluded that (1) all legal (minimum carapace length of 3.5 inches) spiny lobsters caught by commercial fishermen in

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<sup>1</sup> <http://www.fao.org/fi/static-media/MeetingDocuments/WECAFC/WECAFC2019/17/Ref.35e.pdf>

the Puerto Rico, St. Croix, and St. Thomas/St. John fisheries are assumed to be retained, (2) discards include sublegal and berried spiny lobsters, and (3) discard mortality of spiny lobsters is negligible (SEDAR 57 2019). Fishery statistics of recreational spiny lobster removals are not available.

The actions in Framework Amendment 2 are not expected to significantly increase or decrease the magnitude of bycatch or bycatch mortality in the Puerto Rico, St. Croix, and St. Thomas/St. John fisheries that target spiny lobster. Additionally, since fishermen in the U.S. Caribbean region traditionally utilize most resources harvested, and the amount of bycatch from the fisheries targeting spiny lobster are minimal and are not expected to change under this amendment, little to no affect to mammals or birds would be expected from the proposed actions.

### 3.2.3 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. A brief summary of these two laws and more information is available on the NMFS Office of Protected Resources website.<sup>2</sup>

The National Marine Fisheries Service (NMFS) completed a biological opinion on September 21, 2020, evaluating the impacts of the Puerto Rico, St. Croix, and St. Thomas/St. John fisheries on ESA-listed species that occur in the U.S. Caribbean region (NMFS 2020; Table 3.2.1). In the biological opinion, NMFS determined that the authorization of the fisheries conducted under each island FMP is not likely to adversely affect sperm, sei, and fin whales; the Northwest Atlantic DPS of loggerhead sea turtle and leatherback sea turtle; giant manta rays; or critical habitat of green, hawksbill, and leatherback sea turtles. The biological opinion also determined that the authorization of the island-based fisheries is not likely to jeopardize the continued existence of the North Atlantic 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, and boulder star coral, or result in the destruction or adverse modification of designated *Acropora* critical habitat.

**Table 3.2.1.** ESA-listed species that may occur in the U.S. Caribbean region.

Common Name	Species Name	Status	Determination
Sei whale	<i>Balaenoptera borealis</i>	Endangered	NLAA
Sperm whale	<i>Physeter macrocephalus</i>	Endangered	NLAA
Fin whale	<i>Balaenoptera physalus</i>	Endangered	NLAA
Green sea turtle North Atlantic DPS	<i>Chelonia mydas</i>	Threatened	NLJ
Green sea turtle South Atlantic DPS	<i>Chelonia mydas</i>	Threatened	NLJ

<sup>2</sup> <https://www.fisheries.noaa.gov/protecting-marine-life>

Common Name	Species Name	Status	Determination
Hawksbill sea turtle	<i>Eretmochelys imbricata</i>	Endangered	NLJ
Leatherback sea turtle	<i>Dermochelys coriacea</i>	Endangered	NLAA
Loggerhead sea turtle Northwest Atlantic DPS	<i>Caretta caretta</i>	Threatened	NLAA
Elkhorn coral	<i>Acropora palmata</i>	Threatened	NLJ
Staghorn coral	<i>Acropora cervicornis</i>	Threatened	NLJ
Rough cactus coral	<i>Mycetophyllia ferox</i>	Threatened	NLJ
Pillar coral	<i>Dendrogyra cylindrus</i>	Threatened	NLJ
Lobed star coral	<i>Orbicella annularis</i>	Threatened	NLJ
Mountainous star coral	<i>Orbicella faveolata</i>	Threatened	NLJ
Boulder star coral	<i>Orbicella franksi</i>	Threatened	NLJ
Scalloped hammerhead shark (Central and Southwest Atlantic DPS)	<i>Sphyrna lewini</i>	Threatened	NLJ
Nassau grouper	<i>Epinephelus striatus</i>	Threatened	NLJ
Oceanic whitetip shark	<i>Carcharhinus longimanus</i>	Threatened	NLJ
Giant Manta Ray	<i>Manta birostris</i>	Threatened	NLAA

NLAA = not likely to adversely affect

NLJ = not likely to jeopardize the continued existence

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. Critical habitat for green and hawksbill sea turtles occurs entirely within Puerto Rico state waters, and over 99% of the critical habitat for leatherback sea turtles around St. Croix occurs within USVI state waters. Designated critical habitat of *Acropora* corals in Puerto Rico and the USVI extend from the mean low water line seaward to the 98 foot (30 meter) depth contour ([73 FR 72209](#)), the majority of which occur in state waters.

The actions contained in Framework Amendment 2 are not anticipated to change the operation of the Puerto Rico, St. Croix, or St. Thomas/St. John fisheries in a manner that would cause effects to ESA-listed species or critical habitat that were not considered in the 2020 biological opinion.

Information on the Marine Mammal Protection Act and the ESA is available on the NMFS Office of Protected Resources website.<sup>3</sup>

### 3.3 Description of the Spiny Lobster Component of the Puerto Rico, St. Croix, and St. Thomas and St. John Fisheries

The Island-based FMPs (CFMC 2019a-c) and Framework Amendment 1 (CFMC 2022) include a description of the Puerto Rico, St. Croix, and St. Thomas/St. John fisheries that target spiny lobster, which is incorporated herein by reference and summarized below. Under each FMP,

<sup>3</sup> <https://www.fisheries.noaa.gov/protecting-marine-life>

fishable habitat is defined as those waters less than or equal to 100 fathoms (183 m) and the majority of fishing activity for Council-managed species, including spiny lobster, occurs in that area.

Spiny lobster has been managed in U.S. Caribbean federal waters since 1985, and is targeted by commercial and recreational fishermen in Puerto Rico, St. Croix, and St. Thomas/St. John. Annual catch limits (ACL) and accountability measures (AM) for spiny lobster were specified under the Island-based FMPs and revised under Framework Amendment 1. Other management measures for spiny lobster applicable in federal waters include a daily bag limit of three spiny lobster per person per day, with no more than 10 spiny lobster per vessel per day and a minimum size limit of 3.5 inches (8.9 centimeters).

### 3.3.1 Puerto Rico

Landings of spiny lobster are available from self-reported commercial fishermen logbooks, and include information on fishing gear type and location where the catch was landed.

Approximately half of the commercial fishermen in Puerto Rico target spiny lobster (Matos-Caraballo and Agar 2011). In 2019, 373 of the 800 commercial fishermen in Puerto Rico reported landings of spiny lobster. When this amendment was prepared, the most recent and complete year of landings available was from 2019, which is the same terminal year reported in Framework Amendment 1, and represents the best scientific information available. As a result, this section does not contain new landings information; rather it summarizes information contained in the previous framework amendment. See Appendix A for landings information from Framework Amendment 1.

Adjusted landings<sup>4</sup> of spiny lobster in Puerto Rico have generally increased each year since ACLs were established in 2012, peaking at 520,829 pounds (lbs) in 2018. Each year, more than half of the spiny lobster landings reported use dive gear, followed by trap gear, and then net gear. Other species commonly caught on commercial fishing trips in Puerto Rico that target spiny lobster include queen conch, hogfish, and queen triggerfish, among others.

### 3.3.2 St. Croix

Landings of spiny lobster are available from self-reported commercial logbooks and include information on fishing gear type and location where the catch was landed. In the USVI, landings are assumed to be fully reported and correction factors are not used. The most recent census found that 59.6% of the commercial fishermen in St. Croix targeted spiny lobster (Kojis et al. 2017). In 2021, 30 of the 61 commercial fishermen in St. Croix reported landings of spiny

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<sup>4</sup> Puerto Rico landings are adjusted using an expansion factor determined by Department of Natural and Environmental Resources staff at the Fisheries Research Laboratory, which is based on intercept sampling of commercial fishermen.

lobster. At the time this amendment was prepared, the most recent and complete year of landings available was from 2021, which is the same terminal year reported in Framework Amendment 1, and represents the best scientific information available. As a result, this section does not contain new landings information; rather it summarizes information contained in the previous framework amendment. See Appendix A for landings information from Framework Amendment 1.

Since ACLs were established in 2012, landings of spiny lobster have remained under 100,000 lbs, with slightly more than half each year reported from state waters. In St. Croix, the majority (>80%) of spiny lobster are harvested by hand (i.e., while diving), followed by trap gear. Other species commonly caught on commercial fishing trips in St. Croix that target spiny lobster include stoplight parrotfish, queen triggerfish, red hind grouper, and queen conch, among others.

### 3.3.3 St. Thomas and St. John

Landings of spiny lobster are available from self-reported commercial logbooks, and include information on fishing gear type and location where the catch was landed. In the USVI landings are assumed to be fully reported and correction factors are not used. The most recent census found that 44% of the commercial fishermen in St. Thomas/St. John target spiny lobster (Kojis et al. 2017). In 2021, 29 of the 63 commercial fishermen in St. Thomas/St. John reported landings of spiny lobster. At the time this amendment was prepared, the most recent and complete year of landings available was from 2021, which is the same terminal year reported in Framework Amendment 1, and represents the best scientific information available. As a result, this section does not contain new landings information; rather it summarizes information contained in the previous framework amendment. See Appendix A for landings information from Framework Amendment 1.

Since ACLs were established in 2012, landings of spiny lobster have remained fairly stable peaking at 121,695 lbs in 2016. The majority of the annual landings were initially reported from federal waters, then shifted to 50/50 state and federal waters. In St. Thomas/St. John, the majority of spiny lobster (> 93%) are harvested using trap gear. Other species commonly caught on commercial fishing trips that target spiny lobster include queen triggerfish, red hind grouper, and gray angelfish, among others.

## 3.4 Description of the Economic Environment

The Island-based FMPs (CFMC 2019a-c) and Framework Amendment 1 (CFMC 2022) include a description of the economy for the fisheries targeting spiny lobster, which are incorporated herein by reference and summarized below.

### 3.4.1 Spiny Lobster Component of the Puerto Rico Fishery

Estimated annual landings of spiny lobster (Table 3.4.1) have gradually been increasing since ACLs were established in 2012.<sup>5</sup> Commensurate with this increase, the dockside value of these landings has also been gradually increasing, peaking at almost \$3.5 million in 2018, before falling marginally to \$3.33 million in 2019 (Table 3.4.1). The increased value is somewhat less pronounced when expressed on a deflated basis as a result of a relatively stable deflated per pound price which changed little during the eight-year period ending in 2019.<sup>6</sup>

**Table 3.4.1.** Ex-vessel value and average price of spiny lobster per pound in Puerto Rico for 2012-2019.

Year	Landings (Pounds)	Value (\$)		Price (\$/lb)	
		Current	Deflated <sup>a</sup>	Current	Deflated
2012	385,811	2,429,083	3,133,517	6.30	8.13
2013	275,412	1,747,305	2,201,604	6.34	7.99
2014	376,779	2,414,956	2,994,545	6.41	7.95
2015	418,273	2,681,686	3,298,474	6.41	7.88
2016	449,233	2,920,828	3,563,410	6.50	7.93
2017	283,221	1,909,666	2,272,503	6.74	8.02
2018	519,864	3,470,626	4,060,632	6.67	7.80
2019	488,316	3,333,652	3,833,700	6.83	7.85

<sup>a</sup> Values and prices are deflated based on the 2022 BEA Implicit Price Deflator (GDP Deflator by Year).

Approximately 40% of the trips reported by commercial fishermen in 2019 included landings of spiny lobster (12,366 of the total 30,731 trips). These trips frequently harvest species co-occurring with the harvest of spiny lobster.<sup>7</sup> Estimated annual revenues generated from the landing of these co-occurring species ranged from about \$1.35 million in 2013, to about \$2.0 million in 2018 (Table 3.4.2). The price per pound of these co-occurring species gradually

<sup>5</sup> These landings are considered ‘estimates’ because, as discussed in Section 3.3.1, landings that are reported are adjusted using an expansion factor determined by DNER staff at the Fisheries Research Laboratory.

<sup>6</sup> Specifically, the difference between the highest observed annual deflated price (\$7.06 in 2017) and the lowest observed annual deflated price (\$6.79 in 2018) was only about four percent.

<sup>7</sup> A detailed listing of the co-occurrence species as well as the number of trips in which they were landed is presented in Appendix A, Section 1.1.

increased over the 2012-2019 period approaching \$4.00 in the more recent years. The increase was somewhat less when inflation is removed, but still substantially larger than that observed for spiny lobster. The increasing deflated annual price trend observed for the co-occurring species may reflect a changing species composition, a change in demand/supply of the co-occurring species, or some amalgam.

**Table 3.4.2.** Ex-vessel value and price per pound co-occurring species landed with spiny lobster in Puerto Rico for 2012-2019.

Year	Landings (Pounds)	Value (\$)		Price (\$/lb)	
		Current	Deflated <sup>a</sup>	Current	Deflated
2012	507,310	1,608,715	2,075,242	3.17	4.09
2013	402,243	1,353,258	1,705,105	3.36	4.23
2014	466,076	1,537,349	1,906,313	3.30	4.09
2015	482,078	1,606,366	1,975,830	3.33	4.10
2016	475,793	1,628,102	1,986,284	3.42	4.20
2017	353,569	1,406,567	1,673,815	3.98	4.66
2018	521,953	2,043,477	2,390,868	3.92	4.58
2019	441,983	1,734,545	1,994,727	3.92	4.51

<sup>a</sup> Values and prices are deflated based on the 2022 BEA Implicit Price Deflator (GDP Deflator by Year).

While landings of co-occurring species (Table 3.4.2), expressed on a poundage basis, tend to exceed spiny lobster landings during the earlier years (Table 3.4.1), the value of spiny lobster landings consistently exceeded the value of co-occurring species; often by more than \$1.0 million. This reflects the significantly higher per pound price received by fishermen for spiny lobster. This price differential, however, appears to have narrowed in more recent years.

Landings of both spiny lobsters and co-occurring species were both abnormally low in 2017; undoubtedly reflecting the impact from Hurricanes Irma and Maria. However, the 2018 landings of both spiny lobsters and co-occurring species were the highest on record during the eight-year period of analysis. This may suggest some ‘surplus’ stocks harvested in 2018 that evaded harvest in 2017.

Revenues per trip can be ascertained based on those trips where a trip ticket is submitted. Total revenues per trip (i.e., spiny lobsters and co-occurring species) averaged about \$240 during the eight-year period of analysis with an increasing trend during the later years (Table 3.4.3). Revenues from the landing of spiny lobsters ranged from a low of 56% of total trip revenues in 2013, to a high of 66% in 2019. Despite a significant decline in estimated industry-wide landings of spiny lobsters and co-occurring species in 2017 (see Tables 3.4.1 and 3.4.2), estimated spiny lobster catch per trip in 2017 approximated the eight-year average while the landings of co-occurring species were the highest observed during the eight-year period. This

would suggest the decline in industry-wide 2017 landings reflect a decline in number of trips as opposed to a decline in harvest per trip.

**Table 3.4.3.** Average revenues per trip (\$) from spiny lobster and co-occurring species in Puerto Rico for 2012-2019.

Year	Spiny Lobster Revenues		Revenues From Co-occurring Species		Total Revenues	
	Current	Deflated <sup>a</sup>	Current	Deflated	Current	Deflated
2012	120	155	83	107	203	262
2013	114	144	89	112	202	255
2014	136	169	88	109	224	278
2015	145	178	88	107	234	288
2016	159	194	89	109	248	303
2017	153	182	111	132	264	314
2018	173	202	98	115	271	317
2019	182	209	95	109	277	319

<sup>a</sup> Revenues are deflated based on the 2022 BEA Implicit Price Deflator (GDP Deflator by Year).

The harvest of spiny lobsters in Puerto Rico occurs in both state waters (0-9 nautical miles) and federal waters (9-200 nautical miles) with harvests from state waters dominating the catch. Since 2016, revenues (unweighted) from the harvest of spiny lobsters in state waters have averaged \$167 per trip compared to \$186 in federal waters (Table 3.4.4).<sup>8</sup> Similarly, revenues generated from the harvest of co-occurring species in state waters since 2016 averaged \$99 per trip compared to \$97 in federal waters. Total (unweighted) revenues from state waters averaged \$266 per trip compared to \$283 in federal waters. This relatively small differential in per trip revenues (about six percent) in conjunction with a multitude of other factors (e.g., rougher sea conditions in a small boat and the higher fuel costs associated with increased travel) may help to explain the relatively small percentage of trips occurring in federal waters (see Table A1 in Appendix A).<sup>9</sup> While not shown in Table 3.4.4, calculated prices between spiny lobsters reported to be harvested in state waters were not found to be significantly different from those lobsters reported to be harvested from federal waters.

<sup>8</sup> The starting point of 2016 was selected because that was the first year where landings from ‘unknown area’ was less than 10% (see Table A1).

<sup>9</sup> While there appears to be little difference in average trip revenues from harvests in state waters vis-à-vis federal waters, revenues from ‘unknown area’ are consistently less than either revenues from state or federal waters.



**Table 3.4.4.** Average revenues per trip (\$) from spiny lobster and co-occurring species by area fished in Puerto Rico for 2012-2019.

Year	Spiny Lobster Revenues			Revenues From Co-occurring Species			Total Revenues		
	State Waters	Federal Waters	Unknown Area	State Waters	Federal Waters	Unknown Area	State Waters	Federal Waters	Unknown Area
2012	122	126	117	76	127	79	199	254	197
2013	117	133	99	88	124	80	205	256	179
2014	140	144	117	89	99	80	229	243	197
2015	151	149	118	89	99	79	240	248	197
2016	162	155	133	91	90	60	253	245	193
2017	151	192	139	110	113	130	261	306	269
2018	173	211	133	99	89	81	272	299	214
2019	183	185	138	96	97	62	279	281	200

### 3.4.2 Spiny Lobster Component of the St. Croix and St. Thomas/St. John Fisheries

The vast majority of spiny lobster landings in St. Thomas/St. John are taken by trap and these landings have remained relatively stable since ACLs were established in 2012. By comparison, the majority of spiny lobster landings in St. Croix are taken by diving and harvests from waters off this island have declined steadily and substantially since 2012 (see Appendix A).

Annual spiny lobster revenues in St. Thomas/St. John from 2012-2019 averaged \$843,000 and ranged from a low of \$665,000 in 2012 to a high of \$1.1 million in 2016 (Table 3.4.5). The annual price of the landed spiny lobster, with the exception of 2012, consistently fluctuated around \$9.00 per pound.<sup>10</sup>

**Table 3.4.5.** Landings, value, and price of spiny lobster in St. Thomas/St. John for 2012-2019.

Year	Landings (Pounds)	Value (\$)		Price (\$/lb)	
		Current	Deflated <sup>a</sup>	Current	Deflated
2012	83,157	665,254	858,178	8.00	10.32
2013	84,513	769,064	969,021	9.10	11.47
2014	92,261	839,571	1,041,068	9.10	11.28
2015	109,455	985,095	1,211,667	9.00	11.07

<sup>10</sup> It should be noted that the price information for the USVI is somewhat questionable in that prices appear to rarely change. It is not known whether this reflects the ‘true’ situation (i.e., fishermen may not adjust price based on demand) or is an artifact of the method used to ascribe a price to the harvested product. In addition, very few prices were given in 2019 and the prices used in this analysis were based on those few prices. Thus, values as well as prices in St. Thomas and St. John as well as St. Croix should be viewed with some caution.

Year	Landings (Pounds)	Value (\$)		Price (\$/lb)	
		Current	Deflated <sup>a</sup>	Current	Deflated
2016	121,695	1,095,255	1,336,211	9.00	10.98
2017	91,911	829,795	987,456	9.03	10.75
2018	86,708	777,361	909,512	8.97	10.49
2019	86,869	781,817	899,090	9.00	10.35

<sup>a</sup> Values and prices are deflated based on the 2022 BEA Implicit Price Deflator (GDP Deflator by Year).

Spiny lobster revenues in St. Croix from 2012-2019 averaged \$307,000 per year during the eight-year period ending in 2019 (Table 3.4.6). In conjunction with the steady and substantial decline in pounds landed, the annual value of spiny lobster landings fell from about \$700,000 in 2012 to less than \$150,000 in 2019. The decline in both pounds landed and the value of these landings reflects, in part, a sharp decline in number of trips. In 2012, for instance, the number of trips was in excess of 2,000. By 2015 the number of trips had fallen to about 1,000 and continued to fall to 313 in 2018, before increasing to almost 400 in 2019. The annual price of the landed spiny lobster ranged from approximately \$7.50 per pound to \$9.00 per pound. Little to no trend in the price is evident after removing the influence of inflation.

**Table 3.4.6.** Landings, value, and price of spiny lobster in St. Croix for 2012-2019.

Year	Landings (Pounds)	Value (\$)		Price (\$/lb)	
		Current	Deflated <sup>a</sup>	Current	Deflated
2012	87,073	696,586	898,596	8.00	10.32
2013	59,398	440,139	554,575	7.41	9.34
2014	39,724	294,355	365,000	7.41	9.19
2015	44,963	337,228	414,790	7.50	9.22
2016	31,582	237,048	289,199	7.51	9.16
2017	26,193	225,267	268,068	8.60	10.23
2018	10,970	86,540	101,252	7.89	9.23
2019	15,325	137,925	158,614	9.00	10.35

<sup>a</sup> Values and prices are deflated based on the 2022 BEA Implicit Price Deflator (GDP Deflator by Year).

Relevant revenue and price information for co-occurring species landed with spiny lobster in St. Thomas/St. John for the 2012-2019 period averaged about \$670,000 during the period and ranged from a low of about \$530,000 in 2019, to a high of \$800,000 in 2016 (Table 3.4.7). Landings of these co-occurring species accounted for about 45% of total revenues during the period with annual values falling in the narrow range of 40% to 48%.

**Table 3.4.7.** Ex-vessel value and price of co-occurring species landed with spiny lobster in St. Thomas/St. John for 2012-2019.

Year	Landings (Pounds)	Value (\$)		Price (\$/lb)	
		Current	Deflated <sup>a</sup>	Current	Deflated
2012	104,100	603,218	778,151	5.79	7.47
2013	109,216	633,148	797,766	5.79	7.30
2014	128,886	746,088	925,149	5.79	7.18
2015	114,844	660,047	811,858	5.75	7.07
2016	138,566	800,601	976,733	5.78	7.05
2017	121,835	703,934	837,681	5.78	6.88
2018	115,120	667,822	781,352	5.80	6.79
2019	91,308	529,814	609,286	5.80	6.67

<sup>a</sup> Values and prices are deflated based on the 2022 BEA Implicit Price Deflator (GDP Deflator by Year).

The value of co-occurring species landed with spiny lobster in St. Croix for the 2012-2019 period averaged about \$600,000 annually and ranged from high of about \$1 million annually in the earlier years to a less than \$200,000 in the later years (Table 3.4.8).

**Table 3.4.8.** Ex-vessel value and price of co-occurring species landed with spiny lobster in St. Croix, 2012-2019.

Year	Landings (Pounds)	Value (\$)		Price (\$/lb)	
		Current	Deflated <sup>a</sup>	Current	Deflated
2012	221,580	1,285,871	1,658,774	5.80	7.48
2013	161,941	939,949	1,184,336	5.80	7.31
2014	99,134	575,344	713,427	5.80	7.19
2015	92,167	535,304	658,424	5.81	7.15
2016	70,955	413,399	504,347	5.83	7.11
2017	63,835	370,320	440,681	5.80	6.90
2018	29,873	173,309	202,772	5.80	6.79
2019	30,804	178,667	205,467	5.80	6.67

<sup>a</sup> Values and prices are deflated based on the 2022 BEA Implicit Price Deflator (GDP Deflator by Year).

Fishermen in the USVI contend that, given the lack of an export market for their product, the quantity of fish they harvest on any given trip is determined strictly by local market conditions (i.e., what they believe they can sell in the local market at some established price).<sup>11</sup> Given the

<sup>11</sup> The argument often made by these fishermen is that annual changes in landings do not reflect changes in stock status but rather changes in market forces.

well-established economic issues associated with the islands, particularly St. Croix, the large decline in landings (both spiny lobster and co-occurring species) is not unexpected.

Total revenues per trip (i.e., spiny lobsters and co-occurring species) among St. Thomas/St. John commercial fishermen for the 2012-2019 period averaged about \$1,560 per trip (\$1,896 per trip after adjusting for inflation) during the eight-year period of analysis and exhibited stability (Table 3.4.9).

**Table 3.4.9.** Average revenues per trip (\$) from spiny lobster and co-occurring species in St. Thomas/St. John, 2012-2019.

Year	Spiny Lobster Revenues		Revenues From Co-occurring Species		Total Revenues	
	Current	Deflated <sup>a</sup>	Current	Deflated	Current	Deflated
2012	617	796	559	721	1,176	1,517
2013	754	950	621	782	1,375	1,732
2014	892	1,106	793	983	1,685	2,089
2015	954	1,173	639	786	1,593	1,959
2016	957	1,168	700	854	1,657	2,022
2017	845	1,006	719	856	1,564	1,861
2018	965	1,129	829	970	1,793	2,098
2019	981	1,128	665	765	1,646	1,893

<sup>a</sup> Revenues are deflated based on the 2022 BEA Implicit Price Deflator (GDP Deflator by Year).

Total revenues per trip (i.e., spiny lobsters and co-occurring species) among St. Croix commercial fishermen for the 2012-2019 period averaged about \$845 per trip (\$1,033 per trip after adjusting for inflation) during the eight-year period of analysis and exhibited stability (Table 3.4.10). Thus, it appears as though the sharp decline in the aggregate St. Croix landings (both spiny lobster and co-occurring species) reflects a reduction in trips rather than any significant change in catch per trip.

**Table 3.4.10.** Average revenues per trip (\$) from spiny lobster and co-occurring species in St. Croix, 2012-2019.

Year	Spiny Lobster Revenues		Revenues From Co-occurring Species		Total Revenues	
	Current	Deflated <sup>a</sup>	Current	Deflated	Current	Deflated
2012	341	440	629	811	969	1,250
2013	278	350	593	747	871	1,097
2014	275	341	538	667	813	1,008
2015	335	412	531	653	866	1,065
2016	284	346	496	605	780	952
2017	318	378	523	622	841	1,001

Year	Spiny Lobster Revenues		Revenues From Co-occurring Species		Total Revenues	
	Current	Deflated <sup>a</sup>	Current	Deflated	Current	Deflated
2018	277	324	554	648	830	971
2019	349	401	452	520	802	922

<sup>a</sup> Revenues are deflated based on the 2022 BEA Implicit Price Deflator (GDP Deflator by Year).

Estimated per trip revenues (spiny lobster and co-occurring species) from both state and federal waters for St. Thomas/St. John are relatively high averaging well in excess of \$1,100 (Table 3.4.11). The average per trip revenues from federal waters tend to exceed comparable statistics from the state waters by a sizeable margin (generally \$500 to \$800) and surpassing the \$1,000 threshold in 2019.

**Table 3.4.11.** Average revenues per trip (\$) from spiny lobster and co-occurring species by area fished in St. Thomas/St. John for 2012-2019.

Year	Spiny Lobster Revenues		Revenues From Co-occurring Species		Total Revenues	
	State Waters	Federal Waters	State Waters	Federal Waters	State Waters	Federal Waters
2012	515	675	379	648	894	1,323
2013	618	821	417	682	1,035	1,503
2014	887	902	283	902	1,170	1,804
2015	870	1,018	290	765	1,160	1,783
2016	784	1,075	499	874	1,283	1,949
2017	679	1,018	565	864	1,244	1,882
2018	975	952	510	1,214	1,485	2,166
2019	1,048	1,028	279	1,065	1,327	2,355

Estimated per trip revenues (spiny lobster and co-occurring species) from both state and federal waters for St. Croix (Table 3.4.12), in general, contribute a smaller proportion of total revenues than that observed in St. Thomas and Puerto Rico. In St. Thomas/St. John, for example, the contribution of spiny lobster to total revenues (from federal waters) rarely fell below 50% while the proportion in Puerto Rico was even higher.

**Table 3.4.12.** Average revenues per trip (\$) from spiny lobster and co-occurring species by area fished in St. Croix for 2012-2019.

Year	Spiny Lobster Revenues		Revenues From Co-occurring Species		Total Revenues	
	State Waters	Federal Waters	State Waters	Federal Waters	State Waters	Federal Waters
2012	306	386	564	715	870	1,101

Year	Spiny Lobster Revenues		Revenues From Co-occurring Species		Total Revenues	
	State Waters	Federal Waters	State Waters	Federal Waters	State Waters	Federal Waters
2013	248	339	593	591	841	930
2014	254	232	492	466	746	698
2015	315	409	416	732	731	1,141
2016	262	361	354	807	616	1,168
2017	299	370	406	753	705	1,123
2018	252	329	417	853	669	1,182
2019	316	464	360	771	676	1,235

## 3.5 Description of the Social Environment

This section describes select human aspects of the spiny lobster fisheries of Puerto Rico and the USVI. The history of spiny lobster harvest is reviewed, and recent landings data aid in identifying the principal communities from which the species is harvested in the present era. Various secondary sources and select components of the recently developed Island-based FMPs provide additional descriptive context for social effects analysis in Chapter 4. Finally, as per Executive Orders that prescribe analytical attention to environmental justice and equity concerns, the section identifies vulnerabilities to prospective change in island communities where spiny lobster is of known importance.

### 3.5.1 Puerto Rico

Contemporary Puerto Rico is a complex island society with a population of some 3,221,789 persons, nearly 99% of whom self-identify as Hispanic (U.S. Census Bureau 2022). Long-standing traditions developed through centuries of interaction between first settlers and newly arriving migrants vivify island society and culture, and now extend to many parts of the world (Duany 2002; Reichard 2020). Although harvest of marine resources is routinely undertaken by relatively few residents, the activity has long been, and remains, an important organizing feature of social life and source of food and income in communities across the island (Agar et al. 2022).

#### 3.5.1.1 Pursuit and Use of Spiny Lobster in Puerto Rico Past and Present

Archaeological findings indicate human pursuit of living marine resources as early as ~4,700 years before present (BP) around the islands and islets now collectively called Puerto Rico (Napolitano et al. 2019; cf. Rodriguez et al. 2023). This is in keeping with the recent work of Pestle et al. (2023) whose analysis of mortuary sites and middens at Cabo Rojo make clear that the earliest inhabitants were deeply involved in foraging at the ocean's edge. A wide range of marine resources were pursued to support local societies over subsequent centuries (Ramos 2010) including spiny lobster (Vega 1990). The work of de France et al. (1996) evinces widespread harvest and consumption of spiny lobster along the eastern Puerto Rico coastline—as early as 1,000 years BP. Spanier et al. (2015) concur that consumption of lobster was common around Puerto Rico and elsewhere in the Caribbean during prehistory, but also report that physical evidence is recovered at low frequencies from any given site—suggestive of harvesting challenges, limited abundance, and/or rapid decay of lobster shell and resulting underrepresentation in the archaeological record.

Pursuit and use of spiny lobster during the historic era is also described in literature. For example, Jarvis (1932) reports that while capture and consumption of the species was common around Puerto Rico during the early 20<sup>th</sup> century, no viable marketing opportunities were available at that time. Matos-Caraballo (2001) furthers this point, stating that in years past,

commercial harvesters typically used lobster as bait in fish traps. Mattox (1952) reports that spiny lobster became economically significant during the late 1940s, and Feliciano (1958) describes how lobsters of that era were captured with wood or wire traps in shallow grounds along the island’s eastern and western coastlines. The creatures were fed in underwater pens prior to purchase by wholesalers who then distributed the product to buyers at retail outlets, hotels, and restaurants. Inigo (1952) states that 223 harvesters were active in the island’s lobster fishery during 1951.

According to Matos-Carabello et al. (2019), the economic importance of spiny lobster grew over time, ultimately becoming “the most important shellfish by landed weight and price per pound” between the 1970s and early 2000s—albeit with “symptoms of overfishing” during the 1980s. While a variety of gear types were used to harvest spiny lobster during this period, including fish and lobster traps, gill and trammel nets, and dive spears, among others (Die and Morris 2004), concerns about overfishing gradually led to establishment of territorial and federal strictures on harvest, as discussed elsewhere in this amendment.

Of note from a more recent and particularly challenging period of Puerto Rico history, spiny lobster accounted for nearly 14% of all fishery losses resulting from landfall of Hurricane Maria in 2017. As discussed by Agar et al. (2020), harvesters on the eastern shoreline of the island endured the most extensive impacts from the hurricane, including loss of nearly 55% of the 6,700 traps that were reported to be lost around the island in total. The COVID-19 pandemic also impacted Puerto Rico fisheries and seafood markets, largely due to compromised rates of tourism (Agar et al. 2022). Data are not yet available to assess pandemic effects on specific fisheries, and research is needed to examine impacts beyond the first year of the protracted event.

