Amendment 3 to the Puerto Rico, St. Croix, and St. Thomas and St. John Fishery Management Plans: Management Measures for Dolphin and Wahoo

182nd Caribbean Fishery Management Council

Briefing Book Version

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Environmental Assessment Cover Sheet

Name of Action

Amendment 3 to the Puerto Rico, St. Croix, and St. Thomas and St. John Fishery Management Plans: Management Measures for Dolphin and Wahoo

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Type of Action

( ) Administrative
(X) 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 DATE, and accordingly proceeds under the 2020 regulations.

Abbreviations and Acronyms Used in this Document

ACL	annual catch limit
AM	accountability measure
CEA	cumulative effects analysis
CFMC	(Council); Caribbean Fishery Management Council
DAP	District Advisory Panel
DNER	Department of Natural and Environmental Resources (Puerto Rico)
DPNR	Department of Planning and Natural Resources (United States Virgin Islands)
EA	environmental assessment
EEZ	exclusive economic zone
FMP	fishery management plan
MSA	(Magnuson-Stevens Act); Magnuson-Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
SEFSC	Southeast Fisheries Science Center
USVI	United States Virgin Islands

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Fishery Impact Statement (in progress)

The Magnuson-Stevens Fishery Conservation and Management Act requires a Fishery Impact Statement (FIS) be prepared for all fishery management plan (FMP) amendments. The FIS contains an assessment of the expected biological, economic, and social effects of the conservation and management measures on: (1) fishery participants and their communities; (2) participants in the fisheries conducted in adjacent areas under the authority of another Council; and (3) the safety of human life at sea. Detailed discussion of the expected effects for all proposed changes is provided in Chapter 4. The FIS provides a summary of these effects.

Actions Contained in Amendment 3 to the Puerto Rico FMP, St. Croix FMP, and St. Thomas/St. John FMP

Amendment 3 would establish additional management measures for dolphin and wahoo, which are migratory pelagic species new to federal fisheries management, in federal waters around Puerto Rico, St. Croix, and St. Thomas/St. John to ensure individuals have adequate time to mature and reproduce and to take a precautionary approach to management to protect against overfishing for resources with limited management structure.

Assessment of Biological Effects

Discuss effects of preferred alternatives.

Assessment of Economic Effects

Discuss effects of preferred alternatives.

Assessment of Social Effects

Discuss effects of preferred alternatives.

Assessment of Effects on Participants in Fisheries Conducted in Adjacent Areas Under the Authority of Another Fishery Management Council

Discuss effects of preferred alternatives.

Assessment of Effects on Safety at Sea

Discuss effects of preferred alternatives

Chapter 1. Introduction

1.1 What Actions are Being Proposed?

At their August 2022 meeting, the Caribbean Fishery Management Council (Council) requested staff prepare an amendment to the Comprehensive Fishery Management Plan (FMP) for the Puerto Rico Exclusive Economic Zone (EEZ) (Puerto Rico FMP), the Comprehensive FMP for the St. Croix EEZ (St. Croix FMP), and the Comprehensive FMP for the St. Thomas and St. John EEZ (St. Thomas/St. John FMP) to develop additional management measures for select pelagic stocks and stock complexes. At their December 2022 meeting, the Council revised the request to first develop an amendment to the St. Croix FMP and St. Thomas/St. John FMP, which would include management measures for dolphin (*Coryphaena hippurus*) and wahoo (*Acanthocybium solandri*), and then a subsequent amendment to the Puerto Rico FMP, which would include management measures for seven pelagic stocks. However, at the April 2023 meeting, the Council decided that the size limits and recreational bag limits considered for dolphin and wahoo in the U.S. Virgin Islands (USVI) would be applicable for dolphin in wahoo in Puerto Rico, and requested that the current amendment be expanded to include similar measures for dolphin and wahoo under the Puerto Rico FMP.

1.2 Why is the Council Considering Action?

Dolphin and wahoo are new to federal fisheries management under the Puerto Rico, St. Croix, and St. Thomas/St. John FMPs. During FMP development, the Council recognized the economic importance of these stocks in the region and included them for management, even though, given their migratory nature, they are exposed to harvest pressure across a wide area of the Atlantic Ocean. Each FMP established an annual catch limit (ACL), annual catch target (ACT), and accountability measures (AM) for dolphin and wahoo, but did not establish other management measures such as size limits, recreational bag limits, or commercial trip limits.

Amendment 3 to the Puerto Rico FMP, Amendment 3 to the St. Croix FMP, and Amendment 3 to the St. Thomas/St. John FMP (collectively Amendment 3) would establish size limits and recreational bag limits for dolphin and wahoo in federal waters around each island management area. Commercial trip limits were considered but rejected (Appendix A).

The Council is considering size limits for dolphin and wahoo because of the annual influx of sargassum in the region and the potential for very small sized individuals to be caught year-round. Although there currently is not a huge market for the smaller sized fish, the Council recognizes that a fishery could develop in the future and would like to be proactive on management of these species. The Council is considering bag limits to help regulate the harvest of dolphin and wahoo in federal waters from the recreational sector, for which catch and effort

information are either limited or not available. Recreational ACLs were established for dolphin and wahoo under the Puerto Rico FMP, but the Marine Recreational Information Program that collected recreational fisheries statistics for Puerto Rico was suspended in 2017 and has not resumed to date. Additionally, NOAA Fisheries' National Saltwater Angler Registry compiles a list of recreational anglers, and while it is mandatory for recreational anglers in Puerto Rico and the USVI, compliance is low. Thus, the number of recreational anglers and the amount of dolphin or wahoo that they catch are largely unknown.

Versions of draft Amendment 3 will be available on the Council's and NOAA Fisheries' Southeast Regional Office Caribbean Branch websites and during associated public comment periods announced through the *Federal Register*.

1.3 Where Will the Action Have an Effect?

Under the Puerto Rico, St. Croix, and St. Thomas/St. John FMPs, the Council is responsible for managing fishery resources, including dolphin and wahoo, in federal waters (Figure 1.1). Federal waters around Puerto Rico extend 9-200 nautical miles (17 kilometers) from the shoreline to the outer boundary of the U.S. Caribbean EEZ. Federal waters around St. Croix and St. Thomas/St. John extend 3-200 nautical miles (6-370 kilometers) from the shoreline of the respective island or island group to the outer boundary of the U.S. Caribbean EEZ.

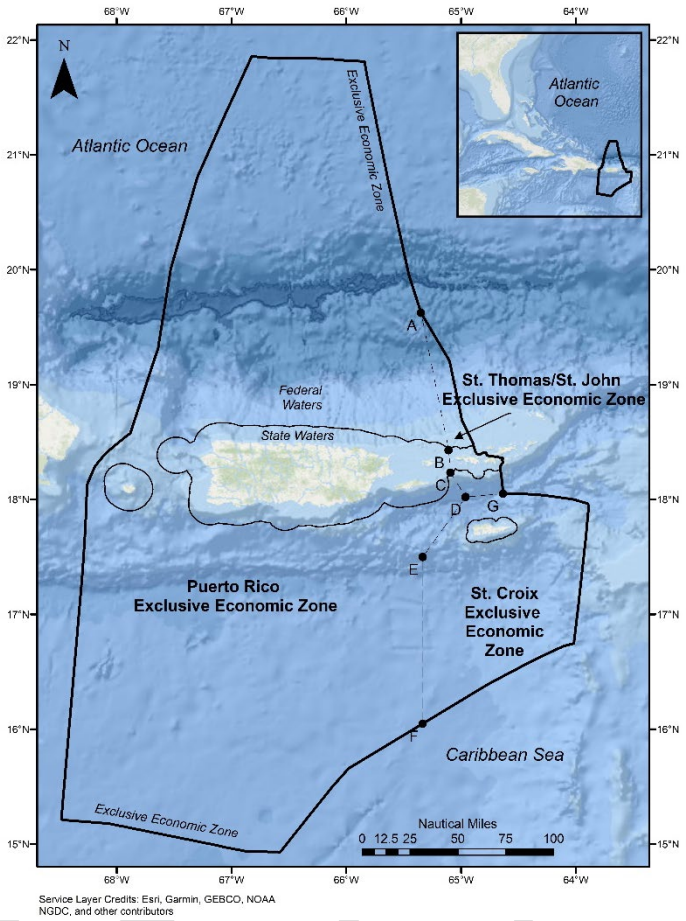

Figure 1.1. U.S. Caribbean region with boundaries between the Puerto Rico, St. Croix, and St. Thomas/St. John management areas.

1.4 Statement of Purpose and Need

The purpose of Amendment 3 is to establish size limits and recreational bag limits for dolphin and wahoo under the Puerto Rico FMP, the St. Croix FMP and the St. Thomas/St. John FMP.

The need for Amendment 3 to develop conservation and management measures for dolphin and wahoo to ensure undersized individuals have adequate time to mature and reproduce and to take a precautionary approach to management to protect against overfishing for resources with limited management structure.

1.5 History of Federal Fisheries Management

The **Puerto Rico FMP** (CFMC 2019a), the **St. Croix FMP** (CFMC 2019b) and the **St. Thomas/St. John FMP** (CFMC 2019c) established management measures for federal waters around each island or island group. The FMPs identified species to be managed in federal waters and if those species would be managed as a single stock or in a stock complex; specified

management reference points for the stocks and stock complexes; updated accountability measures; described essential fish habitat for managed species; and updated FMP framework procedures. The FMPs were effective on October 13, 2022 (87 FR 56204). Management measures applicable to dolphin and wahoo under the FMPs include:

- Finfish in or from the Caribbean EEZ must be maintained with head and fins intact[1] (50 CFR 622.10(a));
- ACLs and ACTs were specified for dolphin and wahoo (50 CFR 622.440(b), 50 CFR 622.480(b) and 50 CFR 622.515(b));
- AMs were specified for the pelagic species new to management, including dolphin and wahoo: At or near the beginning the fishing year, landings will be evaluated relative to the ACT for the stock based on a moving multi-year average of landings. If NMFS estimates that landings have exceeded the ACT, NMFS in consultation with the Council will determine appropriate corrective action (50 CFR 622.440(b)(7), 50 CFR 622.480(b)(3) and 50 CFR 622.515(b)(3)); and
- Seasonal area closures applicable to all fishing, which would include dolphin and wahoo:
  - From December 1 through the last day of February, fishing is prohibited in Abrir La Sierra Bank west of Puerto Rico (50 CFR 622.439(a)(1));
  - From December 1 through the last day of February, fishing is prohibited in those parts of Tourmaline Bank that are in the EEZ around Puerto Rico (50 CFR 622.439(a)(2));
  - From March 1 through June 30, fishing is prohibited in those parts of the mutton snapper spawning aggregation area that are in the EEZ around St. Croix (50 CFR 622.479(a)(1));
  - From December 1 through the last day of February, fishing is prohibited in the red hind spawning aggregation area east of St. Croix (50 CFR 622.479(a)(2));
  - From February 1 through April 30, no person may fish for or possess any species of fish, except highly migratory species, in or from Grammanik Bank (50 CFR 622.514(a)(1));
  - Fishing for any species is prohibited year-round in those parts of the Hind Bank Marine Conservation District that are in the EEZ around St. Thomas (50 CFR 622.514(a)(2)).

Amendment 1 to the Puerto Rico FMP, the St. Croix FMP, and the St. Thomas/St. John FMP (in progress) would prohibit the use of buoy gear for those fishing recreationally in federal waters around Puerto Rico, St. Croix, and St. Thomas/St. John. For those fishing commercially in federal waters, the amendment would modify the definition of buoy gear - increasing the maximum number of hooks allowed between the buoy and the terminal end from 10 to 25. Comment periods for the proposed rule (88 FR 24746) and notice of availability for the amendment (88 FR 20453) ended on May 25, 2023 and June 6, 2023, respectively.

[1] There are exceptions for "bait" and consumption at sea.

Amendment 2 to the Puerto Rico FMP, the St. Croix FMP, and the St. Thomas/St. John FMP (in preparation) would prohibit the use of trawl gear (bottom and mid-water trawls), and certain types of drift net gear (gillnets, trammel nets, and purse seines) in U.S. Caribbean federal waters.

Chapter 2. Proposed Actions

2.1 Action 1: Establish new management measures for dolphin in federal waters around Puerto Rico

2.1.1 Action 1(a). Establish a minimum size limit for dolphin applicable to all fishing (commercial and recreational)

Alternative 1. No Action. Do not establish a minimum size limit for the commercial or recreational harvest of dolphin in federal waters around Puerto Rico.

Alternative 2. Establish a 20" fork length minimum size limit for the commercial or recreational harvest of dolphin in federal waters around Puerto Rico.

Alternative 3. Establish a 24" fork length minimum size limit for the commercial or recreational harvest of dolphin in federal waters around Puerto Rico.

Discussion

Alternative 1 would not establish a size limit for dolphin in federal waters around Puerto Rico and fishing methods could continue as they are and all sizes of dolphin could be removed. **Alternative 2** would establish and 20" fork length size limit, which would correspond to size at which approximately 50% of females are mature (i.e., capable of reproducing).[2] **Alternative 3** would establish and 24" fork length size limit, which would correspond to size at which approximately all females are mature. Compared to **Alternative 1**, **Alternative 2** and **Alternative 3** would leave more undersized fish in the water, allowing more time for them to reach maturity and a chance to reproduce. However, **Alternative 2** and **Alternative 3** could both have a greater level of regulatory discards associated with them.

Analyses conducted using the Southeast Fisheries Science Center's (SEFSC) Trip Interview Program (TIP) length and weight data from dolphin harvested by the commercial sector found that the proposed size limits under both **Alternative 2** and **Alternative 3** would result in a less than 1% change to the landings (Appendix B1, Table 1). Analyses conducted using length data collected during the Marine Recreational Fishery Statistics Survey (MRFSS) of recreational anglers found that the predicted reduction in harvest for dolphin in federal waters would be less than 2% under **Alternative 2** and approximately 15% under **Alternative 3** (Appendix B2, Table 1).[3]

[2] Perez, R.N. and Y. Sadovy. 1991. http://proceedings.gcfi.org/proceedings/preliminary-data-on-landing-records-and-reproductive-biology-of-coryphaena-hippurus-l-in-puerto-rico/

[3] These results are based on the assumption that the size of dolphin landed by recreational anglers in federal waters has not changed since the MRFSS length data were collected in 2000-2017.

2.1.2 Action 1(b). Establish a recreational bag limit for dolphin

Alternative 1. No Action. Do not establish aa recreational bag limit for dolphin in federal waters around Puerto Rico.

Alternative 2. Establish a recreational bag limit in federal waters around Puerto Rico of 10 dolphin per person per day, not to exceed 30 dolphin per vessel per day, whichever is less.

Alternative 3. Establish a recreational bag limit in federal waters around Puerto Rico of 5 dolphin per person per day, not to exceed 15 dolphin per vessel per day, whichever is less.

Discussion

Alternative 1 would not establish a recreational bag limit for dolphin in federal waters around Puerto Rico and all dolphin caught could be removed. **Alternative 2** would establish a daily bag limit of 10 per person/30 per vessel, which would be compatible with regulations established by Puerto Rico's Department of Natural and Environmental Resources (DNER). Compared to **Alternative 1**, **Alternative 2** could result in greater biomass of dolphin available (i.e., more dolphin would be left in the water) if recreational fishermen regularly catch and keep more than 10 dolphin per day. However, **Alternative 2** could result in increased discards if recreational fishermen catch and release dolphin during their fishing activities in an effort to catch a desired fish (e.g., a larger sized fish). As the bag limit under **Alternative 2** would be compatible with state regulations, this alternative would have the greatest benefit for enforcement agencies. **Alternative 3** proposes a more restrictive bag limit compared to **Alternative 2** and **Alternative 1**, which would be expected to result in a greater amount of fish left in the water and a greater potential number of discards.

Analyses conducted using catch and effort data collected during the MRFSS, found that the majority of recreational anglers harvested only one dolphin per trip (Appendix B3, Figure 3) and that the predicted reduction in harvest for dolphin in federal waters would be approximately 3% under **Alternative 2** and 15% under **Alternative 3** (Appendix B3, Table 1).[4]

[4] These results are based on the assumption that fishing behavior and landings from 2000-2017 MRFSS data correspond with the current fishing behavior and landings of recreational anglers in federal waters.

2.2 Action 2: Establish new management measures for wahoo in federal waters around Puerto Rico

2.2.1 Action 2(a). Establish a minimum size limit for wahoo applicable to all fishing (commercial and recreational)

Alternative 1. No Action. Do not establish a minimum size limit for the commercial or recreational harvest of wahoo in federal waters around Puerto Rico.

Alternative 2. Establish a 32" fork length minimum size limit for commercial or recreational harvest of wahoo in federal waters around Puerto Rico.

Alternative 3. Establish a 40" fork length minimum size limit for commercial or recreational harvest of wahoo in federal waters around Puerto Rico.

Discussion

Alternative 1 would not establish a size limit for wahoo in federal waters around Puerto Rico and fishing methods could continue as they are and all sizes of wahoo could be removed. **Alternative 2** would establish and 32" fork length size limit, which would correspond to size at which approximately 25% of females are mature (i.e., capable of reproducing).[5] **Alternative 3** would establish and 40" fork length size limit, which would correspond to size at which approximately all females are mature. Compared to **Alternative 1**, **Alternatives 2** and **3** would leave more undersized fish in the water, allowing more time for them to reach maturity and a chance to reproduce. However, **Alternatives 2** and **3** could both have a greater level of regulatory discards associated with them.

Analyses conducted using the SEFSC's TIP length and weight data from wahoo harvested by the commercial sector found that the proposed size limits under both **Alternative 2** and **Alternative 3** would likely reduce the commercial landings of wahoo by 12% and 38%, respectively (Appendix B4, Table 1). Analyses conducted using the MRFSS of recreational anglers found that the predicted reduction in harvest for wahoo would be approximately 33% under **Alternative 2** and 76% under **Alternative 3** (Appendix B2, Table 2).[6]

[5] Figuerola-Fernandez et al. 2008. https://www.drna.pr.gov/historico/oficinas/arn/recursosvivientes/negociado-de-pesca-y-vida-silvestre/laboratorio-de-investigaciones-pesqueras-1/publicaciones/Informe%20Final%20F48%20revisado.pdf

[6] These results are based on the assumption that the size of wahoo landed by recreational anglers has not changed since the MRFSS length data were collected in 2000-2017.

2.2.2 Action 2(b). Establish a recreational bag limit for wahoo

Alternative 1. No Action. Do not establish a recreational bag limit for wahoo in federal waters around Puerto Rico.

Alternative 2. Establish a recreational bag limit in federal waters around Puerto Rico of 5 wahoo per person per day, not to exceed 10 wahoo per vessel per day, whichever is less.

Alternative 3. Establish a recreational bag limit in federal waters around Puerto Rico of 2 wahoo per person per day, not to exceed 6 wahoo per vessel per day, whichever is less.

Discussion

Alternative 1 would not establish a recreational bag limit for wahoo in federal waters around Puerto Rico and all wahoo caught could be removed. **Alternative 2** would establish a daily bag limit of 5 per person/10 per vessel per day, which would be compatible with DNER regulations. Compared to **Alternative 1**, **Alternative 2** could result in greater biomass of wahoo available (i.e., more wahoo would be left in the water) if recreational fishermen regularly catch and keep more than 5 wahoo per day. However, **Alternative 2** could result in increased discards if recreational fishermen catch and release wahoo during their fishing activities in an effort to catch a desired fish (e.g., a larger sized fish). As the bag limit under **Alternative 2** would be compatible with state regulations, this alternative would have the greatest benefit for enforcement agencies. **Alternative 3** proposes a more restrictive bag limit compared to **Alternative 2**and **Alternative 1**, which would be expected to result in a greater amount of fish left in the water and a greater number of potential discards.

Analyses conducted using catch and effort data collected during the MRFSS, found that the majority of recreational anglers harvested only one wahoo per trip (Appendix B3, Figure 4) and that the predicted reduction in harvest for wahoo in federal waters would be less than 2% under **Alternative 2** and approximately 10% under **Alternative 3** (Appendix B3, Table 2).[7]

[7] These results are based on the assumption that fishing behavior and landings from 2000-2017 MRFSS data correspond with the current fishing behavior and landings of recreational anglers in federal waters.

2.3 Action 3: Establish new management measures for dolphin in federal waters around St. Croix

2.3.1 Action 3(a). Establish a minimum size limit for dolphin applicable to all fishing (commercial and recreational)

Alternative 1. No Action. Do not establish a minimum size limit for the commercial or recreational harvest of dolphin in federal waters around St. Croix.

Alternative 2. Establish a 20" fork length minimum size limit for the commercial or recreational harvest of dolphin in federal waters around St. Croix.

Alternative 3 (Preferred). Establish a 24" fork length minimum size limit for the commercial or recreational harvest of dolphin in federal waters around St. Croix.

Discussion

Alternative 1 would not establish a size limit for dolphin in federal waters around St. Croix and fishing methods could continue as they are and all sizes of dolphin could be removed. **Alternative 2** would establish and 20" fork length size limit, which would correspond to size at which approximately 50% of females are mature (i.e., capable of reproducing).[8] **Preferred Alternative 3** would establish and 24" fork length size limit, which would correspond to size at which approximately all females are mature. Compared to **Alternative 1**, **Alternative 2** and **Preferred Alternative 3** would leave more undersized fish in the water, allowing more time for them to reach maturity and a chance to reproduce. However, **Alternative 2** and **Preferred Alternative 3** could both have a greater level of regulatory discards associated with them.

Analyses conducted using the SEFSC's TIP length and weight data from dolphin harvested by the commercial sector found that the proposed size limits under both **Alternative 2** and **Alternative 3** would result in a less than 5% change to the landings (Appendix B1, Table 2). Recreational data is not available for St. Croix, therefore analysis of the proposed size limits was not conducted. If the recreational length data from Puerto Rico are used as a proxy for St. Croix, then the predicted reduction in harvest for dolphin in federal waters would be expected to be less than 2% under **Alternative 2** and approximately 15% under **Alternative 3** (Appendix B2, Table 1).

[8] Perez, R.N. and Y. Sadovy. 1991. http://proceedings.gcfi.org/proceedings/preliminary-data-on-landing-records-and-reproductive-biology-of-coryphaena-hippurus-l-in-puerto-rico/

2.3.2 Action 3(b). Establish a recreational bag limit for dolphin

Alternative 1. No Action. Do not establish a recreational bag limit for dolphin in federal waters around St. Croix.

Alternative 2 (Preferred). Establish a recreational bag limit in federal waters around St. Croix of 10 dolphin per person per day, not to exceed 32 dolphin per vessel per day, whichever is less.

Alternative 3. Establish a recreational bag limit in federal waters around St. Croix of 5 dolphin per person per day, not to exceed 15 dolphin per vessel per day, whichever is less.

Discussion

Alternative 1 would not establish a recreational bag limit for dolphin in federal waters around St. Croix and all dolphin caught could be removed. **Preferred Alternative 2** would establish a daily bag limit of 10 per person/32 per vessel, which would be compatible with new regulations established by the U.S. Virgin Islands' (USVI) Department of Planning and Natural Resources (DPNR) that apply to territorial waters off St. Croix. The new DPNR regulations have not been implemented yet. Compared to **Alternative 1**, **Preferred Alternative 2** could result in greater biomass of dolphin available (i.e., more dolphin would be left in the water) if recreational fishermen regularly catch and keep more than 10 dolphin per day. However, **Preferred Alternative 2** could result in increased discards if recreational fishermen catch and release dolphin during their fishing activities in an effort to catch a desired fish (e.g., a larger sized fish). As the bag limit under **Preferred Alternative 2** would be compatible with state regulations, this alternative would have the greatest benefit for enforcement agencies. **Alternative 3** proposes a more restrictive bag limit compared to **Alternative 2** and **Alternative 1**, which would be expected to result in a greater amount of fish left in the water and a greater potential number of discards.

Recreational data is not available for St. Croix, therefore analysis of the proposed recreational bag limits was not conducted. If the recreational catch and effort data from Puerto Rico are used as a proxy for St. Croix, then the predicted reduction in harvest for dolphin in federal waters would be similar to the 3% reduction under **Alternative 2**, which allows two more fish per vessel per day that the Puerto Rico alternative, and the estimated 15% under **Alternative 3** (Appendix B3, Table 1).

2.4 Action 4: Establish new management measures for wahoo in federal waters around St. Croix

2.4.1 Action 4(a). Establish a minimum size limit for wahoo applicable to all fishing (commercial and recreational)

Alternative 1. No Action. Do not establish a minimum size limit for the commercial or recreational harvest of wahoo in federal waters around St. Croix.

Alternative 2. Establish a 32" fork length minimum size limit for the commercial or recreational harvest of wahoo in federal waters around St. Croix.

Alternative 3 (Preferred). Establish a 40" fork length minimum size limit for the commercial or recreational harvest of wahoo in federal waters around St. Croix.

Discussion

Alternative 1 would not establish a size limit for wahoo in federal waters around St. Croix and fishing methods could continue as they are and all sizes of wahoo could be removed. **Alternative 2** would establish and 32" fork length size limit, which would correspond to size at which approximately 25% of females are mature (i.e., capable of reproducing).[9] **Preferred Alternative 3** would establish and 40" fork length size limit, which would correspond to size at which approximately all females are mature. Compared to **Alternative 1**, **Alternative 2** and **Preferred Alternative 3** would leave more undersized fish in the water, allowing more time for them to reach maturity and a chance to reproduce. However, **Alternative 2** and **Preferred Alternative 3** could both have a greater level of regulatory discards associated with them.

Analyses conducted using the SEFSC's TIP length and weight data from wahoo harvested by the commercial sector found that the proposed size limits under both **Alternative 2** and **Alternative 3** would likely reduce the commercial landings of wahoo by 2% and 45%, respectively (Appendix B4, Table 2). Recreational data is not available for St. Croix, therefore analysis of the proposed size limits was not conducted. If the recreational length data from Puerto Rico are used as a proxy for St. Croix, then the predicted reduction in harvest for wahoo in federal waters would be approximately 33% under **Alternative 2** and 76% under **Alternative 3** (Appendix B2, Table 2).

[9] Figuerola-Fernandez et al. 2008. https://www.drna.pr.gov/historico/oficinas/arn/recursosvivientes/negociado-de-pesca-y-vida-silvestre/laboratorio-de-investigaciones-pesqueras-1/publicaciones/Informe%20Final%20F48%20revisado.pdf

2.4.2 Action 4(b). Establish a recreational bag limit for wahoo

Alternative 1. No Action. Do not establish a recreational bag limit for wahoo in federal waters around St. Croix.

Alternative 2. Establish a recreational bag limit in federal waters around St. Croix of 4 wahoo per person per day, not to exceed 20 wahoo per vessel per day, whichever is less.

Alternative 3. Establish a recreational bag limit in federal waters around St. Croix of 2 wahoo per person per day, not to exceed 10 wahoo per vessel per day, whichever is less.

Discussion

Alternative 1 would not establish a recreational bag limit for wahoo in federal waters around St. Croix and all wahoo caught could be removed. **Alternative 2** would establish a daily bag limit of 4 per person/20 per vessel, which would be compatible with new regulations established by the USVI's DPNR. The new DPNR regulations have not been implemented yet. Compared to **Alternative 1**, **Alternative 2** could result in greater biomass of wahoo available (i.e., more wahoo would be left in the water) if recreational fishermen regularly catch and keep more than 4 wahoo per day. However, **Alternative 2** could result in increased discards if recreational fishermen catch and release wahoo during their fishing activities in an effort to catch a desired fish (e.g., a larger sized fish). As the bag limit under **Alternative 2** would be compatible with state regulations, this alternative would have the greatest benefit for enforcement agencies. **Alternative 3** proposes a more restrictive bag limit compared to **Alternative 2** and **Alternative 1**, which would be expected to result in a greater amount of fish left in the water and a greater potential number of discards.

2.5 Action 5: Establish new management measures for dolphin in federal waters around St. Thomas and St. John

2.5.1 Action 5(a). Establish a minimum size limit for dolphin applicable to all fishing (commercial and recreational)

Alternative 1. No Action. Do not establish a minimum size limit for the commercial or recreational harvest of dolphin in federal waters around St. Thomas/St. John.

Alternative 2. Establish a 20" fork length minimum size limit for the commercial or recreational harvest of dolphin in federal waters around St. Thomas/St. John.

Alternative 3 (Preferred). Establish a 24" fork length minimum size limit for the commercial or recreational harvest of dolphin in federal waters around St. Thomas/St. John.

Discussion

Alternative 1 would not establish a size limit for dolphin in federal waters around St. Thomas/St. John and fishing methods could continue as they are and all sizes of dolphin could be removed. **Alternative 2** would establish and 20" fork length size limit, which would correspond to size at which approximately 50% of females are mature (i.e., capable of reproducing).[10] **Alternative 3** would establish and 24" fork length size limit, which would correspond to size at which approximately all females are mature. Compared to **Alternative 1**, **Alternative 2** and **Preferred Alternative 3** would leave more undersized fish in the water, allowing more time for them to reach maturity and a chance to reproduce. However, **Alternative 2** and **Preferred 3 Alternative** could both have a greater level of regulatory discards associated with them.

Analyses conducted using the SEFSC's TIP length and weight data from dolphin harvested by the commercial sector found that the proposed size limits under both **Alternative 2** and **Alternative 3** would result in a less than 1% change to the landings (Appendix B1, Table 3). Recreational data is not available for St. Thomas/St. John, therefore analysis of the proposed size limits was not conducted. If the recreational length data from Puerto Rico are used as a proxy for St. Thomas/St. John, then the predicted reduction in harvest for dolphin in federal waters would be expected to be less than 2% under **Alternative 2** and approximately 15% under **Alternative 3** (Appendix B2, Table 1).

[10] Perez, R.N. and Y. Sadovy. 1991. http://proceedings.gcfi.org/proceedings/preliminary-data-on-landing-records-and-reproductive-biology-of-coryphaena-hippurus-l-in-puerto-rico/

2.5.2 Action 5(b). Establish a recreational bag limit for dolphin

Alternative 1. No Action. Do not establish a recreational bag limit for t dolphin in federal waters around St. Thomas/St. John.

Alternative 2 (Preferred). Establish a recreational bag limit in federal waters around St. Thomas/St. John of 10 dolphin per person per day, not to exceed 32 dolphin per vessel per day, whichever is less.

Alternative 3. Establish a recreational bag limit in federal waters around St. Thomas/St. John of 5 dolphin per person per day, not to exceed 15 dolphin per vessel per day, whichever is less.

Discussion

Alternative 1 would not establish a recreational bag limit for dolphin in federal waters around St. Thomas/St. John and all dolphin caught could be removed. **Preferred Alternative 2** would establish a daily bag limit of 10 per person/32 per vessel, which would be compatible with new regulations established by the USVI's DPNR. The new DPNR regulations have not been implemented yet. Compared to **Alternative 1**, **Preferred Alternative 2** could result in greater biomass of dolphin available (i.e., more dolphin would be left in the water) if recreational fishermen regularly catch and keep more than 10 dolphin per day. However, **Preferred Alternative 2** could result in increased discards if recreational fishermen catch and release dolphin during their fishing activities in an effort to catch a desired fish (e.g., a larger sized fish). As the bag limit under **Preferred Alternative 2** would be compatible with state regulations, this alternative would have the greatest benefit for enforcement agencies. **Alternative 3** proposes a more restrictive bag limit compared to **Alternative 2** and **Alternative 1**, which would be expected to result in a greater amount of fish left in the water and a greater potential number of discards.

Recreational data is not available for St. Thomas/St. John, therefore analysis of the proposed recreational bag limits was not conducted. If the recreational catch and effort data from Puerto Rico are used as a proxy for St. Thomas/St. John, then the predicted reduction in harvest for dolphin in federal waters would be similar to the 3% reduction under **Alternative 2**, which allows two more fish per vessel per day that the Puerto Rico alternative, and the estimated 15% under **Alternative 3** (Appendix B3, Table 1).

2.6 Action 6: Establish new management measures for wahoo in federal waters around St. Thomas and St. John

2.6.1 Action 6(a). Establish a minimum size limit for wahoo applicable to all fishing (commercial and recreational)

Alternative 1. No Action. Do not establish a minimum size limit for the commercial or recreational harvest of wahoo in federal waters around St. Thomas/St. John.

Alternative 2. Establish a 32" fork length minimum size limit for the commercial or recreational harvest of wahoo in federal waters.

Alternative 3 (Preferred). Establish a 40" fork length minimum size limit for the commercial or recreational harvest of wahoo in federal waters.

Discussion

Alternative 1 would not establish a size limit for wahoo in federal waters around St. Thomas/St. John and fishing methods could continue as they are and all sizes of wahoo could be removed. **Alternative 2** would establish and 32" fork length size limit, which would correspond to size at which approximately 25% of females are mature (i.e., capable of reproducing).[11] **Alternative 3** would establish and 40" fork length size limit, which would correspond to size at which approximately all females are mature. Compared to **Alternative 1**, **Alternatives 2** and **3** would leave more undersized fish in the water, allowing more time for them to reach maturity and a chance to reproduce. However, **Alternatives 2** and **3** could both have a greater level of regulatory discards associated with them.

Analyses conducted using the SEFSC's TIP length and weight data from wahoo harvested by the commercial sector found that the proposed size limits under both **Alternative 2** and **Alternative 3** would likely reduce the commercial landings of wahoo by 12% and 38%, respectively (Appendix B3, Table 1). Recreational data is not available for St. Croix, therefore analysis of the proposed size limits was not conducted. If the recreational length data from Puerto Rico are used as a proxy for St. Croix, then the predicted reduction in harvest for wahoo in federal waters would be approximately 33% under **Alternative 2** and 76% under **Alternative 3** (Appendix B2, Table 2).

[11] Figuerola-Fernandez et al. 2008. https://www.drna.pr.gov/historico/oficinas/arn/recursosvivientes/negociado-de-pesca-y-vida-silvestre/laboratorio-de-investigaciones-pesqueras-1/publicaciones/Informe%20Final%20F48%20revisado.pdf

2.6.2 Action 6(b). Establish a recreational bag limit for wahoo

Alternative 1. No Action. Do not establish a recreational bag limit for wahoo in federal waters around St. Thomas/St. John.

Alternative 2. Establish a recreational bag limit in federal waters around St. Thomas/St. John of 4 wahoo per person per day, not to exceed 20 wahoo per vessel per day, whichever is less.

Alternative 3. Establish a recreational bag limit in federal waters around St. Thomas/St. John of 2 wahoo per person per day, not to exceed 10 wahoo per vessel per day, whichever is less.

Discussion

Alternative 1 would not establish a recreational bag limit for wahoo in federal waters around St. Thomas/St. John and all wahoo caught could be removed. **Alternative 2** would establish a daily bag limit of 4 per person/20 per vessel, which would be compatible with new regulations established by the USVI's DPNR. The new DPNR regulations have not been implemented yet. Compared to **Alternative 1**, **Alternative 2** could result in greater biomass of wahoo available (i.e., more wahoo would be left in the water) if recreational fishermen regularly catch and keep more than 4 wahoo per day. However, **Alternative 2** could result in increased discards if recreational fishermen catch and release wahoo during their fishing activities in an effort to catch a desired fish (e.g., a larger sized fish). As the bag limit under **Alternative 2** would be compatible with state regulations, this alternative would have the greatest benefit for enforcement agencies. **Alternative 3** proposes a more restrictive bag limit compared to **Alternative 2** and **Alternative 1**, which would be expected to result in a greater amount of fish left in the water and a greater potential number of discards.

Chapter 3. Affected Environment

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

3.1 Description of the Physical Environment

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

3.1.1 Puerto Rico

Federal waters around Puerto Rico extend seaward from 9 nautical miles (17 km) from shore to the offshore boundary of the U.S. Caribbean exclusive economic zone (EEZ), which covers approximately 65,368 mi^2 (169,303 km^2). The island of Puerto Rico is almost rectangular in shape, approximately 110 by 35 mi (177 by 56 km), and its coast measures approximately 700 mi (1,227 km) in linear extent, including the adjacent inhabited islands of Vieques and Culebra as well as various other isolated islands without permanent populations including Mona, Monito, and Desecheo. The Mona Passage separates Puerto Rico from Hispaniola to the west and is about 75 mi (120 km) wide and more than 3,300 feet (ft) (1,000 meters [m]) deep. The Puerto Rico Trench borders the northern coast and is 28,000 ft (8,500 m) deep, and to the south the sea bottom descends to the 16,400 ft (5,000 m) deep Venezuelan Basin of the Caribbean Sea. To the east, Puerto Rico shares the shallow-water shelf platform with St. Thomas/St. John, which extends east towards the British Virgin Islands.

Moored surface and submerged fish aggregating devices (FAD) been deployed in waters around Puerto Rico by the Department of Natural and Environmental Resources (DNER) (Figure 3.1), which are used by the recreational, charter, and commercial fishing sectors to target tunas, billfish, dolphinfish, mackerel, wahoo, and triggerfish using rod and reel, trolling, or spearfishing gear. Currently there are 9 surface and 18 submerged moored FADs along the north coast of Puerto Rico from Fajardo in the east to Arecibo in the west. The 18 submerged FADs are located off San Juan and were deployed after Hurricanes Maria and Irma and several vessel

strikes damaged many of the previously deployed surface FADs. They are moored in water depths ranging from 600-1,200 m with buoys 20 m below the surface. Information on Puerto Rico's FAD monitoring program, including FAD coordinates, can be found at https://prfadsystem.org/.

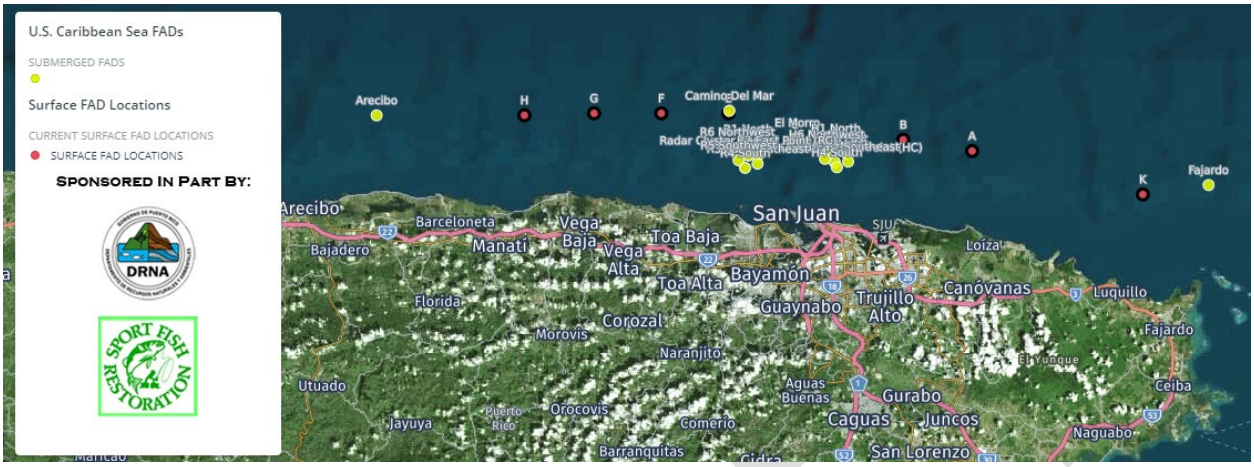

Figure 3.1.1. Location of surface (red) and moored (yellow) FADs off the north coast of Puerto Rico.
Source: https://prfadsystem.org/fad-posiciones/

3.1.2 St. Croix

Federal waters around St. Croix extend seaward from 3 nautical miles (5.6 km) from shore to the offshore boundary of the U.S. Caribbean EEZ, which covers approximately 9,216 mi^2 (23,870 km^2). St. Croix is located about 46 mi (74 km) south of St. Thomas/St. John and lies on a different geological platform. St. Croix is separated from St. Thomas/St. John by a 2.5 mi (4 km) deep trench. The St. Croix shelf is much narrower and shallower than that of the northern islands, with an approximate area of 99 nautical miles $(nm)^2$ (343 km^2). Most of the shelf area is less than 80 ft (24.4 m) deep.

Moored surface and submerged FADs are deployed in waters around St. Croix by the Department of Planning and Natural Resources (DPNR) (Figure 3.1.2), used by the recreational, charter, and commercial fishing sectors to target tunas, billfish, dolphinfish, mackerel, wahoo, and triggerfish using rod and reel, trolling, or spearfishing gear. FAD designs in the USVI consist of either surface buoys or buoys that are submerged 50 ft below the surface. Moored FADs positioned off St. Croix were lost to the 2017 hurricanes or other unidentified causes. The USVI moored FAD program is undergoing re-development as they identify new partners and contractors to assist in moored FAD development and deployment, and secure the needed permits to cover future deployments. The DPNR's Division of Fish and Wildlife collects voluntary data on recreational catches through the USVI Recreational Fishing Report Form that

allows anglers to indicate if they were fishing off of FADs. Information on the USVI's FAD program, including FAD coordinates, can be found at https://coastalanglermag.com/usvi-fish-aggregating-device-fad-program/.

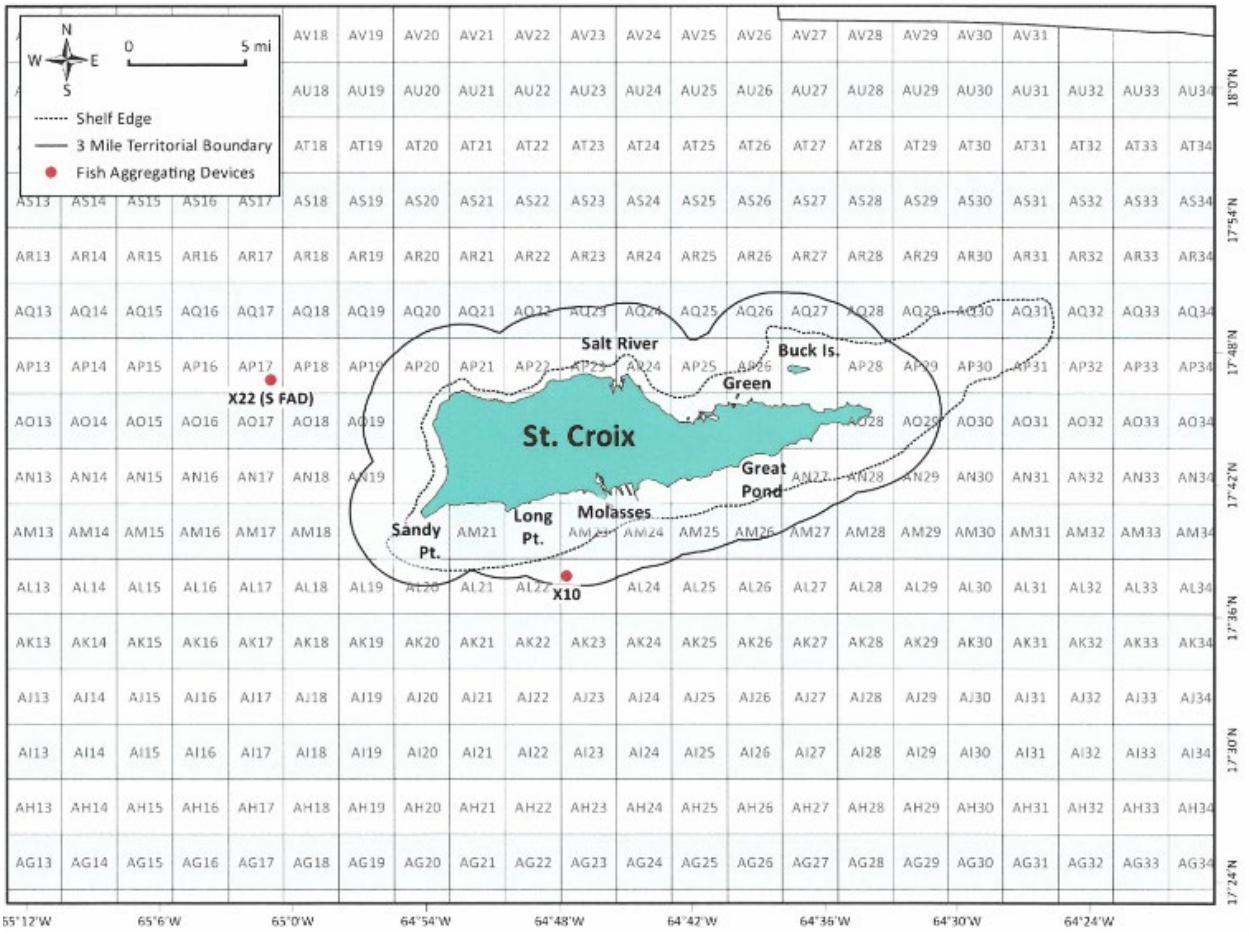

Figure 3.1.2. St. Croix fishing area map used to report catch with FAD device locations denoted by the red circles.
Source: https://www.usvifishinglicense.org/fish-aggregating-devices

3.1.3 St. Thomas and St. John

Federal waters around St. Thomas/St. John extend seaward from 3 nautical miles (5.6 km) from shore to the offshore boundary of the U.S. Caribbean EEZ, which covers approximately 1,103 mi^2 (2,856 km^2). The islands of St. Thomas/St. John are bordered by the Atlantic Ocean to the north and the Caribbean Sea to the south. The island of St. Thomas is bordered to the west by the Puerto Rico islands of Vieques and Culebra, and to the east by St. John, which is bordered on the east by the British Virgin Islands. The shelf shared by the islands of St. Thomas/St. John is about 8 mi (12.9 km) wide on the south and 20 mi (32.2 km) wide on the north with an

approximate area of 510 nm^2 (1751 km^2). Most of the shelf area is greater than 80 ft (24.4 m) deep.

Moored surface and submerged FADs are deployed in waters around St. Thomas by the DPNR (Figure 3.1.3), used by the recreational, charter, and commercial fishing sectors to target tunas, billfish, dolphinfish, mackerel, wahoo, and triggerfish using rod and reel, trolling, or spearfishing gear. FAD designs in the USVI consist of either surface buoys or buoys that are submerged 50 ft below the surface. Moored FADs positioned off St. Thomas were lost to the 2017 hurricanes and other unidentified causes. The USVI moored FAD program is undergoing re-development as they identify new partners and contractors to assist in moored FAD development and deployment, and secure the needed permits to cover future deployments. The DPNR's Division of Fish and Wildlife collects voluntary data on recreational catches through the USVI Recreational Fishing Report Form that allows anglers to indicate if they were fishing off of FADs. Information on the USVI's FAD program, including FAD coordinates, can be found at https://coastalanglermag.com/usvi-fish-aggregating-device-fad-program/.

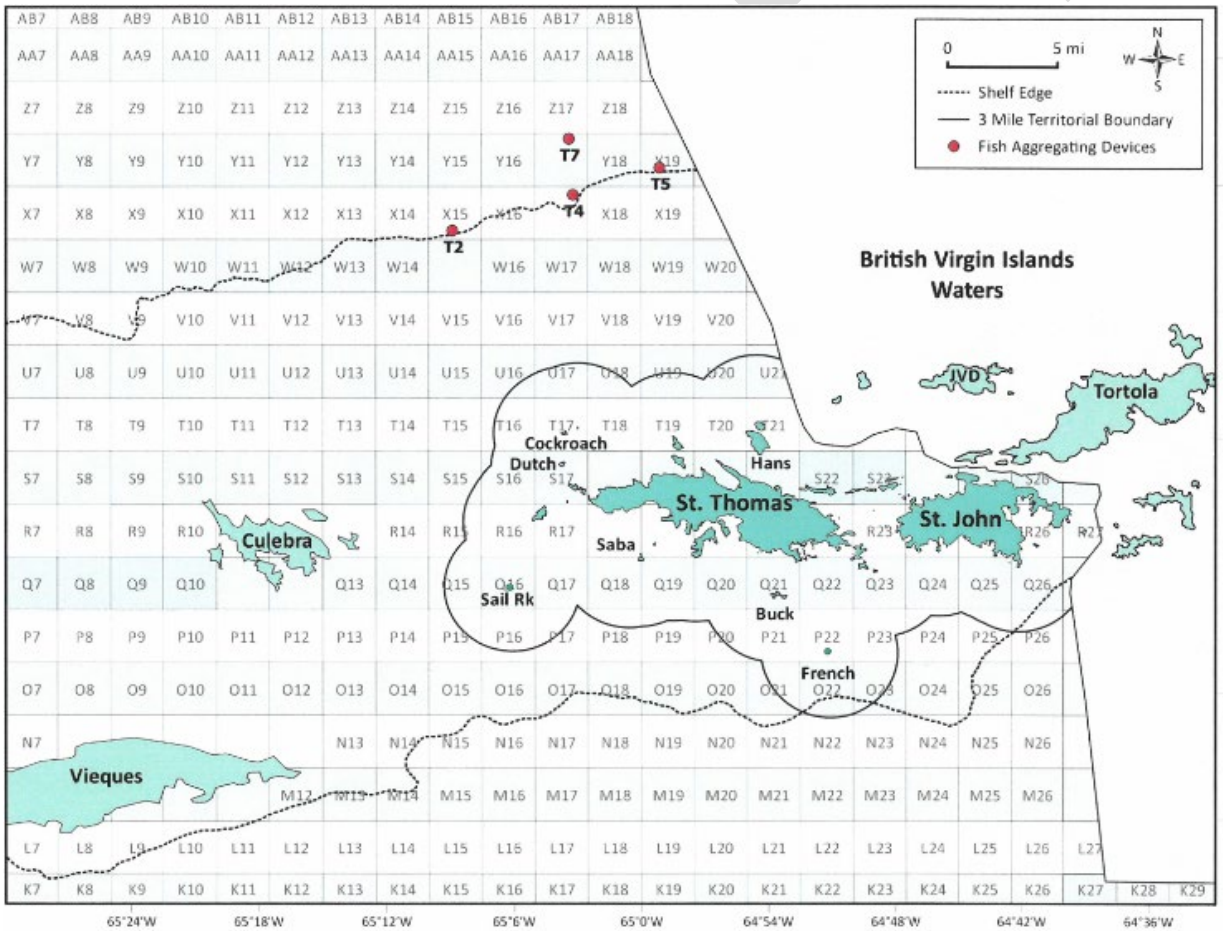

Figure 3.1.3. St. Thomas and St. John fishing area map used to report catch with FAD device locations denoted by the red circles.

Source: https://www.usvifishinglicense.org/fish-aggregating-devices

3.1.4 Habitat and Essential Fish Habitat (EFH)

Information on the habitat utilized by dolphin and wahoo in the U.S. Caribbean is included in Appendix I of the Puerto Rico, St. Croix, and St. Thomas/St. John FMPs and incorporated here by reference.

Dolphin and wahoo are migratory pelagic species occurring in tropical and subtropical waters worldwide. They are found near the surface around natural and artificial floating objects, including sargassum (in the Atlantic and Caribbean). The floating objects and vegetation create an environment where dolphin and wahoo can feed and shelter during various life stages. Dolphin and wahoo also occur near non-moving objects on the ocean surface, such as fish aggregating devices.

Essential Fish Habitat

EFH is defined in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S. C. 1802(10)). EFH for dolphin and wahoo as described in each FMP consists of all waters from mean high water to the outer boundary of the U.S. Caribbean EEZ (habitats used by eggs, larvae, juveniles, and adults) and sargassum, coral reef, and hard bottom substrates from mean high water to the outer boundary of the U.S. Caribbean EEZ (habitats used by juveniles, adults, and larvae [for larvae, sargassum substrates only]).

3.2 Description of the Biological and Ecological Environments

The Puerto Rico FMP, St. Croix FMP, and St. Thomas/St. John FMP include a description of the biological and ecological environments for the species managed in federal waters around the respective island/island group, including dolphin and wahoo. These are incorporated herein by reference and summarized below.

3.2.1 Description of the Species

The species directly affected by actions proposed in this amendment include dolphin (*Coryphaena hippurus*) and wahoo (*Acanthocybium solanderi*). Both are coastal migratory pelagic species occurring in tropical and subtropical waters worldwide.

3.2.1.1 Dolphin

In the western Atlantic, dolphin are distributed from Nova Scotia to Brazil, including Bermuda, the Gulf of Mexico, and the greater Caribbean region. Adult dolphin are usually found in open water, while juveniles are found with floating seagrass and marine debris and occasionally in estuaries and harbors. Dolphin eat a wide variety of species, including small pelagic fish, juvenile tuna, billfish, jacks, and pompano, and pelagic larvae of nearshore, bottom-living species. They also eat invertebrates such as cephalopods, mysids, and jellyfish. Large tuna, rough-toothed dolphin, marlin, sailfish, swordfish, and sharks feed on dolphin, particularly juveniles.

Oxenford and Hunte (1986) proposed migration circuits for dolphin off the northern and southern coasts of Puerto Rico and around the USVI. populations of dolphin, with the northern population moving stocks (Fig. 1). One stock is located southeast, and the other northwest, of Puerto Rico and the Virgin Islands. Previous studies showed that dolphin abundance in Puerto Rico peaks from November to January and again, albeit to a lesser degree, from April to June (Pérez and Sadovy 1996). Similarly dolphin abundance in the USVI has a large peak in April–May with a smaller peak observed in November.

In a study off Puerto Rico (Rivera and Appeldoorn 2000), the lengths and weights of dolphin from the south coast (381-1479 mm FL and 0.70-25.00 kg) were broader than that from the north coast (475-1283 mm FL and 1.25-18.50 kg). From the total sample, 55 were male and 115 were female and males were slightly larger than females (males: 630-1479 mm FL and 2.50-25.00 kg; females: 381-1283 mm FL and 0.07-19.75 kg). The linear growth rate the combined samples was 2.52 mm FL/day, with no significant differences observed for sex or coast. On average, dolphin that were 110–150 days grew 3.3 mm FL/day, 170–220 days grew 2.9 mm FL/day, and those 230–270 days grew 2.1 mm FL/day. When comparing size of dolphin from the north and south coasts of Puerto Rico, the authors note that there is an influx of smaller sized fish in April on the southern coast, which likely represent a new cohort of dolphin rather than a separate stock. In addition, genetic studies conducted by Merten et al. (2015) showed low population differentiation of dolphin throughout the western central Atlantic.

3.2.1.2 Wahoo

In the western Atlantic, wahoo are distributed from New York to Colombia, including Bermuda, the Bahamas, the Gulf of Mexico, and the Caribbean. Wahoo typically occur far offshore, inhabit waters around reef edges and walls and may be attracted to oceanic frontal zones and temperature discontinuities. Wahoo mainly feed on squid and fish, including frigate mackerel, butterfish, porcupine fish, and round herring. They generally compete with tuna for the same kind of food, but can feed on larger prey. A number of predators such as sharks and large tuna that share their habitat feed on young wahoo.

In studies off Florida and the northern Bahamas, wahoo sizes ranged from 24.7 to 77 in (628 to 1956 mm) FL (McBride et al. 2008). Males were smaller than females, with the largest male at 72.3 lbs (32.8 kg) and the largest female are 101.4 lbs (46.0 kg). Maximum age was 9.3 years. Reported size and age at 50% maturity for female wahoo were 36.4 in (925 mm) FL and 0.64 years, respectively, with peak spawning in the summer (Maki Jenkins and McBride 2009).

Theisen et al. (2008) indicated that a worldwide stock for wahoo consisted of a single globally distributed population and Garber et al. (2005) found no genetic heterogeneity for wahoo in the western central Atlantic.

3.2.1.3 Stock Status of Dolphin and Wahoo

The 2022 Report to Congress on the Status of U.S. Fisheries indicates that the dolphin and wahoo stocks in Puerto Rico, St. Croix and St. Thomas/St. John are not undergoing overfishing and the overfished status are unknown.

Dolphin and wahoo are listed as species of "least concern" under the International Union for Conservation of Nature Red List (https://www.iucnredlist.org/), i.e., species that have a low risk of extinction.