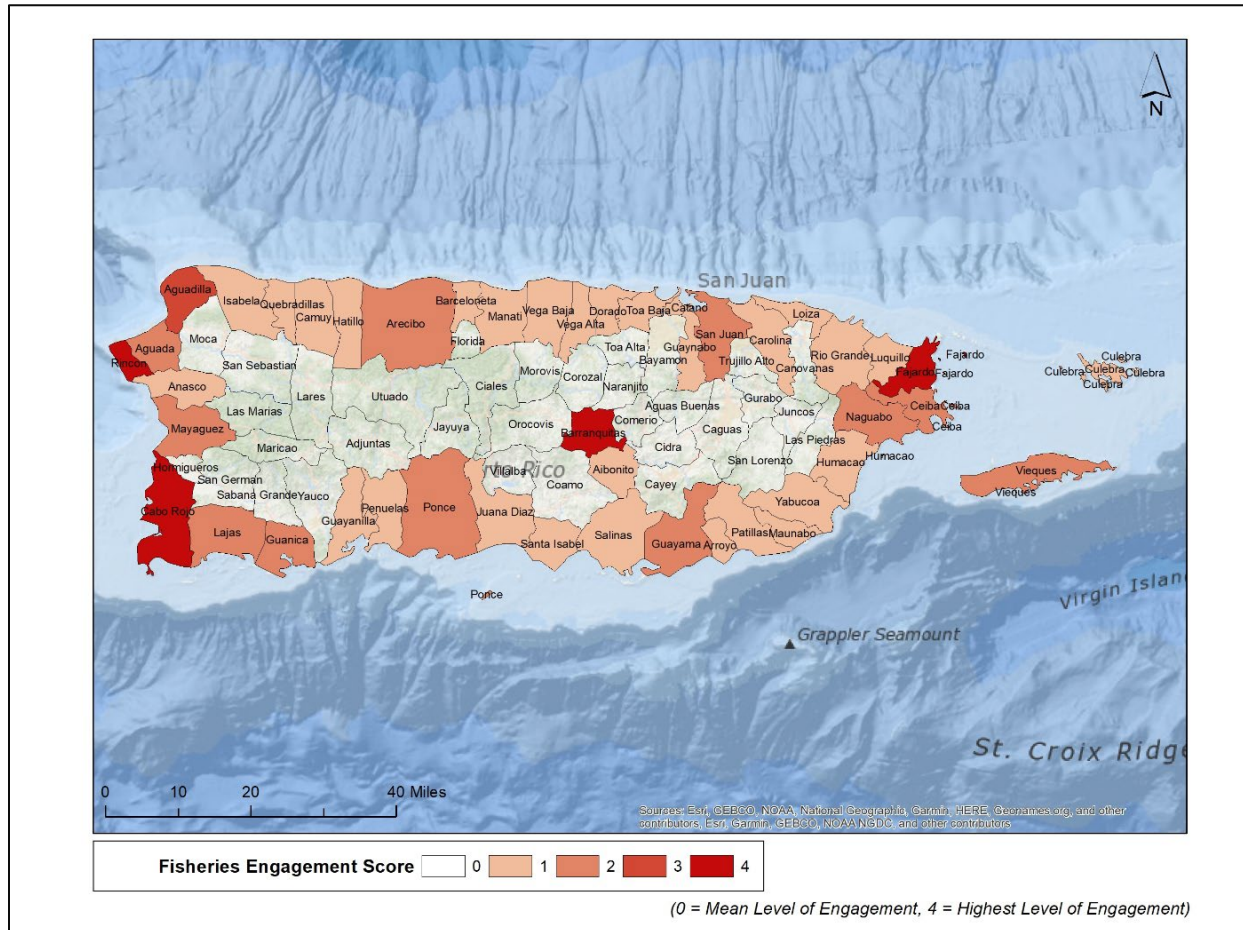
Pelagic fishing is a mainstay for many Puerto Rico-based fishing operations, as is use of trap and pot gear to capture a variety of benthic species, including spiny lobster (see CFMC 2022). Manual harvest of spiny lobster is also popular and effective in relatively shallow portions of Puerto Rico territorial waters. As elaborated below, the species is a source of food and income in communities around Puerto Rico, with residents of particular municipios extensively engaged in its harvest.

### 3.5.1.2 Contemporary Engagement in Marine Fisheries and Lobster Harvest around Puerto Rico

Numerous factors account for variability in the extent to which people in island municipios are engaged in marine fisheries around Puerto Rico. These include but are not limited to ease of ocean access, the nature and extent of historical involvement in fishing activities, and local interest in and capacity to maintain traditional lifeways associated with pursuit and use of marine resources. As depicted in Figure 3.5.1 below, and as might be expected on an island with sharp mountainous relief, persons residing in many upland areas generally are not involved in marine



fisheries, while persons in certain low-lying coastal regions with good ocean access are heavily involved. The engagement scores provided in the figure derive from the number of locally based participants in the island’s commercial fisheries and the extent and value of landings overall.



**Figure 3.5.1.** Commercial/artisanal fisheries engagement, 2016-2020: Municipios de Puerto Rico.

Source: SERO/SEFSC ALS database, accessed May 2023.

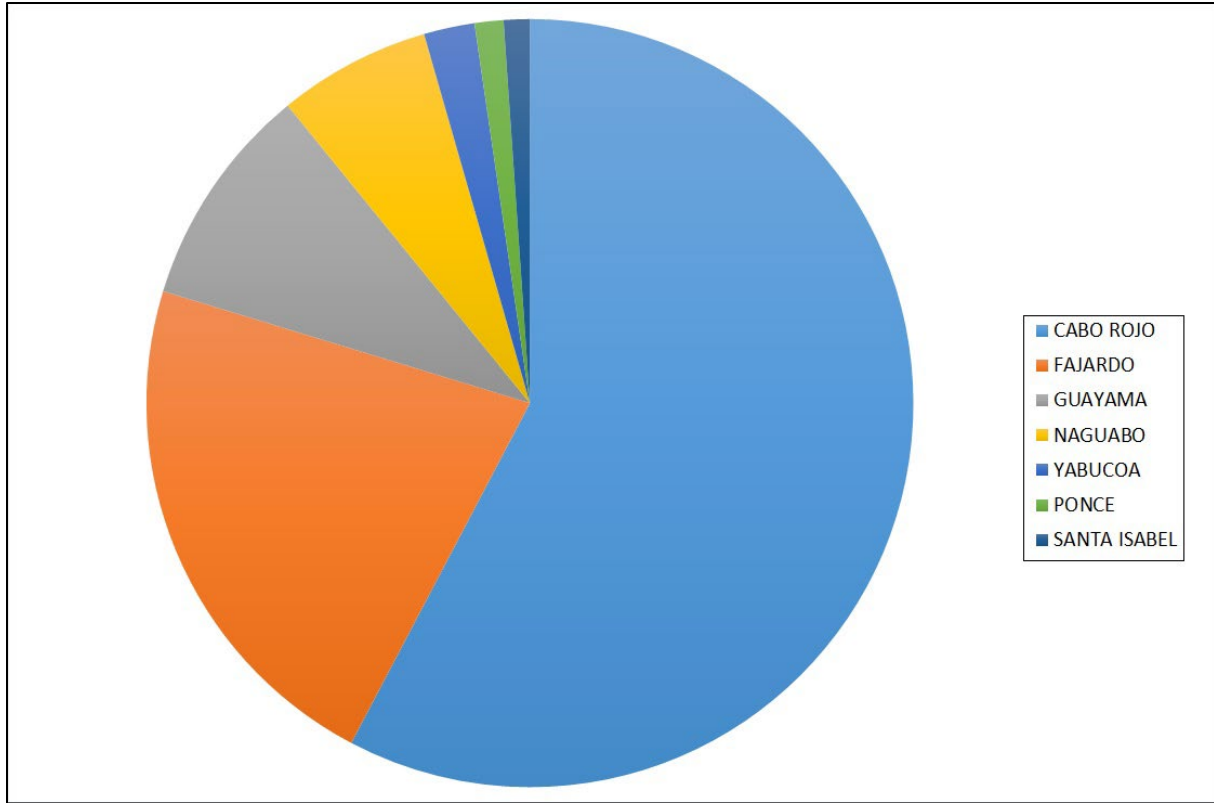
As depicted in Figure 3.5.2 below, involvement in the federal jurisdiction waters portion of the Puerto Rico spiny lobster fishery is concentrated in relatively few coastal municipalities around the island, with the regional quotient of lobster landings for 2020 accruing primarily to seven municipios.<sup>12</sup> These are Cabo Rojo, Fajardo, Guayama, Naguabo, Yabucoa, Ponce, and Santa Isabel. Analysis of spiny lobster landings during a 2016 through 2020 time-series indicates measurable involvement among harvesters in the same locations, and also in Guanica and Salinas—especially during 2016 when landings in these municipios respectively accounted for 13 and 11% of island-wide landings, and during 2017 when the municipios accounted for 20 and

<sup>12</sup> At the time Framework Amendment 2 was prepared, Puerto Rico commercial landings information for year 2020 are preliminary.

8% of the island-wide total, respectively. Of note, while Cabo Rojo and Fajardo are highly engaged in island fisheries overall, Yabucoa, Santa Isabel, and Salinas register relatively low overall fishery engagement scores.

Differences between the harvest of spiny lobster in territorial and federal jurisdiction waters should be noted here inasmuch as the latter requires relatively greater investment of time, effort, and funds, along with greater safety risks and various additional challenges to reach the offshore grounds and deploy traps and/or pots in waters that are generally too deep for manual harvest. In specific human terms, data maintained by the NOAA Southeast Fisheries Science Center (SEFSC) indicate that 243 persons were legally engaged in harvest of spiny lobster in territorial waters during 2020, with 54 persons engaged solely in federal waters harvest, and 43 engaged in harvest of the creatures in both ocean zones.

Figure 3.5.2 depicts the municipios involved in federal waters harvest of spiny lobster. Available data also indicate that persons in the same communities are extensively involved in harvest of the creatures in territorial waters—with the vast majority of inshore lobster landings also accruing to Cabo Rojo and Fajardo. Persons residing in the municipios of Penuelas, Ceiba, and Vieques (island) are involved in both federal and territorial waters harvest as well, though to a far lesser extent than the municipios depicted in Figure 3.5.2. Harvest by free- and scuba-assisted divers, who often use hand-held snares, occurs in many suitable and often secretive locations around the inshore zone.

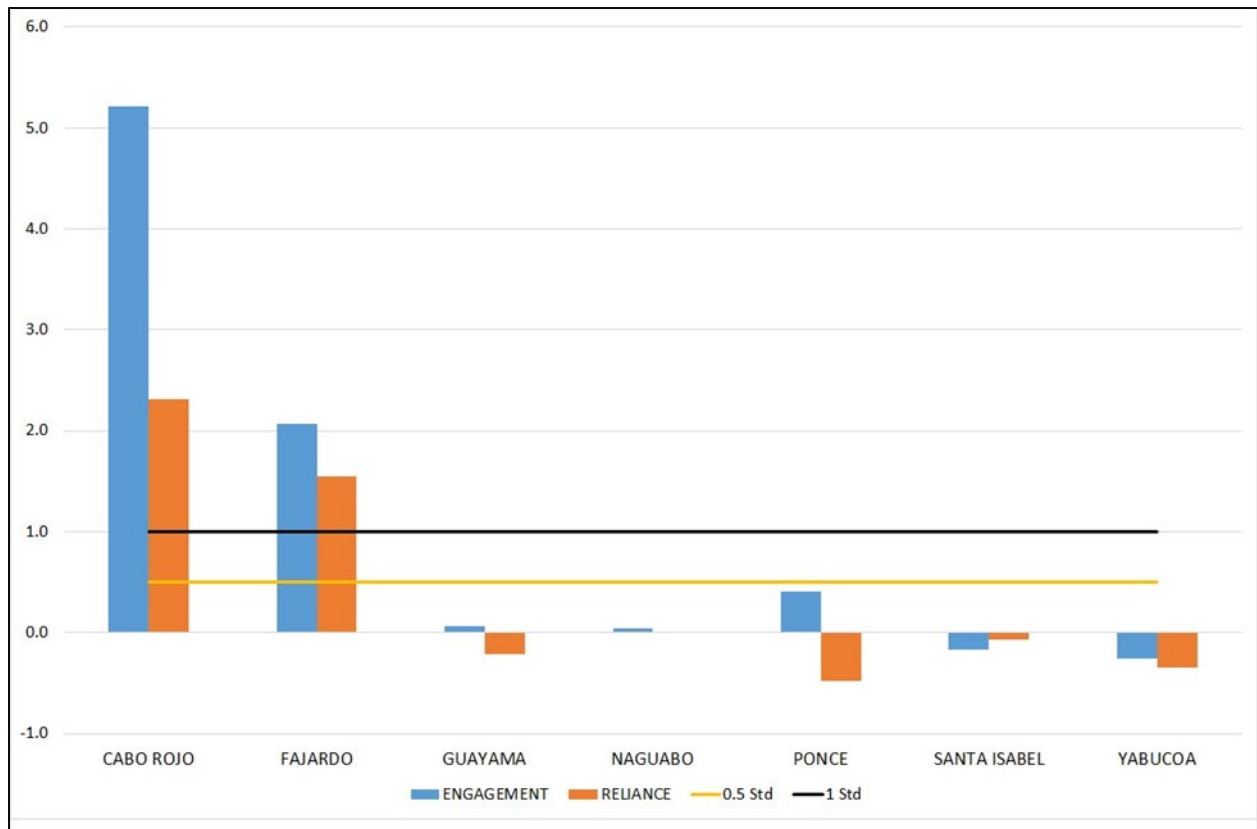


**Figure 3.5.2.** Principal municipios where commercial landings of spiny lobster occurred during 2020.

Source: SEFSC, Community ALS File, May 2023

Community-level involvement in the Puerto Rico spiny lobster fishery can also be usefully characterized by measures of engagement and reliance on the species in particular. The engagement scores used in Figure 3.5.3 below are based on the number of resident commercial harvesters working in federal and territorial waters, and the extent of and value of landings—in this case, landings of spiny lobster specifically. The measure of reliance incorporates the same variables divided by the local total population figure. Readers may consult Jacob et al. (2013), Jepson and Colburn (2013), and Hospital and Leong (2021) for discussion of the underlying rationale and approach for using indicators to assess local engagement in and reliance on regional marine fisheries. Both measures are useful means for indicating where any prospective effects of spiny lobster management actions are likely to be experienced.

As depicted in the graphic, Cabo Rojo and Fajardo were the most deeply engaged of the small group of municipios that account for the bulk of spiny lobster landings during 2020. Both municipios also far exceed the one standard deviation threshold for reliance on the spiny lobster fishery.



**Figure 3.5.3.** Measures of engagement and reliance among Puerto Rico municipios with the greatest volume of commercial spiny lobster landings during 2020.

Source: SERO/SEFSC ALS Database. Accessed May 2023.

Data regarding the manner and extent of harvest on the part of persons who are not permitted for commercial sale of the species are not readily available. However, open-ended discussions with residents make clear that spiny lobster is an important source of food around the island, and that it has long been a target species among persons who harvest marine resources for consumptive use in familial and community settings. For obvious reasons, this is especially the case in areas where bathymetric and ecological conditions are most suitable for finding and readily capturing the species, as in Yabucoa, Fajardo, and other productive areas.

The actions addressed in this amendment bear some potential for social effects in municipios most extensively involved in federal waters harvest of spiny lobster. It should be kept in mind that any such effects would occur in social and demographic context. Importantly, the leading landings municipalities, and the island as a social whole, have been losing residents due to natural decline and exogenous forces for many years (Abel and Dietz 2014)—with particularly rapid and extensive out-migration following Hurricane Maria in 2017 (Acosta et al. 2020). While the total island population declined by 11.8 percent between the 2010 and 2020 census counts, population losses in certain rural areas, including each of the principal lobster harvesting

municipios, have been far more extensive. For example, as depicted in Table 3.5.1 below, Guayama and Yabucoa lost nearly 20% of residents between 2010 and 2020.

The major population declines noted of Puerto Rico and its municipalities are worthy of consideration when examining how and to what extent spiny lobster regulations might affect local residents. That is, at a population level, such radically high levels of decline and related social impacts (Abel and Dietz 2014) comparatively dwarf the social effects that could potentially result from changes in the management of a single marine species. At the same time, such challenging social and economic conditions and their underlying causes may well render the harvest, sale, and consumption of spiny lobster and other marine resources particularly important, especially among families and communities highly engaged in the fishery. Very high rates of poverty in the leading lobster landing communities bolster this assertion, as even the lowest rate of persons-in-poverty (in Fajardo) exceeds the island-wide figure of 40.5%. Moreover, all municipios in focus here far surpass the national rate of persons-in-poverty, which was 11.4% as of the 2020 Census (U.S. Census Bureau 2020). In concise and straightforward terms, Puerto Rico municipalities are by far the most impoverished in the nation (U.S. Census Bureau 2022).

**Table 3.5.1.** Demographic conditions in Puerto Rico’s main lobster harvesting municipios.

Municipio	2020 Population	Population change: 2010-2020	% Persons in poverty: 2020	% Hispanic/Latino
Cabo Rojo	47,158	-3,759 / -7.4%	47.6	98.8
Fajardo	36,993	-4,869 / -13.2%	42.7	98.2
Guayama	36,614	-8,748 / -19.3%	50.6	99.3
Naguabo	23,386	-3,334 / -12.5%	50.4	99.2
Yabucoa	30,426	-7,515 / -19.8%	52.6	100.0
Ponce	137,491	-28,836 / -17.3%	46.4	99.1
Santa Isabel	20,281	-2,993 / -12.9%	46.3	99.4
Guanica	13,787	-5,640 / -29%	66.8	99.0
Salinas	25,789	-5,289 / -17%	50.5	99.0

Sources: U.S. Census Bureau (2021). *American Community Survey 5-year estimates*; U.S. Census Bureau (2020), Puerto Rico: 2020 Census.

### 3.5.2 U.S. Virgin Islands: St. Thomas, St. John, and St. Croix

Island-specific information regarding the harvest of spiny lobster in the USVI is limited in extent. For this reason, this subsection organizes description of the fishery in relation to its conduct around the islands as a whole, while making island-specific distinctions wherever possible.

The USVI was home to a total of 87,146 persons during 2020, an 18.1% decrease from the 106,405 persons who were enumerated as island residents in 2010 (U.S. Census Bureau 2021). This is the steepest population decline reported for all U.S. territories during 2020 (Virgin Island Consortium 2021). A total of 42,261 residents were enumerated on St. Thomas during 2020, with 41,004 persons enumerated on St. Croix, and 3,881 on St. John that year. All islands experienced population loss between censuses, a situation Akin (2021) relates in large part to out-migration following Hurricanes Maria and Irma in 2017, and with additional decline likely resulting from closure of the HOVENSA oil refinery earlier in the decade.

A relatively small percentage of USVI residents are directly engaged in marine fisheries around St. Thomas, St. John, and St. Croix. However, the harvest, transaction, and consumptive use of living marine resources, including spiny lobster, continue to be of great social and dietary significance in districts and communities around the islands. This is evinced through recent discussions with persons directly involved in the harvest of marine resources, and by a variety of secondary sources (cf. Agar et al. 2022; Agar et al. 2020; Stoffle et al. 2009; Valdes-Pizzini et al. 2010; Impact Assessment, Inc. 2006; CFMC 2019b,c).

### 3.5.2.1 Pursuit and Use of Spiny Lobster in the USVI Past and Present

As discussed in Spanier et al. (2015), spiny lobster remains have been recovered at archaeological sites around the Caribbean, including those in the Lesser Antilles where coastal middens dating to ~5,000 years BP provide extensive evidence of increasing social dependence on marine resources. The authors cite Rouse (1992) who reports that, in addition to various fish species, the people of the seafaring Taino culture continually harvested conch, crabs, oysters, and lobster during their millennia-long tenure in this island region. Spanier et al. (2015) reports that, like Puerto Rico, available archaeological evidence from the Lesser Antilles indicates that prehistoric harvest of lobster was at once widespread and of limited frequency in any given area.

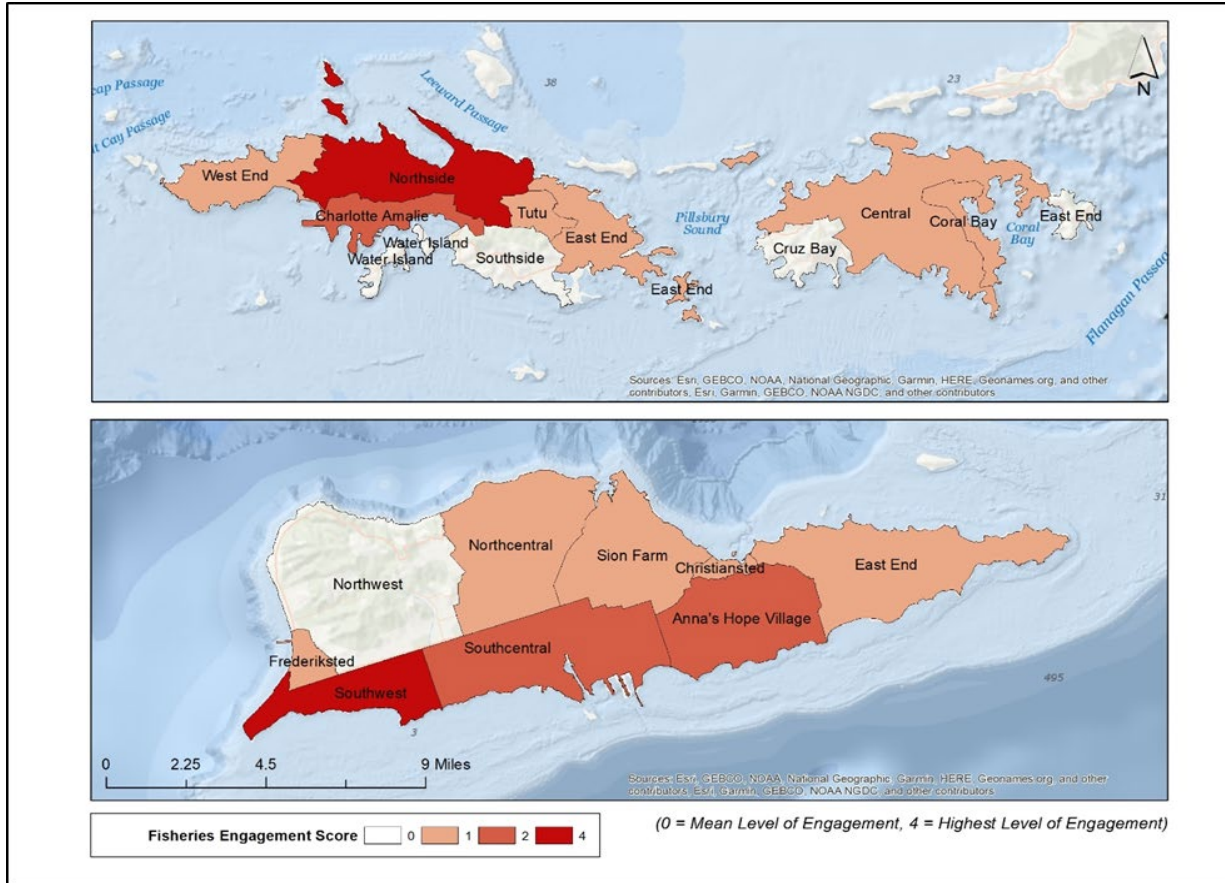
Fiedler and Jarvis (1932) provide limited discussion of (far) more recent spiny lobster harvest in the USVI, reporting that capture of the species occurred both manually and with the use of fish pots constructed from limbs cut from native trees, chicken wire, and mats and cord woven from palm leaves and fibers. Rocks were used to weight the traps, and buoys fashioned from lightwood were attached with lines made from plaited vines. Little additional detail is provided, apart from the assertion that lobsters were not widely considered a delicacy but were rather typically used as bait. The authors state that island fisheries in general furnished a livelihood to 465 commercial participants across the three main islands during 1930. Swingle et al. (1970) report that by 1968, a total of 400 commercial fishermen were residing in the USVI, and that a total of 435 lobster pots and 838 fish pots were being used by the 153 fishery participants interviewed around the islands that year.

Three assessments of USVI fisheries were conducted during subsequent years. A total of 383 fishery participants were deemed active in the USVI during 2004, 339 or 88.5% of whom were interviewed by Kojis (2004). The author determined that the sampled participants were using 2,036 lobster pots and 6,606 fish pots during the year of the study. During the course of a 2011 assessment (Kojis and Quinn 2011), it was found that 297 persons were then active in USVI commercial fisheries, and that an undisclosed percentage of the 259 persons sampled had deployed 2,259 lobster pots and 4,211 fish pots that year. Finally, Kojis et al. (2017) report that 260 commercial participants were active around the USVI during 2016, 213 or 81.9 % of whom were interviewed. In-depth discussions with the participants revealed that a total of 2,068 lobster pots and 5,511 fish pots were then being deployed in and beyond USVI territorial waters.

Kojis et al. (2017) describe USVI commercial fisheries as artisanal in nature, with participants focusing on various pelagic and benthic fishes, along with spiny lobster and queen conch. Vessels are small and trips tend to be short-lived, with harvesters typically returning to shore in the afternoons to market their catch at the local marketplace. The authors also report that over 50% of island fishermen targeted spiny lobster during 2016, and that lobster was ranked as the second most important target species after reef fish by harvesters then active on all three islands.

### 3.5.2.2 Contemporary Engagement in Marine Fisheries and Lobster Harvest around the USVI

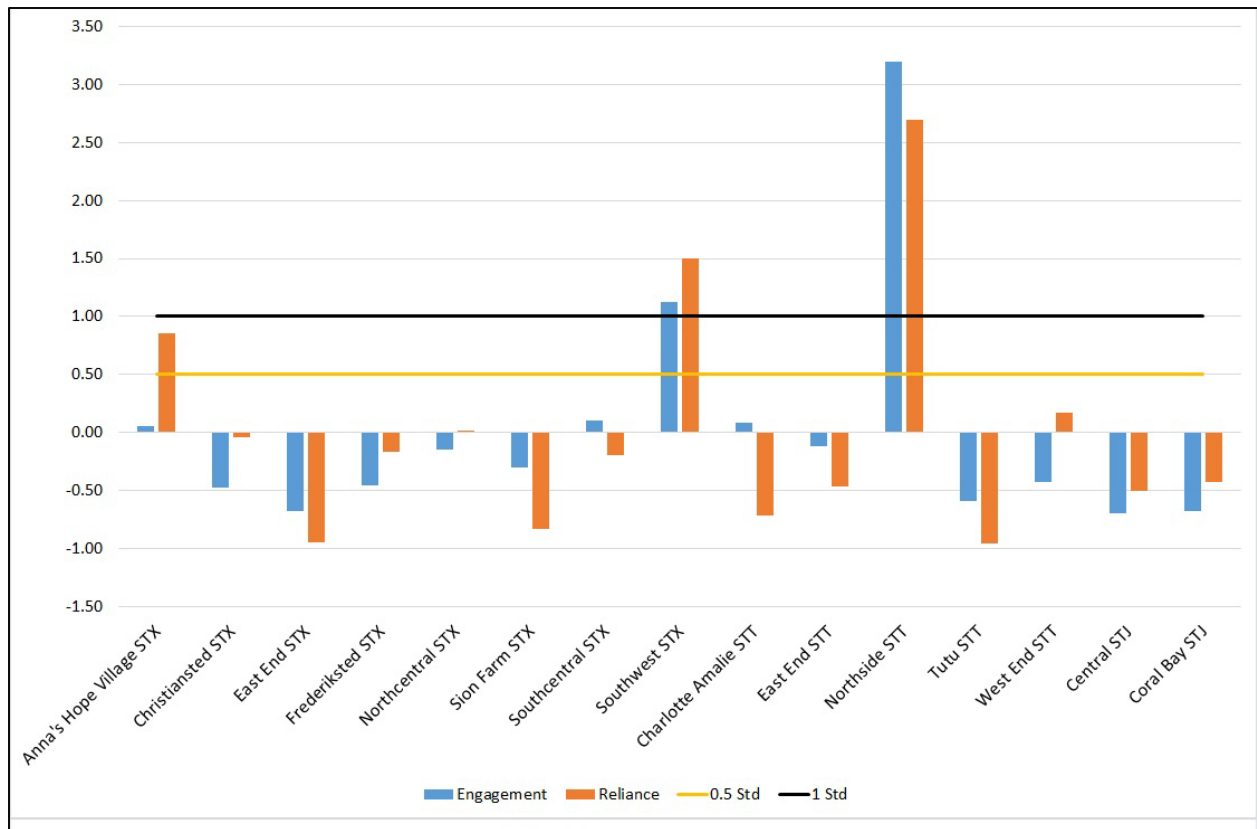
Island districts from which commercial/artisanal harvesters operate are not examined in specific terms by Kojis et al. (2017). However, the authors provide insight into harvest by island during 2016, noting that a total of 39 or 44.3% of sampled fishermen then active around St Thomas and St. John harvested spiny lobster, and that 65 or 56% of the St. Croix sample harvested the species that year. Of utility for identifying specific island areas where residents are most likely involved in the contemporary USVI spiny lobster fishery is Figure 3.5.4 below, which depicts relative levels of district-specific engagement in USVI commercial/artisanal fisheries as a whole. As can be discerned from the graphic, the Northside district of St. Thomas and the Southwest district of St. Croix are, in relative terms, the most highly engaged of all districts around the islands, followed by Charlotte Amalie on St. Thomas and the Southcentral and Anna's Hope districts on St. Croix. Relatively less involvement is noted of the other island districts, though it should be kept in mind that the scores presented here are based on the total number of resident harvesters, along with the cumulative extent and value of all landings. As such, the scores do not represent absolute levels of production on the part of individual harvesters residing in sparsely populated areas where few other participants are present and where overall landings are thereby limited.



**Figure 3.5.4** Commercial/artisanal fisheries engagement by USVI island district, 2016-2020. Source: SERO/SEFSC ALS database, accessed May 2023.

Unlike the situation for Puerto Rico, valid and reliable data are not readily available to assess district-specific engagement in and/or reliance on any species in particular on St. Thomas, St. John, or St. Croix. For this reason, levels of engagement and reliance on USVI commercial/artisanal fisheries in their entirety are presented here as a second proxy for identifying areas where spiny lobster is of local importance and where prospective regulatory effects would most likely be experienced.





**Figure 3.5.5.** Measures of engagement and reliance among USVI districts most extensively involved in the region’s commercial/artisanal fisheries overall during 2020.

Source: SERO/SEFSC ALS Database. Accessed May 2023.

As can be noted in Figure 3.5.5, two USVI districts—Southwest District on St. Croix and Northside District on St. Thomas—register above the one standard deviation threshold for both engagement in and reliance on the region’s commercial fisheries, with Anna’s Hope Village on St. Croix also significantly reliant. Given the relatively high levels of involvement in harvest of living marine resources in each of these districts, and the potential for local residents to experience effects from modification of spiny lobster regulations, key demographic characteristics of the areas are provided in Table 3.5.2 below. As is the case for Puerto Rico, USVI districts deeply involved in the region’s commercial/artisanal fisheries are also undergoing rapid population decline in a context of extensive poverty. Again, while particularly high levels of population decline and poverty are likely to supersede social effects following from management of spiny lobster, local social and economic challenges may concurrently heighten the economic and dietary importance of the species, especially among persons and families most deeply involved in its harvest and consumptive use.

**Table 3.5.2.** Demographic conditions in districts most extensively involved in USVI fisheries.

District/Island	2020 Population	Population change: 2010-2020	% Persons in poverty: 2020	% Black/African American alone*
Anna’s Hope Village, St. Croix	3,282	-759 / -19%	22.8% (region-wide)	71.3% (region-wide)
Southwest District, St. Croix	5,842	-1,656 / -22.1%		
Northside District, St. Thomas	8,889	-1,1160 / -11.5%		

\*Largely persons of West Indian descent.

Sources: U.S. Census Bureau (2022). *Island Area Censuses: US Virgin Islands*; U.S. Census Bureau (2020), *Virgin Islands: 2020 Census*.