3.2.2 Bycatch

The Puerto Rico, St. Croix, and St. Thomas/St. John FMPs each include a bycatch practicability analysis for the species managed under each FMP. 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, or St. Thomas/St. John compared to other regions. What little bycatch that does occur from hook-and-line fishing is generally confined to regulatory discards (e.g., undersized yellowtail snapper), species known for ciguatera (e.g., barracuda), or species managed under Atlantic Highly Migratory Species regulations (e.g., sharks).

The actions in this amendment are not expected to significantly increase or decrease the magnitude of bycatch or bycatch mortality of dolphin and wahoo in the Puerto Rico, St. Croix, and St. Thomas/St. John fisheries. Analysis from the Marine Recreational Fishery Statistics Survey conducted in Puerto Rico from 2000-2017, found that the majority of recreational anglers harvested only one dolphin or wahoo per trip (>60% and 75%, respectively; Appendix B3) and that the mean fork lengths caught were greater than the proposed lengths for dolphin and halfway between the proposed lengths for wahoo (Appendix B2). Analysis from the commercial landigns data found that the proposed size limits for dolphin would have a negligible impact (Appendix B1), but more of an impact for wahoo (Appendix B4). Overall, the proposed actions limits

would not be expected to result in a significant increase in dolphin or wahoo discards. Additionally, since fishermen in the U.S. Caribbean region traditionally utilize most resources harvested, and the amount of bycatch from the fisheries targeting dolphin and wahoo are minimal and 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. At least 17 species of whales and dolphins have been reported in or near U.S. waters in the northeastern Caribbean and all 17 species are protected under the MMPA. Three of the species (i.e., sperm, sei, and fin whales) are also listed as endangered under the ESA.[12] In addition to these three marine mammals, five species or distinct population segments (DPS) of sea turtles (green - North Atlantic DPS and the South Atlantic DPS; hawksbill; leatherback; loggerhead - Northwest Atlantic DPS); four species or DPSs of fish (Nassau grouper; scalloped hammerhead shark - Central and Southwest Atlantic DPS; oceanic whitetip shark; giant manta ray); and seven species of coral (elkhorn coral, staghorn coral, rough cactus coral, pillar coral, lobed star coral, mountainous star coral, and boulder coral) occur in the U.S. Caribbean and are protected under the ESA. ESA designated critical habitat for the green sea turtle, hawksbill sea turtle, leatherback sea turtle, and *Acropora* corals also occur within the Caribbean Fishery Management Council's (Council) 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 extended 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 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). In the biological opinion, NMFS determined that the authorization of the fisheries conducted under each of the island-based FMPs is not likely to adversely affect sperm, sei, and fin whales; the Northwest Atlantic DPS of loggerhead sea turtle; giant manta rays; or critical habitat of green, hawksbill, or 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,

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

mountainous star coral, or boulder star coral, or result in the destruction or adverse modification of designated *Acropora* critical habitat.

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

The actions contained in this Amendment are not anticipated to modify 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.

3.3 Description of the Pelagic Fish Component of the Puerto Rico, St. Croix, and St. Thomas and St. John Fisheries

Fisheries of the U.S. Caribbean region provide food, livelihood, and income. The region's fisheries (federal and state) can be divided into commercial, recreational, and subsistence sectors. Commercial fishermen pursue multiple species using multiple gear types and are characterized as "artisanal" because their fishing vessels tend to be less than 45 feet (13.7 meters) long, have small crews, yield small revenues (when compared to revenues from commercial fishing in the continental U.S.), and the marine resources they harvest have a small seafood supply chain. The Puerto Rico FMP, St. Croix FMP and St. Thomas/St. John FMP contain a comprehensive description of the respective fisheries occurring in federal waters, which are incorporated in here by reference.

3.3.1 Puerto Rico

In Puerto Rico, commercial landings are available from self-reported fishermen logbooks, which are adjusted using a coast-specific expansion factor determined by Puerto Rico's Department of Natural and Environmental Resources (DNER) Fisheries Research Laboratory based on intercept sampling of commercial fishermen. Commercial fishermen primarily use hook-and-line gear to target coastal migratory species such as dolphin and wahoo (Agar and Shivlani 2016). Of the fishermen who use hook-and-line gear, 59% stated they primarily fish in Commonwealth waters (shoreline out to 9 nautical miles), 39% fish in both federal and Commonwealth waters, and less than 2% fish solely in federal waters (9-200 nautical miles) (Agar and Shivlani 2016). In Puerto Rico, there are two-dolphinfish seasons: October through March for the northern population and March to June for the southern population (Rodríguez-Ferrer et al. 2006). In the 2019 Fisheries of the United States (NMFS 2021), dolphinfish accounted for 8% and wahoo for 1% of the total commercial landings for finfish species in Puerto Rico.

According to the most recent census conducted in Puerto Rico, there were approximately 837 active commercial fishermen in 2018 (Shivlani 2022). In 2019[13], 196 commercial fishermen reported landings of dolphin (5.6% of the total adjusted landings[14] for that year) and 107 reported landings of wahoo (0.9% of the total adjusted landings for that year) (Table 3.3.1). Currently, there are approximately 1,200 active commercial fishermen combined for the full time, part time, beginner, and lifetime categories (DNER pers. comm. April 2023).

Table 3.3.1. Number of commercial fishermen that reported their catch and the adjusted landings each year from 2010-2019 for all species combined (total), dolphin, and wahoo in Puerto Rico.

Year*	Total Fishers Reporting	Total Landings (Adjusted)	Fishers Reporting Dolphin	Dolphin Landings (Adjusted)	Fishers Reporting Wahoo	Wahoo Landings (Adjusted)
2010	604	2,816,090	116	176,168	34	14,944
2011	694	2,057,216	168	144,892	78	17,414
2012	749	2,742,281	183	237,778	97	26,487
2013	798	1,892,770	168	111,141	102	17,150
2014	854	2,330,619	185	110,601	111	16,789
2015	830	2,370,452	210	128,382	99	17,002
2016	811	2,369,476	181	116,615	99	20,558
2017	760	1,770,882	159	76,733	69	11,396
2018	720	2,408,744	171	107,596	93	18,763
2019	800	2,466,947	196	139,163	107	21,489

Hook-and-line gear is the most effective and efficient gear type to commercially catch fish like dolphinfish and mackerels (Matos-Caraballo and Agar 2011). A study of the hook-and-line fishery of Puerto Rico reported that about 59% of the line fishermen primarily fished in state waters (<9 nautical miles), 39% fished in both federal and state waters, and less than 2% primarily fished in federal waters (9-200 nautical miles) (Agar and Shivlani 2016). For those commercial fishermen that reported landings of dolphin and wahoo, the majority are reported from federal waters (Tables 3.3.2 and 3.3.3).

[13] At the this amendment was prepared, the most recent and complete year of commercial landings available for Puerto Rico was from 2019.

[14] 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.

Table 3.3.2. Percentage of commercial landings of dolphin in Puerto Rico reported from state (0-9 nautical miles from shore), federal (9-200 nautical miles from shore), or unknown waters from the most recent 5-years available.

Year	State	Federal	Unknown
2015	30.4	50.7	18.9
2016	40.3	54.7	5.1
2017	55.4	43.6	1.0
2018	43.0	53.3	3.7
2019	49.9	48.0	2.1
Average	**43.8**	**50.0**	**6.2**

Table 3.3.3. Percentage of commercial landings of wahoo in Puerto Rico reported from state (0-9 nautical miles from shore), federal (9-200 nautical miles from shore), or unknown waters from the most recent 5-years available.

Year	State	Federal	Unknown
2015	29.6	57.1	13.4
2016	50.8	41.7	7.5
2017	54.5	42.7	2.8
2018	44.7	46.2	9.1
2019	40.1	58.1	1.9
Average	**43.9**	**49.1**	**6.9**

On average, the majority of commercial landings of dolphin and wahoo are reported off the west coast[15] of Puerto Rico (Tables 3.3.4 and 3.3.5). For both species, the smallest portion of commercial landings are reported off the east coast[16], which correspondingly has the smallest population of hook-and-line fishermen in Puerto Rico (Agar and Shivlani 2016). The north coast had the second highest percentage of the dolphin and wahoo commercial landings, which corresponds to the location of the surface and moored FADs (see Figure 3.1.1).

Table 3.3.4. Percentage of commercial landings of dolphin in Puerto Rico by coast for the most recent 5-years available.

Year	North	East	South	West
2015	34.8	6.1	15.4	43.7
2016	36.6	4.0	13.9	45.5
2017	41.1	1.4	20.4	36.8
2018	25.7	3.8	31.1	39.0
2019	43.1	1.3	14.8	40.8
Average	**36.3**	**3.3**	**19.1**	**41.2**

Table 3.3.5. Percentage of commercial landings of wahoo in Puerto Rico by coast for the most recent 5-years available.

Year	North	East	South	West
2015	29.6	7.0	10.8	52.6
2016	29.3	8.3	11.7	50.7
2017	26.9	3.8	9.7	59.6
2018	12.5	5.7	17.2	64.5
2019	34.8	1.2	9.0	55.0
Average	**26.6**	**5.2**	**11.7**	**56.5**

Dolphin and wahoo are landed by commercial fishermen in Puerto Rico year-round, with peak landings for dolphin occurring in October through February (Figure 3.3.1), and for wahoo in October through December (Figure 3.3.2). Length data from the Southeast Fisheries Science

[15] The western region spans the municipalities of Cabo Rojo to Aguadilla.
[16] The eastern region runs from the municipalities of Fajardo to Maunabo, including the islands of Vieques and Culebra.

Center's (SEFSC) Trip Interview Program (TIP) from years 2017-2019, showed that the majority of dolphin caught by commercial fishermen around Puerto Rico ranged from 30-39 inches fork length (FL) (Appendix B1, Figure 1) and for wahoo were less than 32 inches FL (Appendix B4, Figure 1).

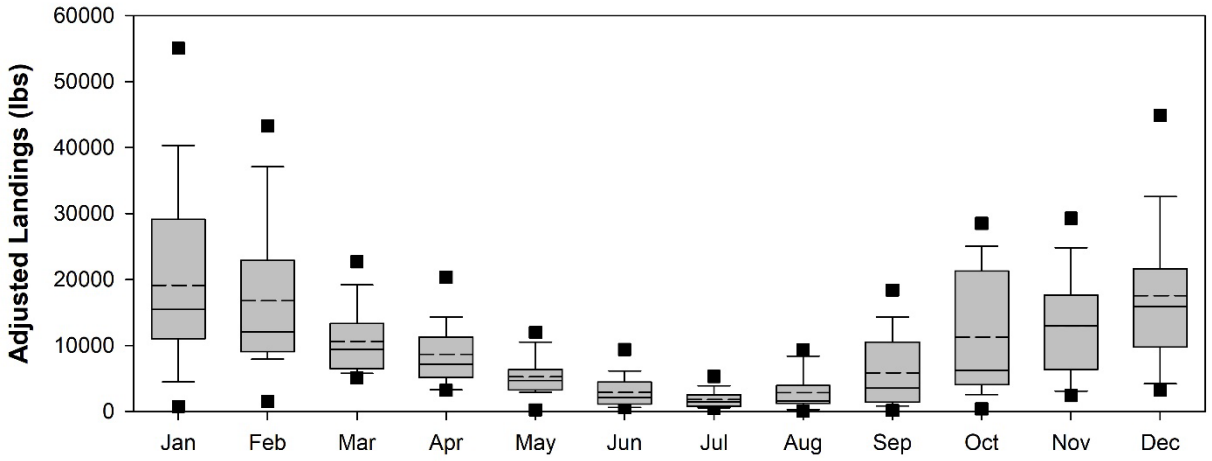

Figure 3.3.1. Range of commercial landings (adjusted) of dolphin each month in Puerto Rico from 2000-2019. The solid line in each box represents the median landings and the dashed line represents the average for each month. The black squares represent the 5th (bottom) and 95th (top) percentiles.

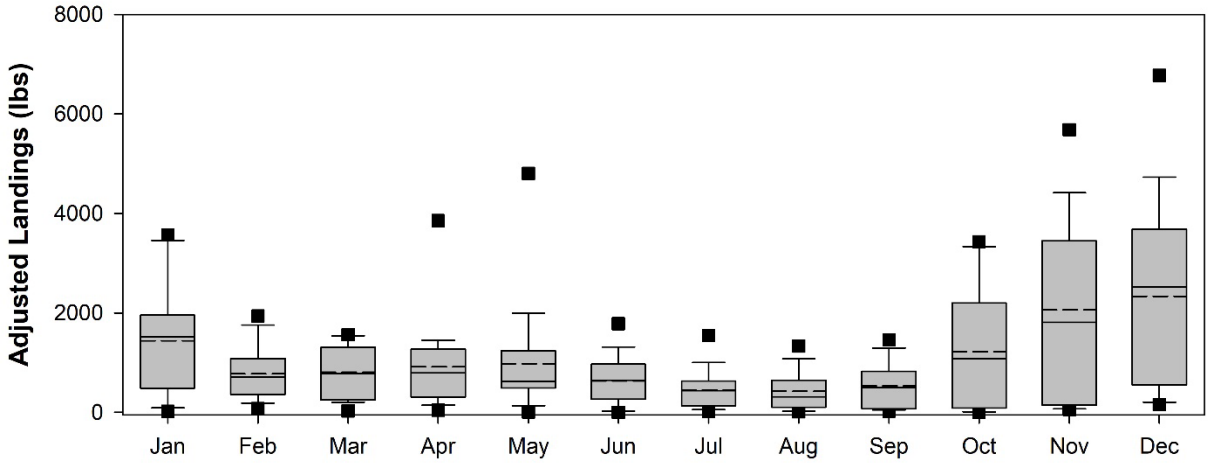

Figure 3.3.2. Range of commercial landings (adjusted) of wahoo each month in Puerto Rico from 2000-2019. The solid line in each box represents the median landings and the dashed line represents the average for each month. The black squares represent the 5th (bottom) and 95th (top) percentiles.

Recreational fishing holds social, economic, and cultural importance for residents and visitors and provides food, livelihood, income, and other benefits to residents of Puerto Rico and USVI. Recreational fishermen frequently target the same species as commercial fishermen and use similar gears to harvest those fish, but are not allowed to sell their catch. Puerto Rico statutes include a provision for mandatory licensing of recreational fishermen, but the licensing requirement has not been implemented to date.

Currently, few data are available for recreational fishing activities in Puerto Rico. The Marine Recreational Information Program (MRIP) was suspended in 2017 and has not resumed to date. For 2016, MRIP estimated that there were 124,674 recreational anglers in Puerto Rico. Recreational catch data collected for 2000-2017, included length measurements from 4,067 dolphin and 467 wahoo (Appendix B2). Approximately half of those measurements (2,267 and 282, respectively) were collected from angler trips occurring in federal waters. The mean FL of dolphin harvested in federal waters was 30.9 inches and for wahoo was 36.6 inches. A total of 1,935 dolphin angler trips and 445 wahoo angler trips were intercepted during 2000-2017, of which 930 dolphin trips and 248 wahoo trips occurred in federal waters (Appendix B3).

In Puerto Rico, tournaments are an important part of the recreational fishing activities. Before regulations (i.e., bag limits) for dolphinfish were implemented by Puerto Rico state waters in 2005, catches of 50 or more fish per boat per day were observed, with high numbers of immature fish and females landed. Following the 2005 regulations, the tournaments encouraged fishermen to land bigger fish, which reduced the tendency to land immature fish. Dolphinfish, great barracuda, wahoo, and tunas are the most often observed bycatch species during the tournaments.

From 2014-2018, 39 dolphinfish tournaments were monitored by DNER staff. Participation ranged from 704-979 anglers (average of 866 anglers per year) and the total weight recorded for all years was 64,155 lbs (29,100 kilograms [kg]) (average of 12,831 lbs/year [5,820 kg/year]) caught over 49 fishing days (Rodríguez-Ferrer and Rodríguez-Ferrer 2018). A comparison of commercial and recreational fishing in Puerto Rico from 2000-2003, found that commercial fishermen landed more dolphin by weight, but smaller sized fish (16-43 inches [414-1100 mm] FL) than both the recreational fishermen (28-43 inches [700-1100 mm] FL) and tournament fishermen (31-45 inches [800-1149 mm] FL) (Rodríguez-Ferrer et al. 2006).

Two 3-day wahoo tournaments are held in Puerto Rico each year during wahoo season - October to February (Rodríguez-Ferrer and Rodríguez-Ferrer 2018). From 2014-2016, tournament participation ranged from 168-284, with an average of 208 anglers per tournament. Total weight of wahoo recorded during the three year period (nine days total) was 3,662 lbs (1,661 kg).

3.3.2 St. Croix

In the USVI, commercial landings are available from self-reported fishermen logbooks, which are assumed to be fully reported and thus correction factors are not used. The USVI commercial fisheries in St. Croix are small, artisanal fisheries that primarily catch benthic, coastal pelagic, and deep-water pelagic fish. spiny lobster. and queen conch (Kojis et al. 2017). The fisheries are operated almost exclusively from small boats and the fishermen market the daily catch themselves. The shelf surrounding St. Croix is smaller than the shelf around St. Thomas and St. John, so deeper water is closer to shore and, therefore, pelagic fish are more accessible to the island's small boat fishery.

Dolphinfish and wahoo are harvested by more than half of the fishermen on St. Croix (Kojis et al. 2017). Most commercial fishermen fish year-round, but a few fish from November to May for dolphinfish and other migratory pelagic fish in St. Croix (Kojis et al. 2017). In the USVI, dolphin landings have a primary peak in the spring and a secondary peak in the fall and wahoo landings have a single peak in fall/winter (Toller et al. 2005). In the 2019 Fisheries of the United States, dolphinfish accounted for 6% and wahoo for 3% of the total commercial landings for finfish species in the USVI.

The most recent census of licensed commercial fishermen in the USVI reported 141 commercial fishermen on St. Croix (Kojis et al. 2017). Kojis et al. (2017) reported that dolphinfish (*Coryphaena hippurus* and *C. equiselius*) and wahoo are harvested by more than half of the commercial fishermen on St. Croix and were ranked third in importance of generating revenue. Annual commercial landings of dolphin and wahoo represent 4-19% and 1-8%, respectively, of the total commercial landings reported each year (Table 3.3.6).

Table 3.3.6. Number of commercial fishermen that reported their catch and reported landings each year from 2000-2021 for all species combined (total), dolphin, and wahoo in St. Croix, USVI.

Year	Total Fishers Reporting	Total Landings	Fishers Reporting Dolphin	Dolphin Landings	Fishers Reporting Wahoo	Wahoo Landings
2000	154	806,265	30	43,853	22	10,815
2001	176	1,005,260	46	57,639	39	20,419
2002	175	1,114,532	55	75,020	37	13,584
2003	170	994,843	40	70,058	31	22,326
2004	155	1,035,333	36	52,346	21	19,614
2005	145	1,150,490	37	42,820	27	21,213
2006	139	1,339,263	31	79,573	22	17,219
2007	145	1,227,034	30	65,902	22	17,711
2008	132	1,038,850	38	63,079	22	12,371

Year	Total Fishers Reporting	Total Landings	Fishers Reporting Dolphin	Dolphin Landings	Fishers Reporting Wahoo	Wahoo Landings
2009	131	941,382	35	66,699	20	11,206
2010	126	720,893	30	52,894	23	13,762
2011	158	645,020	28	45,600	23	5,997
2012	86	511,745	22	35,036	12	8,765
2013	78	469,896	14	35,776	17	24,515
2014	62	398,856	12	63,994	6	29,105
2015	59	379,839	15	52,813	8	27,144
2016	74	433,874	28	56,033	14	35,523
2017	65	389,504	17	73,362	13	28,439
2018	44	107,333	14	11,766	8	5,515
2019	49	114,983	13	6,075	12	4,290
2020	52	258,747	12	20,693	8	15,103
2021	59	302,173	21	29,352	16	25,023

Of the 141 commercial fishermen in 2016, 14.6% said they fished primarily in federal waters and 26.4% said they fished equally in federal and territorial waters (Kojis et al. 2017). In St. Croix, the majority of commercial landings of dolphin (Table 3.3.7) and wahoo (Table 3.3.8) are primarily reported from federal waters.

Table 3.3.7. Percentage of commercial landings of dolphin in St. Croix reported from state (0-3 nautical miles from shore), federal (3-200 nautical miles from shore), or unknown waters for the most recent 5-years available.

Year	State	Federal	Unknown
2017	1.9	97.3	0.8
2018	5.0	95.0	0.0
2019	7.6	61.3	31.1
2020	0.0	91.9	8.0
2021	1.9	97.9	0.2
Average	**3.3**	**88.7**	**8.0**

Table 3.3.8. Percentage of commercial landings of wahoo in St. Croix reported from state (0-3 nautical miles from shore), federal (3-200 nautical miles from shore), or unknown waters for the most recent 5-years available.

Year	State	Federal	Unknown
2017	2.9	96.8	0.3
2018	2.3	97.7	0.0
2019	15.1	75.5	9.4
2020	0.5	93.3	6.2
2021	2.5	97.1	0.4
Average	**4.7**	**92.1**	**3.3**

Most fishermen reported that they fish year-round (96.3%), but a small percentage reported that they fish seasonally (November to May) for dolphin and wahoo (Kojis et al. 2017). Dolphin and

wahoo are landed by commercial fishermen in St. Croix year-round, with peak landings for dolphin occurring in January through May (Figure 3.3.4), and for wahoo in October and November (Figure 3.3.5). Lengths from the SEFSC's TIP data for years 2017-2019, showed that the majority of dolphin caught by commercial fishermen around St. Croix were less than 20 inches FL (Appendix B1, Figure 2) and for wahoo were less than 32 inches FL (Appendix B4, Figure 2). In St. Croix, the majority of the commercial landings (lbs) reported for dolphin and wahoo from years 2012-2021[17] were for handline gear (95.9% and 93.1%, respectively).

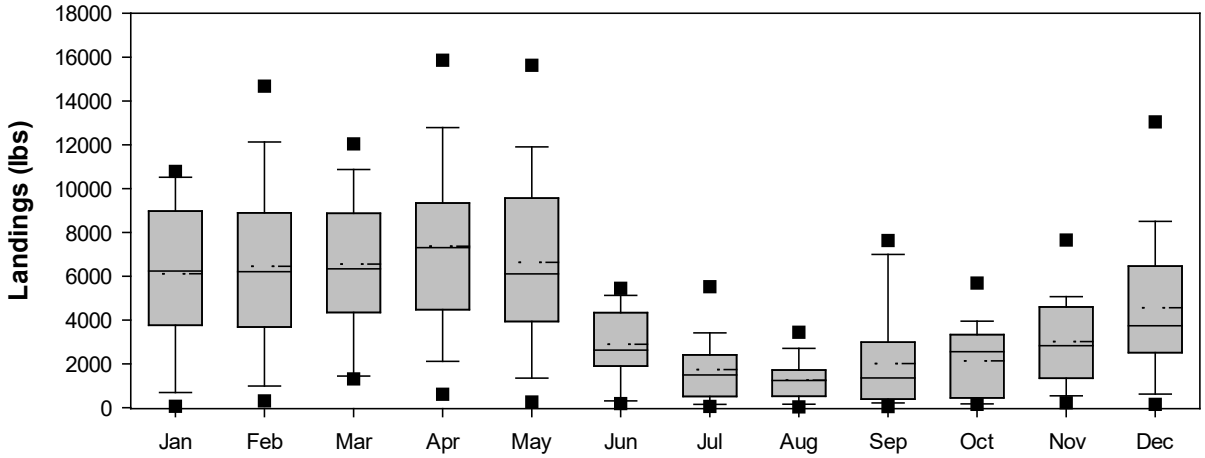

Figure 3.3.4. Range of commercial landings of dolphin each month in St. Croix from 2000-2021. The solid line in each box represents the median landings and the dashed line represents the average for each month. The black squares represent the 5th (bottom) and 95th (top) percentiles.

[17] USVI commercial catch forms were modified in mid-2011 to report landings by species instead of species group and by more specific gear type.

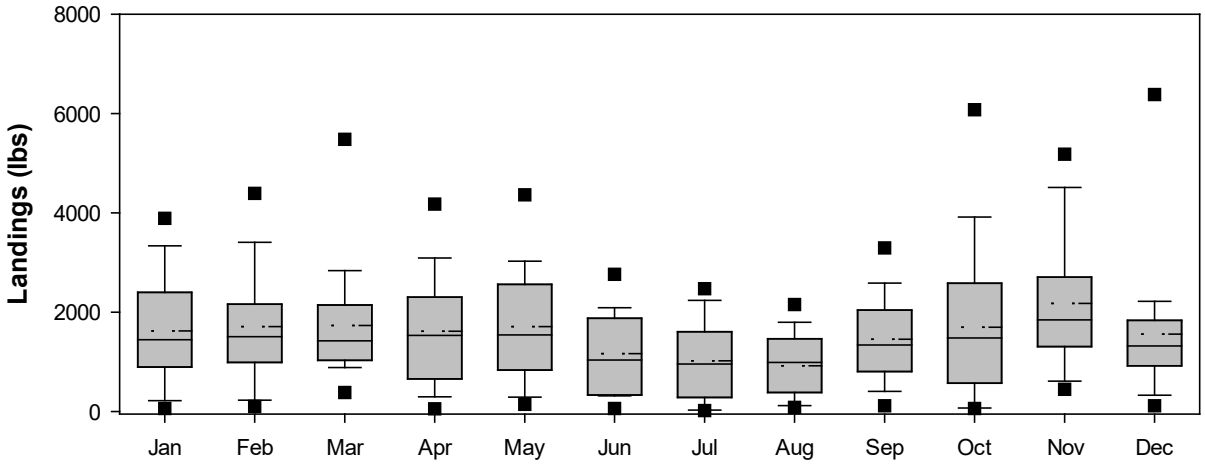

Figure 3.3.5. Range of commercial landings of wahoo each month in St. Croix from 2000-2021. The solid line in each box represents the median landings and the dashed line represents the average for each month. The black squares represent the 5th (bottom) and 95th (top) percentiles.

As in Puerto Rico, information on recreational fishing in the USVI is very limited. A survey of recreational fishermen found that three broad types of fishing occur in the USVI: (1) big game fishing on large vessels (>9 meters) that primarily target billfish; (2) private boat fishing conducted on smaller boats that target reef fish and offshore pelagic fish; and (3) fishing from shore, primarily targeting reef fish (Kojis and Tobias 2016). Most recreational fishing is done using hook-and-line gear types such as plastic spool (Yo-Yo reel) or rod and reel. On St. Thomas/St. John, a higher number of fishermen participated in offshore and inshore trolling (65% and 61%, respectively) than on St. Croix (55% and 42%, respectively), methods primarily used to catch tuna, mackerel, dolphinfish and jacks.

Dolphin, wahoo, and billfish tournaments occur during the spring and summer migrations of the pelagic species. Fourteen percent of the USVI recreational fishermen surveyed participated in fishing tournaments (22% from St. Thomas/St. John and 6% from St. Croix) (Kojis and Tobias 2016). Toller et al. (2005) identified five types of sportfishing tournaments in the USVI: shore-based handline, boat-based handline, offshore coastal pelagic, offshore pelagic, and marlin. Of those tournaments, landings from 2000 to 2005 on St. Thomas were dominated by dolphin, barracuda, and wahoo and on St. Croix by dolphin and wahoo (Toller et al. 2005).

The USVI Department of Planning and Natural Resources (DPNR) recently approved regulations for recreational fishing that include a combined bag limit for recreational catch of dolphin and wahoo in state waters around St. Croix and St. Thomas/St. John. The regulations, which have not been implemented yet, set a combined recreational catch limit of no more than

10 dolphinfish or wahoo, per person, per day, not to exceed 32 per vessel per day, and not to exceed 4 wahoo per person, per day, or 20 wahoo per vessel, per day.

In the USVI, declines in reef fish stocks prompted managers to encourage commercial fishermen to shift fishing effort towards seasonal stocks (i.e. dolphin, wahoo, and tuna) (Toller et al. 2005). If USVI reef fish stocks should continue to decline, it can be predicted that commercial effort will progressively shift towards pelagic resources. Therefore, managers must be aware of the potential for conflict between commercial and recreational fishermen over the shared resources.

3.3.3 St. Thomas and St. John

In the USVI, commercial landings are available from self-reported fishermen logbooks, which are assumed to be fully reported and thus correction factors are not used. The USVI commercial fisheries in St. Thomas/St. John are small, artisanal fisheries that primarily catch benthic, coastal pelagic, and deep-water pelagic fish, spiny lobster, and queen conch (Kojis et al. 2017). The fisheries are operated almost exclusively from small boats and the fishermen market the daily catch themselves.

Dolphinfish and wahoo are harvested by about a quarter of fishermen on St. Thomas/St. John (Kojis et al. 2017). Most commercial fishermen fish year-round, but a few from October to November for dolphinfish, kingfish, tuna, wahoo in St. Thomas/St. John (Kojis et al. 2017). In the USVI, dolphin landings have a primary peak in the spring and a secondary peak in the fall and wahoo landings have a single peak in fall/winter (Toller et al. 2005). In 2019, dolphinfish accounted for 6% of the total commercial landings in the USVI and wahoo for 3% (NMFS 2021). In the 2019 Fisheries of the United States (NMFS 2021), dolphinfish accounted for 6% and wahoo for 3% of the total commercial landings for finfish species in the USVI.

The most recent census of licensed commercial fishermen in the USVI reported 113 commercial fishermen on St. Thomas and 6 on St. John in 2016 (Kojis et al. 2017); however, 65 (57.5%) were active. Dolphinfish (*Coryphaena hippurus* and *C. equiselius*) and wahoo are harvested by about a quarter of the commercial fishermen on St. Thomas/St. John and were ranked fourth in importance of generating revenue (Kojis et al. 2017). Annual commercial landings of dolphin and wahoo represent 0-4% and 0-2%, respectively, of the total commercial landings reported each year (Table 3.3.9).

Table 3.3.9. Number of commercial fishermen that reported their catch and reported landings each year from 2000-2021 for all species combined (total), dolphin, and wahoo in St. Thomas and St. John, USVI.

Year	Total Fishers Reporting	Total Landings	Fishers Reporting Dolphin	Dolphin Landings	Fishers Reporting Wahoo	Wahoo Landings
2000	121	617,874	15	4,639	9	3,125
2001	139	755,248	19	10,360	13	5,671
2002	122	819,132	21	14,405	16	4,759
2003	121	812,436	17	7,777	9	3,355
2004	116	801,710	17	6,929	11	6,671
2005	105	743,436	10	1,824	7	6,515
2006	106	789,822	8	4,340	6	3,623
2007	105	708,638	13	7,647	8	1,517
2008	102	690,480	15	6,904	10	1,631
2009	107	709,118	17	7,915	9	3,716
2010	91	641,748	13	4,711	8	5,472
2011	143	468,755	8	2,569	5	5,931
2012	75	392,581	12	1,833	6	3,372
2013	67	348,272	15	8,590	6	3,953
2014	72	414,511	9	5,748	7	4,424
2015	65	394,075	15	8,272	8	3,964
2016	65	433,055	17	12,911	12	5,429
2017	65	346,010	14	5,831	7	2,561
2018	67	346,801	13	8,189	8	3,715
2019	71	342,224	13	12,696	4	785
2020	71	325,421	8	990	4	650
2021	64	307,383	12	4,211	5	763

Of the 119 commercial fishermen in 2016, 4.6% said they fished primarily in federal waters and 42.5% said they fished equally in federal and territorial waters (Kojis et al. 2017). In St. Thomas/St. John, commercial landings of dolphin (Table 3.3.10) and wahoo (Table 3.3.11) are primarily reported in federal waters.

Table 3.3.10. Percentage of commercial landings of dolphin in St. Thomas/St. John reported from state (0-3 nautical miles from shore) or federal (3-200 nautical miles from shore) waters for the most recent 5-years available.

Year	State	Federal
2017	1.1	98.9
2018	2.5	97.5
2019	1.0	99.0
2020	4.7	95.3
2021	7.2	92.8
Average	**3.3**	**96.7**

Table 3.3.11. Percentage of commercial landings of wahoo in St. Thomas/St. John reported from state (0-3 nautical miles from shore) or federal (3-200 nautical miles from shore) waters for the most recent 5-years available.

Year	State	Federal
2017	1.1	98.9
2018	1.9	98.1
2019	3.8	96.2
2020	2.6	97.4
2021	0.0	100.0
Average	**1.9**	**98.1**

Most commercial fishermen reported that they fish year-round (89.4%), but a small percentage reported that they fish seasonally (in October and November) for dolphin and wahoo (Kojis et al. 2017). Dolphin and wahoo are landed by commercial fishermen in St. Thomas/St. John year-round, with peak landings for dolphin occurring in March through May (Figure 3.3.6) and for wahoo in November through January (Figure 3.3.7). Lengths from the SEFSC's TIP data for years 2017-2019, showed that the majority of dolphin caught by commercial fishermen around St. Thomas/St. John were 26 to 34 inches FL (Appendix B1, Figure 3). There were only 17 wahoo length samples recorded, all of which were greater than 40 inches FL (Appendix B4).

In St. Thomas/St. John, the majority of the commercial landings (lbs) reported for dolphin from years 2012-2021[18] were for rod and reel (63.8%), unknown hook-and-line (16.1%), and handline (15.8%) gear. For wahoo, the majority of landings during the same period were reported for rod and reel (65.2%), unknown hook-and-line (16.5%), and hook-and-line with power winch (9.4%) gear.

[18] USVI commercial catch forms were modified in mid-2011 to report landings by species instead of species group and by more specific gear type.

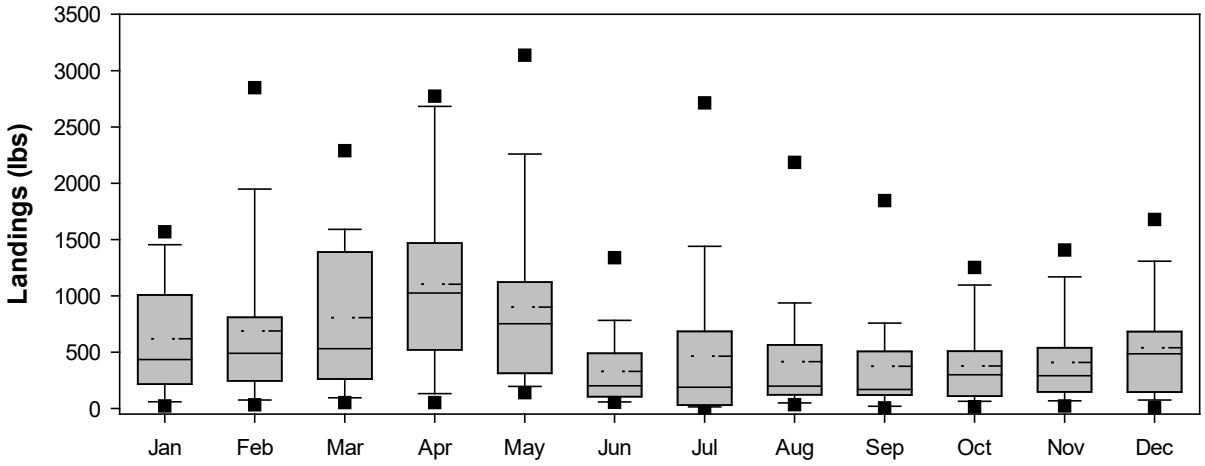

Figure 3.3.6. Range of commercial landings of dolphin each month in St. Thomas and St. John from 2000-2021. The solid line in each box represents the median landings and the dashed line represents the average for each month. The black squares represent the 5th (bottom) and 95th (top) percentiles.

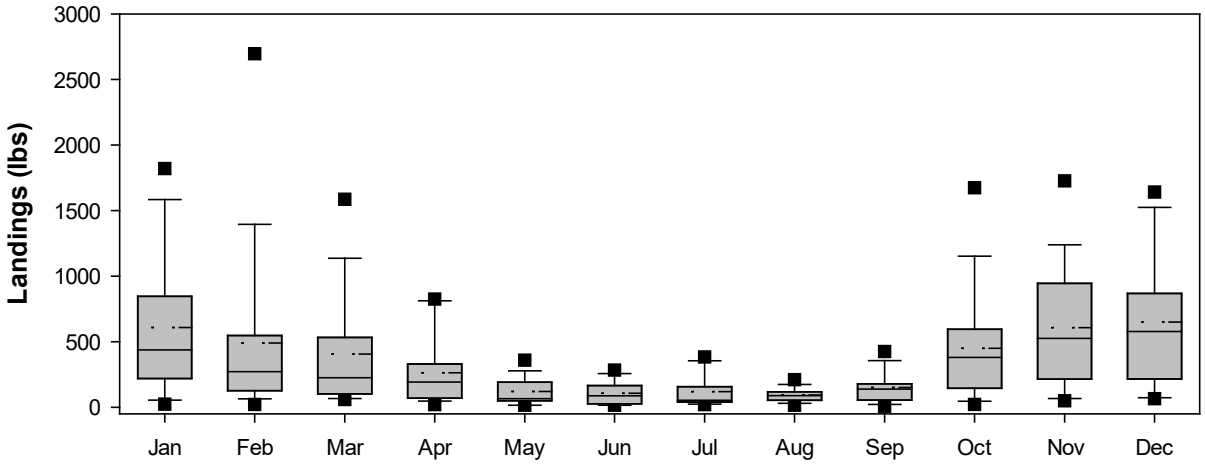

Figure 3.3.7. Range of commercial landings of wahoo each month in St. Thomas and St. John from 2000-2021. The solid line in each box represents the median landings and the dashed line represents the average for each month. The black squares represent the 5th (bottom) and 95th (top) percentiles.

3.3.4 Other Fisheries that Capture Dolphin and Wahoo

The 2022 Stock Assessment and Fishery Evaluation (SAFE) Report summarizes the most recent condition of Atlantic Highly Migratory Species (HMS) stocks and includes information from the latest stock assessment data and recommendations and resolutions from the International Commission for the Conservation of Atlantic Tunas (ICCAT).

The pelagic longline fishery for HMS is a multi-species fishery that primarily targets swordfish, bigeye tuna, and yellowfin tuna, but also includes dolphin and wahoo. From 2017-2021, the pelagic longline fishery caught and kept an average of 23,865 dolphin and 983 wahoo per year (Table 5.22 in the 2022 SAFE Report). Discards during the same period averaged 561 per year for dolphin and 99 per year for wahoo. Table 6.12 in the 2022 SAFE shows a declining trend in the average number of dolphin and wahoo caught and kept by the pelagic longline fishery, with a 39% decline for dolphin and a 81% decline for wahoo since 1997-1999.

Commercial handgear include handlines, harpoons, rod and reel, buoy gear, and bandit gear and are used to fish for HMS on private vessels, charter vessels, and headboat vessels. Pounds by dressed weight of dolphin and wahoo reported for buoy gear from 2017-2021 averaged 336 lbs and 90 lbs, respectively (Table 5.31 in the 2022 SAFE Report).

The average number of dolphin caught by the rod and reel fishery as reported in the large pelagics survey, which ranges from Maine to Virginia, from 2017-2019 was 6,913; the average number of wahoo was 87 (Table 6.22 in the 2022 SAFE Report). During the same period, and average 415 dolphin and 3 wahoo were released (Table 6.23 in the 2022 SAFE Report).

3.4 Description of the Economic Environment

3.4.1 Puerto Rico

3.4.1.1 The Commercial Sector

As is well documented, the nature of the Puerto Rican commercial fishing industry is one of multiple gears with multiple species being harvested. In a recent study of the Puerto Rican fishery, Shivlani (2022) noted that 837 fishermen reported landings in 2018. More than three-quarters of interviewed fishermen (687 surveyed fishermen in total) identified themselves as full-time with almost 90% reporting that they had fished year-round. On average, fishermen reported making 3.6 trips per week. Just under 85% of the interviewed fishermen reported fishing exclusively in territorial waters (i.e., < nine nautical miles from shore) while another 12.1% reported fishing in both territorial and federal waters. Finally, 4.4% of the interviewed fishermen stated that they fished only in federal waters in 2018.

The relatively low percentage of interviewed fishermen reporting fishing activities in federal waters may be due, in part, to the relatively small platforms from which they operate. Shivlani (2022) found that the average length of vessel was just over 20 feet with 97% of the vessels falling in the 10 to 29.9-foot range.

Based on trip ticket data, 2019 landings by the commercial sector totaled about 2.5 million pounds valued at about $12.0 million. This equates to about $4.88 per pound. Shivlani (2022) found that 39% of the respondents in his survey target (at least on occasion) offshore fish. Dolphin and wahoo are two components of this offshore fishery as well as the commercial fishing sector in general and Matos-Caraballo and Agar (2011) found hook-and-line to be the most efficient gear to commercially catch fish like dolphin and Agar and Shivlani (2016), in a survey of hook-and-line fishermen, found that 42% of the participants in the study targeted dolphin and wahoo.

3.4.1.1.1 The Commercial Dolphin Fishery

Reported landings of dolphin in Puerto Rico averaged almost 135,000 pounds annually during the 2010-2019 period and ranged from a low of 76,733 pounds in 2017 to a high of 237,780 pounds in 2012. The annual value of these landings during the ten-year period averaged $408,927 based on an annual dockside price of $3.12 per pound which tended to increase during the period of analysis.[19]

[19] Commercial dolphin landings of 139,164 pounds in 2019 represented about 5.6% of the 2.5 million pound total commercial landings. The 2019 reported dolphin price of $4.22 is about 15% less than the average price of all commercial landings ($4.88). Given the lower dolphin price vis-à-vis the overall price, the 2019 value of dolphin landings ($586,956) as a percent of total seafood landings ($12.0 million) was only 4.9%.

Some of the increase in price during the ten-year period ending in 2019 reflects inflation. The adjusted price (i.e., adjusted for inflation to 2022 dollars based on the BEA Implicit Price Deflator) increased from an average of $3.26 per pound during 2010-2012 to $4.53 during 2017-2019 which indicates a significant increase in price per pound even after adjusting for inflation (Table 3.4.1).

Table 3.4.1. Reported commercial landings of dolphin (pounds, value, and price) landed in Puerto Rico, 2010-2019.

Year	Lbs.	Value ($)	Price ($/Lb.)	Adjusted Value ($)[a]	Adjusted Price ($/Lb.)
2010	176,168	445,182	2.53	595,307	3.38
2011	144,890	339,561	2.34	445,513	3.07
2012	237,780	616,455	2.59	792,506	3.33
2013	111,140	277,402	2.50	350,467	3.15
2014	110,603	352,212	3.18	437,974	3.96
2015	128,383	403,375	3.14	497,629	3.88
2016	116,616	380,224	3.26	462,417	3.97
2017	76,733	277,117	3.61	330,321	4.30
2018	107,596	410,790	3.82	478,731	4.45
2019	139,164	586,956	4.22	672,952	4.84
Avg.	134,907	408,927	3.12	506,382	3.83

[a] Values and prices were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).
Source: SERO 2023

The percentage of commercial harvest of dolphin by jurisdiction (i.e., state versus federal waters), based on weight, was presented in Table 3.3.2. The value of dolphin landings by jurisdiction in which catch was reported (Table 3.4.2), evaluated on a percentage basis, closely mirrors that of poundage indicating that the price differential between dolphin caught in state waters and dolphin caught in federal waters is minor. The adjusted value (i.e., converted to 2022 dollars based on the BEA Implicit Price Deflator) of dolphin reported to be caught in federal waters during 2015-2019, averaging $247,727 annually, exceeded the average annual catch reported from state waters ($212,213) by about seven percentage points. The percentage of dolphin harvested from 'unknown waters' was about six percent with the adjusted value averaging $28,470 during the five-year period ending in 2019. Some unknown amount of this can likely be assigned to federal waters.

Table 3.4.2. Adjusted values and percentages of commercial landings of dolphin in Puerto Rico reported from state (0-9 nautical miles from shore), federal (9-200 nautical miles from shore) and unknown waters, 2015-2019.

Year	State Waters		Federal Waters		Unknown Waters	
	Adjusted[a] Value ($)	%	Adjusted Value ($)	%	Adjusted Value ($)	%
2015	156,797	31.5	247,232	49.7	93,601	18.8
2016	182,578	39.5	259,604	56.1	20,235	4.4
2017	193,418	58.6	134,179	40.6	2,725	0.8
2018	201,269	42.0	264,291	55.2	13,169	2.8
2019	327,001	48.6	333,328	49.5	12,623	1.9
Avg.	212,213	43.4	247,727	50.7	28,470	5.8

[a] Values were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).
Source: SERO 2023

Premised on the assumption that underreporting of landings in Puerto Rico is the result of fishers underreporting harvests on their respective submitted trip tickets rather than a sizeable number of commercial fishermen not submitting trip tickets, one can evaluate the number of Puerto Rican commercial fisherman harvesting dolphin, trips that resulted in the harvest of dolphin, and relevant catch (pounds and revenues) per fisherman and trip (Table 3.4.3). During the 2010-2019 period, the number of fishers reporting the harvest of dolphin fluctuated from a low of 116 (2010) to a high of 210 (2015) with the ten-year average equaling 174. The number of trips wherein dolphin was harvested ranged from less than 700 (2017) to more than 1,400 (2015 and 2019) with the ten-year average equaling 1,154. Revenues from the harvest of dolphin (adjusted to 2022 dollars) averaged $2,980 per year among those fishers reporting the harvest of dolphin while adjusted revenues per trip during the ten-year period averaged $453.

Table 3.4.3. Number of fishers, trips, and landings per fisher and trip (pounds and value) for commercial fishers of Puerto Rico who reported landings of dolphin, 2010-2019.

Year	Number of Fishers	Number of Trips	Trips Per Fisher	Lbs. Per Fisher	Lbs. Per Trip	Adjusted Revenues Per Fisher[a]	Adjusted Revenues per Trip
2010	116	756	6.5	1,582	233	5,132	787
2011	168	1,382	8.2	862	105	2,652	322
2012	183	1,367	7.5	1,299	174	4,331	580
2013	168	1,065	6.3	662	104	2,086	329
2014	185	1,176	6.4	598	94	2,367	372
2015	210	1,409	6.7	611	91	2,370	353
2016	181	1,149	6.3	644	101	2,555	402
2017	159	686	4.3	483	112	2,077	482
2018	171	1,145	6.7	629	94	2,800	418
2019	196	1,405	7.2	710	99	3,433	479
Avg.	174	1,154	6.6	802	121	2,980	453

[a] Values (revenues) were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).

Source: SERO 2023

Since 2015, dolphin was reportedly landed from an average of 1,154 trips per year (see Table 3.4.3). About 45% of these trips, or an average of 516 trips per year during 2015-2019, were reported to have occurred in federal waters.[20] The trips reporting the harvest of dolphin from federal waters also reported the harvest of other species including wahoo, snappers, and tunas (Table 3.4.4). Expressed on a weight basis, dolphin contributed almost three-quarters (i.e., 73.6%) of the total poundage taken by trips in federal waters that reported the harvest of dolphin (i.e., 57,276 pounds out of a total 77,806 pounds). The contribution of dolphin to the value of catch was somewhat less (i.e., 69.6%) due to the lower per pound dolphin price vis-à-vis some of the other species landed in conjunction with dolphin.

Based on an average of 516 trips annually during 2015-2019 (i.e., those trips in federal waters where dolphin was reported to be harvested), the catch per trip averaged 151 pounds with dolphin accounting for 111 pounds of this total. The adjusted value per trip (i.e., expressed in 2022 dollars based on the BEA Implicit Price Deflator) averaged $685 with the adjusted dolphin revenues per trip averaging $477.

Table 3.4.4. Pounds and value of dolphinfish that was reported to be harvested in federal waters and the pounds and value of co-occurring species that were also harvested on these trips, 2015-2019 annual averages.

Species	Pounds	Value ($)	Adjusted Value ($)
Dolphinfish	57,276	208,774	246,145
Wahoo	5,740	20,883	24,621
Silk Snapper	5,384	28,999	34,190
Queen Snapper	4,529	26,874	31,685
Blackfin Tuna	1,325	2,899	3,417
Skipjack Tuna	1,068	1,950	2,299
Tuna & Mackerel	726	3,848	4,537
Yellowfin Tuna	683	2,062	2,437
Misty Grouper	313	1,101	1,299
Cardinal Snapper	286	1,584	1,868
Little Tunny	253	378	445
King Mackerel	221	682	804
Total	77,806	300,038	353,746
Dolphinfish as % of Total	73.6	69.6	69.6

[a] Values were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year). The adjusted value of dolphin landings from harvests in federal waters in this table varies marginally (less than one

[20] The 1,159 average annual number of trips includes those in 'unknown waters'. If these are excluded, the proportion of trips where dolphin were reportedly caught increases to 48% (i.e., 516 out of 1,071 trips).

percent) from what is given in Table 3.4.2 because values in this table were deflated by 5-year averages rather than on a year-by-year basis.
Source: SERO 2023

Landings of dolphin by the commercial fishers of Puerto Rico, expressed on a weight basis, vary significantly on a monthly basis with the summer months exhibiting the lowest landings Figure 3.3.1. The value of these landings (Table 3.4.5) also exhibit considerable month-to-month variation, with the lowest values, like pounds, being during the summer months. The per pound price appears largely independent of the quantity being harvested but does appear to exhibit a significant upward shift in the later six months of the year (i.e., July through December). The seasonal variation in commercial harvests likely represents, at least in part, the migratory nature of dolphin with harvests in a given region varying in relation to the abundance of the stock in that region.

Table 3.4.5. Average monthly landings (pounds, value, and price) of dolphin by commercial fishers in Puerto Rico, 2010-2019.

Month	Pounds	Value ($)	Price ($/Lb.)	Adjusted Value ($)[a]	Adjusted Price ($/Lb.)
January	20,255	56,579	2.79	71,091	3.51
February	17,214	46,320	2.69	58,132	3.38
March	10,774	28,866	2.68	35,947	3.34
April	9,107	25,983	2.85	31,934	3.51
May	5,055	13,946	2.76	17,221	3.41
June	2,645	7,348	2.78	9,112	3.45
July	2,146	7,010	3.27	8,481	3.95
August	4,480	15,003	3.35	18,104	4.04
September	9,533	30,253	3.17	36,777	3.88
October	17,069	56,640	3.32	69,355	4.06
November	16,942	58,685	3.46	72,689	4.29
December	19,688	62,295	3.16	77,327	3.93

[a] Values and prices were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).
Source: SERO 2023

Large differences in dolphin landings by coast were noted in Section 3.3 (Table 3.3.4) and these differences, assuming seasonality differences in landings by coast, were considered as a possible explanation for the higher reported prices during the July-December period. Evaluated on a regional basis, however, indicted a higher July-December price in all regions; especially the north coast where the average 2010-2019 January-June price equaled $3.09 per pound compared to an average price of $3.84 per pound during July-December. In addition, prices reported on the east and north coasts were found to be considerably higher than those observed on the south and west coasts.

3.4.1.1.2 The Commercial Wahoo Fishery

Reported wahoo landings by Puerto Rican commercial fishers averaged 18,200 pounds annually during 2010-2019 with maximum landings of 26,487 pounds occurring in 2012 (Table 3.4.6). The value of these reported landings averaged $53,076 annually ($65,034 when expressed in 2022 dollars based on the BEA Implicit Price Deflator). The price of the landed product increased from about $2.00 in the early years to more than $4.00 in 2019.[21] A sizeable increase in price was evident even after removing the effects of inflation. Specified in 2022 dollars, the price increased from an average of $2.63 per pound during the earliest two years of analysis to $4.49 during the latest two years.

Table 3.4.6. Reported commercial landings of wahoo (pounds, value, and price) landed in Puerto Rico, 2010-2019.

Year	Lbs.	Value ($)	Price ($/Lb.)	Adjusted Value ($)[a]	Adjusted Price ($/Lb.)
2010	14,944	28,199	1.89	37,708	2.52
2011	17,414	36,915	2.12	48,433	2.78
2012	26,487	63,390	2.39	81,493	3.08
2013	17,150	41,791	2.44	52,798	3.08
2014	16,789	44,666	2.66	55,541	3.31
2015	17,002	53,041	3.12	65,434	3.85
2016	20,558	69,205	3.37	84,165	4.09
2017	11,396	35,447	3.11	42,253	3.71
2018	18,789	65,841	3.50	76,731	4.08
2019	21,574	92,265	4.28	105,783	4.90
Avg.	18,210	53,076	2.89	65,034	3.54

[a] Values and prices were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).
Source: SERO 2023

The percentage of commercial harvest of wahoo by jurisdiction (i.e., state versus federal waters), based on weight, was presented in Table 3.3.3. The value of wahoo harvest by jurisdiction (Table 3.4.7), evaluated on a percentage basis, closely mirrors that of poundage indicating that the price differential between wahoo caught in state waters and wahoo caught in federal waters is minor. The adjusted value (i.e., converted to 2022 dollars based on the BEA Implicit Price Deflator) of wahoo reported to be caught in federal waters during 2015-2019, averaging $38,107 annually, exceeded the average annual catch reported from state waters ($32,026) by about seven percentage points. The percentage of wahoo landed where jurisdiction of catch was not

[21] [21] Commercial wahoo landings of 21,574 pounds in 2019 represented just shy of 1% of the 2.5 million pound total commercial landings. The 2019 reported wahoo price of $4.28 is about 12% less than the average price of all commercial landings ($4.88). Given the lower wahoo price vis-à-vis the overall price, the 2019 value of wahoo landings ($92,265) as a percent of total seafood landings ($12.0 million) was also less than 1%.

indicated (i.e., 'unknown waters') averaged about six percent with the adjusted value averaging $4,775 annually during the five-year period ending in 2019. Some unknown amount of this can likely be assigned to federal waters.[22]

Table 3.4.7. Adjusted values and percentages of commercial landings of wahoo in Puerto Rico reported from state (0-9 nautical miles from shore), federal (9-200 nautical miles from shore) and unknown waters, 2015-2019.

Year	State Waters		Federal Waters		Unknown Waters	
	Adjusted[a] Value ($)	%	Adjusted Value ($)	%	Adjusted Value ($)	%
2015	20,182	30.8	37,543	57.4	7,715	11.8
2016	44,514	52.9	34,198	40.6	5,483	6.5
2017	21,741	51.5	19,538	46.2	974	2.3
2018	31,978	41.7	36,808	48.0	7,851	10.2
2019	41,717	39.3	62,451	58.9	1,880	1.8
Avg.	32,026	43.2	38,107	50.2	4,775	6.5

[a] Values were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).
Source: SERO 2023

Premised on the assumption that underreporting of landings in Puerto Rico is the result of fishers underreporting harvests on their respective submitted trip tickets rather than a sizeable number of commercial fishermen not submitting trip tickets, one can evaluate the number of Puerto Rican commercial fisherman harvesting wahoo, trips that resulted in the harvest of wahoo, and relevant catch (pounds and revenues) per fisherman and trip (Table 3.4.8). Overall, an average of 89 fishers reported landing wahoo annually between 2010 and 2019 and these fishers reported harvesting dolphin on an average of 350 trips per year. This equates to about 3.9 trips per fisher. Landings of wahoo among these 89 fishers averaged 220 pounds per year or about 55 pounds per trip. Finally adjusted revenues per fisher (i.e., converted to 2022 dollars based on the BEA Implicit Price Deflator) averaged $753 annually during 2015-2019 or $189 per trip.

Table 3.4.8. Number of fishers, trips, and landings per fisher and trip (pounds and value) for commercial fishers of Puerto Rico who reported landings of wahoo, 2010-2019.

Year	Number of Fishers	Number of Trips	Trips Per Fisher	Lbs. Per Fisher	Lbs. Per Trip	Adjusted Revenues Per Fisher[a]	Adjusted Revenues per Trip
2010	34	147	4.3	440	102	1,109	256
2011	78	340	4.3	223	51	621	142
2012	97	395	4.1	273	67	840	206

[22] A comparison of the information in Table 3.4.7 with that of Table 3.4.2 indicates the proportion of the two species (i.e., dolphin and wahoo) caught in state and federal waters are nearly identical. This is expected since they are co-occurring species often caught on the same trip.