### 3.5.3 Environmental Equity and Justice

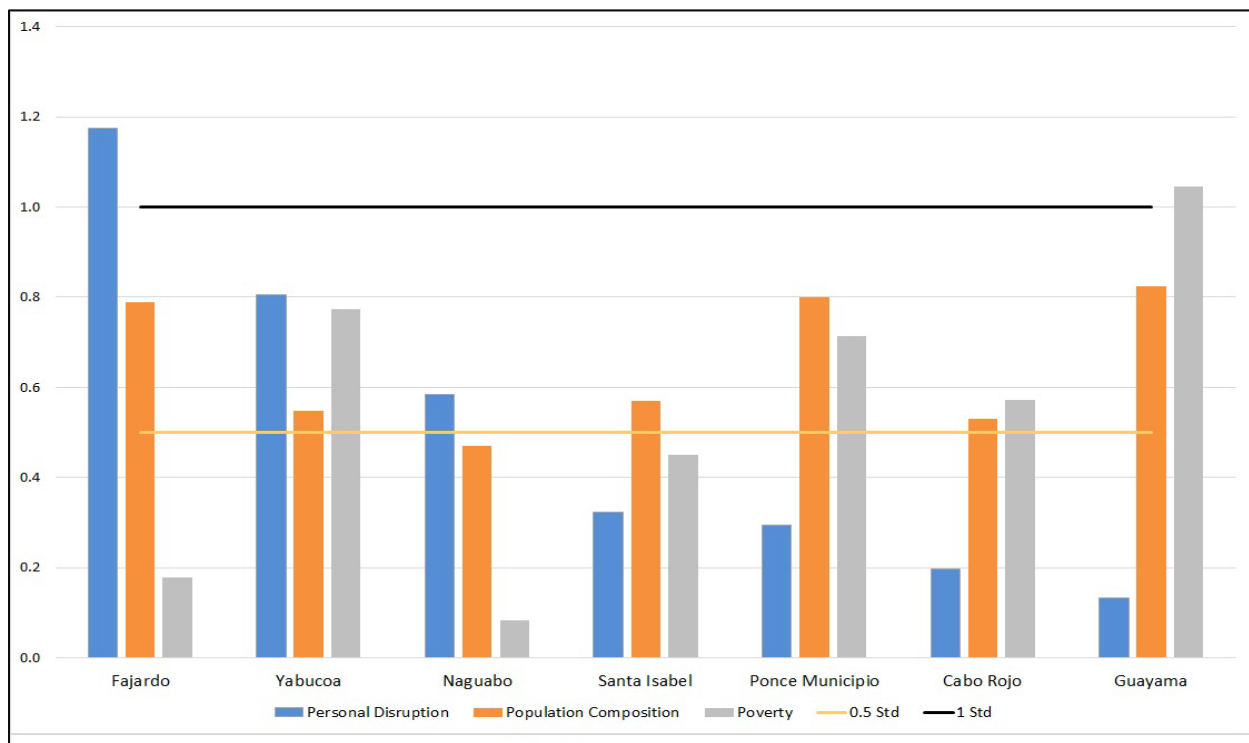
*Executive Order 12898* (Environmental Justice) was established in 1994 to require that federal actions be undertaken in a manner that identifies and avoids adverse human health and/or social and economic effects among low-income and minority groups and populations around the nation and its territories. Federal regulatory decisions must be undertaken in ways that ensure no individuals or populations are excluded, denied the benefits of, or are subjected to discrimination due to race, color, or nation of origin. Of relevance in the context of marine fisheries, federal agencies are further required to collect, maintain, and analyze data regarding patterns of consumption of fish and wildlife among persons who rely on such foods for purposes of subsistence. Established in 2021, *Executive Order 13985* calls for human equity in the context of federal decision-making and policy actions. Titled “Advancing Racial Equity and Support for Underserved Communities through the Federal Government,” the new order requires that federal policies and programs are designed and undertaken in a manner that delivers resources and benefits equitably to all citizens, including members of historically underserved communities. Here, the phrase “underserved communities” refers to populations and persons that have been systematically denied full and equitable opportunity to participate in economic, social, and civic aspects of life in the nation. Finally, *Executive Order 14008*, established in 2021, calls on agencies to make the achievement of Environmental Justice part of their missions “by developing programs, policies, and activities that address disproportionately high and adverse human health, environmental, climate-related and/or other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts.”

Various data are available to indicate environmental justice issues among minority and low-income populations and/or indigenous communities potentially affected by federal regulatory and other actions. Census data, such as that capturing community-specific rates of poverty, number of households maintained by single females, number of households with children under the age of five, rates of crime, and rates of unemployment, exemplify the types of information of

value for identification and analysis of community-level vulnerabilities (Jacob et al. 2013; Jepson and Colburn 2013). As provided in the following figures, three composite indices—poverty, population composition, and personal disruption—are applied to indicate relative degrees of vulnerability among municipalities and districts in the U.S. Caribbean where residents are engaged in the territorial and federally managed fisheries discussed in this amendment. Mean standardized community vulnerability reference points for each island region are provided along the y-axis in the graphics, with means for the vulnerability measures and threshold standard deviations depicted along the x-axis. Scores exceeding the 0.5 standard deviation level indicate vulnerability to regulatory and other sources of social change.

### 3.5.3.1 Puerto Rico

As readily discernible in Figure 3.5.6 below, social vulnerabilities are indicated for each of the Puerto Rico municipalities from which residents generated the bulk of the commercial spiny lobster harvest during 2020. As depicted in the figure, the one standard deviation vulnerability threshold is exceeded in two cases: in Fajardo with regard to measures of personal disruption, and in Guayama with respect to measures of poverty.

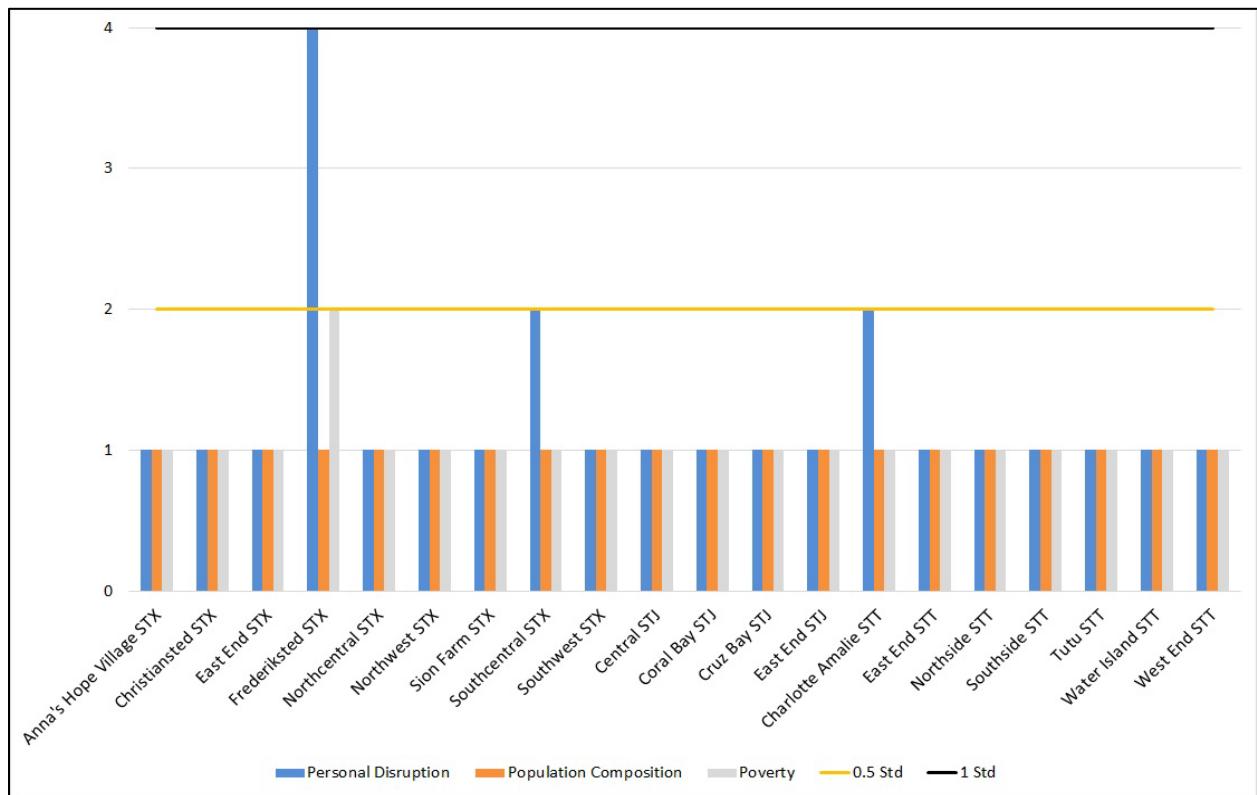


**Figure 3.5.6.** Social vulnerability indices for Puerto Rico municipalities involved in harvest of spiny lobster during 2020.

Source: SERO/SEFSC CSVI database. Accessed May 2023.

### 3.5.3.2 St. Thomas, St. John, and St. Croix

Figure 3.5.7 below depicts social vulnerability indicators for the various districts of St. Thomas, St. John, and St. Croix. Available data generally do not indicate social vulnerabilities for the various island districts, with the exception of Frederiksted on St. Croix, which exceeds the one standard deviation threshold for indications of personal disruption. Of note here, vulnerability scores for each indicator and each USVI district were combined for purposes of analysis with scores from all municipalities in Puerto Rico where poverty and other social factors are particularly challenging in the contemporary context. As such, social conditions depicted for the USVI districts appear relatively less vulnerable—with the caveat that rates of poverty and other social conditions in the USVI are, in relative terms, far more challenging than those typifying life around the nation as a whole.



**Figure 3.5.7.** Social vulnerability indices for districts on St. Thomas, St. John, and St. Croix.

Source: SERO/SEFSC CSVI database. Accessed May 2023.<sup>13</sup>

<sup>13</sup> The measures used to calculate the Personal Disruption index depicted in this section include % of unemployed persons, % of persons with no high school diploma, % of persons in poverty, and % of separated females. The Population Composition measures include % of unemployed persons; % of single female heads of household, % of population who speak English less than well, and % of persons of various ethnic backgrounds. Finally, the Poverty measures include % of persons receiving public assistance income; % of families below the poverty level; % of persons over 65 in poverty; and % of persons under 18 in poverty.

## 3.6 Description of the Administrative Environment

The Island-based FMPs (CFMC 2019a-c) and Framework Amendment 1 (CFMC 2022) include a description of the administrative environment, which is incorporated herein by reference and summarized below.

### 3.6.1 Federal Fishery Management

Federal fishery management is conducted under the authority of the Magnuson-Stevens Act (16 U.S.C. 1801 et seq.), originally enacted in 1976 as the Fishery Conservation and Management Act. The Magnuson-Stevens Act claims sovereign rights and exclusive fishery management authority over most fishery resources within the U.S. EEZ, an area extending from the seaward boundary of each coastal state to 200 nautical miles from shore, as well as authority over U.S. anadromous species and continental shelf resources that occur beyond the 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 is responsible for the conservation and management of fishery stocks within federal waters surrounding Puerto Rico, St. Croix (USVI), and St. Thomas/St. John (USVI). These waters extend to 200 nautical miles (nmi) offshore from the seaward boundaries of Puerto Rico (9 nmi from shore) and the USVI (3 nmi 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 implementing the 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.

### 3.6.2 Puerto Rico and U.S. Virgin Islands Fisheries Management

The purpose of state representation at the Council level is to ensure state participation in federal fishery management decision-making and to promote the development of compatible regulations in state and federal waters. The 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.

#### 3.6.2.1 Commonwealth of Puerto Rico

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

#### 3.6.2.2 U.S. Virgin Islands

The USVI has jurisdiction over fisheries in state waters extending up to 3 nmi 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.

## Chapter 4. Environmental Effects

### 4.1 Action 1: Update the Puerto Rico Spiny Lobster Overfishing Limit (OFL), Acceptable Biological Catch (ABC), and Annual Catch Limit (ACL)

#### Summary of Management Alternatives

**Alternative 1.** No Action. Retain the overfishing limit (OFL), acceptable biological catch (ABC), and annual catch limit (ACL) (which equals optimum yield) for spiny lobster as specified under Framework Amendment 1 to the Puerto Rico Fishery Management Plan for 2024 and subsequent fishing years, until modified.

**Alternative 2.** Update the OFL and ABC for spiny lobster for 2024 and subsequent fishing years based on the constant-catch approach selected by the Caribbean Fishery Management Council (Council) and set the ACL equal to the ABC, until modified.

**Alternative 3 (Preferred).** Update the OFL and ABC for spiny lobster for 2024 and subsequent fishing years based on the constant-catch approach selected by the Council and set the ACL equal to 0.95 of the ABC, until modified.

**Alternative 4.** Update the OFL and ABC for spiny lobster for 2024 and subsequent fishing years based on the constant-catch approach selected by the Council and set the ACL equal to 0.90 of the ABC, until modified.

#### 4.1.1 Effects on the Physical Environment

Effects on the physical environment generally occur from fishing effort associated with interactions between fishing gear (e.g., fish traps and spiny lobster traps) and the bottom substrate or from anchoring.

Through this action, the Caribbean Fishery Management Council (Council) would revise the OFL, ABC, ACL for spiny lobster in federal waters around Puerto Rico based on the 2022 Update Assessment to the 2019 Southeast Data, Assessment, and Review (SEDAR) 57 spiny lobster stock assessment. The analysis below assumes that (1) harvest would be constrained to the ACLs, and (2) the amount of harvest correlates to interactions between fishing gear and anchors and the bottom.

**Alternative 1** (No Action) would retain the OFL, ABC, and ACL for spiny lobster specified under Framework Amendment 1 to the Puerto Rico Fishery Management Plan (FMP) for 2024 and later years. No effects on the physical environment would be expected as the catch levels would not change (no changes in fishing effort from the baseline), thus current interactions with the substrate from gear and anchors would not change.

**Alternative 2, Preferred Alternative 3, and Alternative 4** would specify the same OFL and ABC values based on the average of the 2024-2026 projections from the 2022 Update Assessment, and would set ACL values based on varying degrees of management uncertainty. The ACL under **Alternative 2** would reflect no management uncertainty and would set the ACL equal to the ABC. The ACL under **Alternative 2** would be the highest ACL compared to the other alternatives, including the baseline (**Alternative 1**). Therefore, **Alternative 2** would be expected to provide the least benefits to the physical environment, under the assumption that increased ACLs translates to increased bottom-impacting gear use. The ACL under **Preferred Alternative 3** would be set at 95% of the ABC, and would be less than the ACL under either **Alternative 1** or **Alternative 2**, thereby reducing the potential impacts to the bottom from the baseline. The ACL under **Alternative 4** would be set at 90% of the ABC, and would specify the lowest ACL among the alternatives, and thus, would be expected to provide the greatest benefit to the physical environment.

As mentioned in Section 3.3.1, spiny lobster in Puerto Rico are predominately harvested via diving or with trap gear. Recreational data are not available for spiny lobster, but anecdotal information suggests that the majority of recreational harvest of spiny lobster occurs via diving. Under the analysis above, which assumes lower harvest levels results in greater benefits through reduced effort, those benefits to the physical environment could be lessened if fishermen continue to harvest other species using the same gear, or shift effort into state waters where ACLs are not applicable. Federal waters in Puerto Rico begin at 9 nautical miles from shore, and the majority of the fishable habitat (defined as the area within waters <100 fathoms [183 meters]) and harvest of spiny lobster occur in state waters. Overall, the effects to the physical environment from this action are expected to be minimal due to the primary methods used to harvest spiny lobster (i.e., diving) and the fact that the majority of spiny lobster are harvested in state waters.

#### 4.1.2 Effects on the Biological/Ecological Environment

Management actions that affect the biological and ecological environment mostly relate to the impacts of fishing on a species' population size, life history, and the role of the species within its habitat. Removal of the species from the population through fishing reduces the overall population size if harvest is not maintained at sustainable levels. Indirect impacts of these alternatives on the biological environment would depend on the corresponding reduction or increase in the level of fishing as a result of each alternative. Fishing gear have different (1) selectivity patterns that are used to target and capture organisms by size and species, (2) number of discards, which are often sublegal sized individuals or species caught during seasonal closures, and (3) mortality rates associated with releasing the species.

As described in Chapter 3, spiny lobster are targeted by commercial and recreational fishermen. The majority of harvest in Puerto Rico occurs through diving methods and trap gear, with trap



gear predominantly used by commercial fishermen. Diving is considered a highly selective fishing method and all legal-sized spiny lobster caught by divers are assumed to be retained (SEDAR 57 2019). The only spiny lobsters expected to be discarded from traps include sublegal individuals and berried females. Modifications to the spiny lobster OFL, ABC, and ACL could result in changes to the biological/ecological effects, as changing these catch limits determined the amount of fish that can be harvested.

**Alternative 1** would retain the OFL, ABC, and ACL for spiny lobster specified under Framework Amendment 1 to the Puerto Rico FMP for 2024 and subsequent years. **Alternative 2, Preferred Alternative 3, and Alternative 4** would specify the same OFL and ABC values, based on the average of the 2024-2026 projections from the 2022 Update Assessment, and would set ACL values based on varying degrees of management uncertainty. Applying the best scientific information available would ensure that federally managed stocks are harvested sustainably while protecting reproductive capacity and maintaining effective ecological contributions. Any increases in harvest levels under the proposed alternatives from the current level (i.e., **Alternative 1**) would be expected to have short-term negative effects to the biological/ecological environment through increased removals, but long-term positive effects through the enhanced management to the maximum sustainable yield.

Under **Alternative 2, Preferred Alternative 3, and Alternative 4** the OFL and ABC values would be the same, and only the ACLs would differ. The following analysis compares the ACLs specified under these alternatives. The ACL under **Alternative 2** would be equal to the ABC, and would allow for the greatest amount of harvest before triggering the accountability measure (AM), but would likely provide the least biological benefit compared to the other alternatives. The ACL under **Preferred Alternative 3** would be equal to 95% of the ABC, and the amount of harvest allowed before triggering the AM would be less than that under **Alternative 2**. **Alternative 4** would set the ACL at 90% of the ABC, and would have the greatest biological benefits (i.e., the greatest reduction in allowable harvest ) when compared to **Alternative 1, Alternative 2, and Preferred Alternative 3**.

Any biological/ecological effects from this action are not expected to be significant because the overall prosecution of the Puerto Rico fishery that targets spiny lobster is not expected to change. For this same reason, no additional impacts to Endangered Species Act (ESA) listed species or designated critical habitat, or other non-targeted species are anticipated as a result of this action.

#### 4.1.3 Effects on the Economic Environment

Management actions that affect the economic environment mostly relate to the impacts on society associated with movement from a status quo condition. With respect to the Council, management actions associated with movement from a status quo condition primarily impact commercial fishermen, recreational fishermen, and other segments of society that receive

benefits, either directly or indirectly, via healthy resources. Impacts to the commercial fishing sector due to a movement from the status quo condition tends to be captured via changes (positive or negative) in harvest levels (e.g., catch per trip) which then translates into changes in revenues and profits. With respect to the recreational fishing sector, impacts tend to be captured via a change in catch per trip (either an increase or a decrease), which over the long run culminates in a change in the number of trips. These changes can cascade to auxiliary sectors in the economy such as bait shops or wholesale and retail establishments.

**Alternative 1** (No Action) would retain the OFL, ABC, and ACL for spiny lobster specified under Framework Amendment 1 to the Puerto Rico FMP for 2024 and subsequent years.<sup>14</sup> Under this alternative, the OFL would remain at 438,001 pounds (lbs), the ABC would remain at 386,279 lbs, and the ACL would remain at 366,965 lbs. **Alternative 2, Preferred Alternative 3, and Alternative 4** would instead specify OFL and ABC values based on the average of 2024-2026 projection from the 2022 Update Assessment, and would set ACL values based on varying degrees of management uncertainty.

Under **Alternative 2**, the OFL would equal 426,858 lbs and the ACL would be set equal to the ABC of 376,452 lbs; implying no adjustment in the ACL to account for management uncertainty. The OFL under **Preferred Alternative 3** would be the same as that specified in **Alternative 2**, but the ACL would be set at 95% of ABC (or 357,629 lbs) implying some management uncertainty. Finally, the OFL under **Alternative 4** would also be the same as under **Alternative 2** and **Preferred Alternative 3**, but the ACL would be set at 90% of ABC (or 338,807 lbs) implying a greater amount of uncertainty (and protection of the resource) than that associated with **Alternative 2** or **Preferred Alternative 3**.

Given the status quo nature of **Alternative 1**, there would be no direct economic effects associated with the no action alternative. However, there could be indirect effects associated with maintaining the status quo. This issue is of particular relevance given the fact that **Alternative 1** does not use the best scientific information available. The use of the information derived in **Framework Amendment 1** may not ensure that the Puerto Rico spiny lobster resource is harvested sustainably and in a manner that would protect the reproductive capacity of the spiny lobster stock.

**Alternative 2** would provide the greatest ACL in comparison to the other action alternatives.. While this alternative would allow the largest annual harvest (376,452 pounds) before triggering the accountability measure (AM), it provides no buffer since ACL is set equal to ABC. Thus, the resource may not be adequately protected if management uncertainty is any more than *de minimis*. **Preferred Alternative 3** would provide a greater level of protection to the resource

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<sup>14</sup> Amendment 1 used a constant-catch approach for specifying OFLs and ABCs and set constant-catch ACLs equal to 0.95 of the ABC.

than that afforded under **Alternative 2** but at the cost of a reduction in ACL (357,629 lbs under **Preferred Alternative 3** compared to 376,452 lbs under **Alternative 2**). Among the three action alternatives that specify OFL and ABC values based on the average of 2024-2026 projection from the 2022 Update Assessment with ACL values being set based on varying degrees of management uncertainty, **Alternative 4** would provide the greatest protection to the stock but with the tradeoff of the lowest ACL (338,807 lbs).

Maximum annual revenue losses to the commercial sector associated with providing increased protection to the stock (i.e., moving from **Alternative 2** to **Alternative 4**) can be ascertained by multiplying the expected 2022 dockside price (derived by using the 2017-2019 average unweighted price as provided in Table 3.4.1 adjusted for inflation) by the change in annual harvest. The maximum reduction in annual harvest associated with **Preferred Alternative 3** compared to **Alternative 2** is 18,823 lbs. This translates into an annual loss of revenues equal to about \$145,600 based on the 2022 estimated dockside price of \$7.74. Likewise, while moving from **Preferred Alternative 3** to **Alternative 4** provides an added level of protection to the spiny lobster resource associated with management uncertainty, this added protection comes at the cost of a reduction in harvest and revenues to the commercial sector. The maximum loss in annual revenues, based on the estimated 2022 price is also equal to about \$145,600. Thus, the maximum expected loss in annual revenues associated with a change in buffer from providing no protection (i.e., **Alternative 2**) to a buffer of  $ACL=ABC \times 0.90$  (i.e., **Alternative 4**) is \$291,200.<sup>15</sup> Relative to **Alternative 1** (No Action), **Preferred Alternative 3** would reduce the ACL by 9,336 lbs each year and result in associated annual revenue losses estimated at \$72,261.

It is recognized that the estimated losses in annual revenues associated with providing increased protection to the stock are ‘upper-bound’ estimates with actual losses likely being less. There are two primary reasons for making this assertion, one of them being enforcement. If enforcement is inadequate, specifically, a certain (potentially large) amount of spiny lobster harvested from federal waters may occur even after the triggering and application of AMs (which would be fishing season reductions in federal waters).<sup>16</sup>

The second reason for asserting that the actual revenue losses associated with increasing the buffer (i.e., providing additional protection to the stock) may be less than the estimates provided above reflects the actions taken by fishermen in response to the triggering and application of AMs (in this case fishing season reductions in federal waters). With respect to Puerto Rico, only a small share of annual commercial spiny lobster harvest is taken from federal waters; about 7% to 10% since 2016 Appendix Table A.1). This equates to about 35,000 lbs per year based on total annual landings of 435,000 lbs. The information in Table 3.4.4 suggests, however, that

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<sup>15</sup> The difference in ACL between Alternative 4 and Alternative 2 is 37,645 lbs. As discussed below, this figure exceeds the estimated harvest of spiny lobster from federal waters in some years.

<sup>16</sup> Enforcement associated with the taking of a single species from federal waters via fishing season reduction may be difficult since the fisherman would need to be observed in the act of possessing the species in federal waters.

revenues from the harvest of spiny lobster in federal waters constitutes the majority of total revenues from trips in federal waters (i.e., revenue from the harvest of spiny lobster and revenue from the harvest of co-occurring species). Precluding spiny lobster from the catch would likely make an otherwise profitable trip in federal waters unprofitable unless the fishermen can compensate for the loss in spiny lobster revenues with an increased harvest of other species. More likely, fishermen would respond to the triggering and application of AMs (closure of federal waters to spiny lobster fishing) by increasing the number of trips in territorial waters since, as indicated by the information in Table 3.4.4, differences between average trip revenues in federal waters and territorial waters tend to be relatively small (almost always less than \$50 per trip). Increasing trips in territorial waters would therefore likely be taken as a means of mitigating any losses of revenues associated with the triggering and application of AMs in federal waters.<sup>17</sup>

Discussion to this point has focused on the direct and indirect impacts to the fishing sector associated with the proposed alternatives. There are also administrative costs that vary across the spectrum of alternatives. There would be no changes in administrative costs under the No Action Alternative (**Alternative 1**) since there would be no change in the frequency that AMs are triggered and applied. Among the three action alternatives, **Alternative 4** would result in the highest frequency of AMs being triggered and applied, hence the highest administrative costs. The administrative costs associated with **Preferred Alternative 3** would fall between **Alternative 2** and **Alternative 4**.

Analysis of the economic environment associated with Action 1 suggests that **Alternative 1** is not based on the best scientific information that is available and may thus yield OFL and ACL estimates that are not aligned with management of the spiny lobster resource in a way that ensures that the stock is harvested sustainably and in a manner that that would protect its reproductive capacity. **Alternative 2** does not account for management uncertainty and thus also does not ensure that the spiny lobster stock would be harvested sustainably and in a manner that would protect its reproductive capacity. **Preferred Alternative 3** and **Alternative 4** do yield some protection of the Puerto Rico spiny lobster stock with **Alternative 4** yielding a greater level of protection. The greater protection associated with **Alternative 4**, however, comes at the expense of a lower ACL.

The benefits associated with protection of the resource would depend on the susceptibility of the spiny lobster stock to overfishing. Without this information, one cannot conclude that **Preferred Alternative 3** outperforms **Alternative 4** from an efficiency (i.e., benefit/cost) perspective. **Preferred Alternative 3**, however, does provide a balance between the benefits associated with

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<sup>17</sup> It should also be noted that any shift in effort from federal waters to territorial waters would likely negate much, if not most, of the benefits (i.e., protection of the spiny lobster resource from overfishing conditions and subsequent consequences).

protection of the spiny lobster stock and the cost that would be associated with a further reduction in the ACL (i.e., **Alternative 4**). In addition, the administrative costs associated with **Alternative 3** would be less than those associated with **Alternative 4** which would tend to yield greater net benefits after consideration of all other factors.

#### 4.1.4 Effects on the Social Environment

For purposes of analysis in this sub-section addressing the potential effects of prospect management action, *social effects* are defined to involve beneficial and/or deleterious human outcomes related to any loss or increase in *fishing opportunity*. Based on this logic, examples of social effects associated with prospective regulatory change include, but are not limited to: (a) acquisition or failed acquisition of seafood for consumption by island-based individuals, families, and communities; (b) acquisition or failed acquisition of seafood for customary or traditional uses such as sharing in extended family settings or consumption at community celebrations; (c) the ability or inability to practice one's profession or avocation on the ocean; (d) the ability or inability to accumulate and transmit traditional or local ecological knowledge in the context of fishing; and (e) the ability or inability to develop and maintain interpersonal relationships within social networks of fishery participants. Both beneficial and deleterious social effects potentially associated with the actions described in this amendment are, in probabilistic terms, most likely to occur in island areas where residents are most extensively engaged in harvest of spiny lobster specifically and in marine fisheries in general, as discussed in Section 3.5 above.

**Alternative 1** would involve no new management actions beyond those specified in Framework Amendment 1 and would thereby retain the presently specified OFLs, ABC, and ACLs into 2024 and beyond. As such, the spiny lobster fishery around the federal waters of Puerto Rico would proceed without accommodation of new ABC values recommended by the SSC. The extant ACL would remain, and management of stocks would proceed in the absence of the best available scientific information and associated uncertainty regarding effects on lobster populations around the island. This translates to status quo harvest levels and limited social effects in the near-term, but heightened risk for deleterious stock impacts over time, and related potential for reduction of opportunities for local fleets to pursue and harvest a valued living marine resource in the years to come.

By equating the ACL with the ABC under the constant-catch approach, **Alternative 2** reflects no management uncertainty. The OFL here is less than specified in **Alternative 1**, but the allowable level of harvest is greater than specified in other management alternatives. This alternative thereby allows for the greatest extent of overall opportunity for Puerto Rico fleets to pursue and harvest spiny lobster, and to experience the range of associated social benefits—albeit with some level of risk to the stocks and related fishing opportunities should full certainty of management prove unfounded for any reason during the upcoming years.

**Preferred Alternative 3** would provide for a lower ACL than **Alternative 2**, and thereby reduce related fishing opportunities among persons who pursue spiny lobster in the federal jurisdiction waters of Puerto Rico. The alternative also reflects the same management uncertainty indicated in Spiny Lobster Framework Amendment 1, and thus provides a buffer to enable diminished risk for exceedance of harvest limitations and the potential for overfishing. As such, **Preferred Alternative 3** provides for fishing-related social benefits in the near-term, though at levels below those provided through **Alternative 2**, but also with concomitant attention to factors that have the potential to diminish harvest potential and related fishing opportunities in the future.

Finally, as the most conservative approach to management of spiny lobster in the federal jurisdiction waters of Puerto Rico, **Alternative 4** would enable the relatively lowest levels of spiny lobster harvest specified in all existing alternatives. As such, **Alternative 4** has the greatest potential to diminish fishing opportunities in the near-term, but with the relatively greatest level of attention to the potential for problems with lobster stocks and any related social problems that could occur in association with diminished fishing opportunities over time. As per social-environmental description provided in Chapter 3, any beneficial or problematic social effects potentially resulting from implementation of **Alternatives 1-4** above are, in probabilistic terms, most likely to be experienced among harvesters based in the municipalities of Cabo Rojo, Fajardo, Guayama, Naguabo, Yabucoa, Ponce, Santa Isabel, Guanica, and Salinas.

#### 4.1.5 Effects on the Administrative Environment

Updating management reference points including the OFLs, ABCs, and ACLs does not typically result in substantial effects on the administrative environment. **Alternative 1** is not expected to impact the administrative environment because it would not change the current management reference points. **Alternative 2, Preferred Alternative 3, and Alternative 4** would result in a short-term increased burden on the administrative environment through the need to take administrative action to specify new OFLs, ABCs, and ACLs, and the required rulemaking to implement this management change. Once these changes to catch levels are implemented, the type of regulations needed to manage the fisheries that target spiny lobster would remain unchanged, regardless of the harvest levels set. The lower catch levels under **Alternative 4 and Preferred Alternative 3** could result in more AMs triggered and applied, which would impose more of an administrative burden. Some administrative burden is anticipated under **Alternative 2, Preferred Alternative 3, and Alternative 4** as they would require additional outreach efforts to notify stakeholders of the changes to harvest levels.

## 4.2 Action 2: Update the St. Croix Spiny Lobster OFL, ABC, and ACL

### Summary of Management Alternatives

**Alternative 1.** No Action. Retain the overfishing limit (OFL), acceptable biological catch (ABC), and annual catch limit (ACL) (which equals optimum yield) for spiny lobster as specified under Framework Amendment 1 to the St. Croix Fishery Management Plan for 2024 and subsequent fishing years, until modified.

**Alternative 2.** Update the OFL and ABC for spiny lobster for 2024 and subsequent fishing years based on the constant-catch approach selected by the Caribbean Fishery Management Council (Council) and set the ACL equal to the ABC, until modified.

**Alternative 3 (Preferred).** Update the OFL and ABC for spiny lobster for 2024 and subsequent fishing years based on the constant-catch approach selected by the Council and set the ACL equal to 0.95 of the ABC, until modified.

**Alternative 4.** Update the OFL and ABC for spiny lobster for 2024 and subsequent fishing years based on the constant-catch approach selected by the Council and set the ACL equal to 0.90 of the ABC, until modified.