Year	Number of Fishers	Number of Trips	Trips Per Fisher	Lbs. Per Fisher	Lbs. Per Trip	Adjusted Revenues Per Fisher[a]	Adjusted Revenues per Trip
2013	102	359	3.5	168	48	518	147
2014	111	414	3.7	151	41	500	134
2015	99	367	3.7	172	46	661	178
2016	99	436	4.4	208	47	850	193
2017	69	222	3.2	165	51	612	190
2018	93	376	4.0	202	50	825	204
2019	107	439	4.1	202	49	989	241
Avg.	89	350	3.9	220	55	753	189

[a] Values were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).
Source: SERO 2023

Since 2015, wahoo was reportedly landed from an average of about 365 trips per year (Table 3.4.9). About 48% of these trips, or an average of 177 trips per year during 2015-2019, were reported to have occurred in federal waters. The trips reporting the harvest of wahoo from federal waters also reported the harvest of many other species (Table 3.4.9) with these species being similar to species caught in conjunction with dolphin (Table 3.4.4). This is expected, since the harvest of these two species primarily use the same gears and tend to aggregate together.

Expressed on a weight basis, wahoo contributed about 31% of the total poundage taken by trips in federal waters that reported the harvest of wahoo (i.e., 8,857 pounds out of a total 28,651 pounds). The contribution of wahoo to the value of landings was almost identical suggesting that the average price of wahoo approximated the average price of the group of species landed in conjunction with wahoo.

Based on an average of 177 trips annually during 2015-2019 (i.e., those trips in federal waters where wahoo was reported to be harvested), the catch per trip averaged 162 pounds with wahoo accounting for 50 pounds, or a little less than a third, of this total. The adjusted value per trip (i.e., expressed in 2022 dollars based on the BEA Implicit Price Deflator) averaged $695 with the adjusted wahoo revenues per trip averaging $215.

Table 3.4.9. Pounds and value of wahoo that was reported to be harvested in federal waters off Puerto Rico and the pounds and value of co-occurring species that were also harvested on those trips, 2015-2019 annual averages.

Species	Pounds	Value ($)	Adjusted Value ($)
Wahoo	8,857	32,199	37,963
Dolphinfish	14,895	52,581	61,993
Silk Snapper	1,083	5,889	6,943
Blackfin Tuna	981	2,343	2,762

Species	Pounds	Value ($)	Adjusted Value ($)
Queen Snapper	933	5,964	7,031
Skipjack Tuna	729	1.534	1,809
Yellowfin Tuna	368	1,128	1,329
Little Tunny	219	383	452
Tuna & Mackerel	182	996	1,174
King Mackerel	119	353	416
Red Hind Grouper	117	323	381
Black Snapper	113	523	617
Misty Grouper	56	259	305
Total	28,651	104,475	123,176
Wahoo as % of Total	30.9	30.8	30.8

[a] Values were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year). The adjusted value of wahoo landings from harvests in federal waters in this table varies marginally (less than one percent) from what is given in Table 3.4.2 because values in this table were deflated by 5-year averages rather than on a year-by-year basis.
Source: SERO 2023

As was observed with dolphin (Table 3.4.5), there appears to be some seasonal price differences for wahoo that are independent of changes in the quantity landed, with prices spiking in October and November (Table 3.4.10). This is despite relatively high landings in these two months.

Table 3.4.10. Average monthly landings (pounds, value, and price) of wahoo by commercial fishers in Puerto Rico, 2010-2019.

Month	Pounds[b]	Value ($)	Price ($/Lb.)	Adjusted Value ($)[a]	Adjusted Price ($/Lb.)
January	2,221	6,049	2.72	7,429	3.34
February	1,153	3,219	2.79	3,936	3.41
March	1,109	3,099	2.80	3,779	3.41
April	1,319	3,662	2.78	4,500	3.41
May	783	2,064	2.63	2,520	3.22
June	614	1,757	2.86	2,156	3.51
July	529	1,475	2.79	1,783	3.37
August	512	1,554	3.04	1,897	3.71
September	629	1,939	3.08	2,381	3.78
October	2,010	6,691	3.33	8,131	4.04
November	3,581	11,248	3.14	13,759	3.84
December	3,592	10,046	2.80	12,394	3.45

[a] Values and prices were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).
[b] Summing pounds across all months (18,052 pounds) will differ slightly from the aggregation of pounds in Table 3.4.6 (18,210 pounds) because there was a small amount of confidential data in monthly landings that could not be used in estimating monthly totals.
Source: SERO 2023

3.4.1.2 The Import Sector

In addition to the dolphin landed by the commercial fishery, Puerto Rico also imports a large amount of dolphin. These imports, expressed on a product weight basis, averaged 437,753 pounds annually during 2010-2019 with an associated value (expressed in 2022 dollars) averaging $1.7 million (Table 3.4.11).[23] Virtually all imports are reported to be frozen fillets and the NMFS conversion factor for dolphin fillets to whole weight is 3.33. Imports, expressed on a whole weight basis, averaged about 1.5 million pounds annually during the 2010-2021 period.

When evaluated on a whole-weight basis, Puerto Rico annual imports of dolphin (averaging 1.5 million pounds during 2010-2021) dominate reported commercial landings which averaged 134,907 pounds annually during 2010-2019. However, the imported product may not compete strongly with the domestic product if separate markets[24] exist for the two products. This appears to be the case given the low price of the imported product vis-à-vis domestic landings. In 2019, for example, the domestic dockside price, expressed in 2022 dollars, was $4.84 or about three times greater than the equivalent whole-weight import price of $1.15 per pound (i.e., $3.84/3.33).

Table 3.4.11. Reported Annual Puerto Rico Dolphin Imports (Product Weight), 2010-2021.

Year	Lbs.	Value ($)	Price ($/Lb.)	Adjusted Value ($)[a]	Adjusted Price ($/Lb.)
2010	553,651	1,103.789	1.99	1,476,011	2.67
2011	352,959	1.022.556	2.90	1,341,619	3.80
2012	550,222	2,033,966	3.70	2,614,840	4.75
2013	409,440	839,516	2.05	1,060,635	2.59
2014	357,886	944,954	2.64	1,175,046	3.29
2015	485,951	1,538,877	3.17	1,898,456	3.91
2016	470,232	1,631,847	3.47	1,984,604	4.22
2017	285,962	1,326,516	4.64	1,581,197	5.53
2018	545,140	2,161,978	3.97	2,519,552	4.62
2019	617,530	2,071,881	3.36	2,375,437	3.84
2020	367,891	1,217,992	3.31	1,375,378	3.74
2021	256,675	932,193	3.63	991,934	3.86
Avg.	437,753	1,402.172	3.24	1,699,559	3.88

[a] Values and prices were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).
Source: SERO 2023

[23] More specifically, these are dolphin imports that arrived at the San Juan Customs District.
[24] Markets are actually a continuum and there would likely be some overlap between markets.

3.4.1.3 The Recreational Sector

The estimated number of recreational angler trips taken in Puerto Rico during 2012-2017 averaged almost 509 thousand annually and ranged from a low of 336 thousand in 2017 to a high of 668 thousand in 2015 (Table 3.4.12). The low number of trips in 2017 undoubtedly reflects, in part, the impacts of Hurricane Maria which made landfall in Puerto Rico on September 20th of that year.

Recreational angler trips, as collected under the MRIP program, are segmented by whether the trip is from shore, private boat, or charter. Shore and private boats dominate the total number of trips with shore-based angler trips accounting for 52% of total trips and angler trips on private boats accounting for 48% of total trips.

Table 3.4.12. Estimated recreational angler trips in Puerto Rico by mode, 2012-2017.

Year	Shore	Charter	Private	Total
	----------1,000s----------			
2012	140.3	1.8	208.5	350.6
2013	275.1	6.5	228.7	510.3
2014	275.6	-	258.9	534.5
2015	368.5	2.4	296.7	667.6
2016	309.5	-	344.1	653.6
2017	209.7	-	126.6	336.3
Avg.	263.1	-	243.9	508.8

Of the estimated 543 thousand angler trips taken annually in Puerto Rico waters during 2012-2016, about 50% of these trips (an estimated 271 thousand annually) were reportedly taken in state ocean waters while 9.7% of the trips (52.8 thousand annually) were taken in federal ocean waters (remaining trips are inland).[25]

Estimated number of dolphin harvested (i.e., not including released alive[26]) by recreational anglers during the six-year period ending in 2017 is given in Table 3.4.13. The estimated number of dolphin harvested on an annual basis was 99,974 while the estimated annual harvest of dolphin from federal waters during the 2012-2016 period was estimated to equal 76,344 fish.[27] Estimated annual recreational angler dolphin harvest from federal waters during 2012-2016

[25] 2017 is excluded due to the very high degree of uncertainty associated with trip estimates; especially in federal waters. The program was suspended after Hurricane Maria

[26] The MRIP data indicates that very few dolphin are released alive. In federal waters, for example, the estimated number of dolphin released alive during 2012-2016 averaged less than 2,000 per year.

[27] There is a considerable amount of uncertainty associated with the annual estimates as indicated by the large confidence intervals associated with the annual estimates. Uncertainty with the averages, however, should be somewhat less than with the individual years.

(76,349 fish) accounted for two-thirds of the total estimated number of dolphin harvested annually during the same period (114,456 fish).

Table 3.4.13. Estimated number of dolphin harvested (excluding released alive) by recreational anglers in Puerto Rico in total and in federal waters, 2012-2017.

Year	Total Number Harvested			Number Harvested in Federal Waters		
	Number of Fish	Lower 95% Confidence Number	Upper 95% Confidence Number	Number of Fish	Lower 95% Confidence Interval	Upper 95% Confidence Interval
2012	112,295	65,854	158,736	65,954*	26,397	105,510
2013	18,184*	6,280	30,088	12,455*	1,250	23,660
2014	85,186	40,607	129,766	61,641*	20,232	102,961
2015	72,421	33,812	111,030	32,292*	3,747	60,836
2016	284,192*	115,973	452,595	209,377*	52,202	366,552
2017	26,011*	3,426	48,595	---[a]	---	---
Avg.	99,714	---	---	76,344[b]	---	---

* Caution is advised in using this number due to a high degree of uncertainty around the estimate.

[a] Harvest from federal waters in 2017 not included due to extreme uncertainty around the estimate.

[b] Average based on 2012-2016 data.

Estimated number of wahoo harvested (i.e., not including released alive) by recreational anglers during the six-year period ending in 2017 is given in Table 3.4.14. The number, as indicated, is relatively small with the average being less than 10,000 per year. Furthermore, it is advised not to use the estimated annual dolphin harvests from federal waters due to a very high degree of uncertainty around the estimates. Thus, they are not included here though it appears as the overwhelming majority are taken from federal waters.

Table 3.4.14. Estimated number of wahoo harvested (excluding released alive) by recreational anglers in Puerto Rico, 2012-2017.

Year	Total Number Harvested		
	Number of Fish	Lower 95% Confidence Interval	Upper 95% Confidence Interval
2012	3,398	1,413	5,383
2013	--[a]	--	--
2014	2,160*	115	4,204
2015	19,656*	2,204	37,109
2016	14,674*	1,933	27.414
2017	--[a]	--	--
Avg.	9,972[b]	--	--

* Caution is advised in using this number due to a high degree of uncertainty around the estimate.

[a] Harvest for 2013 and 2017 not included due to extreme uncertainty around the estimates.

[b] Average based on four years of data (i.e., 2012, 2014, 2015, and 2016).

3.4.2 St. Croix

3.4.2.1 The Commercial Dolphin Fishery

Reported commercial landings of dolphin by St. Croix commercial fishers during 2010-2021 exhibited a considerable amount of annual variability ranging from a low of 6,075 pounds in 2019 to a high of 73,362 pounds in 2014 (Table 3.4.15). Average annual landings during the twelve-year period ending in 2021 was 40,318 pounds.

Mirroring poundage, the annual value of reported St. Croix commercial dolphin landings varied significantly; ranging from less than $40,000 in 2019 to more than $500,000 in 2017 (Table 3.4.15). The value of these landings averaged $295,882 annually during 2010-2019.[28] The annual per pound price of the harvested product averaged $6.80 during 2010-2019 and gradually increased from $6.00 in 2010 to $7.50 in 2015 and 2016 before falling in the subsequent three years.[29]

Much of the increase in value and price is the result of inflation. The inflation adjusted value (adjusted to 2022 dollars based on the BEA Implicit Price Deflator) of St. Croix annual commercial dolphin landings exhibited a more moderate increase and averaged $369,062 during the ten-year period ending in 2019 (Table 3.4.15) with the average price, adjusted to 2022 dollars, equaling $8.41 per pound.

[28] At the time of the preparation of this amendment, the latest price data for St. Croix commercial fisheries was 2019.

[29] For purposes of analysis, it is assumed that dolphin prices are being provided by the St. Croix fishers on a whole-weight basis rather than on a product-weight basis. If this is not the case, values will be overstated which would lead to an overestimation of revenues per fisher and trip.

Table 3.4.15. Reported annual commercial landings (pounds, value and price) of dolphin in St. Croix USVI, 2010-2021.

Year	Lbs.	Value ($)	Price ($/Lb.)	Adjusted Value ($)[a]	Adjusted Price ($/Lb.)
2010	52,894	317,364	6.00	424,386	8.02
2011	45,600	281,269	6.17	369,032	8.09
2012	35,036	231,240	6.60	297,279	8.48
2013	35,776	242,205	6.77	305,999	8.55
2014	63,994	433,241	6.77	538,733	8.42
2015	52,813	396,098	7.50	488,652	9.25
2016	56,033	420,206	7.50	511,042	9.12
2017	73,362	513,534	7.00	612,129	8.34
2018	11,766	83,762	7.12	97,615	8.30
2019	6,075	39,909	6.57	45,756	7.53
2020	20,693	NA[b]	NA	NA	NA
2021	29,772	NA	NA	NA	NA
Avg.	40,318	$295,882[c]	$6.80	$369,062	$8.41

[a] Values and prices were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).

[b] Price data are unavailable after 2019.

[c] Average values and prices are based on 2010-2019 data.

Source: SERO 2023

The number of St. Croix commercial fishers reporting dolphin landings averaged almost 19 during 2010-2021 and ranged from a low of 12 (2014 and 2020) to a high of 30 in 2010[30] (Table 3.4.16). These fishers reported harvesting dolphin on an average of 327 trips per year which is equivalent to almost 18 trips per fisher.

Among the annual average of 19 fishers reporting dolphin landings during 2010-2021, harvests per fisher averaged 2,263 pounds of dolphin per year with maximum landings of 5,333 pounds occurring in 2014. Dolphin landings per trip averaged 140 pounds during the same period and exhibited a range of less than 100 pounds to almost 170 pounds. Revenues per fisher from the harvest of dolphin, expressed in 2022 dollars, averaged just over $20,000 during the 2010-2019 period while adjusted revenues per trip averaged $1,038.

[30] The average of 19 fishers reporting dolphin landings during 2010-2021 represents about one-quarter of the average number of fishers reporting any landings during this period (i.e., 76). See Table 3.3.6 for the annual total number of St. Croix fishers reporting landings.

Table 3.4.16. Number of fishers, trips, and landings per fisher and trip (pounds and value) for commercial fishers of St. Croix USVI who reported landings of dolphin, 2010-2021.

Year	Number of Fishers	Number of Trips	Trips Per Fisher	Lbs. Per Fisher	Lbs. Per Trip	Adjusted Revenues Per Fisher ($)[a]	Adjusted Revenues per Trip ($)
2010	30	577	19.2	1,763	92	14,146	786
2011	28	487	17.4	1,629	94	13,180	758
2012	22	315	14.3	1,593	111	13,513	944
2013	14	348	24.9	2,555	103	21,857	879
2014	12	450	37.5	5,333	142	44,894	1,197
2015	15	370	24.7	3,521	143	32,577	1,320
2016	28	378	13.5	2,001	148	18,252	1,351
2017	17	434	25.5	4,315	169	36,008	1,410
2018	14	106	7.6	840	111	6,973	921
2019	13	53	4.1	467	115	3,520	863
2020	12	148	12.3	1,724	140	NA[b]	NA
2021	21	257	12.2	1,417	116	NA	NA
Avg.	18.8	327	17.8	2,263	124	20,491	1,038

[a] Values and prices were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).
[b] Average adjusted revenues per fisher and trip based on data from 2010 to 2019.
Source: SERO 2023

The vast majority of dolphin landed in recent years by commercial fishers in St. Croix, expressed on a weight basis, was reported to be taken from federal waters (Table 3.3.7). Since 2017, the annual harvest from federal waters has averaged 26,809 pounds which represents 94.9% of the total reported dolphin landings of 28,250 pounds. The average annual value of commercial dolphin harvests from federal waters was estimated to equal $185,100 or, when expressed in 2022 dollars (i.e., converted to 2022 dollars based on the BEA Implicit Price Deflator) $213,508.[31]

St. Croix commercial fishers reported harvests of dolphin from federal waters on an average of 183 trips per year during the 2017-21 period. This represents about 92% of all trips reporting the harvest of dolphins during the same timeframe. The trips by St. Croix commercial fishers reporting the harvest of dolphin from federal waters also reported the harvest of many other species including wahoo, little tunny, and king mackerel (Table 3.4.17). Expressed on a weight basis, dolphin contributed about 55% of the total poundage taken by trips in federal waters that reported the harvest of dolphin (i.e., 26,809 pounds out of a total 49,034 pounds). The contribution of dolphin to the value of catch was approximately the same as poundage indicating

[31] For purposes of analysis, the 2020 and 2021 dolphin prices were assumed to equal the average of the 2018 and 2019 dolphin price (i.e., $6.84 per pound).

that the price of dolphin was about the same as the aggregate price of other species taken on the trips in federal waters.[32]

Based on an average of 183 trips annually during 2017-2021 (i.e., those trips in federal waters where dolphin was reported to be harvested), the catch per trip averaged 268 pounds with dolphin accounting for 146 pounds, or about 55%, of this total. The adjusted value per trip (i.e., expressed in 2022 dollars based on the BEA Implicit Price Deflator) averaged $2,057 with the adjusted dolphin revenues per trip averaging $1,151.

Table 3.4.17. Pounds and value of dolphin that was reported to be harvested in federal waters off St. Croix USVI and the pounds and value of co-occurring species that were also harvested on those trips, 2017-2021 annual averages.

Species	Pounds	Value ($)[a]	Adjusted Value ($)[b]
Dolphinfish	26,809	184,797	210,669
Wahoo	10,674	72,798	82,990
Little Tunny	7,472	47,000	53,580
King Mackerel	2,451	15,564	17,743
Tuna, Unspecified	1,246	7,888	8,993
Rainbow Runner	207	1,220	1,391
Barracuda	174	881	1,005
Total	49,034	330,149	376,371
Dolphinfish as % of Total	54.7	56.0	56.0

[a] The unweighted 2017-2019 prices for each of the species were used to estimate the 2017-2021 values.
[b] Values and prices were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).
Source: SERO 2023

3.4.2.2 The Commercial Wahoo Fishery

Reported commercial landings of wahoo by the St. Croix commercial fishing sector exhibited a significant amount of variation across years during 2010-2021 ranging from a low of 4,290 pounds in 2019 to a high of 35,523 pounds in 2016 (Table 3.4.18). The value of reported wahoo landings likewise varied significantly when examined on a yearly basis ranging from a low of $28,614 in 2019 to a high of $266,423 in 2016. Overall, landings averaged 18,598 pounds during the twelve-year period ending in 2021 while the value of these landings (based on data through 2019) averaged $128,017 per year based on an average price of $6.79 per pound.[33] Expressed in 2022 dollars (i.e., converted to 2022 dollars based on the BEA Implicit Price

[32] With some notable exceptions, there were only minor differences in prices among the St. Croix finfish species.
[33] For purposes of analysis, it is assumed that wahoo prices are being provided by the St. Croix fishers on a whole-weight basis rather than on a product-weight basis. If this is not the case, values may well be overstated which would lead to an overestimation of revenues per fisher and trip.

Deflator), the value of landings averaged $158,260 annually during the 2010-2019 period based on an adjusted price of $8.41 per pound.

Table 3.4.18. Reported annual commercial landings (pounds, value, and price) of wahoo in St. Croix, 2010-2021.

Year	Lbs.	Value ($)	Price ($/Lb.)	Adjusted Value ($)[a]	Adjusted Price ($/Lb.)
2010	13,762	82,572	6.00	110,417	8.02
2011	5,997	37,538	6.26	49,251	8.21
2012	8,765	57,847	6.60	74,367	8.48
2013	24,515	166,599	6.80	210,479	8.59
2014	29,105	197,911	6.80	246,101	8.46
2015	27,144	203,576	7.50	251,144	9.25
2016	35,523	266,423	7.50	324,016	9.12
2017	28,439	202,191	7.11	241,010	8.47
2018	5,515	36,903	6.69	43,006	7.80
2019	4,290	28,614	6.67	32,806	7.65
2020	15,103	NA[b]	NA	NA	NA
2021	25,023	NA	NA	NA	NA
Avg.	18,598	128,017[c]	6.79	158,260	8.41

[a] Values and prices were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).
[b] Price data are unavailable after 2019.
[c] Average values and prices are based on 2010-2019 data.
Source: SERO 2023

The number of St. Croix commercial fishers reporting wahoo landings during 2010-2021 averaged about 13 and ranged from a low of 6 in 2014 to a high of 23 in 2010 as well as 2011[34] (Table 3.4.19). These fishers reported harvesting wahoo on an average of 212 trips per year which is equivalent to almost 19 trips per fisher.

Among the 13 fishers reporting wahoo landings during 2010-2021, harvests per fisher averaged 1,708 pounds of wahoo per year with a maximum landings of 4,850 pounds occurring in 2014. Wahoo landings per trip averaged 89 pounds during the same period and exhibited a range of less than 50 pounds to almost 123 pounds. Revenues per fisher from the harvest of wahoo, expressed in 2022 dollars, averaged almost $15,000 during 2010-2019 while adjusted revenues per trip averaged $711.

[34] The average of 13.3 fishers reporting wahoo landings during 2010-2021 represents about 17% of the average number of fishers reporting any landings during this period (i.e., 76). See Table 3.3.6 for the annual total number of St. Croix fishers reporting landings.

Table 3.4.19. Number of fishers, trips, and landings per fisher and trip (pounds and value) for commercial fishers of St. Croix who reported landings of wahoo, 2010-2021.

Year	Number of Fishers	Number of Trips	Trips Per Fisher	Lbs. Per Fisher	Lbs. Per Trip	Adjusted Revenues Per Fisher ($)[a]	Adjusted Revenues per Trip ($)
2010	23	189	8.2	598	72.8	4,800	584
2011	23	122	5.3	260	49.2	2,141	404
2012	12	153	12.7	730	57.3	6,197	486
2013	17	361	21.2	1,442	67.9	12,381	583
2014	6	373	62.2	4,850	78.0	41,017	660
2015	8	289	36.1	3,393	93.9	31,393	869
2016	14	321	22.9	2,537	110.7	23,144	1,009
2017	13	264	20.3	2,188	107.7	18,539	913
2018	8	64	8.0	689	86.2	5,375	672
2019	12	35	2.9	358	122.6	2,733	937
2020	8	124	15.5	1,888	121.8	NA	NA
2021	16	253	15.8	1,564	98.9	NA	NA
Avg.	13.3	212.3	19.3	1,708	88.9	14,772[b]	711

[a] Values were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).

[b] Average adjusted annual revenues are based on 2010-2019 data.

Source: SERO 2023

The vast majority of wahoo landed in recent years by commercial fishers in St. Croix was reported to be taken from federal waters (Table 3.3.8). For the 2017-2021 period, the annual harvest from federal waters averaged 14,906 pounds which represented 95.1% of the total reported wahoo landings of 15,674 pounds. The average annual value of commercial wahoo harvests from federal waters was estimated to equal $101,887 or $115,727 when expressed in 2022 dollars (i.e., converted to 2022 dollars based on the BEA Implicit Price Deflator).[35]

An average of 137 trips reported the catch of wahoo from federal waters during 2017-2021, or about 93% of the total number of trips reporting wahoo landings. The trips by St. Croix commercial fishers reporting the harvest of wahoo from federal waters also reported the harvest of many other species including dolphin, little tunny, and king mackerel (Table 3.4.20). Expressed on a weight basis, wahoo contributed 36% of the total poundage taken by trips in federal waters that reported the harvest of wahoo (i.e., 14,906 pounds out of a total 41,286 pounds). The contribution of wahoo to the value of catch was approximately the same as poundage indicating that the price of wahoo was about the same as the aggregate price of other species taken on the trips in federal waters.

[35] For purposes of analysis, the 2020 and 2021 wahoo prices were assumed to equal the average of the 2018 and 2019 wahoo price (i.e., $6.68 per pound).

Based on an average of 137 trips annually during 2017-2021 (i.e., those trips in federal waters where wahoo was reported to be harvested), the catch per trip averaged 301 pounds with wahoo accounting for 109 pounds of this total. The adjusted value per trip (i.e., expressed in 2022 dollars based on the BEA Implicit Price Deflator) averaged almost $2,300 with the adjusted wahoo revenues per trip averaging $845.

Table 3.4.20. Pounds and value of wahoo that was reported to be harvested in federal waters off St. Croix and the pounds and value of co-occurring species that were also harvested on those trips, 2017-2021 annual averages.

Species	Pounds	Value ($)[a]	Adjusted Value ($)[b]
Wahoo	14,906	101,658	115,890
Dolphin	14,132	97,409	111,046
Little Tunny	8,248	51,879	59,142
King Mackerel	3,911	24,832	28,309
Barracuda	91	458	523
Total	41,286	276,236	314,909
Wahoo as % of Total	36.1	36.8	36.8

[a] The unweighted 2017-2019 prices for each of the species were used to estimate the 2017-2021 values.

[b] Values and prices were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).

Source: SERO 2023

3.4.3 St. Thomas and St. John

3.4.3.1 The Commercial Dolphin Fishery

Reported commercial landings of dolphin by St. Thomas/St. John commercial fishers during 2010-2021 averaged 40,318 pounds and the annual landings exhibited high amount of annual variability (Table 3.4.21). Largely mirroring poundage, the annual value of reported St. Thomas/St. John commercial dolphin landings varied significantly; ranging from just over $12,000 in 2012 to almost $84,000 in 2016. The value of these landings averaged $45,746 annually during 2010-2019 while the per pound price of the harvested product averaged $6.38.[36] Overall, the price increased from about $6.00 per pound in 2010 to $6.50 in 2015 and has changed little since then. After adjusting for inflation, the deflated per pound price, expressed in 2022 dollars, fell from about $8.00 in 2010 to about $7.50 in 2018-2019.

[36] At the time of the preparation of this amendment, the latest price data for St. Thomas/St. John commercial fishery was 2019.[36] For purposes of analysis, furthermore, it is assumed that dolphin prices are being provided by the St. Thomas/St. John fishers on a whole-weight basis rather than on a product-weight basis. If this is not the case, values will be overstated which would lead to an overestimation of revenues per fisher and trip.

Table 3.4.21. Reported annual commercial landings (pounds, value, and price) of dolphin in St. Thomas and St. John USVI, 2010-2021.

Year	Lbs.	Value ($)	Price ($/Lb.)	Adjusted Value ($)[a]	Adjusted Price ($/Lb.)
2010	4,711	28,266	6.00	37,798	8.02
2011	2,569	15,779	6.14	20,702	8.06
2012	1,833	12,098	6.60	15,553	8.49
2013	8,599	53,600	6.23	67,718	7.88
2014	5,748	35,868	6.24	44,602	7.76
2015	8,272	53,767	6.50	66,330	8.02
2016	12,911	83,919	6.50	102,060	7.90
2017	5,831	38,481	6.60	45,869	7.87
2018	8,189	52,261	6.38	60,905	7.44
2019	12,696	83,425	6.57	95,939	7.56
2020	990	NA[b]	NA	NA	NA
2021	4,211	NA	NA	NA	NA
Avg.	6,380	45,746[c]	6.38	55,748	7.90

[a] Values and prices were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).