### 4.2.1 Effects on the Physical Environment

Effects on the physical environment generally occur from fishing effort associated with interactions between fishing gear (e.g., fish traps and spiny lobster traps) and the bottom substrate or from anchoring.

Through this action, the Council would revise the OFL, ABC, and ACL for spiny lobster in federal waters around St. Croix based on the 2022 Update Assessment to the 2019 SEDAR 57 spiny lobster stock assessment. The analysis below assumes that (1) harvest would be constrained to the ACLs, and (2) the amount of harvest correlates to interactions between fishing gear and anchors and the bottom.

**Alternative 1** (No Action) would retain the OFL, ABC, and ACL for spiny lobster specified under Framework Amendment 1 to the St. Croix FMP for 2024 and later years. No effects on the physical environment would be expected as the catch levels would not change (no changes in fishing effort from the baseline), thus current interactions with the substrate from gear and anchors would not change.

**Alternative 2, Preferred Alternative 3, and Alternative 4** would specify the same OFL and ABC values based on the average of the 2024-2026 projections from the 2022 Update Assessment, and would set ACL values based on varying degrees of management uncertainty. The ACL under **Alternative 2** would reflect no management uncertainty and would set the ACL equal to the ABC. The ACL under **Alternative 2** would be the highest ACL compared to the

other alternatives, including the baseline (**Alternative 1**). Therefore, **Alternative 2** would be expected to provide the least benefits to the physical environment, under the assumption that increased ACLs translates to increased bottom-impacting gear use. The ACLs under **Preferred Alternative 3** and **Alternative 4** would also be greater than the **Alternative 1** ACL, thereby increasing the potential impacts to the bottom from the baseline. The ACL under **Preferred Alternative 3** would be set at 95% of the ABC, and would be less than the ACL under **Alternative 2**. The ACL under **Alternative 4** would be set at 90% of the ABC, and less than the ACL under **Alternative 2** and **Preferred Alternative 3**, and would be expected to provide a greater benefit to the physical environment.

As mentioned in Section 3.3.2, spiny lobster in St. Croix are predominately harvested via diving. Additionally, anecdotal information for recreational harvest of spiny lobster suggests that the majority occurs via diving. Under analysis above, which assumes lower harvest levels results in greater benefits through reduced effort, those benefits to the physical environment could be lessened if fishermen continue to harvest other species using the same gear, or shift effort into state waters where ACLs are not applicable. Overall, the effects to the physical environment from this action are expected to be minimal due to the primary methods used to harvest spiny lobster (i.e., diving) and that landings of spiny lobster in St. Croix continue to be a levels well below the ACLs.

#### 4.2.2 Effects on the Biological/Ecological Environment

Management actions that affect the biological and ecological environment mostly relate to the impacts of fishing on a species' population size, life history, and the role of the species within its habitat. Removal of the species from the population through fishing reduces the overall population size if harvest is not maintained at sustainable levels. Indirect impacts of these alternatives on the biological environment would depend on the corresponding reduction or increase in the level of fishing as a result of each alternative. Fishing gear have different (1) selectivity patterns that are used to target and capture organisms by size and species, (2) number of discards, which are often sublegal sized individuals or species caught during seasonal closures, and (3) mortality rates associated with releasing the species.

As described in Chapter 3, spiny lobster are targeted by commercial and recreational fishermen. The majority of harvest in St. Croix occurs through diving methods. Diving is considered a highly selective fishing method and all legal-sized spiny lobster caught by divers are assumed to be retained (SEDAR 57 2019). Modifications to the spiny lobster OFL, ABC, and ACL could result in changes to the biological/ecological effects, as changing these catch limits determined the amount of fish that can be harvested.

**Alternative 1** would retain the OFL, ABC, and ACL for spiny lobster specified under Framework Amendment 1 to the St. Croix FMP for 2024 and subsequent years. **Alternative 2**,



**Preferred Alternative 3**, and **Alternative 4** would specify the same OFL and ABC values, based on the average of the 2024-2026 projections from the 2022 Update Assessment, and would set and ACL values based on varying degrees of management uncertainty. Applying the best scientific information available would ensure that federally managed stocks are harvested sustainably while protecting reproductive capacity and maintaining effective ecological contributions. Any increases in harvest levels under the proposed alternatives from the current level (i.e., **Alternative 1**) would be expected to have short-term negative effects to the biological/ecological environment through increased removals, but long-term positive effects through the enhanced management to the maximum sustainable yield.

Under **Alternative 2**, **Preferred Alternative 3**, and **Alternative 4** the OFL and ABC values would be the same, and only the ACLs would differ. The following analysis compares the ACLs specified under these alternatives. The ACL under **Alternative 2** would be equal to the ABC, and would allow for the greatest amount of harvest before triggering the AM, but would likely provide the least biological benefit compared to the other alternatives. The ACL under **Preferred Alternative 3** would be equal to 95% of the ABC, and the amount of harvest allowed before triggering the AM, would be less than that under **Alternative 2**. **Alternative 4** would set the ACL at 90% of the ABC, and would have the greatest biological benefits (i.e., the greatest reduction in allowable harvest) when compared to **Alternative 1**, **Alternative 2**, and **Preferred Alternative 3**.

Any biological/ecological effects from this action are not expected to be significant because the overall prosecution of the St. Croix fishery that targets spiny lobster is not expected to change. For this same reason, no additional impacts to ESA listed species or designated critical habitat, or other non-targeted species are anticipated as a result of this action.

#### 4.2.3 Effects on the Economic Environment

Management actions that affect the economic environment mostly relate to the impacts on society associated with movement from a status quo condition. With respect to the Council, management actions associated with movement from a status quo condition primarily impact commercial fishermen, recreational fishermen, and other segments of society that receive benefits, either directly or indirectly, via healthy resources. Impacts to the commercial fishing sector due to a movement from the status quo condition tends to be captured via changes (positive or negative) in harvest levels (e.g., catch per trip) which then translates into changes in revenues and profits. With respect to the recreational fishing sector, impacts tend to be captured via a change in catch per trip (either an increase or a decrease), which over the long run culminates in a change in the number of trips. These changes can cascade to auxiliary sectors in the economy such as bait shops or wholesale and retail establishments.

**Alternative 1** (No Action) would maintain the OFL, ABC, and ACL for spiny lobster as specified under Framework Amendment 1 to the St. Croix FMP for 2024 and subsequent years.<sup>18</sup> Under this alternative, the OFL would be maintained at 144,219 lbs, the ABC would be maintained at 127,189 lbs, and the ACL would be maintained at 120,830 lbs. **Alternative 2**, **Preferred Alternative 3**, and **Alternative 4** would instead specify OFL and ABC values based on the average of 2024-2026 projections from the 2022 Update Assessment with ACL values set based on varying degrees of management uncertainty.

Under **Alternative 2**, the OFL would be set equal to 163,823 lbs and the ACL would be set equal to the ABC of 144,478 lbs; implying no adjustment in the ACL to account management uncertainty. The OFL under **Preferred Alternative 3** would be the same as that specified in **Alternative 2**, but the ACL would be set at 95% of ABC (or 137,254 lbs) implying some management uncertainty. Finally, the OFL under **Alternative 4** would also be the same as under **Alternative 2** and **Preferred Alternative 3**, but the ACL would be set at 90% of ABC, or 130,030 lbs, implying a greater amount of uncertainty (and protection of the resource) than that associated with **Alternative 2** or **Preferred Alternative 3**.

Given the status quo nature of **Alternative 1**, there would be no direct economic effects associated with the no action alternative. However, there could be indirect effects associated with maintaining the status quo. This issue is of particular relevance given the fact that **Alternative 1** does not use the best scientific information available. The use of the information derived in **Framework Amendment 1** may not ensure that the St Croix spiny lobster resource is harvested sustainably and in a manner that would protect the reproductive capacity of the spiny lobster stock.

**Alternative 2** would provide the greatest ACL in comparison to the other alternatives, including the no action alternative. While this alternative would allow the largest annual harvest (144,748 lbs) before triggering the AM, it provides no buffer since ACL is set equal to ABC. Thus, the resource may not be adequately protected if management uncertainty is any more than *de minimis*. **Preferred Alternative 3** would provide a greater level of protection to the resource than that afforded under **Alternative 2** but at the cost of a reduction in ACL (137,254 lbs under **Preferred Alternative 3** compared to 144,478 lbs under **Alternative 2**). Among the three action alternatives, **Alternative 4** would provide the greatest level of protection to the stock but with the tradeoff of the lowest ACL (130,030 lbs which represents a reduction of 7,224 lbs when compared to **Preferred Alternative 3** and 14,448 lbs when compared to **Alternative 2**).

Maximum annual revenue losses to the commercial sector associated with providing increased protection to the stock (i.e., moving from **Alternative 2** to **Alternative 4**) can be ascertained by

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<sup>18</sup> Amendment 1 used a constant-catch approach for specifying OFLs and ABCs and set constant-catch ACLs equal to 0.95 of the ABC.

multiplying the expected 2022 dockside price (derived by using the 2017-2019 average unweighted current price as provided in Table 3.4.6 adjusted for inflation) by the change in annual harvest. The maximum reduction in annual harvest associated with **Preferred Alternative 3** compared to **Alternative 2** is 7,224 lbs. This translates into an annual loss of revenues equal to about \$70,300 based on the 2022 estimated dockside price of \$9.73. Likewise, while moving from **Preferred Alternative 3** to **Alternative 4** provides an added level of protection to the spiny lobster resource to account for increased management uncertainty, this added protection comes at the cost of a reduction in harvest and revenues to the commercial sector. The maximum loss in annual revenues, based on estimated 2022 price is also equal to about \$70,300. Thus, maximum expected loss in annual revenues associated with a change in buffer from providing no protection (i.e., **Alternative 2**) to a buffer of  $ACL=ABC \times 0.90$  (i.e., **Alternative 4**) is about \$140,600. Relative to **Alternative 1** (No Action), **Preferred Alternative 3** would increase the ACL by 16,424 lbs each year and result in associated annual revenue increases estimated at \$159,806. The estimated increases in revenues would only materialize if fishermen harvest the totality of the ACL proposed in **Preferred Alternative 3**.

It is recognized that the estimated losses in annual revenues associated with providing increased protection to the stock are ‘upper-bound’ estimates with actual losses potentially being less. There are two primary reasons for making this assertion, one of them being enforcement. Specifically, if enforcement is inadequate, a certain amount of spiny lobster harvested from federal waters may occur even after the triggering and application of AMs (which would be fishing season reductions in federal waters).<sup>19</sup>

The second reason for asserting that the actual revenue losses associated with increasing the buffer (i.e., providing additional protection to the stock) may be less than the estimates provided above reflects the actions taken by fishermen in response to the triggering and application of AMs (in this case fishing season reductions in federal waters). With respect to St. Croix, about one-half of annual spiny lobster harvests have historically occurred in state waters (Table A.4) though year-to-year variation is large. Additionally, spiny lobster revenues from federal waters, expressed on a per trip basis, tend to be large; generally exceeding comparable figures at the state level (Table 3.4.12). The triggering and application of AMs (closure of federal waters to spiny lobster fishing) would thus result in a significant loss in revenues for those trips made in federal waters under the assumption that the loss in spiny lobster revenues could not be made up by an increase in the harvest of co-occurring species. Given this to be the case, one can expect an increase in the number of trips in territorial waters as a means of mitigating any losses of revenues.<sup>20</sup>

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<sup>19</sup> Enforcement associated with the taking of a single species from federal waters via fishing season reduction may be difficult since the fisherman would need to be observed in the act of possessing the species in federal waters.

<sup>20</sup> It should also be noted that any shift in effort from federal waters to territorial waters would likely negate much, if not most, of the benefits (i.e., protection of the spiny lobster resource from overfishing conditions and subsequent consequences).

Discussion to this point has focused on the direct and indirect impacts to the fishing sector associated with the proposed alternatives. There are also administrative costs that vary across the spectrum of alternatives. There would be no change in administrative costs under the No Action alternative (**Alternative 1**) since there would be no change in the frequency that AMs are triggered and applied. Among the three alternatives that specify OFL and ABC values based on the average of 2024-2026 projection from the 2022 Update Assessment with ACL values being set based on varying degrees of management uncertainty, **Alternative 4** would result in the highest frequency of AMs being triggered and applied and hence the highest administrative costs. The administrative costs associated with **Preferred Alternative 3** would fall between **Alternative 2** and **Alternative 4**.

Analysis of the economic environment associated with Action 2 suggests that **Alternative 1** is not based on the best scientific information that is available and may thus yield OFL and ACL estimates that are not aligned with management of the spiny lobster resource in a way that ensures that the stock is harvested sustainably and in a manner that would protect its reproductive capacity. **Alternative 2** does not account for management uncertainty and thus also does not ensure that the spiny lobster stock would be harvested sustainably and in a manner that would protect its reproductive capacity. **Preferred Alternative 3** and **Alternative 4** do yield some protection of the St. Croix spiny lobster stock with **Alternative 4** yielding a greater level of protection than **Preferred Alternative 3**. The greater protection associated with **Alternative 4**, however, comes at the expense of a lower ACL.

The benefits associated with protection of the resource would depend on the susceptibility of the spiny lobster stock to overfishing. Without this information, one cannot conclude that **Preferred Alternative 3** outperforms **Alternative 4** from an efficiency (i.e., benefit/cost) perspective. **Preferred Alternative 3**, however, does provide a balance between the benefits associated with protection of the spiny lobster stock and the cost that would be associated with a further reduction in the ACL (i.e., **Alternative 4**). In addition, the administrative costs associated with **Alternative 3** would be less than those associated with **Alternative 4**, which would tend to yield greater net benefits after consideration of all other factors.

#### 4.2.4 Effects on the Social Environment

For purposes of analysis in this sub-section addressing the potential effects of prospect management action, *social effects* are defined to involve beneficial and/or deleterious human outcomes related to any loss or increase in *fishing opportunity*. Based on this logic, examples of social effects associated with prospective regulatory change include, but are not limited to: (a) acquisition or failed acquisition of seafood for consumption by island-based individuals, families, and communities; (b) acquisition or failed acquisition of seafood for customary or traditional uses such as sharing in extended family settings or consumption at community

celebrations; (c) the ability or inability to practice one’s profession or avocation on the ocean; (d) the ability or inability to accumulate and transmit traditional or local ecological knowledge in the context of fishing; and (e) the ability or inability to develop and maintain interpersonal relationships within social networks of fishery participants. Both beneficial and deleterious social effects potentially associated with the actions described in this amendment are, in probabilistic terms, most likely to occur in island areas where residents are most extensively engaged in harvest of spiny lobster specifically and in marine fisheries in general, as discussed in Section 3.5 above.

**Alternative 1** would involve no new management actions beyond those specified in Framework Amendment 1 and would thereby retain the presently specified OFLs, ABC, and ACLs into 2024 and beyond. As such, the spiny lobster fishery around the federal waters of St. Croix would proceed without accommodation of new ABC values recommended by the SSC. The extant ACL would remain, and management of stocks would proceed in the absence of the best available scientific information and associated uncertainty regarding effects on lobster populations around the island. This translates to status quo harvest levels and limited social effects in the near-term, but heightened risk for deleterious stock impacts over time, and related potential for reduction of opportunities for local fleets to pursue and harvest spiny lobster in the years to come.

By equating the ACL with the ABC under the constant-catch approach, **Alternative 2** reflects no management uncertainty. The OFL here is less than specified in **Alternative 1**, but the allowable level of harvest is greater than specified in other management alternatives. This alternative thereby allows for the greatest extent of overall opportunity for fishery participants on St. Croix to pursue and harvest spiny lobster, and to experience the range of associated social benefits—albeit with some level of risk to the stocks and related fishing opportunities should full certainty of management prove unfounded for any reason during the upcoming years.

**Preferred Alternative 3** would provide for a lower ACL than **Alternative 2**, and thereby reduce related fishing opportunities among persons who pursue spiny lobster in the federal jurisdiction waters of St. Croix. The alternative also reflects the same management uncertainty indicated in Spiny Lobster Framework Amendment 1, and thus provides a buffer to enable diminished risk for exceedance of harvest limitations and the potential for overfishing. As such, **Preferred Alternative 3** provides for fishing-related social benefits in the near-term, though at levels below those provided through **Alternative 2**, but also with concomitant attention to factors that have the potential to diminish harvest potential and related fishing opportunities in the future.

Finally, as the most conservative approach to management of spiny lobster in the federal jurisdiction waters of St. Croix, **Alternative 4** would enable the relatively lowest levels of spiny lobster harvest specified in all existing alternatives. As such, **Alternative 4** has the greatest

potential to diminish fishing opportunities in the near-term, but with the relatively greatest level of attention to the potential for problems with lobster stocks and any related social problems that could occur in association with diminished fishing opportunities over time. As per social-environmental description provided in Chapter 3, any beneficial or problematic social effects potentially resulting from implementation of **Alternatives 1-4** above are, in probabilistic terms, most likely to be experienced among harvesters based in Anna's Hope Village and in the Southwest District of St. Croix.

#### 4.2.5 Effects on the Administrative Environment

Updating management reference points including the OFLs, ABCs, and ACLs does not typically result in substantial effects on the administrative environment. **Alternative 1** is not expected to impact the administrative environment because it would not change the current management reference points. **Alternative 2, Preferred Alternative 3, and Alternative 4** would result in a short-term increased burden on the administrative environment through the need to take administrative action to specify new OFLs, ABCs, and ACLs, and the required rulemaking to implement this management change. Once these changes to catch levels are implemented, the type of regulations needed to manage the fisheries that target spiny lobster would remain unchanged, regardless of the harvest levels set. The lower catch levels under **Alternative 4 and Preferred Alternative 3** could result in more AMs triggered and applied, which would impose more of an administrative burden. Some administrative burden is anticipated under **Alternative 2, Preferred Alternative 3, and Alternative 4** as they would require additional outreach efforts to notify stakeholders of the changes to harvest levels.

## 4.3 Action 3: Update the St. Thomas and St. John Spiny Lobster OFL, ABC, and ACL

### Summary of Management Alternatives

**Alternative 1.** No Action. Retain the overfishing limit (OFL), acceptable biological catch (ABC), and annual catch limit (ACL) (which equals optimum yield) for spiny lobster as specified under Framework Amendment 1 to the St. Thomas/St. John Fishery Management Plan for 2024 and subsequent fishing years, until modified.

**Alternative 2.** Update the OFL and ABC for spiny lobster for 2024 and subsequent fishing years based on the constant-catch approach selected by the Caribbean Fishery Management Council (Council) and set the ACL equal to the ABC, until modified.

**Alternative 3 (Preferred).** Update the OFL and ABC for spiny lobster for 2024 and subsequent fishing years based on the constant-catch approach selected by the Council and set the ACL equal to 0.95 of the ABC, until modified.

**Alternative 4.** Update the OFL and ABC for spiny lobster for 2024 and subsequent fishing years based on the constant-catch approach selected by the Council and set the ACL equal to 0.90 of the ABC, until modified.

### 4.3.1 Effects on the Physical Environment

Effects on the physical environment generally occur from fishing effort associated with interactions between fishing gear (e.g., fish traps and spiny lobster traps) and the bottom substrate or from anchoring.

Through this action, the Council would revise the OFL, ABC, and ACL for spiny lobster in federal waters around St. Thomas/St. John based on the 2022 Update Assessment to the 2019 SEDAR 57 spiny lobster stock assessment. The analysis below assumes that (1) harvest would be constrained to the ACLs, and (2) the amount of harvest correlates to interactions between fishing gear and anchors and the bottom.

**Alternative 1** (No Action) would retain the OFL, ABC, and ACL for spiny lobster specified under Framework Amendment 1 to the St. Thomas/St. John FMP for 2024 and later years. No effects on the physical environment would be expected as the catch levels would not change (no changes in fishing effort from the baseline), thus current interactions with the substrate from gear and anchors would not change.

**Alternative 2, Preferred Alternative 3, and Alternative 4** would specify the same OFL and ABC values based on the average of the 2024-2026 projections from the 2022 Update Assessment, and would set ACL values based on varying degrees of management uncertainty. The ACL under **Alternative 2** would reflect no management uncertainty and would set the ACL equal to the ABC. The ACL under **Alternative 2** would be the highest ACL compared to the

other alternatives, including the baseline (**Alternative 1**). Therefore, **Alternative 2** would be expected to provide the least benefits to the physical environment, under the assumption that increased ACLs translates to increased bottom- impacting gear use. The ACL under **Preferred Alternative 3** would be set at 95% of the ABC, and would be less than the ACL under **Alternative 2**, but greater than the ACL under **Alternative 1**, thereby increasing the potential impacts to the bottom from the baseline but less than the impacts expected under **Alternative 2**. The ACL under **Alternative 4** would be set at 90% of the ABC, and would specify the lowest ACL compared to **Alternative 2** and **Preferred Alternative 3**, and thus, would be expected to provide greater benefits to the physical environment. The ACL under **Alternative 4** would be 107 pounds more than the ACL under **Alternative 1**, and any changes from the baseline would be nominal.

As mentioned in Section 3.3.3, spiny lobster in St. Thomas/St. John are predominately harvested via trap gear. Anecdotal information for recreational harvest of spiny lobster suggests that the majority occurs via diving. Under analysis above, which assumes lower harvest levels results in greater benefits through reduced effort, those benefits to the physical environment could be lessened if fishermen continue to harvest other species using the same gear, or shift effort into state waters where ACLs are not applicable. Effects to the physical environment from this action would be expected to increase if landings of spiny lobster in St. Thomas/St. John are at or near the proposed ACLs. However, recent landings of spiny lobster have been at levels below the current and proposed ACLs and effects from the action would be minimal.

#### 4.3.2 Effects on the Biological/Ecological Environment

Management actions that affect the biological and ecological environment mostly relate to the impacts of fishing on a species' population size, life history, and the role of the species within its habitat. Removal of the species from the population through fishing reduces the overall population size if harvest is not maintained at sustainable levels. Indirect impacts of these alternatives on the biological environment would depend on the corresponding reduction or increase in the level of fishing as a result of each alternative. Fishing gear have different (1) selectivity patterns that are used to target and capture organisms by size and species, (2) number of discards, which are often sublegal sized individuals or species caught during seasonal closures, and (3) mortality rates associated with releasing the species.

As described in Chapter 3, spiny lobster are targeted by commercial and recreational fishermen. The majority of harvest in St. Thomas/St. John occurs through trap gear, with trap gear predominantly used by commercial fishermen. The only spiny lobsters expected to be discarded from traps include sublegal individuals and berried females. Modifications to the spiny lobster OFL, ABC, and ACL could result in changes to the biological/ecological effects, as changing these catch limits determined the amount of fish that can be harvested.



**Alternative 1** would retain the OFL, ABC, and ACL for spiny lobster specified under Framework Amendment 1 to the St. Thomas/St. John FMP for 2024 and subsequent fishing years. **Alternative 2, Preferred Alternative 3, and Alternative 4** would specify the same OFL and ABC values, based on the average of the 2024-2026 projections from the 2022 Update Assessment, and would set ACL values based on varying degrees of management uncertainty. Applying the best scientific information available would ensure that federally managed stocks are harvested sustainably while protecting reproductive capacity and maintaining effective ecological contributions. Any increases in harvest levels under the proposed alternatives from the current level (i.e., **Alternative 1**) would be expected to have short-term negative effects to the biological/ecological environment through increased removals, but long-term positive effects through the enhanced management to the maximum sustainable yield.

Under **Alternative 2, Preferred Alternative 3, and Alternative 4** the OFL and ABC values would be the same, and only the ACLs would differ. The following analysis compares the ACLs specified under these alternatives. The ACL under **Alternative 2** would be equal to the ABC, and would allow for the greatest amount of harvest before triggering the AM, but would likely provide the least biological benefit compared to the other alternatives. The ACL under **Preferred Alternative 3** would be equal to 95% of the ABC, and the amount of harvest allowed before triggering the AM would be less than that under **Alternative 2**. **Alternative 4** would set the ACL at 90% of the ABC, and would have the greatest biological benefits (i.e., the greatest reduction in allowable harvest) when compared to **Alternative 1, Alternative 2, and Preferred Alternative 3**.

Any biological/ecological effects from this action are not expected to be significant because the overall prosecution of the St. Thomas/St. John fishery that targets spiny lobster is not expected to change. For this same reason, no additional impacts to ESA listed species or designated critical habitat, or other non-targeted species are anticipated as a result of this action.

### 4.3.3 Effects on the Economic Environment

Management actions that affect the economic environment mostly relate to the impacts on society associated with movement from a status quo condition. With respect to the Council, management actions associated with movement from a status quo condition primarily impact commercial fishermen, recreational fishermen, and other segments of society that receive benefits, either directly or indirectly, via healthy resources. Impacts to the commercial fishing sector due to a movement from the status quo condition tends to be captured via changes (positive or negative) in harvest levels (e.g., catch per trip) which then translates into changes in revenues and profits. With respect to the recreational fishing sector, impacts tend to be captured via a change in catch per trip (either an increase or a decrease), which over the long run culminates in a change in the number of trips. These changes can cascade to auxiliary sectors in the economy such as bait shops or wholesale and retail establishments.

**Alternative 1** (No Action) would retain the OFL, ABC, and ACL for spiny lobster specified under Framework Amendment 1 to the St. Thomas and St. John FMP for 2024 and subsequent years.<sup>21</sup> Under this alternative, the OFL would be maintained at 150,497 lbs, the ABC would be maintained at 132,725 lbs, and the ACL would be maintained at 126,089 lbs. **Alternative 2**, **Preferred Alternative 3**, and **Alternative 4** would instead specify OFL and ABC values based on the average of 2024-2026 projections from the 2022 Update Assessment with ACL values set based on varying degrees of management uncertainty.

Under **Alternative 2**, the OFL would be set equal to 158,993 lbs and the ACL would be set equal to the ABC of 140,218 lbs; implying no adjustment in the ACL to account management uncertainty. The OFL under **Preferred Alternative 3** would be the same as that specified in **Alternative 2**, but the ACL would be set at 95% of ABC (or 133,207 lbs) implying some management uncertainty and a subsequent buffer to account for the management uncertainty. Finally, the OFL under **Alternative 4** would also be the same as under **Alternative 2** and **Preferred Alternative 3**, but the ACL would be set at 90% of ABC, or 126,196 lbs, implying a greater amount of uncertainty and a greater buffer (and protection of the resource) than that associated with **Alternative 2** or **Preferred Alternative 3**.

Given the status quo nature of **Alternative 1**, there would be no direct economic effects associated with the no action alternative. However, there could be indirect effects associated with maintaining the status quo. This issue is of particular relevance given the fact that **Alternative 1** does not use the best scientific information available. The use of the information derived in Framework Amendment 1 may not ensure that the St. Thomas/St. John spiny lobster resource is harvested sustainably and in a manner that that would protect the reproductive capacity of the spiny lobster stock.

**Alternative 2** would provide the greatest ACL in comparison to the other alternatives, including the no action alternative. While this alternative would allow the largest annual harvest (140,218 lbs) before triggering the AM, it provides no buffer since ACL is set equal to ABC. Thus, the resource may not be adequately protected if management uncertainty is any more than *de minimis*. **Preferred Alternative 3** would provide a greater level of protection to the resource than that afforded under **Alternative 2** but at the cost of a reduction in ACL (133,207 lbs under **Preferred Alternative 3** compared to 140,218 lbs under **Alternative 2**). Among the three action alternatives, **Alternative 4** would provide the greatest level of protection to the stock but with the tradeoff of the lowest ACL (126,196 lbs which represents a reduction of 7,011 lbs when compared to **Preferred Alternative 3** and 14,022 lbs when compared to **Alternative 2**).

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<sup>21</sup> Amendment 1 used a constant-catch approach for specifying OFLs and ABCs and set constant-catch ACLs equal to 0.95 of the ABC.

Maximum annual revenue losses to the commercial sector associated with providing increased protection to the stock (i.e., moving from **Alternative 2** to **Alternative 4**) can be ascertained by multiplying the expected 2022 dockside price (derived by using the 2017-2019 average unweighted current price as provided in Table 3.4.5 adjusted for inflation) by the change in annual harvest. The maximum reduction in annual harvest associated with **Preferred Alternative 3** compared to **Alternative 2** is 7,011 lbs. This translates into an annual loss of revenues equal to about \$72,300 based on the 2022 estimated dockside price of \$10.32 per lb. Likewise, while moving from **Preferred Alternative 3** to **Alternative 4** provides an added level of protection to the spiny lobster resource to account for increased management uncertainty, this added protection comes at the cost of a reduction in harvest and revenues to the commercial sector. The maximum loss in annual revenues, based on estimated 2022 price is also equal to about \$72,300. Thus, maximum expected loss in annual revenues associated with a change in buffer from providing no protection (i.e., **Alternative 2**) to a buffer of  $ACL=ABC \times 0.90$  (i.e., **Alternative 4**) is about \$144,600. Relative to **Alternative 1** (No Action), **Preferred Alternative 3** would increase the ACL by 7,118 lbs each year and result in associated annual revenue increases estimated at \$73,458. The estimated increases in revenues would only materialize if fishermen harvest the totality of the ACL proposed in **Preferred Alternative 3**.

It is recognized that the estimated losses in annual revenues associated with providing increased protection to the stock are ‘upper-bound’ estimates with actual losses likely being less. There are two primary reasons for making this assertion, one of them being enforcement. Specifically, if enforcement is inadequate, a certain amount of spiny lobster harvested from federal waters may occur even after the triggering and application of AMs (which would be fishing season reductions in federal waters).<sup>22</sup>

The second reason for asserting that the actual revenue losses associated with increasing the buffer (i.e., providing additional protection to the stock) may be less than the estimates provided above reflects the actions taken by fishermen in response to the triggering and application of AMs (in this case fishing season reductions in federal waters). With respect to St. Thomas and St. John, about one-half of annual spiny lobster harvest have come from federal waters in recent years (Table A.7) and the vast majority of landings was harvested using a non-selective gear; i.e., traps (Table A.8). Additionally, spiny lobster revenues from federal waters, expressed on a per trip basis, have tended to exceed the comparable figures at the state level by a significant amount which is also the case with average total revenues per trip (Table 3.4.9). The triggering and application of AMs (closure of federal waters to spiny lobster fishing) would thus result in a significant loss in revenues for those trips made in federal waters under the assumption that the loss in spiny lobster revenues could not be made up by an increase in the harvest of co-occurring species. This is likely the case given the non-selective nature of the gear used to harvest spiny

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<sup>22</sup> Enforcement associated with the taking of a single species from federal waters via fishing season reduction may be difficult since the fisherman would need to be observed in the act of possessing the species in federal waters.

lobster in St. Thomas/St. John. As such, one can expect an increase in the number of trips in territorial waters as a means of mitigating any losses of revenues associated with the triggering and application of AMs.

Discussion to this point has focused on the direct and indirect impacts to the fishing sector associated with the proposed alternatives. There are also administrative costs that vary across the spectrum of alternatives. There would be no changes in administrative costs under the No Action alternative (**Alternative 1**) since there would be no change in the frequency that AMs are triggered and applied. Among the three alternatives that specify OFL and ABC values based on the average of 2024-2026 projection from the 2022 Update Assessment with ACL values being set based on varying degrees of management uncertainty, **Alternative 4** would result in the highest frequency of AMs being triggered and applied and hence the highest administrative costs. The administrative costs associated with **Preferred Alternative 3** would fall between **Alternative 2** and **Alternative 4**.

Analysis of the economic environment associated with Action 3 suggests that **Alternative 1** is not based on the best scientific information that is available and may thus yield OFL and ACL estimates that are not aligned with management of the spiny lobster resource in a way that ensures that the stock is harvested sustainably and in a manner that would protect its reproductive capacity. **Alternative 2** does not account for management uncertainty and thus also does not ensure that the spiny lobster stock would be harvested sustainably and in a manner that would protect its reproductive capacity. **Preferred Alternative 3** and **Alternative 4** do yield some protection of the St. Thomas/St. John spiny lobster stock with **Alternative 4** yielding a greater level of protection than **Preferred Alternative 3**. The greater protection associated with **Alternative 4**, however, comes at the expense of a lower ACL.

The benefits associated with protection of the resource would depend on the susceptibility of the spiny lobster stock to overfishing. Without this information, one cannot conclude that **Preferred Alternative 3** outperforms **Alternative 4** from an efficiency (i.e., benefit/cost) perspective. **Preferred Alternative 3**, however, does provide a balance between the benefits associated with protection of the spiny lobster stock and the cost that would be associated with a further reduction in the ACL (i.e., **Alternative 4**). In addition, the administrative costs associated with **Alternative 3** would be less than those associated with **Alternative 4**, which would tend to yield greater net benefits after consideration of all other factors.

#### 4.3.4 Effects on the Social Environment

For purposes of analysis in this sub-section addressing the potential effects of prospect management action, *social effects* are defined to involve beneficial and/or deleterious human outcomes related to any loss or increase in *fishing opportunity*. Based on this logic, examples of social effects associated with prospective regulatory change include, but are not limited to: (a)

acquisition or failed acquisition of seafood for consumption by island-based individuals, families, and communities; (b) acquisition or failed acquisition of seafood for customary or traditional uses such as sharing in extended family settings or consumption at community celebrations; (c) the ability or inability to practice one's profession or avocation on the ocean; (d) the ability or inability to accumulate and transmit traditional or local ecological knowledge in the context of fishing; and (e) the ability or inability to develop and maintain interpersonal relationships within social networks of fishery participants. Both beneficial and deleterious social effects potentially associated with the actions described in this amendment are, in probabilistic terms, most likely to occur in island areas where residents are most extensively engaged in harvest of spiny lobster specifically and in marine fisheries in general, as discussed in Section 3.5 above.

**Alternative 1** would involve no new management actions beyond those specified in Framework Amendment 1 and would thereby retain the presently specified OFLs, ABC, and ACLs into 2024 and beyond. As such, the spiny lobster fishery around the federal waters of St. Thomas/St. John would proceed without accommodation of new ABC values recommended by the SSC. The extant ACL would remain, and management of stocks would proceed in the absence of the best available scientific information and associated uncertainty regarding effects on lobster populations around the island. This translates to status quo harvest levels and limited social effects in the near-term, but heightened risk for deleterious stock impacts over time, and related potential for reduction of opportunities for local fleets to pursue and harvest spiny lobster in the years to come.

By equating the ACL with the ABC under the constant-catch approach, **Alternative 2** reflects no management uncertainty. The OFL here is less than specified in **Alternative 1**, but the allowable level of harvest is greater than specified in other management alternatives. This alternative thereby allows for the greatest extent of overall opportunity for harvesters around St. Thomas/St. John to pursue and harvest spiny lobster, and to experience the range of associated social benefits—although with some level of risk to the stocks and related fishing opportunities should full certainty of management prove unfounded for any reason during the upcoming years.

**Preferred Alternative 3** would provide for a lower ACL than **Alternative 2**, and thereby reduce related fishing opportunities among persons who pursue spiny lobster in the federal jurisdiction waters of St. Thomas/St. John. The alternative also reflects the same management uncertainty indicated in Spiny Lobster Framework Amendment 1, and thus provides a buffer to enable diminished risk for exceedance of harvest limitations and the potential for overfishing. As such, **Preferred Alternative 3** provides for fishing-related social benefits in the near-term, though at levels below those provided through **Alternative 2**, but also with concomitant attention to factors

that have the potential to diminish harvest potential and related fishing opportunities in the future.

Finally, as the most conservative approach to management of spiny lobster in the federal jurisdiction waters of St. Thomas/St. John, **Alternative 4** would enable the relatively lowest levels of spiny lobster harvest specified in all existing alternatives. As such, **Alternative 4** has the greatest potential to diminish fishing opportunities in the near-term, but with the relatively greatest level of attention to the potential for problems with lobster stocks and any related social problems that could occur in association with diminished fishing opportunities over time. As per social-environmental description provided in Chapter 3, any beneficial or problematic social effects potentially resulting from implementation of **Alternatives 1-4** above are, in probabilistic terms, most likely to be experienced among harvesters based in the Northside and Charlotte Amalie Districts of St. Thomas.

#### 4.3.5 Effects on the Administrative Environment

Updating management reference points including the OFLs, ABCs, and ACLs does not typically result in substantial effects on the administrative environment. **Alternative 1** is not expected to impact the administrative environment because it would not change the current management reference points. **Alternative 2, Preferred Alternative 3, and Alternative 4** would result in a short-term increased burden on the administrative environment through the need to take administrative action to specify new OFLs, ABCs, and ACLs, and the required rulemaking to implement this management change. Once these changes to catch levels are implemented, the type of regulations needed to manage the fisheries that target spiny lobster would remain unchanged, regardless of the harvest levels set. The lower catch levels under **Alternative 4** and **Preferred Alternative 3** could result in more AMs triggered and applied, which would impose more of an administrative burden. Some administrative burden is anticipated under **Alternative 2, Preferred Alternative 3, and Alternative 4** as they would require additional outreach efforts to notify stakeholders of the changes to harvest levels.

## 4.4 Cumulative Effects Analysis

While this environmental assessment (EA) is being prepared using the 2020 Council on Environmental Quality National Environmental Policy Act Regulations, the cumulative effects discussed in this section meet the two-part standard for “reasonable foreseeability” and “reasonably close causal connection” required by the new definition of effects or impacts. Below is the five-step cumulative effects analysis that identifies criteria that must be considered in an EA.

**1. *The area in which the effects of the proposed action will occur*** – The affected area of this proposed action encompasses the state and federal waters of the U.S. Caribbean and includes the communities of Puerto Rico, St. Croix, St. Thomas, and St. John that fish for spiny lobster. For more information about the area in which the effects of this proposed action will occur, please see Chapter 3, Affected Environment, which describes these resources as well as other relevant features of the human environment.

**2. *The impacts that are expected in that area from the proposed action*** – The proposed action would update OFLs, ABCs, and ACLs for spiny lobster under each FMP based on the 2022 Update Assessment to the 2019 Southeast Data, Assessment, and Review (SEDAR) 57 Spiny Lobster Stock Assessment. The environmental consequences of the proposed actions are analyzed in Sections 4.1 - 4.3.

Generally a decrease in the OFL, ABC, and ACL from the status quo should provide benefits to the physical environment through fewer gear-bottom interactions, which would be the case for Puerto Rico (Action 1). Conversely, an increase in the OFL, ABC, and ACL, which would occur for St. Croix (Action 2) and St. Thomas/St. John (Action 3), could generate additional gear-bottom interactions. However, as mentioned in Sections 4.1.1, 4.2.1, and 4.3.1, little to no effects to the physical environment are expected from due to the primary methods used to harvest spiny lobster (i.e., diving), the majority of spiny lobster are harvested in state waters, and current harvest levels of spiny lobster in the USVI are below both the baseline and the proposed ACLs.

Setting OFLs, ABCs, and ACLs based on best scientific information available (i.e., 2022 Update Assessment) would be expected to provide increased benefits to the biological/ecological environment for spiny lobster through the increased conservation of the stocks (Sections 4.1.2, 4.2.2, and 4.3.2). Long-term economic and social benefits could be expected, because managing based on best scientific information available better protects against the risk of overfishing and is more likely to provide for long-term use of the resource. Short-term negative economic and social effects could occur in Puerto Rico (Sections 4.1.3 and 4.1.4), where the catch levels are decreasing, but those effects would be mitigated by the fishermen’s ability to shift fishing

activities to other species (a higher probability in multi-species fisheries) or to state waters. Short-term positive economic and social effects would be expected for St. Croix (Sections 4.2.3 and 4.2.4) and St. Thomas/St. John (Sections 4.3.3 and 4.3.4) since the spiny lobster catch levels would increase. Modifying management reference points is not expected to substantially affect the administrative environment, either adversely or beneficially (Sections 4.1.5, 4.2.5, and 4.3.5) because once the changes are implemented, the type of regulations needed to manage the fisheries that target spiny lobster would remain unchanged.

**3. *Other past, present and reasonably foreseeable future actions that have or are expected to have impacts in the area*** – Listed are actions under development in the U.S. Caribbean that would be expected to have impacts associated with them.

*Other fishery related actions* – The Island-based FMPs, implemented in 2022, reorganized management measures from the U.S. Caribbean-wide level to each island management area. Framework Amendment 1 to the FMPs, implemented in 2023, updated management reference points for the spiny lobster stocks based on the SEDAR 57 stock assessment and using the ABC Control Rule included in each FMP. Framework Amendment 1 also revised the spiny lobster AM so that the AM would be triggered if the average of the most recent three years of spiny lobster landings exceeds the average ACLs in place during those years. Cumulative effects associated with the FMPs and Framework Amendment 1 were analyzed in the respective EAs (CFMC 2019a, CFMC 2019b, CFMC 2019c, and CFMC 2022) and are incorporated here by reference.

Specific to spiny lobster, each island-based FMP retained management measures such as size limits and recreational bag limits and revised the management reference points using Tier 4 (data limited with no accepted assessment) of the ABC Control Rule. The cumulative effects analysis (CEA) found that the overall impacts of the actions included in the Island-based FMPs would be minimal. Framework Amendment 1 updated the management reference points for lobster using Tier 3 (data limited with an accepted assessment) of the Control Rule and revised part of the spiny lobster accountability measure process in order to anticipate changes to reference points based on future stock assessments for the species. The CEA of Framework Amendment 1 found that setting management reference points based on best scientific information available would be expected to provide increased long-term benefits through the increased conservation of the stocks, and would have minimal-to-no negative effects.

The Council, in partnership with NMFS and other regional constituencies, is in the process of moving towards implementation of ecosystem-based fishery management (EBFM) in the U.S. Caribbean. EBFM enables a more holistic approach to decision-making by considering trade-offs among fisheries, aquaculture, protected species, biodiversity, habitats, and the human community, within the context of climate, habitat, ecological, and other environmental change.



*Non-fishery related actions* – Actions affecting the U.S. Caribbean fisheries, including effects of global climate change, were included in the CEAs for the FMPs and Framework Amendment 1. Other issues affecting human communities (e.g., high fuel costs, increased seafood imports, restricted access to fishing grounds, regional economies) were also considered.

Emerging information sheds light on how global climate change would affect, and is already affecting, fishery resources and the habitats upon which they depend. Impacts commonly mentioned are sea level rise, increased frequency of severe weather events, and change in air and water temperatures. In the U.S. Caribbean region, major climate-induced concerns include: (1) threats to coral reef ecosystems – coral bleaching, disease, and ocean acidification; (2) threats to habitats from sea level rise – loss of essential fish habitat; (3) climate-induced changes to species phenology and distribution, (4) changes in resource composition in fishing areas, (5) rise in temperature including ocean temperatures and their relationship to more severe and frequent storms, (6) droughts, and (7) effects on environmental justice. Climate change may impact spiny lobster stocks in the future (see Section 3.2.1.3), but the level of impacts cannot be quantified at this time, nor is the time frame known in which these impacts would occur. The proposed action is not expected to significantly contribute to climate change through the increase or decrease in the carbon footprint from fishing, as this action would not be expected to change how the fishery is prosecuted.

U.S. Caribbean fisheries experienced broad declines in both effort and harvest as a result of the 2017 hurricanes and the COVID-19 public health crisis. Global protective measures (e.g., restaurant closures, social distancing protocols) instituted in March 2020 contributed to an almost-immediate impact on commercial, recreational, and subsistence fishermen. As discussed in Section 3.5, commercial fishermen lost more than half of their traps and the fishing communities and seafood markets were compromised due to the reduced tourism rates.

**4. *The impacts or expected impacts from these other actions*** – The cumulative effects from managing fishery resources in the U.S. Caribbean, including spiny lobster, have been analyzed in other actions as listed in part three of this section. They include detailed analysis of the Puerto Rico, St. Croix, and St. Thomas/St. John fisheries, effects on non-targeted and protected species, and habitats in the U.S. Caribbean. The effects of this action would be expected to be positive in the long-term, as they ultimately act to maintain the spiny lobster stocks at a level that would allow the maximum benefits in yield and increased fishing opportunities to be achieved. Some short-term minor negative impacts on the social and economic environments could occur due to the changes in ACLs, and if AM-based closures related to those revised ACLs occur in the future. However, these effects would likely be reduced, compared to taking no action, as the stocks would be managed based on the best scientific information available.

**5. *The overall impact that can be expected if the individual impacts are allowed to accumulate*** – Cumulative effects resulting from the revision of spiny lobster management reference points, in combination with other past, present, and reasonably foreseeable future actions, would be expected to be minimal in each island-management area. Some minor short-term negative effects to the social and economic environments would result from the decrease in ACLs (Puerto Rico only) and any increase in associated AMs that are triggered and applied, although long-term positive effects would be expected through the increased conservation and continued access to the spiny lobster stocks.

No significant overall impacts to the biological/ecological environment, to protected species occurring within that environment, to the habitats constituting and supporting that environment, or to the dependent socio-economic environment would be expected from the cumulative past, present, or reasonably foreseeable future actions as it would not be expected to significantly affect current fishing practices (i.e., U.S. Caribbean fisheries would continue to target multiple species using multiple gear types; see Section 3.3). Similarly, no significant cumulative effects would be expected to result from reasonably foreseeable future actions that may be taken, by other federal or non-federal agencies in combination with this action.

**6. *Summary*** – The proposed action is not expected to have significant effects to the physical, biological/ecological, economic, social, or administrative environments. Any effects of the proposed action, when combined with other past actions, present actions, and reasonably foreseeable future actions are not expected to be significant. The effects of the proposed action are, and will continue to be, monitored through collection of data by the National Marine Fisheries Service, individual state programs, stock assessments and stock assessment updates, life history studies, economic and social analyses, and other scientific observations.

## Chapter 5. Regulatory Impact Review

### 5.1 Introduction

The National Marine Fisheries Service (NMFS) requires a Regulatory Impact Review (RIR) for all regulatory actions that are of public interest. The RIR does three things: (1) it provides a comprehensive review of the level and incidence of impacts associated with a proposed or final regulatory action; (2) it provides a review of the problems and policy objectives promoting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problem; and (3) it ensures that the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost-effective way. The RIR also serves as the basis for determining whether the regulations are a “significant regulatory action” under the criteria provided in Executive Order (E.O.) 12866. This RIR analyzes the impacts this action would be expected to have on the spiny lobster fishery of the U.S. Caribbean.

### 5.2 Problems and Objectives

The problems and objectives addressed by this action are discussed in Section 1.3.

### 5.3. Description of the Fishery

A description of the U.S. Caribbean spiny lobster fishery is provided in Section 3.4.

### 5.4 Impacts of Management Measures

#### 5.4.1 Action 1: Update the Puerto Rico Spiny Lobster OFL, ABC, and ACL

A detailed analysis of the economic effects expected to result from this action is provided in Section 4.1.3. The following discussion summarizes the expected economic effects of the preferred alternative. Relative to **Alternative 1** (No Action), **Preferred Alternative 3** would reduce the ACL by 9,336 pounds each year and result in associated annual revenue losses estimated at \$72,261.

#### 5.4.2 Action 2: Update the St. Croix Spiny Lobster OFL, ABC, and ACL

A detailed analysis of the economic effects expected to result from this action is provided in Section 4.2.3. The following discussion summarizes the expected economic effects of the preferred alternative. Relative to **Alternative 1** (No Action), **Preferred Alternative 3** would increase the ACL by 16,424 pounds each year and result in associated annual revenue increases

estimated at \$159,806. The estimated increases in revenues would only materialize if fishermen harvest the totality of the ACL proposed in **Preferred Alternative 3**.

### 5.4.3 Action 3: Update the St. Thomas and St. John Spiny Lobster OFL, ABC, and ACL

A detailed analysis of the economic effects expected to result from this action is provided in Section 4.3.3. The following discussion summarizes the expected economic effects of the preferred alternative. Relative to **Alternative 1** (No Action), **Preferred Alternative 3** would increase the ACL by 7,118 pounds each year and result in associated annual revenue increases estimated at \$73,458. The estimated increases in revenues would only materialize if fishermen harvest the totality of the ACL proposed in **Preferred Alternative 3**.

The combined changes in economic effects expected to result from the three preferred alternatives selected in this amendment are summarized in Table 5.4.1 below.

**Table 5.4.1.** Estimated changes in annual catch limits and in revenues (\$2022) by action and preferred alternative.

Actions and Preferred Alternatives	Year	ACL	Revenues		
			Nominal	Net Present Value (3%)	Net Present Value (7%)
Action 1 - Preferred Alternative 3	2024	-9,336	-\$72,261	-\$72,261	-\$72,261
	2025	-9,336	-\$72,261	-\$70,156	-\$67,534
	2026	-9,336	-\$72,261	-\$68,113	-\$63,116
	Total	-28,008	-\$216,783	-\$210,530	-\$202,910
Action 2 - Preferred Alternative 3	2024	16,424	\$159,806	\$159,806	\$159,806
	2025	16,424	\$159,806	\$155,151	\$149,351
	2026	16,424	\$159,806	\$150,632	\$139,581
	Total	49,272	\$479,418	\$465,590	\$448,738
Action 3 - Preferred Alternative 3	2024	7,118	\$73,458	\$73,458	\$73,458
	2025	7,118	\$73,458	\$71,318	\$68,652
	2026	7,118	\$73,458	\$69,241	\$64,161
	Total	21,354	\$220,374	\$214,018	\$206,271
<b>Actions 1, 2 and 3 Total</b>		<b>42,618</b>	<b>\$483,009</b>	<b>\$469,077</b>	<b>\$452,099</b>

Combined, the preferred alternatives selected in Actions 1 (Puerto Rico), 2 (St. Croix) and, 3 (St. Thomas and St. John) are expected to increase ACL by 14,206 lbs each year. In nominal value, associated annual increases in revenues are estimated at \$161,003. Between 2024 and 2026, cumulative changes in ACL for the preferred alternatives selected in Actions 1, 2, and 3

are estimated at 42,618 lbs. In nominal value, associated cumulative increases in revenues are estimated at \$483,009. Using 3 percent and 7 percent discount rates, corresponding net present values are estimated at \$469,077 and \$452,099, respectively. The estimated increases in revenues would only materialize if fishermen harvest the entirety of the ACLs proposed in preferred alternatives selected in Actions 1, 2 and, 3.

## 5.5 Public and Private Costs of Regulations

The preparation, implementation, enforcement, and monitoring of this or any federal action involves the expenditure of public and private resources which can be expressed as costs associated with the regulations. Estimated costs associated with this action include:

Council costs of document preparation, meetings, public hearings, and information dissemination	\$18,567
NMFS administrative costs of document preparation, meetings, and review	\$28,539
TOTAL	\$47,106

The estimate provided here does not include any law enforcement costs.

## 5.6 Determination of Significant Regulatory Action

Pursuant to E.O. 12866, a regulation is considered a “significant regulatory action” if it is likely to result in: (1) an annual effect of \$200 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities; (2) create a serious inconsistency or otherwise interfere with an action taken or planned by another agency; (3) materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights or obligations of recipients thereof; or (4) raise legal or policy issues for which centralized review would meaningfully further the President’s priorities or the principles set forth in this Executive order, as specifically authorized in a timely manner by the Administrator of the Office of Information and Regulatory Affairs in each case. Based on the information provided above, this action has been determined to not be economically significant for the purposes of E.O. 12866.

## Chapter 6. Regulatory Flexibility Act Analysis

### 6.1 Introduction

The purpose of the Regulatory Flexibility Act (RFA) is to establish a principle of regulatory issuance that agencies shall endeavor, consistent with the objectives of the rule and of applicable statutes, to fit regulatory and informational requirements to the scale of businesses, organizations, and governmental jurisdictions subject to regulation. To achieve this principle, agencies are required to solicit and consider flexible regulatory proposals and to explain the rationale for their actions to assure such proposals are given serious consideration. The RFA does not contain any decision criteria; instead the purpose of the RFA is to inform the agency, as well as the public, of the expected economic effects of various alternatives contained in the regulatory action and to ensure the agency considers alternatives that minimize the expected economic effects on small entities while meeting the goals and objectives of the applicable statutes (e.g., the Magnuson Stevens Fishery Conservation and Management Act [Magnuson-Stevens Act]).

The RFA requires agencies to conduct at the least a threshold analysis to determine if there would be a significant economic impact on a substantial number of small entities. If the threshold analysis concludes there would not be a significant impact on a substantial number of small entities, the threshold analysis is sufficient. However, if the threshold analysis comes to a different conclusion, then an initial regulatory flexibility analysis (IRFA) is required. The following threshold analysis concludes there would not be a significant economic impact on a substantial number of small entities.

### 6.2 Statement of the need for, objectives of, and legal basis for the proposed rule

A discussion of the reasons why the action is being considered is provided in Section 1.1. The purpose of this proposed rule is to update the overfishing limit (OFL), acceptable biological catch (ABC), and annual catch limit (ACL) for spiny lobster under the Puerto Rico, St. Croix, and St. Thomas/St. John Fishery Management Plans to account for the 2022 Update Assessment to the 2019 Southeast Data and Review spiny lobster stock assessments. More information about the need for and objectives of these actions can be found in Chapter 1 of this document. The Magnuson-Stevens Act provides the legal basis for this proposed rule.

## 6.3 Description and estimate of the number of small entities to which the proposed action would apply

This proposed rule would directly impact two sectors that fish for spiny lobster in the U.S. Caribbean exclusive economic zone (EEZ): recreational fishers (anglers) and commercial fishing businesses.

### **Recreational Fishers (Anglers)**

The proposed changes in the OFL and ABC for spiny lobster would indirectly apply to recreational fishers (anglers) that fish in federal waters of the U.S. Caribbean.<sup>23</sup> The proposed changes in the ACL for spiny lobster, however, would have direct impacts. However, anglers are not considered small entities as that term is defined in 5 U.S.C. 601(6), whether fishing from charter (for-hire) fishing, private or leased vessels. Therefore, estimates of the number of anglers directly affected by the proposed rule and any impacts on them are not assessed here.

### **Commercial Fishing Businesses**

The proposed changes in the OFL and ABC for spiny lobster would indirectly apply to commercial fishing businesses that operate in federal waters of the U.S. Caribbean. The proposed changes in the ACL for spiny lobster would have direct impacts. For RFA purposes, NMFS has established a small business size standard for businesses, including their affiliates, whose primary industry is commercial fishing (50 CFR 200.2). A business primarily involved in the commercial fishing industry (North American Industrial Classification Code code 11411) is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates) and its combined annual receipts are no more than \$11 million for all of its affiliated operations worldwide. All of the following figures are expressed in 2021 dollars.

From 2017 through 2021, the Puerto Rico fishery as a whole generated average annual direct revenues of about \$9.58 million.<sup>24</sup> During those five years, there were an average of 710 commercial fishermen who reported landings. It is estimated that from 2017 through 2021, the average commercial fisherman in Puerto Rico had annual revenue of \$13,497.<sup>25</sup> Maximum annual revenue from reported landings for any of them was less than \$60,000 and minimum annual revenue was about \$200. That range in individual annual revenues illustrates the difference between part-time fishermen and those full time. Nonetheless, whether full or part time, each active licensed commercial fisherman is expected to represent a unique commercial fishing business, and all active commercial fishing businesses in Puerto Rico are small.

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<sup>23</sup> Federal waters are from 9 – 200 nautical miles (nm) off the coast of Commonwealth of Puerto Rico, 3 – 200 nm off the coast of St. Croix and 3 – 200 nm off the coast of St. Thomas/St. John.

<sup>24</sup> These are the most recent five years of landings in Puerto Rico.

<sup>25</sup> Average annual revenue was lower from 2014 through 2021.

Not all of Puerto Rico's active commercial fishing businesses operate in the EEZ or harvest spiny lobster. From 2017 through 2021, an average 313 (44.1%) of the 710 annually active commercial fishermen reported landings of spiny lobster from all waters, while 64 (9.0%) reported landings of spiny lobster from the EEZ (Southeast Fisheries Science Center [SEFSC] Southeast Fisheries Reporting System, Caribbean Commercial Landings [CCL] Reports for Puerto Rico).<sup>26</sup> The 64 small businesses collectively landed an average of 23,510 pounds (lbs) of spiny lobster from the EEZ annually, which accounted for about 6.6% of all spiny lobster commercial landings by weight and value.

From 2015 through 2019, the U.S. Virgin Islands (USVI) fishery as a whole generated average annual direct revenues of \$4.39 million.<sup>27</sup> Therefore, all commercial fishing businesses in the USVI (St. Croix and St. Thomas/St. John) are small.

From 2015 through 2019, there was an average of 112 active commercial fishermen in the USVI: 59 reported landings in St. Croix and 67 of them reported landings in St. Thomas/St. John (SEFSC Southeast Fisheries Reporting System, CCL Reports for USVI).<sup>28</sup> Not all of St. Croix's 59 active commercial fishing businesses operate in the EEZ or harvest spiny lobster. From 2015 through 2019, an average 24 (41.5%) of 59 active commercial fishermen in St. Croix reported landings of spiny lobster from all waters<sup>29</sup>, while 11 (18.3%) reported landings of spiny lobster from the EEZ (SEFSC Southeast Fisheries Reporting System, CCL Reports for USVI). The 11 small businesses collectively landed an average of 8,681 lbs of spiny lobster from the EEZ annually, which accounted for 33.5% of all spiny lobster commercial landings in St. Croix by weight and 34.2% by value.

From 2015 through 2019, an annual average of 29 (43.9%) of St. Thomas/St. John's 67 annually active commercial fishermen reported landings of spiny lobster from all waters, while 20 (30.1%) reported landings of spiny lobster from the EEZ (SEFSC Southeast Fisheries Reporting System, CCL Reports for USVI). The 20 small businesses collectively landed an annual average of 62,077 lbs of spiny lobster from the EEZ annually, which accounted for 61.8% of all spiny lobster landings in St. Thomas/St. John by weight and 61.3% by value.

In summary, 64 small commercial fishing businesses in Puerto Rico, 11 in St. Croix and 20 in St. Thomas/St. John would be directly affected by the proposed rule annually.

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<sup>26</sup> If landings from unknown waters were included, the average increases to 119 fishermen. This analysis assumes landings from unknown waters are most likely from Puerto Rico waters.

<sup>27</sup> These are the most recent five years of landings in the USVI.

<sup>28</sup> Fourteen reported landings in both St. Croix and St. Thomas/St. John.

<sup>29</sup> From 2017 through 2021, an annual average of 24 commercial fishermen collectively landed 17,628 lbs of spiny lobster from all waters.



## 6.4 Description of the projected reporting, record-keeping and other compliance requirements of the proposed rule and their impacts on small businesses

This proposed regulatory action would not impose any new reporting or record-keeping requirements on any of the small businesses that operate in Puerto Rico, St. Croix or St. Thomas/St. John. This proposed rule concerns harvesting of spiny lobster in federal waters of the U.S. Caribbean.

### **Action 1 (Puerto Rico)**

**Preferred Alternative 3** of Action 1 would update the OFL and ABC for spiny lobster for the period from 2024 through 2026 and set the ACL equal to 95 percent of the ABC until modified (Table 6.1). As shown in Table 6.1, the OFL, ABC and ACL would be reduced under the proposed rule.

**Table 6.1.** Comparison of baseline and proposed OFL, ABC and ACL for spiny lobster in Puerto Rico. All values are in pounds whole weight.

Alternative	OFL	ABC	ACL
Alt. 1 (no action)*	438,001	386,279	366,965
Pref. Alt. 3	426,858	376,452	357,629

\* Values for 2024 and later (CFMC 2022)

This proposed action would not change the sequence of landings data used to compare the ACL for determining whether the accountability measure (AM) for the spiny lobster stock has been triggered. It would not change the process for applying an AM in Puerto Rico. The average of the three most recent years of landings are compared to the ACL. The annual average of spiny lobster landings from 2019 through 2021 is 313,837 lbs, while the annual average from 2020 through 2022 is 228,522 lbs. Both averages are less than the current and proposed ACLs. As such, **Preferred Alternative 3** is expected to have no economic impact on small businesses of Puerto Rico.

### **Action 2 (St. Croix)**

**Preferred Alternative 3** of Action 2 would update the OFL and ABC for spiny lobster for the period from 2024 through 2026 and set the ACL equal to 95 percent of the ABC until modified (Table 6.2). As shown in Table 6.2, the OFL, ABC and ACL would be increased under the proposed rule.

**Table 6.2.** Comparison of baseline and proposed OFL, ABC and ACL for spiny lobster in St. Croix. All values are in pounds whole weight.

Alternative	OFL	ABC	ACL
Alt. 1 (no action)*	144,219	127,189	120,830
Pref. Alt. 3	163,823	144,478	137,254

\* Values for 2024 and later (CFMC 2022)

This proposed action would not change the sequence of landings data used to compare the ACL for determining whether the AM for the spiny lobster stock has been triggered. It would not change the process for applying an AM in St. Croix. The average of the three most recent years of landings are compared to the ACL. Annual landings and three-year averages of landings of spiny lobster in St. Croix have been much lower than the current and proposed ACLs every year from 2014 through 2021. As such, **Preferred Alternative 3** is expected to have no economic impact on small businesses of St. Croix.

**Action 3 (St. Thomas/St. John)**

**Preferred Alternative 3** of Action 2 would update the OFL and ABC for spiny lobster for the period from 2024 through 2026 and set the ACL equal to 95 percent of the ABC until modified (Table 6.3). As shown in Table 6.3, the OFL, ABC and ACL would be increased under the proposed rule.

**Table 6.3.** OFL, ABC and ACL for spiny lobster in St. Thomas and St. John under each of the Action 3 alternatives. All values are in pounds whole weight.

Alternative	OFL	ABC	ACL
Alt. 1 (no action)*	150,497	132,725	126,089
Pref. Alt. 3	158,993	140,218	133,207

\* Values for 2024 and later (CFMC 2022)

This proposed action would not change the sequence of landings data used to compare the ACL for determining whether the AM for the spiny lobster stock has been triggered. It would not change the process for applying an AM in St. Thomas/St. John. The average of the three most recent years of landings are compared to the ACL. Annual landings and three-year averages of landings of spiny lobster in St. Thomas/St. John have been much lower than the current and proposed ACLs every year from 2014 through 2021. As such, **Preferred Alternative 3** is expected to have no economic impact on small businesses of St. Thomas/St. John.

## 6.5 Identification of all relevant federal rules, which may duplicate, overlap or conflict with the proposed rule

No federal rules have been identified that duplicate, overlap or conflict with the proposed rule.

## 6.6 Significance of economic effects on small entities

### Substantial number criterion

If implemented, this proposed regulatory action would affect all of the small businesses that own or operate fishing vessels that actively harvest spiny lobster in federal waters off Puerto Rico, St. Croix, and St. Thomas/St. John. As stated previously, 64 (9.0%) of 710 annually active small commercial fishing businesses in Puerto Rico, 11 (18.3%) of 59 annually active small commercial fishing businesses in St. Croix, and 20 (30.1%) of 67 annually active small commercial fishing businesses in St. Thomas/St. John would be directly affected by the proposed rule annually.

### Significant economic effects

The outcome of “significant economic impact” can be ascertained by examining two factors: disproportionality and profitability.

Disproportionality: Do the regulations place a substantial number of small entities at a significant competitive disadvantage to large entities?

All entities directly regulated by this regulatory action have been determined to be small entities. Thus, the issue of disproportionality does not arise in the present case.

Profitability: Do the proposed regulations significantly reduce profits for a substantial number of small entities?

As explained above, the proposed rule would have no economic impact on small commercial fishing businesses in Puerto Rico, St. Croix, or St. Thomas/St. John. The proposed rule would not have significantly reduce profits for any small commercial fishing businesses that operate in federal waters of the U.S. Caribbean. Therefore, there would be no significant economic impact on a substantial number of small entities.

## Chapter 7. List of Preparers

List of personnel that assisted with development of the Framework Amendment 2 and Environmental Assessment.