[b] Price data are unavailable after 2019.

[c] Average values and prices are based on 2010-2019 data.

Source: SERO 2023

The number of St. Thomas/St. John commercial fishers reporting dolphin landings averaged about 12 annually during 2010-2021 and ranged from a low of 8 (2011 and 2020) to a high of 17 in 2016[37] (Table 3.4.22). These fishers reported harvesting dolphin on an average of 80 trips per year which is equivalent to about 6.1 trips per fisher.

Among the annual average of 12 fishers reporting dolphin landings during 2010-2021, harvests per fisher averaged 488 pounds of dolphin per year with maximum landings of 977 pounds occurring in 2019 (Table 3.4.22). Dolphin landings per trip averaged 80 pounds during the same period and exhibited a range of less than 40 pounds in 2020 to more than 100 pounds in many years. Revenues per fisher from the harvest of dolphin, expressed in 2022 dollars, averaged just over $4,200 during the 2010-2019 period while adjusted revenues per trip averaged $671.

[37] The average of 12 fishers reporting dolphin landings during 2010-2021 represents about one-quarter of the average number of fishers reporting any landings during this period (i.e., 76). See Table 3.3.9 for the annual total number of St. Thomas/St. John fishers reporting landings.

Table 3.4.22. Number of fishers, trips, and landings per fisher and trip (pounds and value) for commercial fishers of St. Thomas/St. John who reported landings of dolphin, 2010-2021.

Year	Number of Fishers	Number of Trips	Trips Per Fisher	Lbs. Per Fisher	Lbs. Per Trip	Adjusted Revenues Per Fisher ($)[a]	Adjusted Revenues per Trip ($)
2010	13	63	4.8	362	75	2,907	600
2011	8	28	3.5	321	92	2,588	739
2012	12	47	3.9	153	39	1,296	331
2013	15	66	4.4	573	130	4,515	1,026
2014	9	50	5.6	639	115	4,956	892
2015	15	144	9.6	551	57	4,442	461
2016	17	183	10.8	759	71	6,004	558
2017	14	100	7.1	417	58	3,276	459
2018	13	98	7.5	630	84	4,685	621
2019	13	94	7.2	977	135	7,379	1,021
2020	8	27	3.4	124	37	NA	NA
2021	12	57	4.8	351	74	NA	NA
Avg.	12.4	79.8	6.1	488	80.5	4,203[b]	671

[a] Values were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).
[b] Average adjusted annual revenues are based on 2010-2019 data.
Source: SERO 2023

The vast majority of dolphin landed in recent years by commercial fishers in St. Thomas/St. John, expressed on a weight basis, was reported to be taken from federal waters (Table 3.3.10). Since 2017, the annual harvest from federal waters has averaged 6,235 pounds which represents almost 98% of the total reported dolphin landings of 6,83 pounds. The average annual value of commercial dolphin harvests from federal waters was estimated to equal $40,553 or, when expressed in 2022 dollars (i.e., converted to 2022 dollars based on the BEA Implicit Price Deflator) $46,662.[38]

St. Thomas/St. John commercial fishers reported harvest of dolphin from federal waters on an average of 68 trips per year during the 2017-21 period. The trips by St. Thomas/St. John commercial fishers reporting the harvest of dolphin from federal waters also reported the harvest of many other species including yellowfin tuna, wahoo, spiny lobster, and king mackerel (Table 3.4.23). Expressed on a weight basis, dolphin contributed about 50% of the total poundage taken by trips in federal waters that reported the harvest of dolphin (i.e., 6,235 pounds out of a total 12,559 pounds). The contribution of dolphin to the value of catch was approximately the same

[38] For purposes of analysis, the 2020 and 2021 dolphin prices were assumed to equal the average of the 2018 and 2019 dolphin price (i.e., $6.48 per pound).

as poundage indicating that the price of dolphin was about the same as the aggregate price of other species taken on the trips in federal waters.[39]

Based on an average of 68 trips annually during 2017-2021 (i.e., those trips in federal waters where dolphin was reported to be harvested), the catch per trip averaged 185 pounds with dolphin accounting for 92 pounds, or about one-half of this total. The adjusted value per trip (i.e., expressed in 2022 dollars based on the BEA Implicit Price Deflator) averaged $1,348 with the adjusted dolphin revenues per trip averaging $679.

Table 3.4.23. Pounds and value of dolphin that was reported to be harvested in federal waters off St. Thomas and St. John and the pounds and value of co-occurring species that were also harvested on those trips, 2017-2021 annual averages.

Species	Pounds	Value ($)[a]	Adjusted Value ($)[b]
Dolphin	6,235	40,525	46,198
Unclassified Tuna	1,976	11,696	13,323
Yellowfin Tuna	1,553	9,785	11,155
Wahoo	1,070	7,027	8,011
Spiny Lobster	433	3,887	4,431
Herrings	221	1,104	1,259
King Mackerel	208	1,231	1,404
Red Hind Grouper	191	1,115	1,271
Yellowtail Snapper	158	967	1,102
Blue Runner	116	699	797
Red Grouper	110	659	751
Queen Triggerfish	88	505	576
Skipjack Tuna	70	427	487
Blackfin Tuna	66	410	467
Rainbow Runner	66	391	446
Total	12,559	80,428	91.688
Dolphin as % of Total	49.6	50.4	50.4

[a] The unweighted 2017-2019 prices for each of the species were used to estimate the 2017-2021 values. In a few instances, prices were not provided and other years or species were used in lieu of the missing prices.

[b] Values and prices were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).

Source: SERO 2023

3.4.3.2 The Commercial Wahoo Fishery

Reported commercial landings of wahoo by the St. Thomas/St. John commercial fishing sector exhibited a significant amount of variation across years during 2010-2021 with the annual landings ranging from a low of 650 pounds in 2020 to a high of almost 6,000 pounds in 2011

[39] With some notable exceptions, there were only minor differences in prices among the different St. Thomas/St. John finfish species.

(Table 3.4.24). The value of reported wahoo landings likewise varied significantly when examined on a yearly basis ranging from a low of $5,236 in 2019 to a high of almost $37,000 in 2016. Overall, landings averaged 3,418 pounds during the twelve-year period ending in 2021 while the value of these landings (based on data through 2019) averaged $25,329 per year based on an average price of $6.44 per pound.[40] Expressed in 2022 dollars (i.e., converted to 2022 dollars based on the BEA Implicit Price Deflator), the value of landings averaged $31,750 annually during the 2010-2019 period based on an adjusted price of $7.97 per pound.

Table 3.4.24. Reported annual commercial landings (pounds, value, and price) of wahoo in St. Thomas and St. John USVI, 2010-2021.

Year	Lbs.	Value ($)	Price ($/Lb.)	Adjusted Value ($)[a]	Adjusted Price ($/Lb.)
2010	5,472	32,882	6.01	43,971	8.04
2011	5,931	36,703	6.19	48,155	8.12
2012	3,372	22,256	6.60	28,612	8.49
2013	3,953	24,664	6.24	31,160	7.88
2014	4,424	27,604	6.24	34,325	7.76
2015	3,964	26,760	6.75	33,013	8.33
2016	5,429	36,649	6.75	44,571	8.21
2017	2,561	16,472	6.43	19,634	7.67
2018	3,715	24,061	6.48	28,040	7.55
2019	785	5,236	6.67	6,021	7.67
2020	650	NA[b]	NA	NA	NA
2021	763	NA	NA	NA	NA
Avg.	3,418	25,329[c]	6.44	31,750	7.97

[a] Values and prices were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).

[b] Price data are unavailable after 2019.

[c] Average values and prices are based on 2010-2019 data.

The number of St. Thomas/St. John commercial fishers reporting wahoo landings during 2010-2021 averaged between six and seven and ranged from a low of 4 in 2019 and 2020 to a high of 12 in 2016 [41] (Table 3.4.25). These fishers reported harvesting wahoo on an average of 38 trips per year which is equivalent to about 5.5 trips per fisher.

[40] For purposes of analysis, it is assumed that wahoo prices are being provided by the St. Thomas and St. John fishers on a whole-weight basis rather than on a product-weight basis. If this is not the case, values may well be overstated which would lead to an overestimation of revenues per fisher and trip.

[41] The average of 6.5 fishers reporting wahoo landings during 2010-2021 represents less than 10% of the average number of fishers reporting any landings during this period (i.e., 76). See Table 3.3.9 for the annual total number of St. Thomas/St. John fishers reporting landings.

Among the six to seven fishers reporting wahoo landings during 2010-2021, harvests per fisher averaged 501 pounds of wahoo per year with a maximum landings of 1,186 pounds in 2011. Wahoo landings per trip averaged 92 pounds during the same period and exhibited a range of less than 40 pounds to more than 200 pounds. Revenues per fisher from the harvest of wahoo, expressed in 2022 dollars, averaged almost $4,565 during 2010-2019 while adjusted revenues per trip averaged $825.

Table 3.4.25. Number of fishers, trips, and landings per fisher and trip (pounds and value) for commercial fishers of St. Thomas and St. John who reported landings of wahoo, 2010-2021.

Year	Number of Fishers	Number of Trips	Trips Per Fisher	Lbs. Per Fisher	Lbs. Per Trip	Adjusted Revenues Per Fisher ($)[a]	Adjusted Revenues per Trip ($)
2010	8	44	5.5	684	124	5,496	999
2011	5	26	5.2	1,186	228	9,631	1,852
2012	6	30	5.0	562	112	4.769	954
2013	6	37	6.2	659	107	5,193	842
2014	7	34	4.9	632	130	4,904	1,010
2015	8	63	7.9	496	63	4,127	524
2016	12	86	7.2	452	63	3,714	518
2017	7	32	4.6	366	80	2,805	614
2018	8	41	5.1	464	91	3,505	684
2019	4	24	6.0	196	33	1,505	251
2020	4	16	4.0	163	41	NA	NA
2021	5	22	4.4	153	35	NA	NA
Avg.	6.5	37.9	5.5	501	92	4,565[b]	825

[a] Values were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).

[b] Average adjusted annual revenues are based on 2010-2019 data.

Source: SERO 2023

The vast majority of wahoo landed in recent years by commercial fishers in St. Thomas/St. John was reported to be taken from federal waters (Table 3.3.11). For the 2017-2021 period, the annual harvest from federal waters averaged 1,666 pounds which represented 98% of the total reported wahoo landings of 1,695 pounds. The average annual value of commercial wahoo harvests from federal waters was estimated to equal $10,824 or $12,565 when expressed in 2022 dollars (i.e., converted to 2022 dollars based on the BEA Implicit Price Deflator).[42]

An average of 26 trips reported the catch of wahoo from federal waters of St. Thomas/St. John during 2017-2021, or about 96%of the total number of trips reporting wahoo landings. The trips by St. Thomas/St. John commercial fishers reporting the harvest of wahoo from federal waters

[42] For purposes of analysis, the 2020 and 2021 wahoo prices were assumed to equal the average of the 2018 and 2019 wahoo price (i.e., $6.57 per pound).

also reported the harvest of many other species including dolphin, little tunny, and king mackerel (Table 3.4.26). Expressed on a weight basis, wahoo contributed 44% of the total poundage taken by trips in federal waters that reported the harvest of wahoo (i.e.,1,666 pounds out of a total 3,742 pounds). The contribution of wahoo to the value of catch was approximately the same as poundage indicating that the price of wahoo was about the same as the aggregate price of other species taken on the trips in federal waters.

Based on an average of 26 trips annually during 2017-2021 (i.e., those trips in federal waters where wahoo was reported to be harvested), the catch per trip averaged 144 pounds with wahoo accounting for 64 pounds of this total. The adjusted value per trip (i.e., expressed in 2022 dollars based on the BEA Implicit Price Deflator) averaged almost $1,055 with the adjusted wahoo revenues per trip averaging $480.

Table 3.4.26. Pounds and value of wahoo that was reported to be harvested in federal waters off St. Thomas and St. John USVI and the pounds and value of co-occurring species that were also harvested on those trips, 2017-2021 annual averages.

Species	Pounds	Value ($)[a]	Adjusted Value ($)[b]
Wahoo	1,666	10,946	12,478
Dolphin	1,192	7,749	8,834
Unspecified Tuna	383	2,266	2,583
Yellowfin Tuna	306	1,928	2,198
King Mackerel	70	413	471
Rainbow Runner	66	393	448
Skipjack Tuna	59	360	410
Total	3,742	24,055	27,422
Wahoo as % of Total	44.5	45.5	45.5

[a] The unweighted 2017-2019 prices for each of the species were used to estimate the 2017-2021 values. In a few instances, prices were not provided and other years or species were used in lieu of the missing prices.
[b] Values and prices were converted to 2022 dollars using the BEA Implicit Price Deflator (GDP Deflator by Year).
Source: SERO 2023

3.5 Description of the Social Environment

The following text describes select social aspects of the dolphin and wahoo fisheries of Puerto Rico and the USVI. Recent landings data are used to identify communities from which the species are harvested by the commercial sector, and various secondary source materials provide insight into recreational pursuit of the species around the islands. The principal intent of the section is to provide sufficient descriptive context for regulatory effects analysis in Chapter 4. In keeping with Executive Orders that call for examination of environmental equity and justice (EEJ) issues in the context of federal regulatory actions, the section also identifies social vulnerabilities among island communities where commercial and recreational fishing activities are of known importance. Readers are referred to an extensive base of literature regarding the social environment associated with commercial/artisanal, recreational, and consumption-oriented fishing around Puerto Rico—encapsulated in the new island-based FMP (CFMC 2019a), and in recent amendments, such as that regulating use of buoy gear in the federal jurisdiction waters of the U.S. Caribbean (CFMC 2022).

3.5.1 Puerto Rico

Pursuit of living marine resources is an important aspect of society in contemporary Puerto Rico—a natural outcome of life in a region where the Atlantic Ocean is continually in view and where its azure waters have provided a source of food, income, and enjoyment to islanders for so many generations. The contemporary importance of seafood is amplified in this setting—and especially in *municipios* where residents are most deeply engaged in commercial/artisanal marine fisheries—since these county-level administrative units are by far the most impoverished in the nation (cf. Cheatham and Roy 2022; U.S. Census Bureau 2023). While Puerto Rico's small-scale commercial/artisanal fishing fleets have long provided seafood for distribution in markets and among families and communities around the Commonwealth, persons who do not possess commercial licenses or permits have also harvested, consumed, and informally shared, bartered, or otherwise transacted seafood in the same social settings over time. Indeed, as discussed by Napolitano et al. (2019), small societies of residents were pursuing and consuming marine resources around what is now called Puerto Rico as early as 4,700 years before present.

Meanwhile, the concept and practice of fishing primarily for recreational purposes is at once relatively new and also important here, and in this context invites questions about the motivations of those involved. For purposes of analysis, the phrase "recreational fishing," as used in this section, follows the definitional logic offered by Puerto Rico's DNER (2013) in its final report of the Puerto Rico Marine Recreational Fisheries Statistics Program. While this definition holds that recreational anglers prioritize the sport and relaxation dimensions of fishing, it is important to note that the authors also assert that living marine resources captured via the recreational approach and at recreational tournaments around are Puerto Rico: (a) very typically are kept for consumption, (b) are in some cases are sold, and (c) are very rarely released (cf.

DNER 2013; Rodriguez-Ferrer, pers. comm., 2023). Moreover, recent discussions with fishery managers working in Puerto Rico indicate increasing rates of illegal/difficult to enforce sale of fish by tournament participants and unregistered charter vessel operators active in certain island regions. As such, the definition of recreational fishing is somewhat blurred here, underscoring the observable importance of seafood and its consumption and transaction in this island setting (see also discussion of "subsistence fishing" around Puerto Rico, as discussed in CFMC 2019a.

3.5.1.1 Key Social Aspects of Commercial/Artisanal Dolphin and Wahoo Fishing: Puerto Rico

The commercial fisheries of Puerto Rico are characteristically artisanal in nature. That is, most harvesters use and maintain relatively small vessels, employ few crewmembers, and use a variety of gear types suited to a shifting suite of target species over the course of a given year (Agar et al. 2020, Agar and Shivlani 2016). Like successful fishing everywhere, knowledge of the target species, ecological cues of their presence, and effective means of capture are key elements of success. Such knowledge is often transferred between generations of island residents (Garcia-Quijano 2009), as are navigational skills, the ability to maintain vessels and engines, and other core aspects of fishing-associated work on the ocean. Tourism-generated demand provides extensive opportunity for sale of seafood to restaurants and resorts around Puerto Rico. However, like many small-scale fisheries around the world, island harvesters often supplement fishing income with that generated through other forms of work (Agar et al. 2022; Agar and Shivlani 2016; Valle-Esquivel et al. 2011).

As discussed by Agar and Shivlani (2016) and at the outset of this amendment, most commercial/artisanal pursuit of dolphin (*dorado*) and wahoo (*peto*) occurs in territorial waters, with fewer participants fishing for the species in both federal and territorial waters, and very few solely in federal waters. Patterns in the geographic distribution of landings are also notable and suggest some regional specialization in pelagic fishing activities. This is indicated in Figure 3.5.1 below, which depicts those island municipalities registering the greatest extent of landings from the federal waters component of Puerto Rico's dolphin and wahoo fishing grounds during the period 2016 through 2020.[43] A single graphic depicting combined dolphin and wahoo landings is provided here since the same principal communities are identified when landings for each species are considered separately. As can be discerned from the graphic, the highest percentage of landings of the two species occurred in the municipalities of Rincon, Lajas, and Arecibo during the period, with smaller proportions consistently accruing to seven additional municipalities. Of note here from a sociodemographic perspective, the percentage of persons in poverty residing in each of the three principal landings communities during 2020—40.9% in Rincon, 59.8% in Lajas, and 47% in Arecibo—far exceed the national rate of 11.4% during the same census year (U.S. Census Bureau 2020).

[43] With the caveat that 2020 data are preliminary in nature.

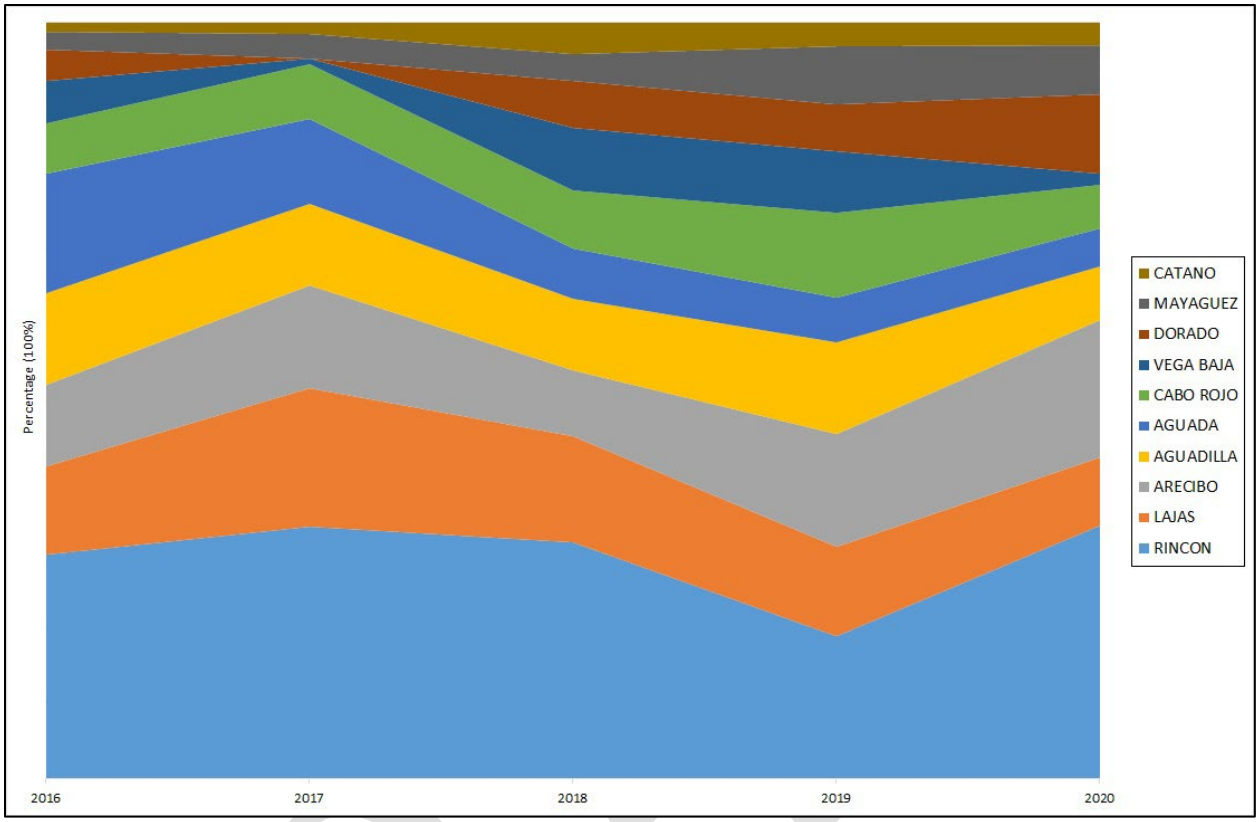

Figure 3.5.1. Puerto Rico municipios where commercial landings of dolphin and wahoo were documented during the period 2016 through 2020.
Source: SEFSC, Community ALS File, June 2023

3.5.1.2 Key Social Aspects of Recreational Dolphin and Wahoo Fishing: Puerto Rico

As discussed in the final report of the Puerto Rico Marine Recreational Fishing Statistics Survey (MRFSS) Program (DNER 2013), the Puerto Rico DNER monitored recreational fishing activities around the island region between 1999 and 2013, with a directed focus on competitive tournaments, for-hire fishing operations, and visiting and resident anglers in general. The authors note that roughly 25 major tournaments were convened during each year of the monitoring period by 12 fishing clubs and marinas around the island.[44] Pelagic-focused tournaments were most popular, with blue marlin- and dolphin-focused tournaments particularly so.[45] Notably, dolphin constituted the greatest volume-in-weight of all fish landed at pelagic tournaments, and it was also the principal bycatch species landed at such tournaments during the period (DNER 2013). A total of 37 dolphin tournaments were held between 2009 and 2013, involving 4,081 anglers and 1,406 fishing vessels overall. Hearkening again to the importance of

[44] The formation and perpetuation of fishing clubs around Puerto Rico are inherently social processes that speak both to the popularity of fishing and the camaraderie it can engender within and across island communities.
[45] The 70th San Juan International Billfish Tournament is scheduled to occur during summer 2023.

seafood and to mixed and fluid motives for engaging in fishing activities around Puerto Rico, the authors assert that "most dolphin landed during tournaments [of the period] was sold, despite [the fact that] most fishermen are aware that to buy or sell fish caught recreationally is illegal." With specific regard to wahoo, six wahoo-focused tournaments were organized by a single fishing club along the south coast of Puerto Rico during the period 2009 through 2013, with 1,185 anglers and 298 fishing vessels involved in total. A single tournament targeting both wahoo and dolphin was held during the same period (DNER 2013).

Of note from a resource management perspective, Rodríguez -Ferrer et al. (2006) describe tournaments occurring around Puerto Rico between 2000 and 2003. The authors assert that recreational fishing regulations established by the Commonwealth altered the manner in which club-sponsored events were conducted at the time, including dolphin-specific competitions. That is, when the Commonwealth established a territory-wide limit of five dolphin per recreational angler (20 fish per vessel) in 2005, tournament organizers stopped awarding prizes to persons landing the most fish and instead championed those capturing the largest specimens. This reportedly encouraged a then-emerging trend wherein certain clubs were requiring that only dolphin of sufficient size could qualify for review by tournament judges (Rodríguez-Ferrer et al. (2006). These authors also describe illegal sale of dolphin by tournament participants of the day.

With regard to charter (for-hire) operations monitored by DNER between 2009 and 2013, it is notable that dolphin again constituted the greatest percentage of landings-by-weight of all species captured, and that no dolphin releases were documented during the period. The authors state that most charter operations around Puerto Rico accommodate visitors from other parts of the nation and world, though some also serve local clientele (DNER 2013). For-hire operations are widely distributed around Puerto Rico, with some 47 businesses reportedly active in 2018, based mostly in harbors around San Juan and along the island's northeast and southwest coastlines (CFMC 2019a). The pandemic-focused research of Agar et al. (2022) also indicates approximately 50 for-hire fishing operations around Puerto Rico. Large charter vessels operating in federal jurisdiction waters typically target highly migratory pelagics such as the marlins and tunas, with dolphin and wahoo often captured incidentally (CFMC 2019a). During 2017, 405 persons held permits to capture highly migratory species on a recreational basis around Puerto Rico (CFMC 2019a).

Finally, in order to document catch and effort on the part of persons fishing on recreational basis from privately owned vessels, the DNER (2013) conducted between 600 and 1,000 access point interviews during each year of the 2009 through 2013 monitoring period. Capture of dolphin by this fleet far surpassed that of all other species during each year monitored, and the authors report that release of fish on the part of anglers involved in this mode of fishing is "quite rare," indicating again the questionability of attributing purely recreational motives to pelagic fishing around Puerto Rico (DNER 2013).

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

As for other Leeward Islands, the islands now known as St. Thomas, St. John, and St. Croix were occupied by small marine resource dependent societies at least 3,500 years before present (Baumgardt 2009; Dreyfus 1994). Such engagement continued over subsequent centuries, as persons of African, West Indian, French, and Danish descent arrived and established small agriculture- and fishing-oriented communities around the island chain (Olwig 1993; Rogozinski 1994; IAI 2006, 2007). Today, relatively few—some 260—of the 87,146 residents enumerated across the USVI during the 2020 census are directly engaged in marine fisheries (Kojis et al. 2017). Yet the harvest, transaction, and consumption of living marine resources—including dolphin, wahoo, and other pelagic species—continue to be of great social and dietary importance here (cf. Agar et al. 2022; Agar et al. 2020; CFMC 2019b,c; Valdes-Pizzini et al. 2010; Stoffle et al. 2009; IAI 2006, 2007). In straightforward terms, seafood harvested from territorial and federal jurisdiction waters around the USVI constitutes an important part of local diets in a context of extensive regional poverty (U.S. Census Bureau 2022).

3.5.2.1 Key Social Aspects of Commercial/Artisanal Dolphin and Wahoo Fishing: USVI

Very similar to the situation around Puerto Rico, contemporary commercial fishing operations around the USVI tend to be artisanal in nature. That is, (a) vessels are small and fishing trips are generally short-lived, (b) harvesters typically sell their catch at local markets while also retaining a portion for consumption by family and friends in various social settings (Kojis et al. 2017; IAI 2006, 2007), and (c) many fishery participants supplement fishing income with other forms of employment during certain parts of the year (Agar et al. 2022, Agar and Shivlani 2016).

As per the fishery census work conducted by Kojis et al. (2017), and as discussed at the outset of this amendment, dolphin and wahoo are regularly targeted by about 25% of artisanal participants residing on St. Thomas and St. John, and by more than 50% of those residing on St. Croix. When defined as a target species unit, dolphin/wahoo was deemed study participants in both island areas to be the third most important target species both overall and in terms of its capacity to generate revenue. The authors report that longline gear was not used to harvest dolphin or wahoo anywhere in the USVI during the most recent fishery census year, and that the two species are captured exclusively by trolling with hook and line gear, including both handlines and rods and reels. This approach is perennially common around the islands, with 83.5% of surveyed participants trolling for the species in 2011 (Kojis and Quinn 2011), and with 85.2% so engaged in 2016 (Kojis et al. 2017).

Table 3.5.1 provides additional summary information regarding the pursuit of dolphin and wahoo by local participants during 2016. As indicated by number of hours fished for the species during any given trip, dolphin and wahoo are pursued with somewhat greater intensity by persons operating from St. Thomas and St. John than those operating from St. Croix. This may relate to

the reported tendency of the latter group to prioritize consumption of bottomfish species above pelagics, and the tendency of the former to transact dolphin and wahoo to buyers at restaurants and resorts around St. Thomas (Stoffle, pers. comm., June 2023).