**Table 7.1.** List of interdisciplinary plan team members and other contributors.

Name	Agency	Title
Graciela García-Moliner	CFMC	IPT Co-lead / Fishery Biologist
Liajay Rivera	CFMC	Technical Assistant for Ecosystem Based Fisheries Management
Walter Keithly	CFMC	Economist
Sarah Stephenson	NMFS/SFD	IPT Co-lead / Fishery Biologist
María del Mar López	NMFS/SFD	Caribbean Operations Branch Lead / Fishery Biologist
Ed Glazer	NMFS/SFD	Social Scientist
Denise Johnson	NMFS/SFD	Economist
Adam Bailey	NMFS/SFD	Technical Writer
Michael Larkin	NMFS/SFD	Data Analyst
Dominique Lazarre	NMFS/SFD	Data Analyst
Patrick O'Pay	NMFS/PRD	Fishery Biologist
Adyan Rios	NMFS/SEFSC	Biologist
Brent Stoffle	NMFS/SEFSC	Social Scientist
Noah Silverman	NMFS/SERO	Regional NEPA Coordinator
Anne Kersting	NOAA/GC	Attorney
Miguel Borges	NOAA/OLE	Enforcement Officer

CFMC = Caribbean Fishery Management Council, NMFS = National Marine Fisheries Service, SFD = Sustainable Fisheries Division, PRD = Protected Resources Division, SEFSC = Southeast Fisheries Science Center, SERO = Southeast Regional Office, GC = General Counsel, OLE= Office of Law Enforcement

## Chapter 8. List of Agencies, Organizations, and Persons Consulted

Department of Commerce Office of General Counsel  
National Marine Fisheries Service Office of General Counsel  
National Marine Fisheries Service Office of General Counsel Southeast Region  
National Marine Fisheries Service Southeast Regional Office  
National Marine Fisheries Service Southeast Fisheries Science Center  
National Marine Fisheries Service Silver Spring Office  
National Marine Fisheries Service Office of Law Enforcement Southeast Division  
United States Coast Guard  
United States Department of the Interior  
U.S. Virgin Islands Department of Planning and Natural Resources  
Puerto Rico Department of Natural and Environmental Resources  
Puerto Rico Junta de Calidad Ambiental (Puerto Rico Environmental Quality Board)

## Chapter 9. References

- Abel, J.R., and R. Dietz. 2014. The causes and consequences of Puerto Rico's declining population. *Current Issues in Economics and Finance*. Volume 20, Number 4. [https://www.newyorkfed.org/medialibrary/media/research/current\\_issues/ci20-4.pdf](https://www.newyorkfed.org/medialibrary/media/research/current_issues/ci20-4.pdf)
- Agar, J.J., and M. Shivlani. 2016. Socio-economic study of the hook and line fishery in the Commonwealth of Puerto Rico (2014). *Marine Fisheries Review*. 78(3-4): 12-21.
- Agar, J.J., M. Shivlani, and D. Matos-Caraballo. 2020. The aftermath of Hurricane María on Puerto Rican small-scale fisheries. *Coastal Management*. Volume 48, Number 5, pp. 378-397. <https://www.tandfonline.com/doi/full/10.1080/08920753.2020.1795967>
- Agar, J.J., M. Shivlani, and D. Solis. 2017. The Commercial Trap Fishery in the Commonwealth of Puerto Rico: an Economic, Social, and Technological Profile. *North American Journal of Fisheries Management*. Vol. 37(4):778-788. <https://doi.org/10.1080/02755947.2017.1317678>.
- Agar, J., B. Stoffle, M. Shivlani, D. Matos-Caraballo, A. Mastitski, and F. Martin. 2022. One-year COVID-19 Pandemic Impacts on U.S. Caribbean Small-Scale Fisheries with a note on the Puerto Rican earthquake swarm of 2020 and 2021. NOAA Tech. Memo. NMFS-759, 34 p. <https://repository.library.noaa.gov/view/noaa/47711>
- CFMC (Caribbean Fishery Management Council). 1981. Fishery management plan, final environmental impact statement, and regulatory impact review for the spiny lobster fishery of Puerto Rico and the U.S. Virgin Islands. Caribbean Fishery Management Council, San Juan, Puerto Rico. <https://repository.library.noaa.gov/view/noaa/18383>
- CFMC (Caribbean Fishery Management Council). 2004. Final environmental impact statement for the generic essential fish habitat amendment to: Spiny lobster Fishery Management Plan (FMP), Queen Conch FMP, Reef Fish FMP, and Coral FMP for the U.S. Caribbean, Vols. I and II. Caribbean Fishery Management Council, San Juan, Puerto Rico. <https://www.caribbeanfmc.com/fishery-management/2-uncategorised/173-feis-to-the-efh>
- CFMC (Caribbean Fishery Management Council). 2005. Comprehensive amendment to the fishery management plans (FMPs) of the U.S. Caribbean to address required provisions of the Magnuson-Stevens Fishery Conservation and Management Act (Sustainable Fisheries Act Amendment). Caribbean Fishery Management Council, San Juan, Puerto Rico. 533 pp + Appendices. <https://repository.library.noaa.gov/view/noaa/18269>

CFMC (Caribbean Fishery Management Council). 2019a. Comprehensive Fishery Management Plan for the Puerto Rico Exclusive Economic Zone, Environmental Assessment, Regulatory Impact Review, and Fishery Impact Statement. Caribbean Fishery Management Council, San Juan, Puerto Rico. 637 pp. <https://repository.library.noaa.gov/view/noaa/45274>

CFMC (Caribbean Fishery Management Council). 2019b. Comprehensive Fishery Management Plan for the St. Croix Exclusive Economic Zone, Environmental Assessment, Regulatory Impact Review, and Fishery Impact Statement. Caribbean Fishery Management Council, San Juan, Puerto Rico. 509 pp. <https://repository.library.noaa.gov/view/noaa/45275>

CFMC (Caribbean Fishery Management Council). 2019c. Comprehensive Fishery Management Plan for the St. Thomas/St. John Exclusive Economic Zone, Environmental Assessment, Regulatory Impact Review, and Fishery Impact Statement. Caribbean Fishery Management Council, San Juan, Puerto Rico. 507 pp. <https://repository.library.noaa.gov/view/noaa/45276>

CFMC (Caribbean Fishery Management Council). 2022. Framework Amendment 1 to the Fishery Management Plans for Puerto Rico, St. Thomas/St. John, and St. Croix: Modification of Spiny Lobster Management Reference Points Based on SEDAR 57 Stock Assessments Including Environmental Assessment, Regulatory Impact Review, and Regulatory Flexibility Act Analysis. Caribbean Fishery Management Council, San Juan, Puerto Rico. 139 pp. <https://repository.library.noaa.gov/view/noaa/49328>

de France, S.D., W.F. Keegan, and L.A. Newsom. 1996. The archaeobotanical, bone isotope, and zooarchaeological records from Caribbean sites in comparative perspective. In *Case Studies in Environmental Archaeology*, pp. 289–304. Ed. by E. J. Reitz, L. A. Newsom, and S. J. Scudder. Plenum Press. New York.

Die, D., and A. Morris (2004). Update of commercial landings of Spiny Lobster in Puerto Rico 1983-2003. SEDAR 8-DW-11. David Die and Alexis Morris: CUFER/CIMAS, RSMAS, University of Miami. <https://sedarweb.org/documents/s8dw11-the-commercial-lobster-fishery-on-puerto-rico-and-us-virgin-islands/>

Duany, J. 2002. *The Puerto Rican nation on the move: identities on the island and in the United States*. The University of North Carolina Press, Chapel Hill.

Feliciano, C. 1958. *The Lobster Fishery of Puerto Rico*. Puerto Rico Department of Agriculture and Commerce. San Juan. [https://aquadocs.org/bitstream/handle/1834/27852/gcfi\\_10-30.pdf?sequence=1&isAllowed=y](https://aquadocs.org/bitstream/handle/1834/27852/gcfi_10-30.pdf?sequence=1&isAllowed=y)

Fiedler, R.H. and N.D. Jarvis. 1932. Fisheries of the Virgin Islands of the United States. U.S. Dept. Comm., Bur. Fish. Invest. Rpt. No. 14. 32 pp.

Hospital J., and K. Leong. 2021. Community participation in Hawai'i fisheries. NOAA Technical Memorandum NMFS-PIFSC-119. 89 pp.  
<https://repository.library.noaa.gov/view/noaa/30731>

Impact Assessment. 2006. Community Profiles and Socioeconomic Evaluation of Marine Conservation Districts: St. Thomas and St. John, U.S. Virgin Islands. Glazier, E.W., and M. Jepson (authors). Prepared for the U.S. Department of Commerce, NOAA Fisheries, Southeast Fisheries Science Center under Contract WC133F-03-SE-1150. Miami.

Inigo, F. 1952. A preliminary report on a survey of the commercial fisheries of Puerto Rico. Rp. Div. Fish and Wildl. Dept. Agric. and Comm. P. R. (Mimeo): 1-8.  
[https://aquadocs.org/bitstream/handle/1834/27852/gcfi\\_10-30.pdf?sequence=1&isAllowed=y](https://aquadocs.org/bitstream/handle/1834/27852/gcfi_10-30.pdf?sequence=1&isAllowed=y)

Jarvis, N.D. 1932. The Fisheries of Puerto Rico. U.S. Department of Commerce, Bureau of Fisheries, Investigational Report. No. 13:1-41.

Jepson, M. and L.L. Colburn. 2013. Development of social indicators of fishing community vulnerability and resilience in the U.S. Southeast and Northeast Regions. U.S. Dept. of Commerce, NOAA Technical Memorandum NMFS-F/SPO-129, 64 p.  
<https://repository.library.noaa.gov/view/noaa/4438>

Jacob, S., P. Weeks, B. Blount, and M. Jepson. 2013. Development and evaluation of social indicators of vulnerability and resiliency for fishing communities in the Gulf of Mexico. *Marine Policy* 37:86-95. <https://www.sciencedirect.com/science/article/abs/pii/S0308597X12000759>

Kanciruk, P. 1980. Ecology of juvenile and adult Palinuridae (spiny lobsters). Pages 59-96 In: J. S. Cobb and B. F. Phillips, eds. *The Biology and Management of Lobsters*, Vol. II, Ecology and management. Academic Press, New York. 390 pp.

Kojis, B.L. 2004. Census of the Marine Commercial Fishers of the U.S. Virgin Islands. Caribbean Fishery Management Council, San Juan, PR. 87 pp.

Kojis, B.L. and N.J. Quinn. 2011. Census of the Marine Commercial Fishers of the U.S. Virgin Islands. Final Report submitted to NOAA/NMFS/SEFSC, Miami, Florida. 137 pp.



Kojis, B., N. Quinn, and J. Agar. 2017. Census of Licensed Fishers of the U.S. Virgin Islands (2016). NOAA Technical Memorandum NMFS-SEFSC-715, 160 pp.

<https://repository.library.noaa.gov/view/noaa/16210>

Matos-Caraballo, D. 2001. Overview of the spiny lobster, *Panulirus argus*, commercial fishery in Puerto Rico during 1992-1998. Proceedings of the Gulf and Caribbean Fisheries Institute, 52:194-203.

Matos-Caraballo, D., and J. Agar. 2011. Census of Active Commercial Fishermen in Puerto Rico: 2008. Department of Natural and Environmental Resources, Final Report to the National Marine Fisheries Service, NOAA. 39 pp.

Matos-Caraballo, D., M. Ricaurte-Chica, J. Leon, and L.A. Rivera. 2019. Portrait of the Spiny Lobster (*Panulirus argus*) Fishery in Puerto Rico during 1998 – 2013. SEDAR57-RD-21. July. Presented at the Proceedings of the 68th Gulf and Caribbean Fisheries Institute November 9 - 13, 2015. Panama City, Panama. <https://sedarweb.org/documents/sedar-57-rd-21-portrait-of-the-spiny-lobster-panulirus-argus-fishery-in-puerto-rico-during-1998-2013/>

Mattox, N.T. 1952. A preliminary report on the biology and economics of the spiny lobster (*Panulirus argus*). Proceedings of the Gulf and Caribbean Fisheries Institute 4:69-70.

Munro, J.L. 1974. The biology, ecology, exploitation and management of Caribbean reef fishes. Scientific Rep. ODA/UWI Fish. Ecol. Res. Proj., 1969-73. Pt. V. 1. The biology, ecology, and bionomics of Caribbean reef fishes: VI. Crustaceans (spiny lobsters and crabs). Univ. W. Indies 2:<101. Dep. Res. Rep. No. 3. Kingston, Jamaica, 57 pp.

Napolitano, M.F., R.J. Dinapoli, J.H. Stone, M.J. Levin, N.P. Jew, J.T. O’Conner, and S.M. Fitzpatrick. 2019. Reevaluating human colonization of the Caribbean using chronometric hygiene and Bayesian modeling. *Sci. Adv.* Vol. 5, Issue 12.

<https://www.science.org/doi/10.1126/sciadv.aar7806>

NMFS (National Marine Fisheries Service). 2020. Endangered Species Act Section 7 Consultation on the authorization and management of the Puerto Rico fishery under the Puerto Rico Fishery Management Plan (FMP), the St. Thomas/St. John fishery under the St. Thomas/St. John FMP, and the St. Croix fishery under the St. Croix FMP (SERO-2019-04047).

Pestle W.J., E.M. Perez, and D. Koski-Karell. 2023. Reconsidering the lives of the earliest Puerto Ricans: Mortuary Archaeology and bioarchaeology of the Ortiz site. PLoS ONE 18(4): e0284291. <https://doi.org/10.1371/journal.pone.0284291>

Ramos, R.R. 2010. Rethinking Puerto Rican Precolonial History. The University of Alabama Press. Tuscaloosa.

Reichard, R. 2020. Why Young Diasporicans Have Decided to Repatriate Puerto Rico. Remezcla. October 7, 2020. <https://remezcla.com/features/culture/young-diasporicans-decided-repatriate-puerto-rico/>

Rodriguez, R.R., M.R. Lopez, and W.J. Pestle. 2023. Revision of the cultural chronology of precolonial Puerto Rico: A Bayesian approach. PLoS ONE 18(2): e0282052. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0282052>

Ross, E. and D. Behringer. 2019. Changes in temperature, pH, and salinity affect the sheltering responses of Caribbean spiny lobsters to chemosensory cues. Sci Rep 9, 4375. <https://doi.org/10.1038/s41598-019-40832-y>

Rouse, I. 1992. The Tainos: Rise and Decline of the People Who Greeted Columbus. Yale University Press, New Haven, CT. 213 pp.

SEDAR (SouthEast Data, Assessment, and Review) 57. 2019. Stock Assessment Report U.S. Caribbean Spiny Lobster Southeast Data, Assessment, and Review. North Charleston, South Carolina. <https://sedarweb.org/sedar-57>

Spanier, E., K.L. Lavalli, J.S. Goldstein, J.C. Groeneveld, G.L. Jordaan, C.M. Jones, B.F. Phillips, M.L. Bianchini, R.D. Kibler, D. Díaz, S. Mallo, R. Goñi, G.I. van Der Meeren, A-L. Agnalt, D.C. Behringer, W.F. Keegan, and A. Jeffs. 2015. A concise review of lobster utilization by worldwide human populations from prehistory to the modern era. ICES Journal of Marine Science. [https://academic.oup.com/icesjms/article/72/suppl\\_1/i7/620442](https://academic.oup.com/icesjms/article/72/suppl_1/i7/620442)

Stoffle, B., J.R. Waters, S. Abbott-Jamieson, S. Kelley, D. Grasso, J. Freibaum, S. Koestner, N. O'Meara, S. Davis, M. Stekedee, and J. Agar. 2009. Can an island be a fishing community: an examination of St. Croix and its fisheries. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Science Center. NOAA Technical Memorandum NMFS-SEFSC-593. Silver Spring. <https://repository.library.noaa.gov/view/noaa/551>

Swingle, W.E., A.E. Dammann, and J.A. Yntema. 1970. Survey of the Commercial Fishery of the Virgin Islands of the United States. Proc. Gulf Carib Fish. Inst. 22:110-121.

U.S. Census Bureau. 2023. Table S1701 – Poverty Status in the Past 12 Months. Puerto Rico. [https://data.census.gov/profile/Puerto\\_Rico?g=040XX00US72](https://data.census.gov/profile/Puerto_Rico?g=040XX00US72)

U.S. Census Bureau. 2022. 2020 Island Areas Censuses: U.S. Virgin Islands. [census.gov/data/tables/2020/dec/2020-us-virgin-islands.html](https://www.census.gov/data/tables/2020/dec/2020-us-virgin-islands.html)

U.S. Census Bureau. 2021. Census Population and Housing Unit Counts for the U.S. Virgin Islands. <https://www.census.gov/newsroom/press-releases/2021/2020-census-us-virgin-islands.html>

U.S. Census Bureau. 2020. Puerto Rico: 2020 Census. <https://www.census.gov/library/stories/state-by-state/puerto-rico-population-change-between-census-decade.html>

Valdés-Pizzini, M., J.J. Agar, K. Kitner, C. García-Quijano, M. Tust, and F. Forrestal. 2010. Cruzan Fisheries: A rapid assessment of the historical, social, cultural and economic processes that shaped coastal communities' dependence and engagement in fishing in the island of St. Croix, U.S. Virgin Islands. NOAA Series on U.S. Caribbean Fishing Communities. NOAA Technical Memorandum NMFS-SEFSC-597, 144 p. <https://www.fisheries.noaa.gov/inport/item/69956>

Vega, J.E. 1990. The Archaeology of Coastal Change, Puerto Rico. A dissertation presented to the graduate school of the University of Florida in partial fulfillment of the requirements for the degree of doctor of philosophy at the University of Florida. Gainesville. <https://ufdcimages.uflib.ufl.edu/AA/00/02/64/92/00001/archaeologyofcoa00vega.pdf>

Virgin Islands Consortium. 2021. USVI Populations Drops a Stunning 18.1 Percent to 87,146 From 106,405. October 28. [https://viconsortium.com/vi-top\\_stories/virgin-islands-usvi-population-drops-a-stunning-18-1-percent-to-87146-from-106405](https://viconsortium.com/vi-top_stories/virgin-islands-usvi-population-drops-a-stunning-18-1-percent-to-87146-from-106405)

## Appendix A. Additional Affected Environment Information

### A1. Landings Information Included in Chapter 3 of the Framework Amendment 1 to the Puerto Rico, St. Croix, and St. Thomas and St. John Fishery Management Plans (FMP): Modification of Spiny Lobster Management Reference Points

#### A.1.1. Puerto Rico

**Table A 1.1.** Number of commercial fishermen in Puerto Rico who reported landings of spiny lobster for 2012-2019, the total adjusted landings (in pounds), and the percent reported from state waters (0-3 nautical miles), federal waters (3-200 nautical miles), or unknown location.

Year	Number of Fishermen	Spiny Lobster Landings (lbs)*	Percent from State Waters	Percent from Federal Waters	Percent from Unknown Area
2012	290	385,811	26%	11%	63%
2013	325	275,424	71%	8%	21%
2014	345	376,779	77%	8%	15%
2015	351	418,273	78%	9%	13%
2016	344	449,233	87%	7%	5%
2017	328	283,221	91%	7%	3%
2018	320	520,829	93%	5%	3%
2019	373	489,243	90%	8%	2%

\* Puerto Rico landings are adjusted using an expansion factor determined by Department of Natural and Environmental Resources staff at the Fisheries Research Laboratory, which is based on intercept sampling of commercial fishermen.

Source: NMFS SERO 2023

**Table A 1.2.** Percent of spiny lobster landings in Puerto Rico for 2012-2019 reported by gear type.

Year	Diving	Traps	Nets*
2012	58%	39%	3%
2013	64%	30%	6%
2014	59%	35%	6%
2015	57%	38%	5%
2016	53%	41%	6%
2017	58%	37%	5%
2018	62%	34%	4%
2019	57%	37%	6%

\* Values include landings from gill nets and trammel nets that are prohibited gear types for harvest of spiny lobster in federal waters.

Source: NMFS SERO 2023

**Table A 1.3.** Adjusted commercial landings (in pounds whole weight) and the number of trips that reported spiny lobster and co-occurring species in Puerto Rico in 2018 and 2019.

Species	2018 Landings	2018 Trips	2019 Landings	2019 Trips
Lobster Spiny	520,829	10,964	488,734	12,365
Conch Queen	172,718	3,520	100,809	3,485
Hogfish	62,939	2,841	52,893	3,131
Triggerfish Queen	44,933	2,279	45,646	2,925
Boxfish, Unspecified	31,144	1,975	33,562	2,305
Grouper Red Hind	26,422	1,387	23,117	1,460
Octopus, Unspecified	15,833	989	14,238	1,305
Parrotfishes, Unspecified	23,518	868	25,508	1,231
Snapper Mutton	21,327	944	18,782	1,168
Snapper Lane	18,856	623	21,595	1,031
Snapper, Unspecified	14,068	615	14,351	835
Porgy, Unspecified	11,325	498	9,437	735
Snapper Yellowtail	11,551	530	10,836	713
Grunt, Unspecified	14,606	262	15,788	529
Lionfish	3,883	225	4,698	291
Snapper Cubera	4,186	206	3,742	280
Goatfish Spotted	4,483	172	3,374	205
Crab, Unspecified	657	156	1,036	196
Jack Bar	3,639	124	3,332	165
Grouper, Unspecified	3,321	155	2,862	161
Squirrelfish	1,896	123	1,844	159
Snapper Silk	5,673	111	3,952	154

Source: NMFS SERO 2023

Traps and diving have represented in excess of 90% of the commercial harvest of spiny lobster in Puerto Rico since 2012 (Table A 1.2) with reported harvests from diving consistently exceeding reported harvests from traps. Approximately 70% of trips reporting the harvest of spiny lobster from federal waters indicate that the harvest was taken via diving with the figure approaching 80% in 2019.

While important to the Island’s economy, economic analysis of Puerto Rico’s commercial fishing industry is limited. With respect to the Island’s commercial diving sector, the most comprehensive study is that conducted by Agar and Shivilani (2016) who interviewed ‘active’ divers between March 2014 and March 2015 in an effort to ascertain characteristics of the fishermen and their fishing practices. The researchers found that the commercial divers had various economic objectives associated with their fishing trips with about two-thirds of the fishermen reporting having a ‘target’ (e.g., catch and/or income) that that he hoped to achieve.

About a quarter of the interviewees reported maximizing benefits (i.e., catching as much as possible) as their trip objective.

Gross returns per trip among diving operations according to Agar and Shivilani (2016) ranged from \$75 to \$700 and averaged \$251.<sup>30</sup> Total variable costs per trip, according to Agar and Shivilani (2016) averaged \$81 resulting in net earnings per trip of about \$170. The crew size (including the captain) averaged 2.4 indicating per trip net earnings per person of about \$70 (with owner-captains generally receiving somewhat more than crew members).

Agar et al. (2017) also examined the commercial Puerto Rico trap fishery with data for the analysis coming from active trap fishermen. Interviews were conducted between June 2014 and January 2016. The average boat length among participants was 20 feet. About two-thirds of the participants reported fishing exclusively with fish traps while another 20% reported fishing with both fish traps and lobster traps. Among survey participants, about 40% reported a trip objective of maximizing landings while about 30% had an objective of covering costs. On average, respondents reported making an average of 2.3 trips per week with average landings per trip being 57 pounds. Gross revenues per trip were estimated to equal \$290 (a median of \$207) with total variable costs per trip equaling \$57. This resulted in estimated net earnings of \$232 per trip.

### A.1.2 St. Croix

**Table A 1.4.** Number of commercial fishermen in St. Croix who reported landings of spiny lobster for 2012-2021, the total reported landings (in pounds), and the percent reported from state waters (0-3 nautical miles), federal waters (3-200 nautical miles), or unknown location.

Year	Number of Fishermen	Spiny Lobster Landings (lbs)	Percent from State Waters	Percent from Federal Waters	Percent from Unknown Area
2012	43	87,073	51%	49%	0%
2013	32	59,398	57%	41%	2%
2014	29	39,724	64%	30%	5%
2015	29	44,963	55%	38%	7%
2016	26	31,582	63%	31%	7%
2017	27	26,193	65%	29%	6%
2018	15	10,970	59%	39%	2%
2019	19	15,721	59%	30%	11%
2020	25	22,312	41%	52%	7%
2021	30	39,422	51%	49%	0%

Source: NMFS SERO 2023

<sup>30</sup> This number compares favorably to the revenue figures (for all trips reporting the harvest of spiny lobster). Specifically, 2014 estimated per trip revenues based on trip tickets equaled \$224 or about 90% of that reported by Agar and Shivilani (2016).

**Table A 1.5.** Percent of spiny lobster landings in St. Croix for 2012-2021 reported by gear type.

Year	Diving	Traps
2012	82%	18%
2013	90%	10%
2014	94%	6%
2015	87%	13%
2016	97%	3%
2017	89%	11%
2018	94%	6%
2019	92%	8%
2020	91%	9%
2021	85%	15%

Source: NMFS SERO 2023

**Table A 1.6.** Number of trips and landings (in pounds) of spiny lobster reported in St. Croix for 2018-2021, the reported landings and number of trips for the top co-occurring species reported on the same trips reporting spiny lobster.

Species	2018 Landings	2018 Trips	2019 Landings	2019 Trips	2020 Landings	2020 Trips	2021 Landings	2021 Trips
Lobsters, Spiny	10,970	313	15,721	395	22,312	447	39,422	914
Parrotfish, Stoplight	6,020	159	3,976	108	14,441	212	19,585	473
Triggerfish, Queen	2,977	146	2,221	140	3,409	211	8,153	465
Grouper, Red Hind	893	90	1,575	113	3,529	195	7,253	449
Snapper, Gray	427	48	320	39	2,220	156	3,617	288
Parrotfish, Redfin	1,128	65	934	71	1,424	98	5,929	286
Schoolmaster	1,163	84	1,908	115	2,130	121	4,173	231
Grouper, Coney	666	77	850	63	2,898	177	3,231	219
Grunt, Bluestriped	844	77	698	67	2,738	186	2,895	201
Surgeonfish, Doctorfish	667	59	821	58	2,836	172	2,458	186
Surgeonfish, Blue Tang	194	37	827	63	2,947	179	2,375	175
Angelfish, Gray	516	54	392	46	2,229	151	1,930	156
Conch, Queen	6,466	105	7,950	114	3,893	89	8,413	144
Snapper, Mutton	493	63	442	41	2,713	165	2,066	144
Grunt, White	65	10	931	60	2,298	151	2,347	143
Angelfish, French	594	59	83	22	2,470	156	1,759	142
Blue Runner	455	29	174	10	2,465	138	2,156	129
Squirrelfish	41	5	178	14	1,840	128	1,444	123
Surgeonfish, Ocean	410	29	297	16	2,654	140	1,967	120
Goatfish, Unspecified	509	49	75	16	2,203	140	1,527	118
Angelfish, Queen	70	8	295	18	2,180	129	1,672	107
Grunt, Tomtate	470	28	220	20	2,276	127	1,436	101
Hind, Rock	268	32	348	29	2,080	138	1,171	100

Species	2018 Landings	2018 Trips	2019 Landings	2019 Trips	2020 Landings	2020 Trips	2021 Landings	2021 Trips
Parrotfish, Redtail	1,864	74	3,568	115	1,701	73	1,711	94
Parrotfish, Redband	371	38	655	60	2,020	138	1,632	67
Snapper, Lane	370	28	250	12	1,909	131	1,048	66
Parrotfish, Princess	102	6	331	23	447	32	1,067	65
Parrotfish, Queen	707	42	326	22	363	26	1,163	65
Grunt, Margate	13	2	146	24	214	29	327	46
Lionfish	65	9	37	8	89	14	144	36

Source: NMFS SERO 2023

### A.1.3 St. Thomas/St. John

**Table A 1.7.** Number of commercial fishermen in St. Thomas/St. John who reported landings of spiny lobster for 2012-2021, the total reported landings (in pounds), and the percent reported from state waters (0-3 nautical miles), federal waters (3-200 nautical miles), or unknown location.

Year	Number of Fishermen	Spiny Lobster Landings (lbs)	Percent from State Waters	Percent from Federal Waters	Percent from Unknown Area
2012	32	83,157	24%	76%	0%
2013	29	84,513	16%	79%	5%
2014	29	92,261	18%	81%	1%
2015	29	109,455	29%	69%	3%
2016	30	121,695	34%	61%	5%
2017	29	91,911	41%	59%	0%
2018	28	86,708	55%	45%	0%
2019	29	98,608	44%	56%	0%
2020	35	94,328	42%	58%	0%
2021	29	99,174	52%	48%	0%

Source: NMFS SERO 2023

**Table A 1.8.** Percent of spiny lobster landings in St. Thomas/St. John for 2012-2021 reported by gear type.

Year	Diving	Traps
2012	2%	98%
2013	1%	99%
2014	1%	99%
2015	1%	99%
2016	2%	98%
2017	6%	94%
2018	7%	93%
2019	1%	99%



Year	Diving	Traps
2020	2%	98%
2021	2%	98%

Source: NMFS SERO 2023

**Table A 1.9.** Number of trips and landings (in pounds) of spiny lobster reported in St. Thomas/St. John for 2018-2021, the reported landings and number of trips for the top co-occurring species reported on the same trips reporting spiny lobster.

Species	2018 Landings	2018 Trips	2019 Landings	2019 Trips	2020 Landings	2020 Trips	2021 Landings	2021 Trips
Lobsters, Spiny	86,708	806	98,608	867	94,328	1013	99,174	1035
Triggerfish, Queen	20,587	438	17,985	421	23,975	501	18,981	424
Grouper, Red Hind	13,538	433	14,732	397	17,390	485	12,738	396
Angelfish, Gray	7,543	418	6,659	359	7,432	452	6,342	382
Grunt, White	6,248	354	6,748	360	7,715	426	6,341	332
Doctorfish	3,708	359	4,263	342	4,667	408	4,160	331
Cowfish, Scrawled	4,603	385	3,986	350	4,751	399	3,722	320
Snapper, Yellowtail	2,850	359	2,643	322	2,745	378	2,032	303
Squirrelfish	2,837	353	3,031	355	3,719	403	2,946	301
Surgeonfish, Blue Tang	2,484	313	2,465	285	2,672	352	2,242	294
Parrotfish, Stoplight	3,048	309	3,570	293	3,067	351	2,688	290
Grunt, Bluestriped	3,584	320	4,068	312	4,097	369	3,077	285
Grouper, Coney	2,089	323	2,224	290	2,322	364	1,801	276
Angelfish, French	3,411	302	2,844	247	3,211	313	2,718	267
Porgy, Saucereye	3,714	347	3,267	310	3,278	340	2,690	267
Parrotfish, Redtail	2,207	255	2,743	288	2,658	329	1,915	256
Triggerfish, Unspecified	4,721	351	3,560	272	2,724	320	1,654	245
Grunt, Cottonwick	1,743	253	1,361	229	1,513	259	1,415	217
Hogfish	2,180	222	2,292	205	3,113	274	2,256	202
Snapper, Mutton	2,663	183	1,663	145	2,674	199	2,294	164
Crab, Unspecified	1,417	136	896	127	951	134	1,293	163
Angelfish, Queen	1,330	178	1,734	209	1,600	219	1,179	156
Grunt, Margate	2,279	189	2,278	156	2,086	154	1,511	115
Lionfish	1,940	128	2,076	123	1,390	114	1,341	112
Grouper, Yellowfin	1,270	69	899	49	874	58	1,474	90
Snapper, Lane	2,036	122	619	71	844	98	961	88
Grouper, Red	1,075	53	983	46	1,096	57	1,864	70
Snapper, Blackfin	1,828	50	2,527	82	1,677	91	898	63
Grunt, Tomtate	110	20	160	24	230	28	370	53
Porgy, Jolthead	592	75	288	34	361	40	362	42

Source: NMFS SERO 2023

## A2. General Economic Environment of Puerto Rico and the U.S. Virgin Islands

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.

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. Most of the roughly 3,000 people who died in Puerto Rico in Maria's aftermath died because of lack of electricity and the ensuing interruptions in medical and other services. 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>31</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 (U.S. Department of Agriculture [USDA] National Resources Conservation Service Caribbean Area).<sup>32</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

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<sup>31</sup> <https://www.ncdc.noaa.gov/billions/events.pdf>

<sup>32</sup> <https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/pr/newsroom/features/?cid=nrcseprd1420889>

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/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.

### A.2.1 Puerto Rico

Puerto Rico's population is and has been a significant economic resource; within its population are workers, small business owners, and innovation. However, wages in Puerto Rico tend to be about half the level of the mainland and income inequality is considerably higher. That plus the disastrous 2017 hurricane season motivated a larger number of Puerto Ricans to move out of the territory.<sup>33</sup> The number that left for the mainland increased to 301,304 in 2017 and peaked in 2018 (U.S. Census Bureau). Puerto Rico's population declined every year from 2012 through 2018, with the largest declines in 2017 (2.4%) and 2018 (3.9%). In 2018, 31 per 1,000 of the population moved out of the territory. However, net outmigration slowed during COVID, and there was a slight population increase in 2019 (3.19 million) and another increase in 2020 (3.28 million).<sup>34</sup> The population fell again in 2021 (3.26 million) and 2022 (3.22 million) (U.S. Census Bureau (Census)). The United Nations projections suggest an increase in the territory's population in 2023.

The World Bank compares the labor force participation rates of countries and includes U.S. territories in its rankings.<sup>35</sup> Puerto Rico's labor force participation rate tends to be among the lowest in the world. From 2012 through 2021, it averaged approximately 40%, as compared to approximately 62% for the U.S. and 56% for the U.S. Virgin Islands (Table A 2.1) (The World Bank). Various explanations of why the island's labor force participation rate is so low are offered in academic and public media, such as the rate is lowered by ongoing out-migration of working-age Puerto Ricans leaving for higher wages and incomes on the mainland and/or large numbers of working-age men and women choose to be out of the labor force for reasons such as family (housewives), underground economy or they are discouraged.<sup>36</sup>

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<sup>33</sup> Another incentive that followed Hurricane Maria was the prolonged power outage, which was the most extensive power outage in U.S. history.

<sup>34</sup> In 2020, net outmigration was approximately 16 per 1,000 residents.

<sup>35</sup> Labor force participation rate is the percentage of the working-age population that is in the labor force.

<sup>36</sup> Discouraged workers are defined as those persons not in the labor force who want and are available for work, and who have looked for a job sometime in the prior 12 months, but were not counted as unemployed because they had not searched for work in the 4 weeks preceding the survey.

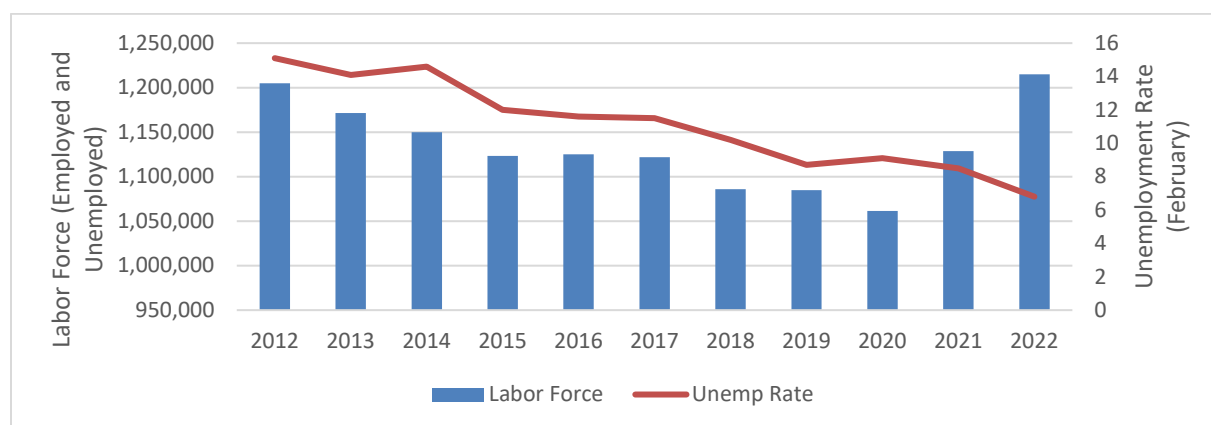
**Table A 2.1.** Labor participation rate for Puerto Rico, U.S., and Virgin Islands, 2012 – 2021.

Year	Puerto Rico	U.S.	U.S. Virgin Islands
2012	40.38%	62.82%	60.33%
2013	40.26%	62.45%	56.95%
2014	40.14%	62.19%	56.26%
2015	40.02%	62.06%	58.65%
2016	40.10%	62.21%	58.32%
2017	40.00%	62.30%	59.13%
2018	40.50%	62.37%	55.06%
2019	40.90%	62.62%	52.30%
2020	40.20%	61.31%	51.81%
2021	40.29%	61.22%	53.56%
<b>Average</b>	<b>40.28%</b>	<b>62.15%</b>	<b>56.24%</b>

Source: World Bank, Labor Force Participation Rate.

<https://data.worldbank.org/indicator/SL.TLF.CACT.ZS?end=2021&start=2012>.

A look at Puerto Rico’s February labor force and unemployment rate shows generally declining trends from 2012 to 2020 (Figure A 2.1). However, the February labor force expanded in both 2021 and 2022, and the February unemployment rate during those years was lower than it had been since 2012 (U.S. Department of Labor [USDOL] Bureau of Labor Statistics [BLS]). As of mid-2022, private-sector employment was at a fifteen-year high.

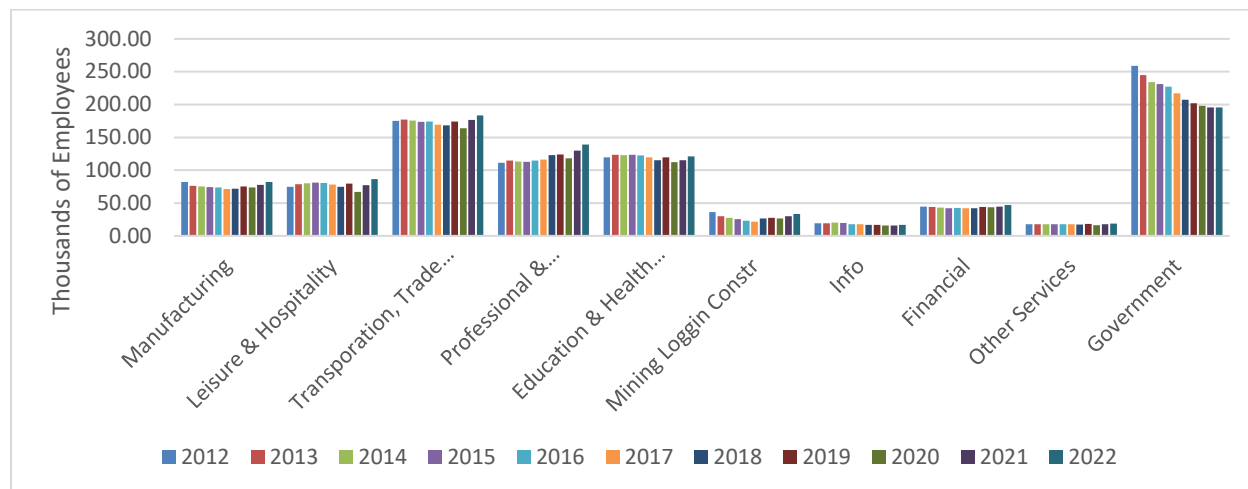


**Figure A 2.1.** Labor force and unemployment rate in Puerto Rico, 2012 – 2020.

Source: USDOL BLS

The medical manufacturing industry remains a key part of Puerto Rico’s economy, though employment in this industry is well below its peak levels of 2005. The tourism sector is relatively small, but it has been one of the territory’s strongest job creators in recent years. From 2020 through 2022, employment in the leisure and hospitality industry grew from 66,710 to 86,310. Employment in the transportation, trade and utilities industry grew from 163,980 in

2020 to 183,620 in 2022. Government was the only sector with a loss of employment from 2020 through 2022 (Figure A 2.2). As of mid-2022, private-sector employment was at a fifteen-year high.



**Figure A 2.2.** Total nonfarm employment by sector, 2012 – 2022.  
Source: U.S. Department of Labor (DOL), Bureau of Labor Statistics (BLS)

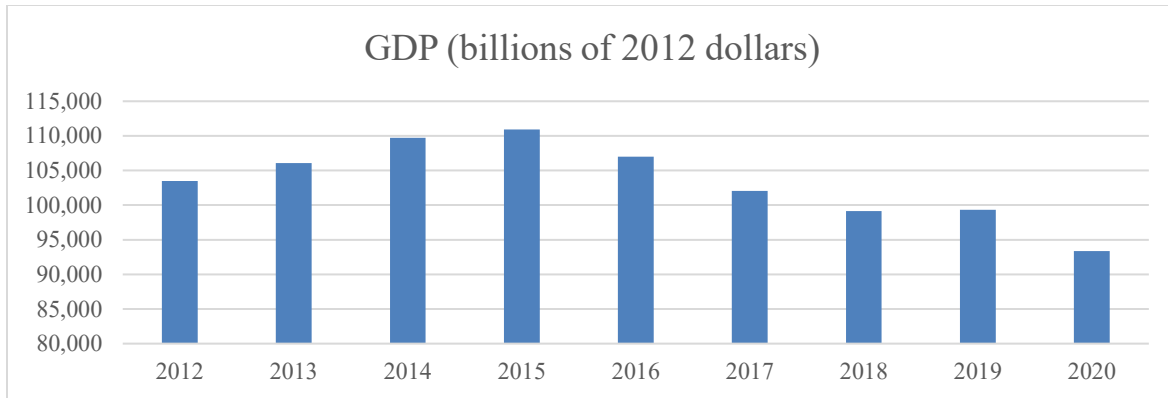
A new aerospace industry has emerged that has added jobs and is clustered around Aguadilla and Arecibo.<sup>37</sup> In part, that has occurred because of the territory’s expressed interest in developing a space port, as evidenced in February 2023 when the Puerto Rico Ports Authority issued a request for proposals seeking candidates to handle the leasing, development, construction, operation, marketing and maintenance of a spaceport at José Aponte de la Torre (JAT) airport in Ceiba.<sup>38</sup>

Despite the labor force downtrend from 2012 through 2018, Puerto Rico’s Gross Domestic Product (GDP) rose from approximately \$103.5 billion dollars in 2012 to peak to \$110.9 billion in 2016, although it generally declined thereafter (Figure A 2.3). GDP is forecast to rise in 2022/2023; however, forecasts beyond that are mixed.<sup>39</sup>

<sup>37</sup> Aerospace companies with operations in Puerto Rico include Lockheed Martin, Collins Aerospace, Pratt & Whitney, Raytheon Technologies, Honeywell Aerospace, Lufthansa Technik, Boeing, and others. According to Puerto Rico’s Department of Economic Development and Commerce, by the end of 2018, the aerospace industry was generating \$500 million annually and some 7,000 direct and indirect jobs.

<sup>38</sup> According to the New York Federal Reserve Bank (2023), the San Juan-Caguas metropolitan area accounts for about 75% of the territory’s economy (<https://www.newyorkfed.org/regional-economy/profiles/puertorico>). Ceiba is located outside that area and is about 42 miles southeast of San Juan.

<sup>39</sup> The World Bank, Economist Intelligence Unit and Statista.com forecast real GDP to increase in 2022 and 2023. They differ in following years. The World Bank and Economist Intelligence Unit expect smaller and declining increases after 2023, while Statista.com forecasts decreases in real GDP from 2024 through 2026.



**Figure A 2.3.** Puerto Rico GDP, 2012 – 2020.

Source: BEA Puerto Rico GDP, issued January 12, 2023

The COVID-19 pandemic had a devastating effect on travel and tourism across the Caribbean. Travel and tourism’s share of Puerto Rico’s GDP fell by 50.4% in 2020. Travel and tourism accounted for 10.3% of Puerto Rico’s GDP in 2019, but only 5.3% in 2020 (World Travel and Tourism Council June 2022). However, in 2021, its share rose to 6.1%.

Exports add to GDP, while imports subtract from it. From 2012 through 2020, Puerto Rico’s net exports was always positive and ranged from \$17.70 billion (2018) to \$36.62 billion (2015) (BEA GDP tables for Puerto Rico). Net exports fell from \$24.44 billion in 2019 to \$18.90 billion in 2020. BEA does not have a net export figure for 2021 available at the time of this writing.

Pharmaceuticals make up the largest portion of Puerto Rico’s exports, and 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 2021, there were 49 pharmaceutical companies and 70 manufacturers of medical devices (Datexcorp.com).

Manufacturing, which includes the production of pharmaceuticals and medical devices, is the territory’s largest economic sector, contributing, on average, to approximately 47% of Puerto Rico’s GDP annually from 2012 through 2020 (Table A 2.2). The second largest contributor to GDP is the finance, insurance and real estate sector (Fin, Ins & RE), with the service sector running third. The smallest sector is agriculture, forestry and fishing (Ag, For & Fish), and it contributes to less than 1% of GDP annually. Prior to the late 1950s, the agriculture, forestry and

fishing sector was the largest economic sector because of sugarcane and other agriculture products.

**Table A 2.2.** Percentage of Puerto Rico’s GDP by sector, 2012 – 2020.

Sector	Percent of Puerto Rico’s GDP									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	Ave.
Manufacturing	45%	47%	47%	48%	48%	48%	47%	47%	48%	47%
Fin, Ins & RE	21%	20%	20%	19%	19%	19%	20%	20%	21%	20%
Services	13%	13%	13%	13%	13%	14%	13%	13%	13%	13%
Government	8%	8%	8%	7%	7%	7%	6%	6%	5%	7%
Trade	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Trans & P Util <sup>1</sup>	3%	3%	3%	3%	3%	3%	3%	4%	3%	3%
Constr & Min <sup>2</sup>	1%	1%	1%	1%	1%	<1%	1%	1%	1%	1%
Ag, For & Fish	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

1. Transportation and Other Public Utilities

2. Construction and Mining

Source: Puerto Rico Government Planning Board, Fact Sheet, Economic Report to the Governor (2018 and 2020), Annual Fact Sheets (2013 – 2015, 2020, 2022).

Most of Puerto Rico’s farms<sup>40</sup> were and 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 were 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). Agriculture’s contribution to GDP declined from 0.81% in 2017 to 0.71% in 2018. In 2021, its contribution declined to 0.67% (<https://data.worldbank.org/indicator/NV.AGR.TOTL.ZS?locations=PR>).

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

<sup>40</sup> Most farms in Puerto Rico were and continue to be small, with 54% selling less than \$5,000 annually (2018 USDA Census of Agriculture (USDA 2020).

of farms were those with one to nine cuerdas<sup>41</sup> (Table A 2.3). The 2022 Census of Agriculture was mailed out to all known agriculture producers in every municipio in December 2022 and responses were due in February 2023.<sup>42</sup>

**Table A 2.3.** 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

Puerto Ricans who aspire to own and operate commercial farms are challenged by the cost of acquiring land. Real estate prices have risen rapidly in recent years making it more difficult for them to buy land. Leasing either private or public land has also become more difficult since it is more lucrative for a private land owner to sell land rather than lease it. Also, territorial agencies that lease public lands have favored multinational corporations.<sup>43</sup>

From 2012 to 2018, the number of corporate farms increased from 738 to 1,147, a 55% increase, while the amount of cuerdas corporations farmed increased by 12% (Table A 2.4). There were decreases in the number of farms and cuerdas by all other organization types.

<sup>41</sup> One cuerda is equivalent to 0.97 acre.

<sup>42</sup> Responding to the Census of Agriculture is required by law under Title 7 USC 2204(g) Public Law 105-113. The same law requires USDA National Agricultural Statistics Service (NASS) to keep all information confidential, to use the data only for statistical purposes, and only publish in aggregate form to prevent disclosing the identity of any individual producer or farm operation. NASS will release the results of the ag census in 2024.

<sup>43</sup> According to Puerto Rico's Center for Investigative Journalism (CPI) (March 2017), multinational seed corporations, such as Monsanto, control 31% of the land with the greatest potential for agriculture in the municipality of Juana Díaz. It is the transgenic epicenter of Puerto Rico. Seed corporations dominate about 9,712 public and private acres in the island. Between 2006 and 2015, Puerto Rico became the locality with more permits to do experiments with transgenics in the United States and its territories. Corporations that dominate the global transgenic seed and agrochemical industry are located there: Monsanto, Bayer CropScience, DuPont Pioneer, Syngenta, Dow AgroSciences, AgReliant Genetics and Illinois Crop Improvement. This industrial sector received more than \$526 million in subsidies and tax exemptions from the territory between 2006 and 2015, according to CPI's analysis of those benefits contained in government documents. See <https://periodismoinvestigativo.com/2017/03/the-boom-of-monsanto-and-other-seed-corporations-blows-in-the-south-of-puerto-rico/>.



**Table A 2.4.** Number of farms and cuerdas by type of organization, 2012, 2018.

Organization Type	Number of Farms 2012	Number of Farms 2018	Cuerdas 2012	Cuerdas 2018
Individual or Family	11,938	6,886	406,461	309,497
Partnership	117	77	18,414	7,799
Corporation	738	1,147	138,152	154,869
Other	366	120	21,962	15,610

Source: Puerto Rico USDA 2018 Census of Agriculture

Land leases tend to be relatively short (2 to 3 years), with no guarantee that the lease can or will be continued despite a farmer's inputs into improving the land for commercial agriculture. Another factor is climate change. Puerto Rico's farmers have to consider what they can do versus what they must do to have sustainable farms that can withstand hurricanes, droughts, heat waves, floods, and other natural adverse events. For many, commercial farming is not a viable option.

The 2017 hurricanes showed how vulnerable the territory's food systems were. Residents lost access to electrical power and food, and had to wait for months to get fresh food. A study by Rodriguez-Cruz et al. (2022) found that 69% of Puerto Rico's 405 surveyed farmers experienced at least one month of food insecurity in the aftermath of Hurricane Maria, and 38% reported persistent food insecurity (three months or more). More recently, the COVID pandemic has also increased food insecurity. A 2020 online survey (Ostolaza et al. 2021) found that of the almost 1,400 survey participants, 40% experienced food insecurity during the pandemic--up from 38% before the pandemic (<https://publichealth.gwu.edu/content/survey-finds-40-percent-puerto-rican-families-reporting-food-insecurity-due-covid-19>). Family vegetable gardens helped ease the food shortage; however, it was far from enough.

In Puerto Rico, the majority of children rely on school meals, typically getting breakfast and lunch at school. The government of Puerto Rico delayed food distribution in school cafeterias in Puerto Rico until May 5, 2020, a decision that led to controversy. The survey ran from June 9 to June 30, 2020, and only 27% of participants reported that they were using school food services during that time. Ostolaza et al. (2021) were concerned that school-aged children were not getting enough food to grow and develop properly because school food programs were not being used.

Although freshly caught fish and shellfish can help reduce food insecurity, Puerto Rico's per capita consumption of seafood ranks at the bottom globally. From 2009 through 2011, the territory's average per capita consumption of fish and seafood for human food was 0.5 kilograms (1.1 lbs). Only Afghanistan (0.2 lbs), Mongolia (0.9 lbs), and Ethiopia (0.5 lbs) had lower average

per capita seafood consumption

([https://www.st.nmfs.noaa.gov/Assets/commercial/fus/fus13/09\\_percapita2013.pdf](https://www.st.nmfs.noaa.gov/Assets/commercial/fus/fus13/09_percapita2013.pdf)). Its Caribbean neighbors of the USVI, Haiti, and Dominican Republic had average per capita seafood consumption of 19.6 lbs, 10.1 lbs, and 22.1 lbs, respectively.

The territory does not produce most of its residents' food: 85% to 90% of its food is imported and 86% of the meat supply comes from the U.S. mainland (Ramos Segarra, Sept. 9 and 15, 2020). According to Puerto Rico's Secretary of Agriculture, there is insufficient agricultural land to feed all of the territory's residents, so it has to import food

([https://www.theweeklyjournal.com/business/food-autonomy-is-impossible-in-puerto-rico/article\\_2622ff42-f22d-11ea-a158-d71aa4411364.html](https://www.theweeklyjournal.com/business/food-autonomy-is-impossible-in-puerto-rico/article_2622ff42-f22d-11ea-a158-d71aa4411364.html)). The territory imports about 79% of the 352 million pounds of chicken consumed annually, 92% of beef consumed, and 96% of pork consumed (Table A 2.5).

**Table A 2.5.** Annual Meat Consumed, Produced within, and Imported into Puerto Rico.

Meat	Consumed (millions of lbs)	Produced in PR (millions of lbs)	Imported (millions of lbs)	Percentage Produced in PR	Percentage Imported
Chicken	352	73	279	20.74%	79.26%
Beef	124	10	114	8.06%	91.94%
Pork	224	8	216	3.57%	96.43%

Source: Ramos Segarra, September 9 and 15, 2020. [https://www.theweeklyjournal.com/business/food-autonomy-is-impossible-in-puerto-rico/article\\_2622ff42-f22d-11ea-a158-d71aa4411364.html](https://www.theweeklyjournal.com/business/food-autonomy-is-impossible-in-puerto-rico/article_2622ff42-f22d-11ea-a158-d71aa4411364.html)

Residents in the territory are challenged not only by disruptions in the food supply chain, but also by a high rate of poverty. Median household income from 2017 through 2021 was \$21,967 (2021 dollars),<sup>44</sup> and 40.5% of residents lived in poverty (Census, Quick Facts). The USDA Food and Nutrition Services' Center for Nutrition and Policy Promotion (CNPP) maintains four food plans that represent a nutritious diet for home consumption at four different cost levels: Thrifty, Low Cost, Moderate Cost, and Liberal (USDA, 2021). The plans differ in types and quantity of foods for 15 age-sex groups, each with a corresponding specific market basket. Each market basket represents a selection of foods that align with USDA dietary recommendations, food prices, and typical food intake. The thrifty food plan (TFP) is the least costly healthy, practical diet, and although it is estimated for the states, it has not been estimated for Puerto Rico.<sup>45</sup> However, to put median household income in perspective relative to a healthy diet, the TFP for the mainland is used and for a reference family it is estimated to be about \$836 per month or about \$10,027 annually (2021 dollars).<sup>46</sup> The average household in Puerto Rico during

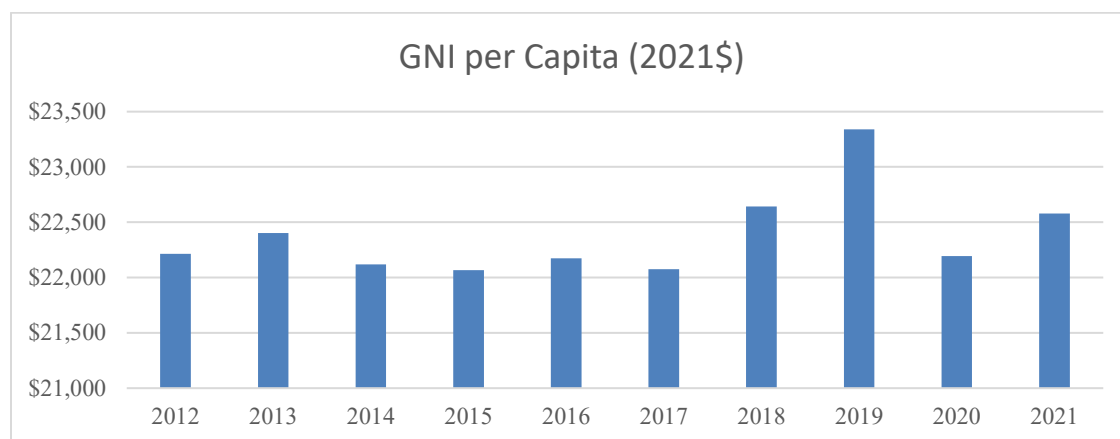
<sup>44</sup> Average (mean) household income was \$34,931.

<sup>45</sup> The CNPP is currently developing a methodology to produce an estimate for Puerto Rico.

<sup>46</sup> A reference family of four is defined as consisting of a man and a woman, both age 20 through 50 and two children, one age between 6 through 8 and one age 9 through 11.

the 5- year period (2017 – 2021) does not match the reference family used to estimate TFP. The average household in Puerto Rico has three persons, not four.<sup>47</sup> If feeding three persons is about 19% less than feeding a family of four,<sup>48</sup> the TFP would be about \$677 per month or about \$8,122, which represents about 37% of median household income.<sup>49</sup>

Gross national income (GNI) per capita from 2012 through 2017 ranged from \$22,066 to \$22,401(Figure A 2.4).<sup>50</sup> However, it grew to \$22,644 in 2018 and again in 2019 to \$23,339. The COVID pandemic caused it to drop to 2020, but it rose again in 2021.<sup>51</sup> GNI per capita is not equivalent to per capita disposable income. In 2014, for example, disposable income per capita was about \$18,000. Although the size of Puerto Rico’s underground economy is, by definition, difficult to measure with precision, estimates about its size generally range from about 15% of GNP to about 20% of GNP (<https://www.newyorkfed.org/medialibrary/media/outreach-and-education/puerto-rico/2014/Puerto-Rico-Report-2014.pdf>).



**Figure A 2.4.** Puerto Rico’s GNI per capita (constant 2021 U.S. dollars), 2012 – 2021. 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

<sup>47</sup> Average household size is 2.75 persons, and is rounded up to 3.

<sup>48</sup> The percentage estimate is based on the average U.S. cost of groceries for a family of four versus a family of three. These groceries are most likely not consistent with foods and beverages that make up a TFP.

<sup>49</sup> Household income is defined as the combined income of all household members before taxes. Prices in Puerto Rico are not the same as on the mainland. For example, dairy prices are higher in the territory than on the mainland. Consequently, the TFP for Puerto Rico is not equivalent to any TSP on the mainland because of differences in average household sizes, available foods and beverages, and prices of those foods and beverages.

<sup>50</sup> Gross national income is the value of all income (also called output or national output) produced by Puerto Rico's residents (both Puerto Ricans and non-Puerto Rican residents) within its geographical borders, plus net receipts of income (wages, salary, and property income) from Puerto Ricans on the mainland and abroad.

<sup>51</sup> The increase in GNI per capita can be partially explained by the increase in Puerto Ricans working on the mainland where wages are higher.

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 January 2020 earthquake knocked out of service the territory's largest power plant, the Costa Sur power plant with a capacity of 970 megawatts. It had 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.

There were many aftershocks, which made relief and recovery difficult.<sup>52</sup> On January 11, there was an aftershock that registered at 5.9 magnitude. On 14 January, PREPA said service had been restored for 99% of its customers; however, the next day (January 15), there was a 5.2 earthquake and ten days later, a 5.0 magnitude earthquake hit near Guayanilla. On May 2, 2020, the same area was rocked by a magnitude 5.4 earthquake that caused new damage in Ponce.<sup>53</sup> 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 caused by the January earthquakes of 2020.

In 2021, Puerto Rico was shaken by 3 earthquakes of magnitude 5.0 or above; 26 earthquakes between 4.0 and 5.0; 1,092 earthquakes between 3.0 and 4.0; and 2,122 earthquakes between 2.0 and 3.0. There were also 242 earthquakes below magnitude 2.0, which people don't normally feel. From February 14, 2022, to February 13, 2023, there were 5,597 earthquakes in or near Puerto Rico and 54 were between 4.0 and 5.0 and 2 were greater than 5.0 or above (<https://www.volcanodiscovery.com/earthquakes/puertorico.html>).

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 -

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<sup>52</sup> Over two dozen aftershock earthquakes had a magnitude of 4.5 or more.

<sup>53</sup> 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.

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 [EIA]). 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 has been 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 (<https://www.eia.gov/state/print.php?sid=RQ>). 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 (EIA).

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). The creation of the Financial Oversight Board was contested and its constitutional legitimacy questioned. In June 2020, however, 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 January 2020, PREPA selected New Fortress Energy to convert natural gas and delivery fuel to San Juan generation stations 5 and 6. The \$1.5 billion contract was PREPA's first major generation project since Hurricane Maria devastated the island in September 2017, and was not without controversy.<sup>54</sup> Also, LUMA Energy was awarded a lucrative 2020 contract to operate Puerto Rico's electric transmission and distribution system and the awarding of that contract was controversial because of lack of transparency. The contract was signed behind closed doors and the public did not become aware of it until it was signed ([https://en.wikipedia.org/wiki/LUMA\\_Energy#:~:text=controversy%20and%20protests-Contract%20controversy,had%20no%20say%20in%20it.](https://en.wikipedia.org/wiki/LUMA_Energy#:~:text=controversy%20and%20protests-Contract%20controversy,had%20no%20say%20in%20it.)). On June 1, 2021, LUMA took

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<sup>54</sup> For more information about this, see the Institute for Energy Economics and Financial Analysis report at <https://ieefa.org/resources/puerto-ricos-energy-future-rigged>.

command of Puerto Rico’s transmission and distribution system, customer service, and billing, among other key functions.<sup>55</sup>

In February 2021, the Financial Oversight Board announced that it 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 included a proposed cut of up to 8.5% to monthly pensions of at least \$1,500. That had long been a point of contention between the board and the governor, who repeatedly said he would not approve such cuts. Ultimately, the plan also had to be approved by a judge overseeing Puerto Rico’s bankruptcy-like process. Governor Pierluisi who previously said he would reject any plan with high pension cuts, said the government would declare in court that it does not fully support the plan, but still, he called the proposal a step in the right direction. In October 2021, the Governor signed into law a bill that slashed the territory’s debt by half, but it sparked protests and led to heated exchanges between lawmakers and the Financial Oversight Board (<https://www.nbcnews.com/news/latino/puerto-rico-governor-signs-law-debt-restructuring-bill-rcna3902>).

The Financial Oversight Board oversaw a bankruptcy process that culminated in March 2022, when a federal court confirmed a plan that reduced Puerto Rico’s debt by 80%.<sup>56</sup> Governor Pierluisi gave it his approval. Those proceedings did not resolve the \$5.8 billion in debt held by Puerto Rico’s Highways and Transportation Authority or \$9 billion in debt held by the Electric Power Authority.

On December 16, 2022, the Financial Oversight Board filed its proposed Plan of Adjustment to restructure more than \$10 billion of debt and other claims against the Puerto Rico Electric Power Authority.<sup>57</sup> In December 2022, Congress approved \$1 billion to improve the resilience of Puerto Rico’s electrical grid, with a focus on the island’s most vulnerable and disadvantaged households and communities. On January 4, 2023, the Federal Emergency Management Agency (FEMA) awarded over \$68.5 million to PREPA for emergency protective measures taken after Hurricane Fiona struck the island on September 18, 2022, which left most Puerto Ricans without power or

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<sup>55</sup> For more information, see the following article in Georgetown (University) Journal of International Affairs at <https://gjia.georgetown.edu/2021/06/21/fuera-luma-puerto-rico-confronts-neoliberal-electricity-system-takeover-amid-ongoing-struggles-for-self-determination/>

<sup>56</sup> Puerto Rico’s government formally exited bankruptcy March 14, 2022, completing the largest public debt restructuring in U.S. history after announcing nearly seven years before that it was unable to pay its more than \$70 billion debt.

<sup>57</sup> PREPA, Puerto Rico’s primary electricity supplier, has long been a source of frustration for Puerto Ricans. Its troubles predate the island’s financial crisis. Electricity was unreliable and expensive, and Hurricane Maria further damaged the utility’s aging infrastructure.

water for days. Even without disruptions caused by natural disasters, electrical service in the territory has a history of being irregular.<sup>58</sup>

On January 23, 2023, the U.S. Department of Energy (DOE) and the Federal Emergency Management Agency (FEMA) released a one-year progress report for the Puerto Rico Grid Resilience and Transition to 100% Renewable (PR100) Study (<https://www.energy.gov/gdo/puerto-rico-grid-resilience-and-transitions-100-renewable-energy-study-pr100>). PR100, which launched in February 2022 with funding from FEMA, is a two-year study designed to help inform infrastructure investments that will provide Puerto Rico with clean, reliable, and affordable power. The study aims to generate community-driven pathways to meet Puerto Rico's target of 100% renewable electricity by 2050 and improving the resilience of the power system against future extreme weather events.

In January 2023, the Puerto Rico Electric Power Authority selected Genera PR to take over the operation and maintenance of state power generation units as part of an initial \$22.5 million annual contract. Genera PR is a subsidiary of New York-based New Fortress Energy, which works closely with Shell Oil and other oil and gas producers. Genera also will handle contracts related to fuel purchases for the island's 12 power facilities as part of a 10-year contract with Puerto Rico's government (APnews.com, January 25, 2023). Genera PR's selection is not without controversy.<sup>59</sup>

Puerto Rico's economy as a whole tends to mirror that of the U.S. economy. When the U.S. experiences an economic slowdown or recession, so too does Puerto Rico. The Congressional Budget Office (CBO) forecasts zero increase in U.S. real GDP in 2023, but real potential GDP is projected to grow at an average rate of 1.8 percent a year over the 2028 through 2033 period. That being said, the short-term forecast for the territory is generally positive.

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<sup>58</sup> In addition to unreliable electrical service, power customers in Puerto Rico have been subjected to seven electric rate increases in the past year, even though people in Puerto Rico already pay about twice as much as mainland U.S. customers. Both high rates and unreliable service have been an ongoing frustrating issue for households in the territory, especially in light that the median household income is \$21,967, which is about 69% lower than the median household income on the mainland (Census, Income in the United States 2021).

<sup>59</sup> See the San Juan Daily Star February 22, 2023, article at <https://www.sanjuandaily.com/post/fiscal-board-law-firm-notes-that-it-represented-new-fortress-in-past-lawsuit>.