Table 3.5.1. Use of hook-and-line gear to harvest dolphin and wahoo resources in the USVI.*

Location	N**	Number/% Owning Gear	# Using Gear < 3 Miles	# Using Gear > 3 Miles (only)	# Using Gear in Both Zones	Mean Units Owned	Mean Hrs. Fished per Trip
Handlines							
St. Thomas/ St. John	82	69/84.1%	35	2	30	1.4	6.2
St. Croix	109	100/91.7%	42	3	51	1.8	5.3
Rods and Reels							
St. Thomas/ St. John	82	43/52.4%	15	2	21	6.9	5.1
St. Croix	109	39/35.8%	12	2	25	5.9	4.3

*From Kojis et al. (2017).
** N = number of research participants responding to questions about the gear.

As per Figure 3.5.2 below, the vast majority of dolphin/wahoo landings deriving from commercial/artisanal fishing activities in federal jurisdiction waters surrounding the USVI during 2021 accrued primarily to participants in the Southwest District of St. Croix, followed by the those operating from the Northside and East End Districts of St. Thomas, and from the Sion Farm District of St. Croix. Of note from a sociodemographic perspective, the total population figure for the Southwest District of St. Croix diminished by 22.1% between the 2010 and 2020 census counts, with the figure for the Northside District of St. Thomas declining by 11.5% during the same period. Such dramatic changes are reflective of the fact that the USVI population in total fell more precipitously than any other U.S. territory between the last two counts undertaken by the U.S. Census Bureau (Virgin Islands Consortium 2021). Recent rates of poverty across the USVI are also inordinately high, as described in a variety of sources, including the U.S. Census Bureau (2022).

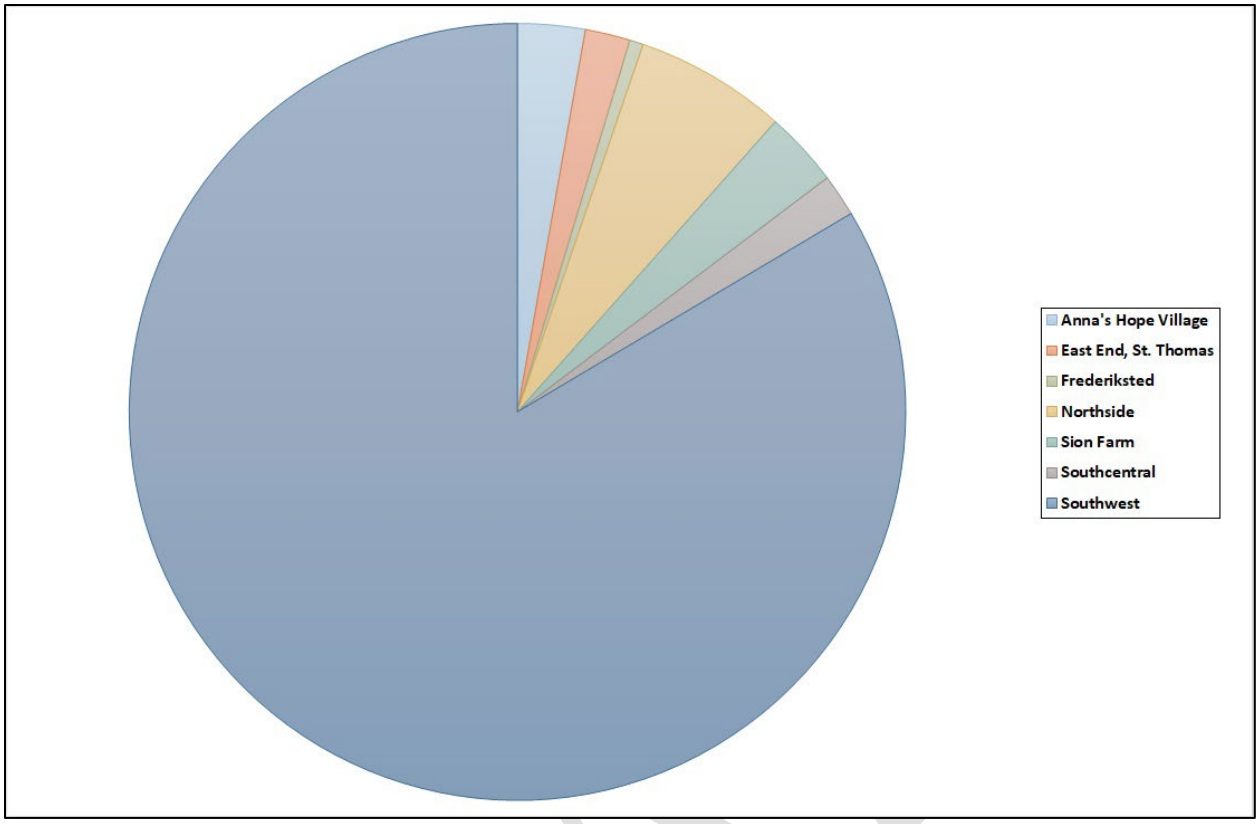

Figure 3.5.2. Districts where commercial dolphin and wahoo landings from federal waters around the USVI occurred during 2021.
Source: SEFSC, Community ALS File, June 2023

3.5.5.2 Key Social Aspects of Recreational Dolphin and Wahoo Fishing: USVI

As is the case for Puerto Rico, recent data regarding recreation-oriented fishing activities around the USVI is both limited in nature and difficult to parse from fishing undertaken with the intent of generating income. In this case, the most recent and pertinent information is available in Kojis and Tobias (2016) and in Freeman et al. (2017). The latter source describes the results of a creel survey conducted with non-commercial anglers, for-hire captains, and tournament participants around the three islands during 2016 and 2017. Among the key points discussed in study findings is that "very low" rates of recreational activity were documented during the course of the research effort, and that "in the USVI, as in many small scale fisheries, it can be challenging to distinguish between commercial and recreational fishers" with "many charter operations also hold[ing] commercial fishing licenses, which allow them to sell their catch" (Freeman et al. 2017). Meanwhile, Kojis and Tobias (2016) assert that of the 378 boat owners who responded to a 2014 survey regarding recreational fishing in the USVI, 75% reported fishing primarily for food and 43% considered themselves subsistence specialists. These sources, coupled with information provided through discourse with active fishermen in the islands, indicate that that any form of non-commercial fishing undertaken in the islands: (a) very

typically involves consumption of the captured resources, (b) very rarely involves the catch-and-release approach undertaken by many recreational anglers elsewhere in the nation,[46] and (c) can often contrarily involve sale of marine resources in local markets in a context of limited enforcement capacity.

Challenges related to the definition of recreational fishing and assessment of related motivations aside, Freeman et al. (2017) describe the activities of persons whose motivations to fish around the USVI ostensibly prioritize sport and relaxation, with pertinent information recovered through structured interviews with anglers and documentation of catch at various well-used harbors and vessel ramps around the island districts. The research effort also involved monitoring of the six fishing tournaments that were held around the islands during the study period, and a series of interviews with island-based charter operators. As described by the authors, "85 recreational trip (38 private and 47 charter) surveys were completed in 2017 under the operational sampling design on St. Thomas," with "105 recreational trip (67 private and 38 charter) surveys completed on St. Croix." Two charter trip interviews were conducted on St. John (Freeman et al. 2017).

With regard to the species addressed by this amendment, for-hire and private recreational interviewees on both St. Thomas and St. Croix collectively reported dolphin landings at the greatest volumes-by-weight of all species landed during the course of study. Wahoo was ranked third in terms of landings in pounds (lbs) whole weight on St. Thomas and second on St. Croix. Overall landings of the species were minimal, however, with a total of 306 lbs of dolphin and 116 lbs of wahoo landed by study participants on St. Thomas, and 580 lbs of dolphin and 296 lbs of wahoo landed by participants around St. Croix. The vast majority of poundage was landed by the sampled charter operators. Such notably small volumes of fish are in keeping with the authors' summary observation that a limited amount of recreational fishing was occurring in the USVI during the study period. The number of documented trips was greatest during the period January through March and lowest during June and July (Freeman et al. 2017).

Of note from a demographic perspective, 47% of St. Thomas interviewees participating in the Freeman et al. (2017) study reported that they had been born on the island, while 39% reported their place of birth as the U.S. mainland. Some 30% of St. Croix interviewees claimed the island as their place of birth, while 58% reported having been born on the U.S. mainland. Only three native islanders who were interviewed during the study reported having been born on an island other than where the interview was conducted, suggesting strong sociocultural affinity between the vast majority of native-born research participants and the island where their lives began.

[46] One exception relates to the recreational pursuit of bonefish by visiting anglers, an activity that is typically led by for-hire captains and crew in suitable, usually shallow nearshore habitats around the islands. Given the (bony) nature of this species, it is very typically is released after capture (Stoffle, pers. comm., 2023).

3.5.3 Environmental Equity and Justice (EEJ) Considerations

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. The measures used to calculate the Personal Disruption index depicted in this section incorporate percentages of unemployed persons, persons with no high school diploma, persons in poverty, and separated females. The Population Composition measures incorporate percentages of unemployed persons, single female heads of household, persons who speak English less than well, and persons of

various ethnic backgrounds. Finally, the Poverty measures incorporate percentages of persons receiving public assistance income, families below the poverty level, persons in poverty over the age of 65, and persons in poverty under the age of 18.

As depicted in Figure 3.5.3 below, multiple Puerto Rico municipalities involved in artisanal dolphin/wahoo harvest exceed the 0.5 standard deviation (std. dev.) threshold for multiple vulnerability indices, with Lajas exceeding the one std. dev. threshold for personal disruption and poverty, and Mayaguez exceeding the same threshold for personal disruption. Certain USVI districts of interest also exceed the established vulnerability thresholds, with Frederiksted and Southcentral Districts on St. Croix exceeding the one std. dev. threshold for multiple indices, and Southwest District (also on St. Croix) exceeding the 0.5 std. dev. thresholds for poverty and personal disruption.

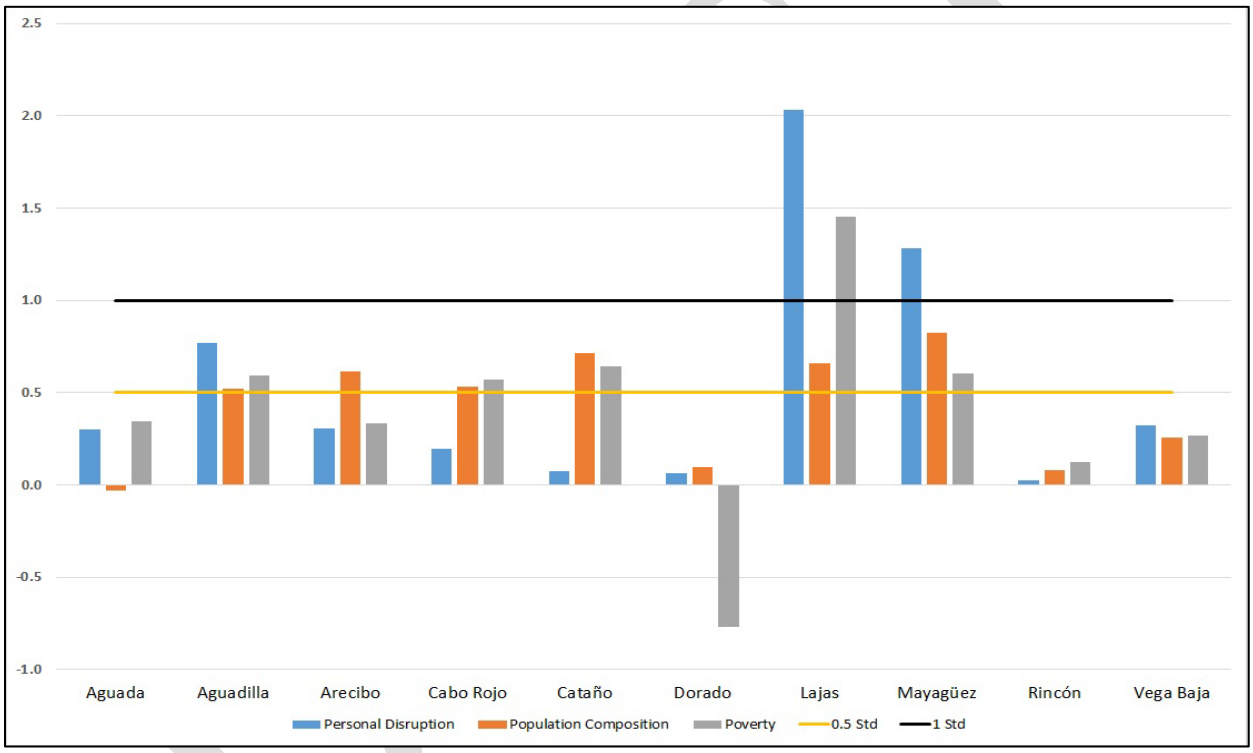

Figure 3.5.3. Social vulnerability indices for Puerto Rico municipalities most extensively involved in harvest of dolphin/wahoo: 2016-2020.
Source: SERO/SEFSC CSVI database, June 2023.

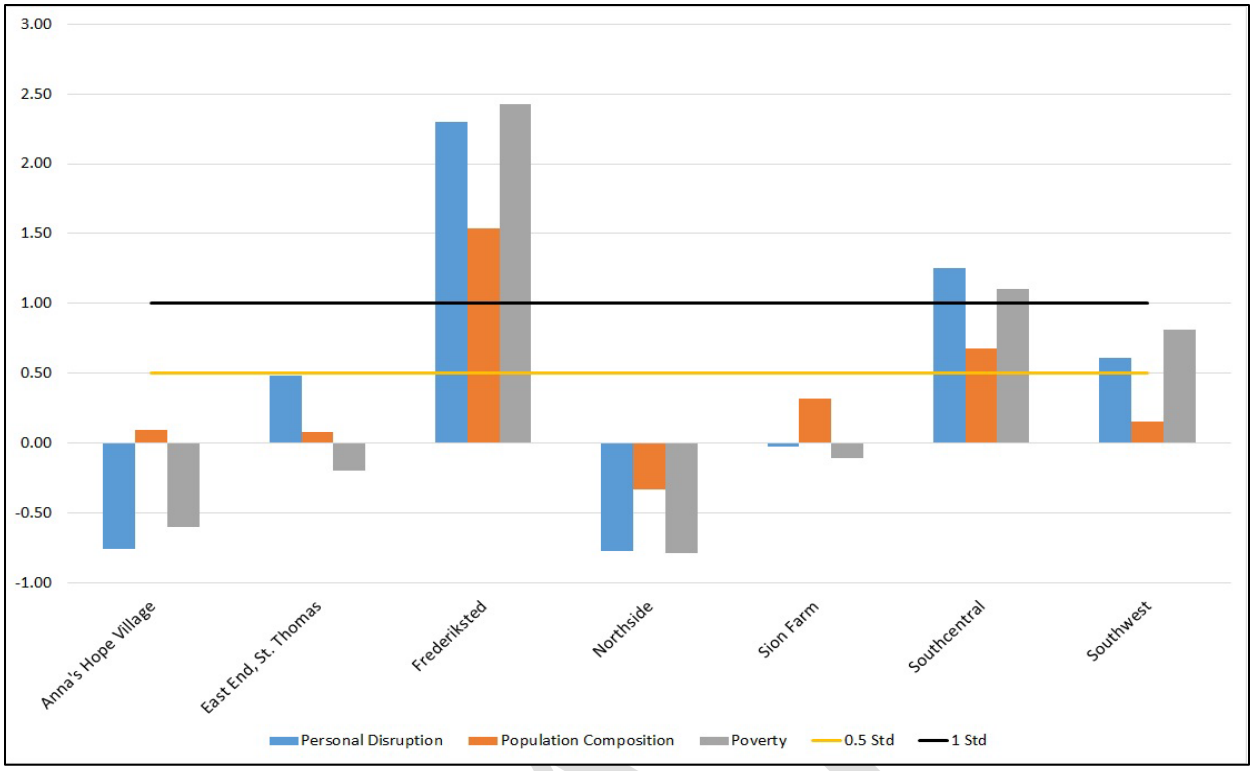

Figure 3.5.4. Social vulnerability indices for USVI districts most extensively involved in harvest of dolphin/wahoo: 2021.

Source: SERO/SEFSC CSVI database, June 2023.

3.6 Description of the Administrative Environment

The administrative environment for the U.S. Caribbean was discussed in detail in the Puerto Rico, St. Croix, and St. Thomas/St. John FMPs, 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 Fishery 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). 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 designated by their Governors; and NMFS' Southeast Region Regional Administrator.

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 the 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. 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 state agency 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 nautical miles from shore. Those fisheries are managed by Puerto Rico's Department of Natural and Environmental Resources per Puerto Rico Law 278 of November 29, 1998 as amended, known as Puerto Rico's Fisheries Law. 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. 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.

More information on the Puerto Rico DNER can be found on their web page: https

3.6.2.2 U.S. Virgin Islands

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 in state waters (0-3 nautical miles from shore). The DPNR's Division of Fish and Wildlife (DFW) is responsible for data collection pertaining to the fisheries of the USVI. The DFW monitors commercial and recreational fisheries and provides recommendations to the DPNR Commissioner on matters relating to fisheries management. Rules and regulations for the USVI fisheries are codified in the Virgin Islands Code, primarily within Title 48 Chapter 12.

More information on the USVI DPNR can be found on their web page:
https://dpp.vi.gov/agency/department-planning-and-natural-resources

Chapter 4. Environmental Effects (in progress)

Since this amendment includes the same management measure considerations for each Fishery Management Plan (FMP), and to reduce repetition within this chapter, the environmental effects are discussed by management measure and species rather than by island, management measure, species.

4.1 Establish a size limit for dolphin in federal waters around Puerto Rico (Action 1a), St. Croix (Action 3a), and St. Thomas/St. John (Action 5a)

Summary of Management Alternatives

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

Alternative 1. No Action. Do not establish a minimum size limit for the commercial or recreational harvest of dolphin in federal waters around Puerto Rico, St. Croix, or St. Thomas/St. John.

Alternative 2. Establish a 20" fork length minimum size limit for the commercial or recreational harvest of dolphin in federal waters around Puerto Rico, St. Croix, or St. Thomas/St. John.

Alternative 3 (Preferred for St. Croix, St. Thomas/St. John). Establish a 24" fork length minimum size limit for the commercial or recreational harvest of dolphin in federal waters around Puerto Rico, St. Croix, or St. Thomas/St. John.

4.1.1 Effects on the Physical Environment

4.1.2 Effects on the Biological/Ecological Environment

4.1.3 Effects on the Economic Environment

4.1.4 Effects on the Social Environment

4.1.5 Effects on the Administrative Environment

4.2 Establish a size limit for wahoo in federal waters around Puerto Rico (Action 2a), St. Croix (Action 4a), and St. Thomas/St. John (Action 6a)

Summary of Management Alternatives

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

Alternative 1. No Action. Do not establish a minimum size limit for the commercial or recreational harvest of wahoo in federal waters around Puerto Rico, St. Croix, or St. Thomas/St. John.

Alternative 2. Establish a 32" fork length minimum size limit for commercial or recreational harvest of wahoo in federal waters around Puerto Rico, St. Croix, or St. Thomas/St. John.

Alternative 3 (Preferred for St. Croix and St. Thomas/St. John). Establish a 40" fork length minimum size limit for commercial or recreational harvest of wahoo in federal waters around Puerto Rico, St. Croix, or St. Thomas/St. John.

4.2.1 Effects on the Physical Environment

4.2.2 Effects on the Biological/Ecological Environment

4.2.3 Effects on the Economic Environment

4.2.4 Effects on the Social Environment

4.2.5 Effects on the Administrative Environment

4.3 Establish a recreational bag limit for dolphin in federal waters around Puerto Rico (Action 1b), St. Croix (Action 3b), and St. Thomas/St. John (Action 5b)

Summary of Management Alternatives

Puerto Rico

Alternative 1. No Action. Do not establish aa recreational bag limit for dolphin in federal waters around Puerto Rico.

Alternative 2. Establish a recreational bag limit in federal waters of 10 dolphin per person per day, not to exceed 30 dolphin per vessel per day, whichever is less.

Alternative 3. Establish a recreational bag limit in federal waters of 5 dolphin per person per day, not to exceed 15 dolphin per vessel per day, whichever is less.

St. Croix and St. Thomas/St. John

Alternative 1. No Action. Do not establish a minimum size limit for the commercial or recreational harvest of dolphin in federal waters around St. Croix or St. Thomas/St. John.

Alternative 2 (Preferred for St. Croix and St. Thomas/St. John). Establish a recreational bag limit in federal waters of 10 dolphin per person per day, not to exceed 32 dolphin per vessel per day, whichever is less.

Alternative 3. Establish a recreational bag limit in federal waters of 5 dolphin per person per day, not to exceed 15 dolphin per vessel per day, whichever is less.

4.4 Establish a recreational bag limit for wahoo in federal waters around Puerto Rico (Action 2b), St. Croix (Action 4b), and St. Thomas/St. John (Action 6b)

Summary of Management Alternatives

Puerto Rico

Alternative 1. No Action. Do not establish a recreational bag limit for wahoo in federal waters around Puerto Rico.

Alternative 2. Establish a recreational bag limit in federal waters around Puerto Rico of 5 wahoo per person per day, not to exceed 10 wahoo per vessel per day, whichever is less.

Alternative 3. Establish a recreational bag limit in federal waters around Puerto Rico of 2 wahoo per person per day, not to exceed 6 wahoo per vessel per day, whichever is less.

St. Croix and St. Thomas/St. John

Alternative 1. No Action. Do not establish a recreational bag limit for wahoo in federal waters around St. Croix or St. Thomas/St. John.

Alternative 2. Establish a recreational bag limit in federal waters of 4 wahoo per person per day, not to exceed 20 wahoo per vessel per day, whichever is less.

Alternative 3. Establish a recreational bag limit in federal waters of 2 wahoo per person per day, not to exceed 10 wahoo per vessel per day, whichever is less.

4.5 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.

4.5.1 The area in which the effects of the proposed action will occur

4.5.2 The impacts that are expected in that area from the proposed action

4.5.3 Other past, present and reasonably foreseeable future actions that have or are expected to have impacts in the area

4.5.3.1 Other fishery related actions –

4.5.3.2 Non-fishery related actions –

4.5.4 The impacts or expected impacts from these other actions –

4.5.5 The overall impact that can be expected if the individual impacts are allowed to accumulate

4.5.6 Summary

Chapter 5. Regulatory Impact Review

Chapter 6. Regulatory Flexibility Act Analysis

Chapter 7. List of Preparers

List of personnel that assisted with development of the Amendment 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
Edward Glazer	NMFS/SFD	Social Scientist
Denise Johnson	NMFS/SFD	Economist
Scott Sandorf	NMFS/SFD	Technical Writer
Michael Larkin	NMFS/SFD	Data Analyst
Dominique Lazarre	NMFS/SFD	Data Analyst
Patrick Opay	NMFS/PRD	Fishery Biologist
Refik Orhun	NMFS/SEFSC	Biologist
Juan Agar	NMFS/SEFSC	Social Scientist
Noah Silverman	NMFS/SERO	Regional NEPA Coordinator
Katharine Zamboni	NOAA/GC	Attorney
Matthew Walia	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

Agar, J.J. and M. Shivlani. 2016. Socio-economic study of the hook and line fishery in the Commonwealth of Puerto Rico (2014). NOAA Technical Memorandum NMFS-SEFSC-700. 34 pp. https://repository.library.noaa.gov/view/noaa/14196

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., 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://doi.org/10.25923/x7sp-ey87

Baumgardt, K. 2009. Digging paradise: historical and archeological miscellany of the U.S. Virgin Islands. The Bridge: Vol. 32: No. 2, Article 7. https://scholarsarchive.byu.edu/thebridge/vol32/iss2/7

CFMC (Caribbean Fishery Management Council). 2022. Generic Amendment 1 to the Fishery Management Plans for Puerto Rico, St. Thomas and St. John, and St. Croix: Modification to the Buoy Gear Definition and Use Including Environmental Assessment, Fishery Impact Statement, Regulatory Impact Review, and Regulatory Flexibility Act Analysis. October 2022. San Juan. https://www.fisheries.noaa.gov/s3/2023-02/Generic%20Amdt.%201%20IBFMPs%20-%20Buoy%20Gear%20Amendment_Final%20508c.pdf

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

Cheatham, A. and D. Roy. 2022. *Puerto Rico: A U.S. Territory in Crisis*. Council on Foreign Relations. https://www.cfr.org/backgrounder/puerto-rico-us-territory-crisis#chapter-title-0-1

DNER (Department of Natural and Environmental Resources). 2013. Puerto Rico Marine Recreational Fisheries Statistics Program - Final Report: 2009-2013. https://www.drna.pr.gov/wp-content/uploads/2022/09/DRNA_RecreationalFisheriesStatistics_2009-2013.pdf

Dreyfus, S. 1994. [Review of The Tainos: Rise and Decline of the People Who Greeted Columbus, by I. Rouse]. NWIG: New West Indian Guide/Nieuwe West-Indische Gids, 68(1/2), 144–147. http://www.jstor.org/stable/41849586

Figuerola-Fernandez, M., N. Pena-Alvarado, & W. Torres-Ruiz. 2008. Maturation and reproductive seasonality of the wahoo (*Acanthocybium solandri*), red-ear sardine (*Harengula humeralis*), false pilchard (*Harengula clupeola*), thread herring (*Opisthonema oglinum*), crevalle jack (*Caranx hippos*), horse-eye jack (*Caranx latus*), blue runner (*Caranx crysos*), and great barracuda (*Sphyraena barracuda*) in Puerto Rico. In J. Velez-Arocho, E. Diaz-Velazquez, M.

Freeman, P., T. Gedamke, and C. Cook. 2017. Final Project Report: Creel Survey of Private Recreational Fishing in the U.S. Virgin Islands. November. Prepared for the NOAA Fisheries Southeast Fisheries Science Center by MER Consultants LLC. Port Salerno, Florida.

Garber, A.F., M.D. Tringali, and J.S. Franks. 2005. Population genetic and phylogeographic structure of wahoo, *Acanthocybium solandri*, from the western Atlantic and central Pacific Oceans. Marine Biology (Berlin) 147: 205–214. doi:10.1007/S00227-004-1533-1.

Garcia-Quijano, C.G. 2009. Managing complexity: ecological knowledge and success in Puerto Rican small-scale fisheries. Human Organization. Volume 68, Number 1. Published by the Society for Applied Anthropology. https://www.jstor.org/stable/44148532

Garcia-Perez, J. M. Berrios, & A. Rosario-Jimenez (Eds.). Aspects of the reproductive biology of recreationally important fish species in Puerto Rico. Department of Natural and Environmental Resources, Fish and Wildlife Bureau. https://www.drna.pr.gov/historico/oficinas/arn/recursosvivientes/negociado-de-pesca-y-vida-silvestre/laboratorio-de-investigaciones-pesqueras-1/publicaciones/Informe%20Final%20F48%20revisado.pdf

IAI (Impact Assessment, Inc.). 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.

IAI (Impact Assessment, Inc.). 2007. Community Profiles and Socioeconomic Evaluations of Marine Conservation Districts: St. Thomas and St. John, U.S. Virgin Islands. NOAA Series on U.S. Caribbean Fishing Communities. NOAA Technical Memorandum NMFS-SEFSC-557, 123 p. Agar, J.J. and B. Stoffle (editors). NOAA Series on U.S. Caribbean Fishing Communities Community Profiles and Socioeconomic Evaluation of Marine Conservation Districts, St. Thomas and St. John, U.S. Virgin Islands

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

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

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. https://www.ncei.noaa.gov/data/oceans/coris/library/NOAA/other/census_marine_commercial_fishers_usvi_2004.pdf

Kojis, B. L., and W. J. Tobias. 2016. Survey of boat-based recreational fishers in the US Virgin Islands. Proceedings of the 13th International Coral Reef Symposium, Honolulu: pp. 170-183. https://coralreefs.org/wp-content/uploads/2019/01/Session-21-Kojis-Tobias.pdf

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

Maki Jenkins, K.L. and R.S. McBride. 2009. Reproductive biology of wahoo, *Acanthocybium solandri*, from the Atlantic coast of Florida and the Bahamas. Marine and Freshwater Research. 60:893-897.