## A.2.2 U.S. Virgin Islands: St. Croix, St. Thomas, St. John

Like Puerto Rico and other U.S. territories, the population of the USVI shrank from 2010 through 2020. The populations of St. Croix and St. Thomas/St. John declined by about 19% and 17%, respectively (Table A 2.6). The population decline is not due to the death rate exceeding the birth rate. The birth rate from 2010 to 2020 in the USVI varied from 14.80 to 12.10 per 1,000 people, while the death rate varied from 7 to 8 per 1,000 people (World Bank data). Instead, the population decline is due to outmigration. In 2020, while about 87,000 resided in the territory, an estimated 72,000 ex-U.S. Virgin Islanders were living and having families on the mainland.<sup>60</sup>

**Table A 2.6.** Population of St. Croix and St. Thomas/St. John, 2010, 2020.

Island Area	2010	2020	Number Change	Percent Change
St. Croix	50,601	41,004	-9,597	-18.97%
St. Thomas/St. John	55,804	46,142	-9,662	-17.31%
USVI	106,405	87,146	-19,259	-18.10%

Source: <https://www.census.gov/data/tables/2020/dec/2020-us-virgin-islands.html>

The outmigration of working-age individuals is illustrated in both the decline of the USVI labor force and the aging of the population. In 2010, there were 51,273 persons in the labor force, but by 2020, there were 46,154, a drop of about 10% (USVI Electronic Workforce System). As of 2022, there were 43,088 persons in the labor force, which is 16% less than what it was in 2010. USVI's population is growing older. In 2000, the median age of a USVI resident was 33.4 years; in 2010, it was 39.2, and by 2020, it was 45.9 years (Census).

Incentives for leaving the territory include increased educational and job opportunities, higher wages and incomes, and lower costs of living on the U.S. mainland.<sup>61</sup> In May 2020, for example, the average (mean) hourly wage in the USVI was \$23.06, while the average hourly wage in the U.S. was \$27.07 (BLS, Occupational Employment and Wages in the USVI). Also, in 2020, the average annual wage was \$42,870 in the USVI versus \$69,392 on the U.S. mainland.

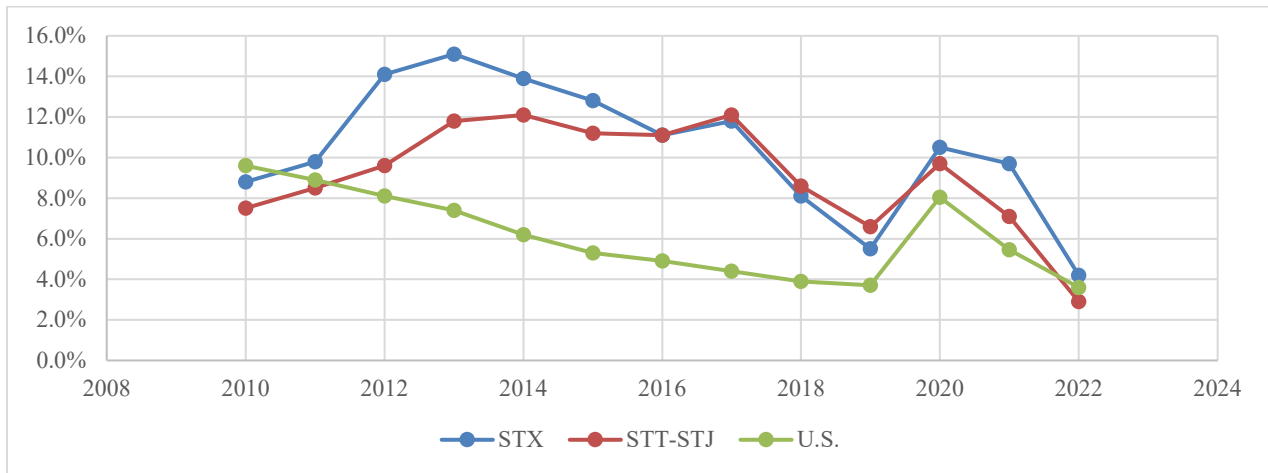
The unemployment rate tends to be higher in the USVI than on the mainland. In 2021, for example, the average monthly unemployment rate in the U.S. was 5.5%, while it averaged 13.3%

<sup>60</sup> The World Bank and United Nations estimates of the USVI's population continue to be above 100,000 and have not been below 100,000 since the early 1980s.

<sup>61</sup> Often young residents of U.S. territories go to colleges on the mainland and never return and that contributes to the brain drain that many U.S. territories are experiencing. In 2010, 11.8% (8,350) USVI residents age 25 and older had a bachelor's degree, while in 2020, 13.7% (8,560) had a bachelor's degree. Similarly, in 2010, 7.4% (5,229) of residents age 25 and older had a professional or graduate degree, and in 2020, that percentage was higher, at 8.6% (5,339), which suggests no brain drain in the USVI.



in the USVI. From 2010 through 2020, the average monthly unemployment rate in St. Croix ranged from 5.5% to 12.1% (VIDOL Labor Statistics). During the same years, the unemployment rate in St. Thomas/St. John ranged from 6.6% to 12.1% (VIDOL Labor Statistics) (Figure A 2.5). Note the increases in the unemployment rate in 2017 due to the twin hurricanes and in 2020 due to the recession caused by the COVID-19 pandemic. The closing of the HOVENSA refinery in 2012 also caused a spike in the unemployment rate in the USVI.



**Figure A 2.5.** Unemployment rates for St. Croix, St. Thomas/St. John, and U.S., 2010 –2022.  
Source: VIDOL Labor Statistics and BLS

Despite the recent decline in USVI’s unemployment rate, according to a March 20, 2023 article in The Virgin Islands Consortium, the USVI Labor Commissioner proposed reducing unemployment benefits by 50% to get more people back to work (<https://viconsortium.com/vi-government/virgin-islands-usvi-labor-commissioner-proposes-slashing-unemployment-benefits-by-50-percent-to-spur-people-back-to-work>).<sup>62</sup>

Median household income in the USVI fell from \$44,499 (2019 dollars) in 2009 to \$40,408 in 2019 (Census). In 2009, the poverty rate in the territory was 18.3% and it rose to 18.6% by 2019 (Census). A household being unable to afford sufficient quality food correlates with experiences of unemployment and poverty. Food and other basic commodities’ prices are higher in the USVI than on the mainland. According to mylifelsewhere.com, it is 24.9% cheaper to live in Florida and 15.6% cheaper to live in New York than the USVI.

<sup>62</sup> VIDOL believes people do not want to go back to work, in part, because unemployment benefits of \$642 a week are considered to be too generous. Unemployment insurance currently lasts for 26 weeks, resulting in a total payout of \$16,692, and VIDOL observes many of the unemployed collect benefits for 26 weeks (The VI Consortium, March 20, 2023).

Over 90% of the USVI’s food is imported and the twin hurricanes of 2017 reduced food imports into the territory.<sup>63</sup> Post-hurricanes access to fresh food was severely limited. There was significant damage inflicted on producers, wholesalers, and private household sources of food (FEMA 2018)<sup>64</sup>. Unfortunately, there is little information about the rate of food insecurity in the USVI. However, there is information on the number of individuals that receive assistance through Supplemental Nutrition Assistance Program (SNAP, originally known as the Food Stamp Program). In 2010, 53% of USVI children were in families that received SNAP benefits, and by 2015, it was almost 83% (KidsCount.org). In 2014, about 26% of the territory’s residents received SNAP benefits. Congress increased SNAP benefits in response to the COVID-19 pandemic in March 2020. In FY2020, there were 22,520 persons in the USVI who received SNAP benefits and 14,838 of them also received the additional COVID SNAP benefit (USDA FNS). The additional benefit ended in February 2023.

Because of the territory’s history of being highly dependent on imported food, many have advocated for USVI and/or federal actions to increase locally produced foods, especially fruits, grains and vegetables. From 2007 to 2018, the number of farms increased in both St. Croix and St. Thomas/St. John (Table A 2.7). The number of crop farms and acres used by crop farms in St. Croix increased by 217% and 427%, respectively, while the number of crop farms and crop-farm acres increased by 93% and 451% in St. Thomas/St. John, respectively. There were decreases in the number of pasture or grazing farms during that time. The USDA Census of Agriculture for the USVI (2018) indicates there were no farms that produced fish or other aquaculture products in St. Thomas/St. John; however, from 2007 to 2018, there was an increase in the number of farms that sold fish or aquaculture products in St. Croix: from one to four.

**Table A 2.7.** Farms and acres in St. Croix and St. Thomas/St. John by land use 2007, 2018.

District	St. Croix		St. Thomas/St. John	
	2007	2018	2007	2018
All Farms	160	461	59	104
All Farm Acres	5,574	8,269	307	1,056
Average Acres/Farm	34.84	17.94	5.20	10.15
Crop Farms	106	336	41	79
Crop Farm Acres	399	2,102	94	518
Ave. Acres/Crop Farm	3.76	6.26	2.29	6.56
Crop Farms with Harvest	105	327	40	73
Pasture or Grazing (P-G) Farms	79	185	24	39

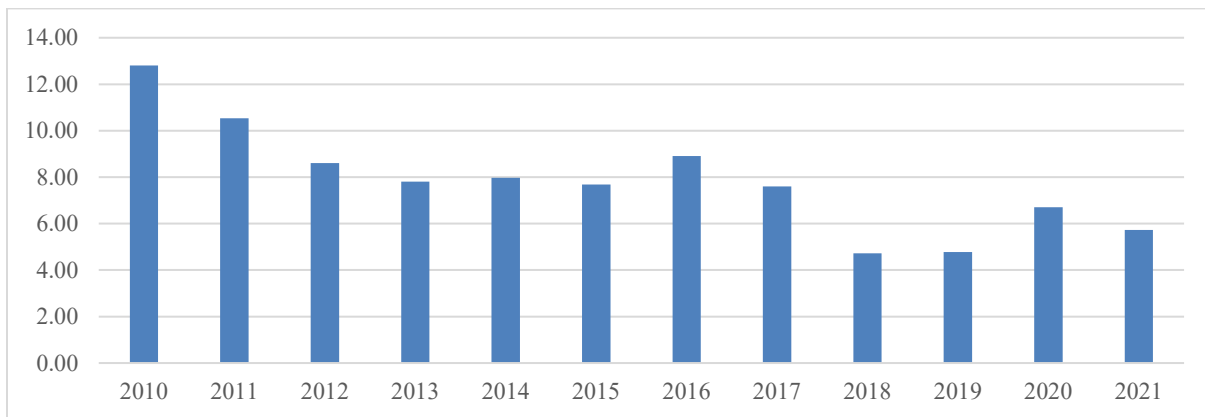
<sup>63</sup> Estimates of the percentage of consumed food that is imported range from 95% to 99% ([https://www.extension.iastate.edu/ffed/wp-content/uploads/2020-Final-USVI-Snapshot\\_red.pdf](https://www.extension.iastate.edu/ffed/wp-content/uploads/2020-Final-USVI-Snapshot_red.pdf)). Such a high percentage is indicative of the USVI’s severe dependence on imported food and lack of food security (United Nations Conference on Trade and Development (UNCTAD) June 2021; see <https://unctad.org/news/trade-and-food-security-when-agreement-delayed-becomes-human-right-denied>).

<sup>64</sup> See FEMA report at [https://www.usviodr.com/wp-content/uploads/2019/07/STX\\_Community\\_Plan\\_Final\\_3\\_12s.pdf](https://www.usviodr.com/wp-content/uploads/2019/07/STX_Community_Plan_Final_3_12s.pdf).

District	St. Croix		St. Thomas/St. John	
	2007	2018	2007	2018
P-G Farm Acres	5,048	5,389	161	150
Ave. Acres/P-G Farm	63.90	29.13	6.71	3.85
Woodland Farms	11	28	8	25
Woodland Farm Acres	71	354	24	333
Ave. Acres/Woodland Farm	6.45	12.64	3.00	13.32
Other Farms	27	148	13	39
Other Farm Acres	152	854	36	393
Ave. Acres/Other Farm	5.63	5.77	2.77	10.08

Source: USDA National Agricultural Statistics Service (NASS), July 22, 2022.

Although freshly caught fish and shellfish can help reduce food insecurity, the USVI’s per capita landings of fish and shellfish has declined from 2010 (over 12 lbs per person) through 2021 (less than 6 lbs per person) (Figure A 2.6). Per capita consumption of fish and shellfish also declined. From 2010 through 2012, the USVI’s average annual per capita consumption of fish and shellfish for human food was 15.3 lbs (6.9 kg) (NOAA NMFS Fisheries Statistics Division, September 2015), while from 2017 through 2019, it was 9.9 lbs (4.5 kg) (NOAA NMFS Fisheries Statistics Division, May 2021).

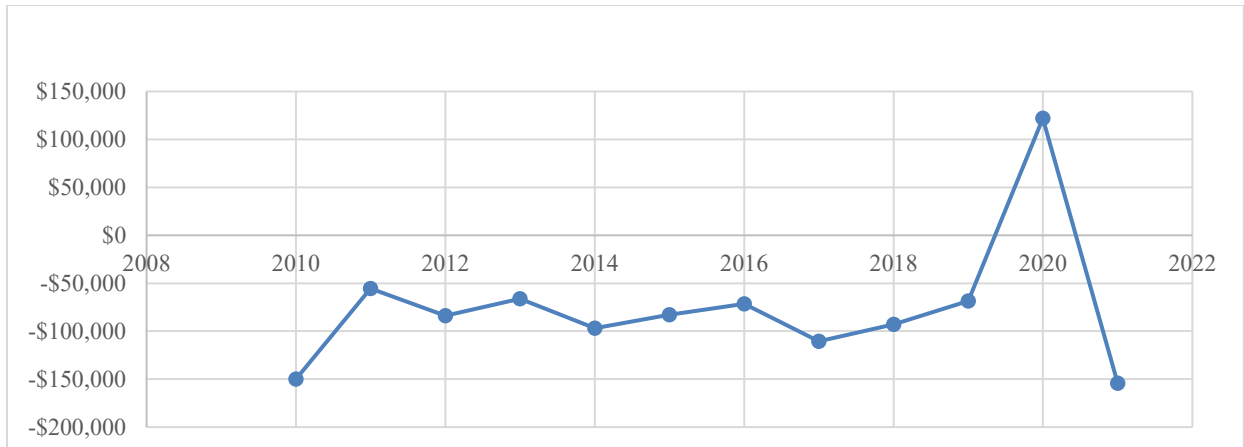


**Figure A 2.6.** USVI commercial landings per capita, 2010 –2021.

Source: Landings data as of October 28, 2022 and USVIBER for population.

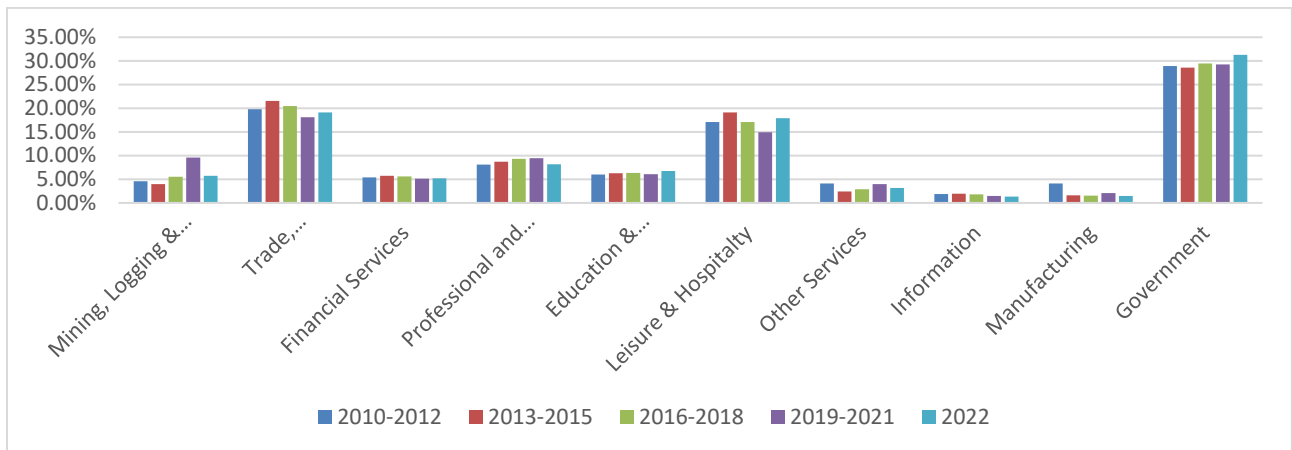
The USVI has to import fish and shellfish because it consumes more fish and shellfish than it produces. From 2010 through 2021, imports of finfish, shellfish and other marine products (NAICS 11411) exceeded their exports for all but one year (Figure A 2.7).<sup>65</sup> In 2020, there was a positive trade balance of finfish, shellfish and other marine products, and it was the only year when more finfish (NAICS 114111) were exported (\$194,209) than imported (\$6,155).

<sup>65</sup> With the exception of one year from 2010 through 2021, the USVI did not import any “other marine products.”



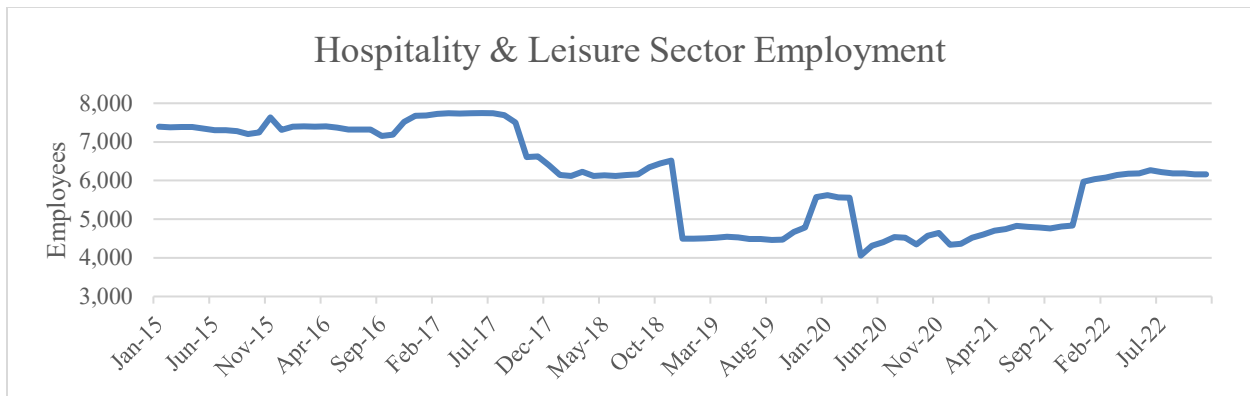
**Figure A 2.7.** USVI trade balance (2021 dollars) of finfish, shellfish and other marine products, 2010 –2021.  
Source: USA Trade Online.

The government sector has been and continues to be the largest employing sector in the USVI. From 2010 through 2022, the government sector accounted, on average, for about 29% of all nonfarm employment (Figure A 2.8). The trade, transportation and utilities sector ranked second with an annual average of 20% of all nonfarm employees, followed by the leisure and hospitality sector with 17%.



**Figure A 2.8.** Percentage of nonfarm employment by sector, 2010 – 2022.  
Source: VIDOL.

Figure A 2.9 shows monthly declines of employment in the hospitality and leisure sector caused by the 2017 hurricanes and COVID pandemic. Although employment in the sector has increased since January 2021 and especially in 2022, it has not fully recovered to pre-September 2017 levels.



**Figure A 2.9.** Employment in the hospitality and leisure sector, January 2015 – November 2022.

Source: USVI DOL, Labor Market Basket.

From 2010 through 2012, the manufacturing sector accounted for 4% of nonfarm employment; however, after the HOVENSA refinery<sup>66</sup> was shut down in 2012, the manufacturing sector accounted for less than 2% of all nonfarm employment. There were hopes that the 2015/2016 purchase of the former refinery by Limetree Bay Refining LLC would invigorate the manufacturing sector. The refinery was restarted in February 2021; however, within days, the refinery began experiencing what became a series of high-profile accidents that angered nearby residents, raining oil down on homes, contaminating drinking water and releasing hazardous fumes so pungent that officials shut down schools and offices for days. The refinery was forced to pause operations in May 2021 following an EPA emergency order. Then in July of 2021, the refinery’s owners announced the facility would cease operations for good, and then declared bankruptcy, announced layoffs, and began the process to auction off the property (insideclimatenews.com December 17, 2021).<sup>67</sup> In December 2021, the refinery and adjacent fuel storage facility were sold for \$62 million to West Indies Petroleum and Port Hamilton Refining and Transportation. As of April 2023, the refinery has yet to be restarted since the new owners have not yet complied with necessary federal laws and regulations (virginislandsdailynews.com).<sup>68</sup>

With the declining influence of the manufacturing sector, the USVI economy became even more dependent on tourism and related business activity, which made it more vulnerable to the effects of hurricanes, pandemics and other travel and tourism disruptions than jurisdictions with more diverse economies. According to USVI Commissioner of Tourism Joseph Boschulte, tourism

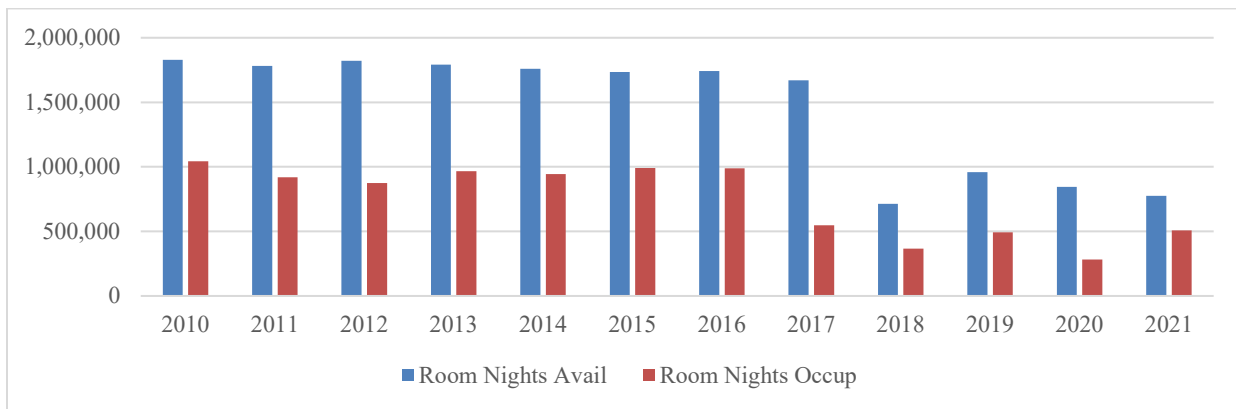
<sup>66</sup> The refinery, once the largest in the Western Hemisphere, was built in the mid-1960s and became the largest private employer in the USVI. It was originally owned by HOVENSA, a joint venture of U.S.-based Hess Corp. and Venezuela’s state-owned oil company, that shut down the facility in 2012 following multimillion-dollar losses.

<sup>67</sup> See <https://insideclimatenews.org/news/17122021/limetree-st-croix-oil-refinery-reopening/>.

<sup>68</sup> See [http://www.virginislandsdailynews.com/news/lawsuit-claims-port-hamilton-still-owes-millions-for-shared-services-at-refinery/article\\_19bd3026-7d2c-5f27-8a92-6cac3ca3e3e7.html](http://www.virginislandsdailynews.com/news/lawsuit-claims-port-hamilton-still-owes-millions-for-shared-services-at-refinery/article_19bd3026-7d2c-5f27-8a92-6cac3ca3e3e7.html).

accounts for about 60% of the territory’s GDP (visitusvi.com July 14, 2022).<sup>69</sup> Commissioner Boschulte said his department expects to see the tourism industry in the USVI to increase by 3.5 % for FY 2023 and by 6% in FY 2024 (<https://www.vi.gov/ombs-spring-revenue-estimating-conference-forecasts-continued-fiscal-stability-with-slight-increase-in-capital/>).

Evidence of the impact of the 2017 hurricane season and COVID pandemic on the USVI’s tourism and travel sector can be seen in the decline in available room nights after 2017 and drop in occupancy in 2020. From 2010 through 2017, there was an annual average of about 1.77 million room nights available and a 51.4% average occupancy rate, but from 2018 through 2021, there was average was about 0.82 million room nights available and a 50.4% average occupancy rate (Figure A 2.10). The number of available room nights in 2022 was back to over a million and the occupancy rate was about 71%.

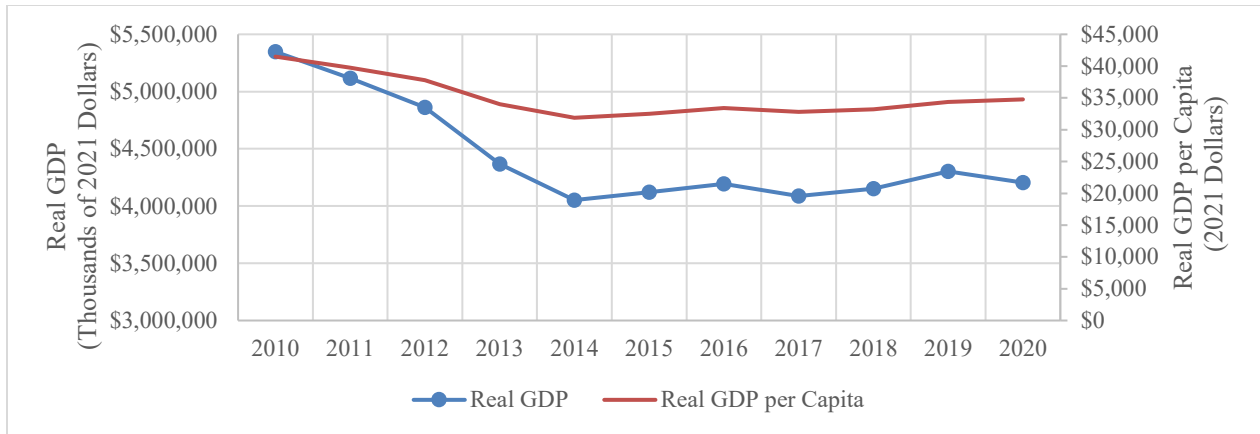


**Figure A 2.10.** Annual room nights available and occupied, 2010 – 2021.

Source: USVI BEA.

Both real GDP and real GDP per capita declined annually from 2010 through 2014, but showed slightly increasing trends from 2015 through 2020 (Figure A 2.11). Note that although real GDP declined in 2020, real GDP per capita increased slightly that year because of a decrease in the population. Personal consumption expenditures accounted for 66% of GDP, on average, while government expenditures account for 31% of real GDP.

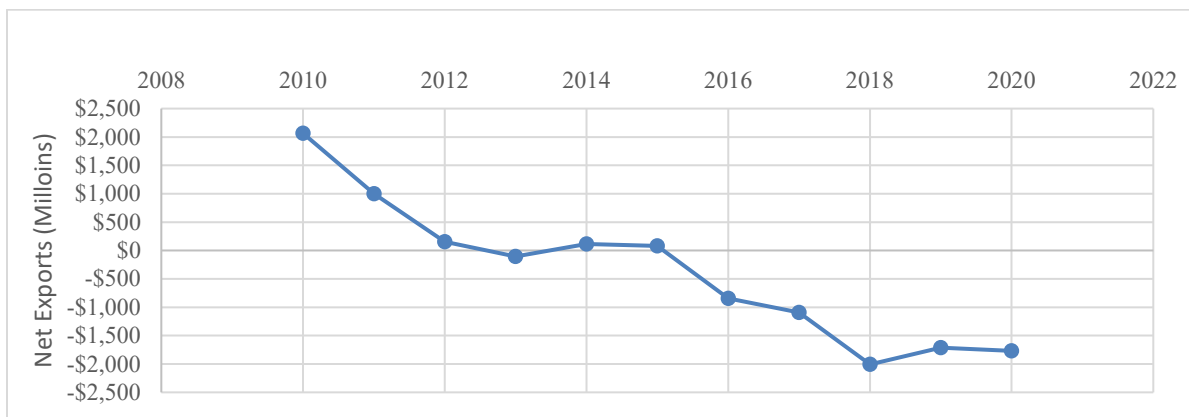
<sup>69</sup> Spending by tourists and business travelers in the USVI is accounted for in USVI exports of services, and from 2010 through 2020, exports of services exceeded imports of services every year.



**Figure A 2.11.** Real GDP and real GDP per capita, (2021 dollars), 2010 – 2020.

Source: BEA GDP USVI 2020 for real GDP, World Bank data for population.

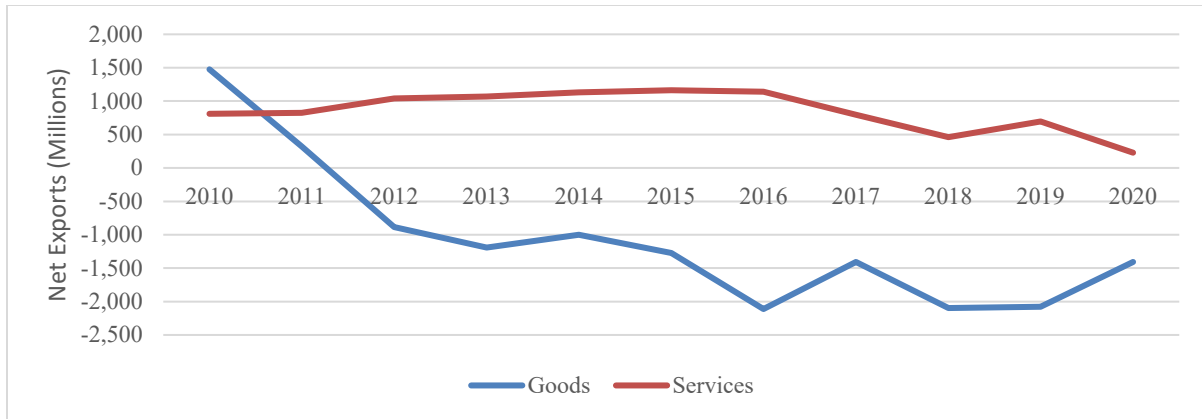
From 2010 through 2020, the USVI trade balance went from positive to negative after the closing of the HOVENSA refinery (Figure A 2.12). The USVI has no fossil energy reserves, but does have some renewable resources, particularly solar energy. Nonetheless, the USVI imports petroleum products to meet nearly all of its energy needs, including the fuels to operate vehicles and boats, to generate electricity, and to run the ocean water desalination plants that produce its public water supply. While the USVI exports more services than it imports largely because of tourism<sup>70</sup>, the USVI imports more goods than it exports (Figure A 2.13).



**Figure A 2.12.** Net exports (2021 dollars), 2010 – 2020.

Source: BEA GDP data and GDP price deflator issued April 27, 2023.

<sup>70</sup> USVI businesses in the travel and tourism industry sell their services to USVI tourists and business travelers and those services are counted as exports.



**Figure A 2.13.** Net exports of goods and services (2021 dollars), 2010 – 2020.

Source: BEA GDP data and GDP price deflator issued April 27, 2023.

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 was helping rebuild the economy.<sup>71</sup> Prior to 2017, government spending (both territorial and federal) accounted for less than 30% of GDP. Since 2017, it has accounted for about 32% to 43% of GDP and averaged 37% (BEA GDP data). Before 2017, federal government spending contributed less than 4.2% of the USVI’s GDP, but since 2017, federal government spending has accounted for 5.4% of the territory’s GDP.

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. The main external threats are natural events that disrupt travel and tourism, such as hurricanes and pandemics. The main internal threats to the USVI economy are the massive unfunded liabilities of the Government Employee Retirement System (GERS) and mounting liquidity issues at the Water and Power Authority (WAPA), a semi-autonomous government-owned electric, water, and sewer utility. 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.

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.

<sup>71</sup> In 2018, federal government spending in the USVI was about 15% greater than it had been in 2017; and in 2017, federal government spending was 41% greater than it had been in 2016.



## 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 (FMP) 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. Croix, and St. Thomas/St. John fisheries on ESA-listed species. Refer to Section 3.2.3 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. Croix, and St. Thomas/St. John FMPs will have no adverse impact on marine mammals. In the 2023 List of Fisheries published by NMFS, all gear types used to harvest spiny lobster (e.g., trap/pot, dive, hand/mechanical collection) in the Puerto Rico, St. Croix, and St. Thomas/St. John fisheries are considered Category III ([87 FR 55348](#)). 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 types in these fisheries and as such would 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. Croix, and St. Thomas/St. John 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 Comprehensive Amendment to the Fishery Management Plans (FMP) of the U.S. Caribbean (CFMC 2005) designated habitats of particular concern in Puerto Rico and St. Croix for managed corals and established management measures to minimize, to the extent practicable, adverse effects caused by fishing on those habitats. There are no implications to coral reefs by the actions proposed in this amendment.

### **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 (MPA)**

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. Croix, or St. Thomas/St. John.