Matos-Caraballo, D., and J. Agar. 2011. Census of Active Commercial Fishermen in Puerto Rico: 2008. Marine Fisheries Review 73(1):13-27.

McBride, R.S., A.K. Richardson, and K.L. Maki. 2008. Age, growth, and mortality of wahoo, *Acanthocybium solandri*, from the Atlantic coast of Florida and the Bahamas. Marine and Freshwater Research 59, 799–807. doi:10.1071/MF08021.

Merten, W.B., N.V. Schizas, M.T. Craig, R.S. Appeldoorn, and D.L. Hammond. 2015. Genetic structure and dispersal capabilities of dolphinfish (*Coryphaena hippurus*) in the western central Atlantic. Fish. Bull. 113:419–429.

Napolitano, M., R.J. Dinapoli, J.H. Stone, M.J. Levin, and S.M. Fitzpatrick. 2019. Reevaluating human colonization of the Caribbean using chronometric hygiene and Bayesian modeling. Science Advances. Volume 5, Number 2. 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).

Olwig, K.F. 1993. Cultural Adaptation and Resistance on St. John: Three Centuries of Afro-Caribbean Life. Gainesville: University Press of Florida.

Oxenford, H. A. and W. Hunte. 1986. A preliminary investigation of the stock structure of the dolphin, *Coryphaena hippurus*, in the western central Atlantic. Fish. Bull. 84(2):451–459.

Pérez, R. N. and Y. Sadovy. 1996. Preliminary data on the reproductive dynamics and landing records of *Coryphaena hippurus* L., in Puerto Rico. Proc. Gulf Caribb. Fish. Inst. 44:651–670.

Pérez, R.N. and Y. Sadovy. 1991. Preliminary data on landings records and reproductive biology of *Coryphaena hippurus*, L., in Puerto Rico. Proceedings of the Gulf Caribbean Fisheries Institute, 44: 636–50. http://proceedings.gcfi.org/proceedings/preliminary-data-on-landing-records-and-reproductive-biology-of-coryphaena-hippurus-l-in-puerto-rico/

Rodríguez-Ferrer, G. and Y, Rodríguez-Ferrer. 2018. Puerto Rico Marine Recreational Fisheries Statistics Program Final Report. Department of Natural and Environmental Resources. USFW Federal aid Project F 68, Segment 2. 24 pp.

Rodriguez-Ferrer, G., personal communication. 2023. June. Puerto Rico Department of Natural and Environmental Resources. San Juan.

Rodríguez-Ferrer, G., Y. Rodríguez-Ferrer, D. Matos-Caraballo, and C. Lilyestrom. 2006. Comparison of Dolphinfish (*Coryphaena hippurus*) Commercial and Recreational Fisheries in Puerto Rico during 2000-2003. Gulf Carib. Fish. Inst. 57, 20 pp. https://aquadocs.org/bitstream/handle/1834/29780/gcfi_57-23.pdf?sequence=1.

Rogozinski, J. 1994. *A Brief History of the Caribbean - from the Arawak and the Carib to the Present*. New York: Meridian Books.

Shivlani, M. 2022. A commercial fishery census of Puerto Rico to develop a new baseline on fishery participation, markets, and infrastructure in the small-scale fishery sector. Final Report submitted to NOAA Fishers Southeast Fisheries Science Center, Miami, Florida. 46 pp.

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. NOAA Technical Memorandum NMFS-SEFSC-593, 57p.

Theisen, T.C., B.W. Bowen, W. Lanier, and J.D. Baldwin. 2008. High connectivity on a global scale in the pelagic wahoo, *Acanthocybium solandri* (tuna family Scombridae). Molecular Ecology 17, 4233–4247.

Toller, W., C. O'Sullivan, and R. Gomez. 2005. Survey of Fishing Tournaments in U.S. Virgin Islands, October 1, 2000 to September 30, 2005. F-8. U.S. Virgin Islands Recreational Fishery Assessment Project: Study 1. Activity Patterns in U.S. Virgin Islands Recreational Fisheries. Job 3. Survey of Fishing Tournaments. Division of Fish and Wildlife, Frederiksted, St. Croix, USVI and Division of Fish and Wildlife, St. Thomas, USVI. December 13, 2005.

Valdés-Pizzini, M., J. Agar, K. Kitner, C. Garcia 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, USVI. NOAA Technical Memorandum. NMFS-SEFC-597.

Valle-Esquivel, M., M. Shivlani, D. Matos-Caraballo, and D.J. Die. 2011. Coastal fisheries of Puerto Rico. Pages 285–313 in S. Salas, R. Chuenpagdee, A. Charles and J.C. Seijo , editors. Coastal fisheries of Latin America and the Caribbean. FAO Fisheries and Aquaculture Technical Paper. No. 544. Rome, FAO.

Appendix A. Alternatives Considered but Eliminated from Detailed Analysis

Actions:
Establish a commercial trip limit for dolphin in federal waters around St. Croix.
Establish a commercial trip limit for wahoo in federal waters around St. Croix.
Establish a commercial trip limit for dolphin in federal waters around St. Thomas/St. John.
Establish a commercial trip limit for wahoo in federal waters around St. Thomas/St. John.

Alternative 1. No Action. There are no trip limits for the commercial harvest of dolphin/wahoo in federal waters.

Alternative 2. Establish a commercial trip limit of x,xxx pounds of dolphin/wahoo per trip.

Alternative 3. Establish a commercial trip limit of x,xxx pounds of dolphin/wahoo per trip.

Discussion: The Caribbean Fishery Management Council (Council) removed these actions in their entirety during their April 2023 meeting. The Council initially considered the actions to limit the amount of dolphin and wahoo harvested per trip by the commercial sector in combination with the proposed recreational bag limits for dolphin and wahoo to limit the number of individuals removed by the fisheries. Analyses presented during the meeting showed that the current commercial harvest levels of dolphin and wahoo were below the annual catch limits (ACL). In light of this, and the migratory nature of the species, the Council felt that a commercial trip limit was not needed at this time and concluded that the actions should be removed from further consideration. Additionally at this meeting, the Council requested staff add similar dolphin and wahoo size limit and recreational bag limit actions for federal waters around Puerto Rico, but did not request staff consider commercial trip limits for the species under the Puerto Rico Fishery Management Plan. Thus, they are not included in Amendment.

Appendix B. Dolphin and Wahoo Analyses

B.1. Dolphin Commercial Size Limit Analysis

Amendment 3 has proposed management measures for the dolphin and wahoo management plans for Puerto Rico, St. Croix, and St. Thomas. Amendment 3 is considering implementing size limits for dolphin in Puerto Rico, St. Croix, and St. Thomas/St. John. The amendment is considering these size limit changes to both the commercial and recreational sectors. However, data on recreational sizes of dolphin were only collected in Puerto Rico, and the recreational survey collecting the length information from was discontinued in 2017. Therefore, this analysis will only analyze the size limits for the commercial sector due to the lack of recent recreational sector length data.

The commercial length data came from the Southeast Fisheries Science Center's Trip Interview Program (TIP). TIP collects fish lengths and weights from harvested fish in the commercial sector. TIP data from 2010 to 2021 was provided from the SEFSC in January of 2023. A total of 1,816 dolphin lengths (Puerto Rico = 1,358 lengths, St. Croix = 211 lengths, and St. Thomas/St. John = 247 lengths) were collected by TIP from 2010 to 2021.

Puerto Rico

Action 1a of Amendment 3 has commercial minimum size limit alternatives for dolphin in Puerto Rico. The Action 1a alternatives are no size limit, 20-inches fork length minimum size, and a 24-inches fork length minimum size. Assuming recent landings are a good reflection of future landings, only data from 2017 to 2021 were used for the size limit analysis. Figure 1 provides the distribution of dolphin lengths from the TIP data for Puerto Rico from 2017 to 2021.

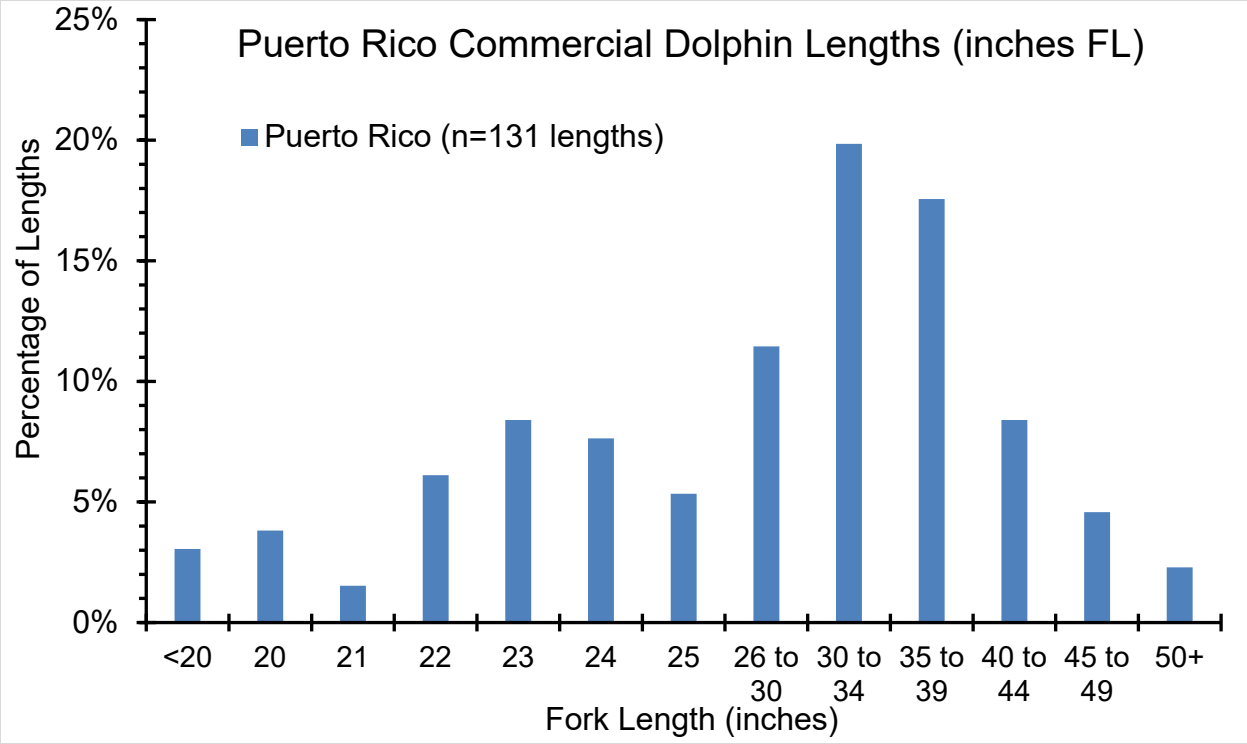

Figure 1. Puerto Rico dolphin length distribution (in inches fork length) from the commercial sector from 2017 to 2021. The data came from the Trip Intercept Program.

The commercial annual catch limit (ACL) is set in pounds so a percent reduction of landings in pounds was done to match the ACL. TIP data has both lengths and weights available for the dolphin sampled, however some TIP samples only had length available. If only length was available for a dolphin sample then weight estimates were generated by applying the dolphin weight-length equation from Uchiyama and Boggs (2006). Percent reductions in harvest by weight were calculated by imposing 20-inch and 24-inch fork length minimum size limits since Puerto Rico waters don't currently have a minimum size limit. This was done by assuming the harvest of dolphin less than 20-inches or 24-inch fork length would cease because these fish would be released if these size limits were implemented. Percent reductions in landings came from comparing the sum of the weight of the fish weights without the fish less than 20-inches fork length (Alternative 2) or 24-inches fork length (Alternative 3) to the total weight of all the fish using the equation of:

$$Percent\ Reduction = \frac{(\text{Adjusted Weight} - \text{Total Weight})}{Total\ Weight}$$

Where Adjusted Weight is the sum of the weight of all the dolphin minus the weights from the dolphin less than 20-inches fork length or 24-inches fork length, and Total Weight is the weight of all the dolphin samples.

The results of the percent reduction in Puerto Rico commercial landings were very low with all of the size limit options resulting in less than 1% change to the landings (Table 1). This is

because there is a small proportion of dolphin harvested that are less than 20-inches fork length or 24-inches fork length. Also, the dolphin harvested less than 20-inches fork length and 24-inches fork length are small fish with low weights (mostly less than 1 pound each). Therefore, the implementation of a 20-inch size limit or 24-inches fork length for the Puerto Rico commercial sector is expected to have a very low impact on the commercial landings.

Table 1. Estimated percent reduction for Puerto Rico dolphin commercial landings for the proposed minimum size limit options for Amendment 3.

Size Limit Alternatives	Percent Reduction
Alternative 1: No Minimum Size Limit (status quo)	0
Alternative 2: 20-inch Fork Length Minimum Size Limit	<1%
Alternative 3: 24-inch Fork Length Minimum Size Limit	<1%

St. Croix

Action 3a of Amendment 3 has commercial minimum size limit alternatives for dolphin in St. Croix. The Action 3a alternatives are no size limit, 20-inches fork length minimum size, and a 24-inches fork length minimum size. Assuming recent landings are a good reflection of future landings, only data from 2017 to 2021 were used for the size limit analysis. However, there was a limited sample size with dolphin lengths available for only 46 fish in St. Croix from 2017 to 2021. Figure 2 provides the distribution of dolphin lengths from the TIP data for St. Croix from 2017 to 2021.

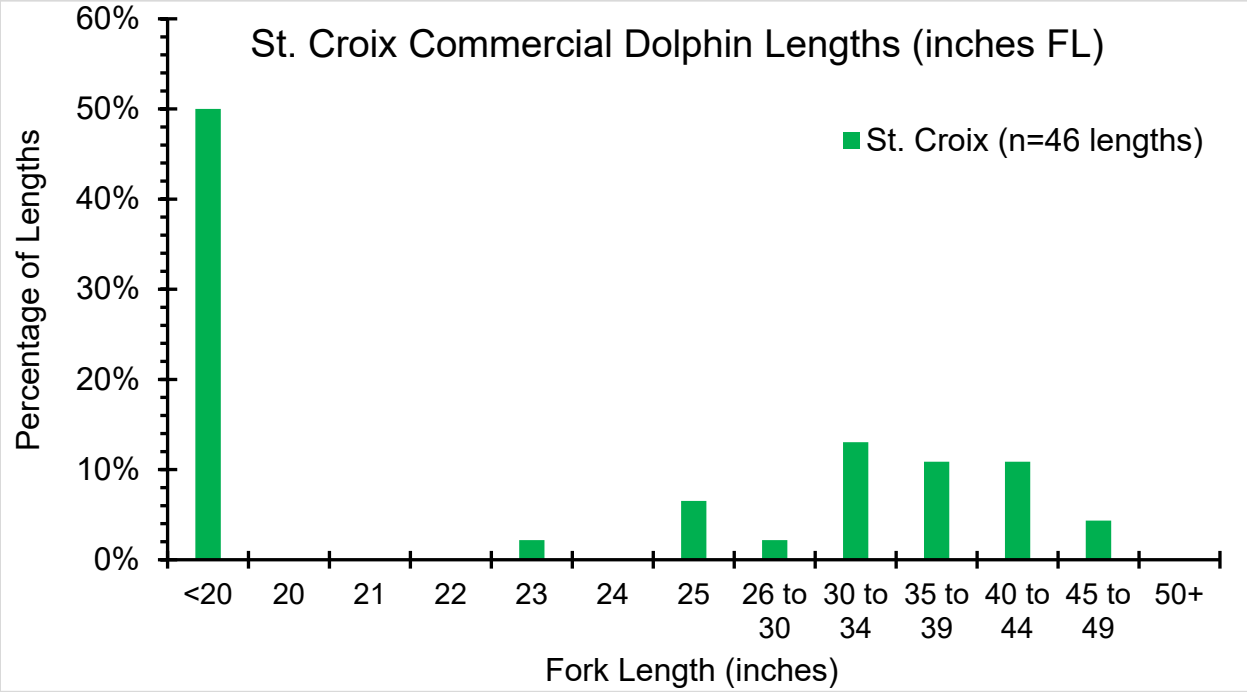

Figure 2. St. Croix dolphin length distribution (in inches fork length) from the commercial sector from 2017 to 2021. The data came from the Trip Intercept Program.

St. Croix TIP data was analyzed the same as stated earlier for the Puerto Rico size limit analysis. The results of the percent reduction in St. Croix commercial landings were low with percent reductions from 3.9 to 5.0 percent (Table 2). The dolphin that were harvested that were less than 20-inches fork length and 24-inches fork length are small fish with low weights (mostly less than 1 pound each), thus, having a smaller impact on the percent reduction in weight as the larger fish. The implementation of a 20-inch size limit or 24-inches fork length for the St. Croix commercial sector is expected to have a low impact on the commercial landings.

Table 2. Estimated percent reduction for St. Croix dolphin commercial landings for the proposed minimum size limit options for Amendment 3.

Size Limit Alternatives	Percent Reduction
Alternative 1: No Minimum Size Limit (status quo)	0
Alternative 2: 20-inch Fork Length Minimum Size Limit	3.9%
Alternative 3: 24-inch Fork Length Minimum Size Limit	5.0%

St. Thomas/St. John

Action 5a of Amendment 3 has commercial minimum size limit alternatives for dolphin in St Thomas/St. John. The Action 5a alternatives are no size limit, 20-inches fork length minimum size, and a 24-inches fork length minimum size. Assuming recent landings are a good reflection of future landings, only data from 2017 to 2021 were used for the size limit analysis. Figure 3 provides the distribution of dolphin lengths from the TIP data for St. Thomas/St. John from 2017 to 2021.

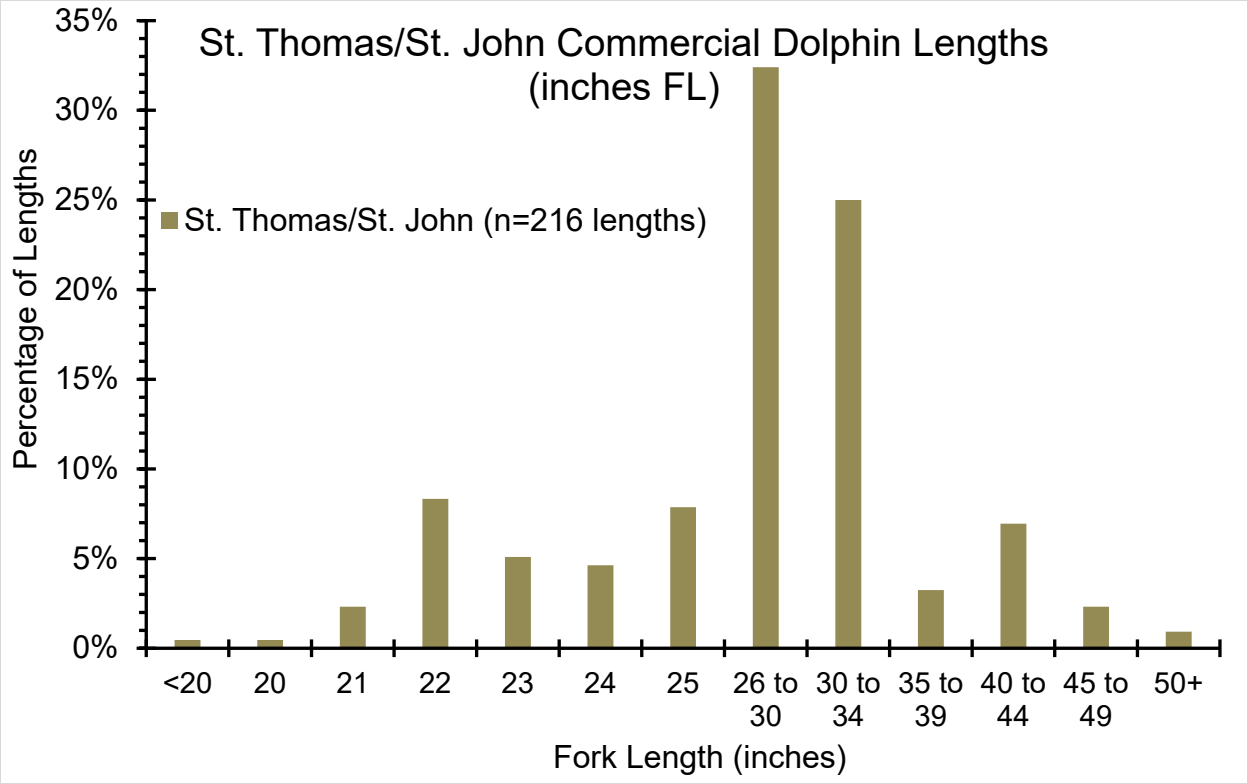

Figure 3. St. Thomas/St. John dolphin length distribution (in inches fork length) from the commercial sector from 2017 to 2021. The data came from the Trip Intercept Program.

St. Thomas/St. John TIP data was analyzed the same as stated earlier for the Puerto Rico size limit analysis. The results of the percent reduction in St. Thomas/St. John commercial landings were very low with percent reductions (<1%) (Table 3). This is because there is a small proportion of dolphin harvested that are less than 20-inches fork length or 24-inches fork length. Also, the dolphin that were harvested that were less than 20-inches fork length and 24-inches fork length are small fish with low weights (mostly less than 1 pound each). Therefore, the implementation of a 20-inch size limit or 24-inches fork length for the St. Thomas/St. John commercial sector is expected to have a very low impact on the commercial landings.

Table 3. Estimated percent reduction for St. Thomas/St. John dolphin commercial landings for the proposed minimum size limit options for Amendment 3.

Size Limit Alternatives	Percent Reduction
Alternative 1: No Minimum Size Limit (status quo)	0
Alternative 2: 20-inch Fork Length Minimum Size Limit	<1%
Alternative 3: 24-inch Fork Length Minimum Size Limit	<1%

References

Uchiyama, J.H., and C.H. Boggs. 2006. Length-weight Relationships of Dolphinfish, *Coryphaena hippurus*, and Wahoo, *Acanthocybium solandri*: Seasonal Effects of Spawning and Possible Migration in the Central North Pacific. Marine Fisheries Review. 68:19-29.

B.2. Dolphin and Wahoo Recreational Size Limit Analysis

The U.S. Caribbean Fisheries Management Council (Council) is considering implementing size limits for dolphin (*Coryphaena hippurus*) and wahoo (*Acanthocybium solandri*) for the recreational sector in federal waters around Puerto Rico. St. Croix, and St. Thomas/St. John. Recreational catch data from the U.S. Caribbean has only been collected in Puerto Rico, via the Marine Recreational Fishery Statistics Survey (MRFSS). Dockside samplers collected catch and effort data from recreational anglers from 2000-2017, including measurements from 4,067 dolphin and 467 wahoo. Approximately half of these measurements were collected from angler trips occurring in federal waters, reducing the number of measurements of dolphin and wahoo to 2,267 and 282, respectively. These lengths were used to investigate the size distribution of dolphin and wahoo landed in Puerto Rico, and to quantify the potential reduction in harvest if each of the size limit alternatives are adopted.

Size Distribution and Size Limit Analysis
Tournament data from the U.S. Caribbean was reviewed, but these size data represent the targeting of larger fish, and may not be representative of fish landed during normal fishing activity. The MRFSS length data are the only available length data from the U.S. Caribbean that were collected using a randomized survey design. Boxplots were used to investigate changes in the size of harvested fish over time, using 3 year bins (**Figures 1** and **2**). Dolphin and wahoo have overlapping boxplots, suggesting the size of fish intercepted remained fairly stable between 2000 and 2017. Thus, measurements were aggregated with all years combined, to investigate the size distributions for each species.

The dolphin and wahoo length data were then plotted in 2-inch bins (**Figures 3** and **4**). The mean fork length of fish intercepted were 30.9 inches and 36.6 inches for dolphin and wahoo, respectively. The two proposed size limits for dolphin include a 20-inch and 24-inch fork length minimum and 32-inch and 40-inch fork length minimums for wahoo in Puerto Rico. The mean size of dolphin is greater than both minimum fork lengths limits, and one of the wahoo minimum size limits suggested by the Council. A scalar to represent the percentage of intercepted fish that could be discarded if each size limit was imposed was calculated. The number of fish above and below each minimum fork length limit was calculated, and divided by the total number of each species that was intercepted. All lengths from the 2000 to 2017 time period were used, to allow for the largest possible sample size.

The predicted reduction in harvest for dolphin is less than 15% for both size limit alternatives investigated (**Table 1**). The majority of dolphin intercepted in Puerto Rico between 2000 and 2017 were greater than 20 inches in size. Alternatively, the size limits for wahoo indicate the potential for larger reductions in harvest, with 32.6% of wahoo intercepted below the 32" minimum size limit and 75.9% of wahoo below the 40" size limit (**Table 2**). These results are

based on the assumption that the size of fish landed has not changed since the MRFSS length data were collected. Additionally, the use of this analysis to predict the potential impacts on harvest for St. Croix and St. Thomas/St. John would be based on an assumption that the fishing practices and size of fish landed are the same across the U.S. Caribbean.

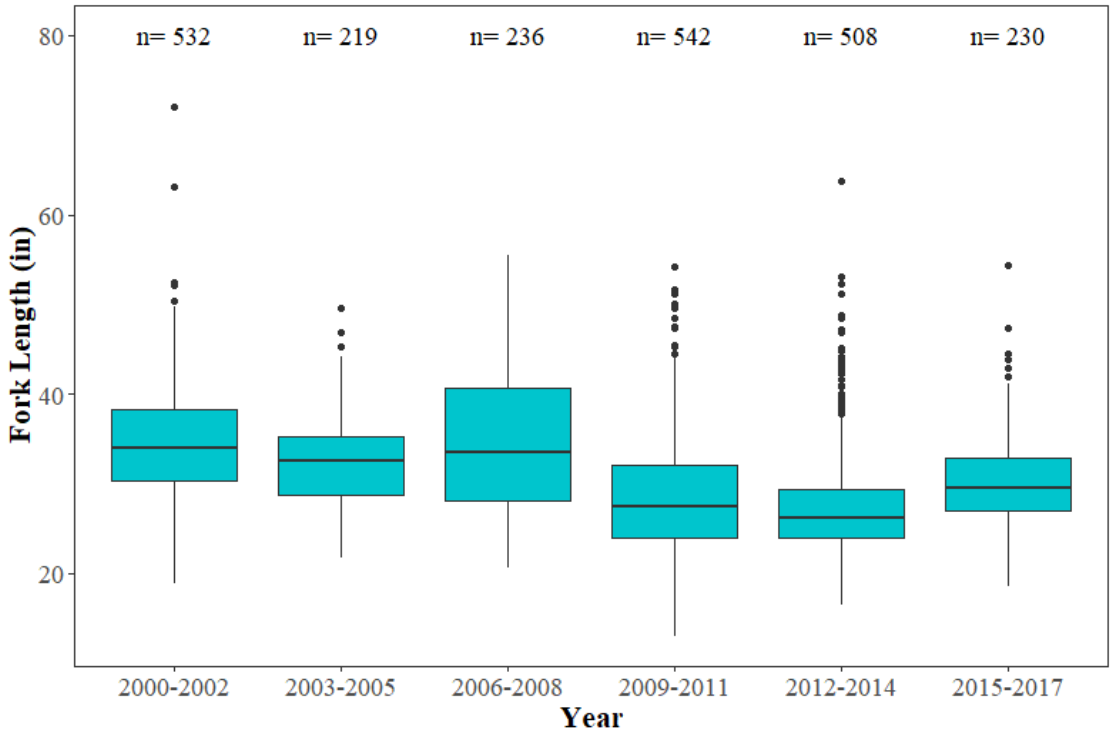

Figure 1. Boxplot of dolphin lengths caught in federal waters around Puerto Rico, lengths are binned in three year intervals.

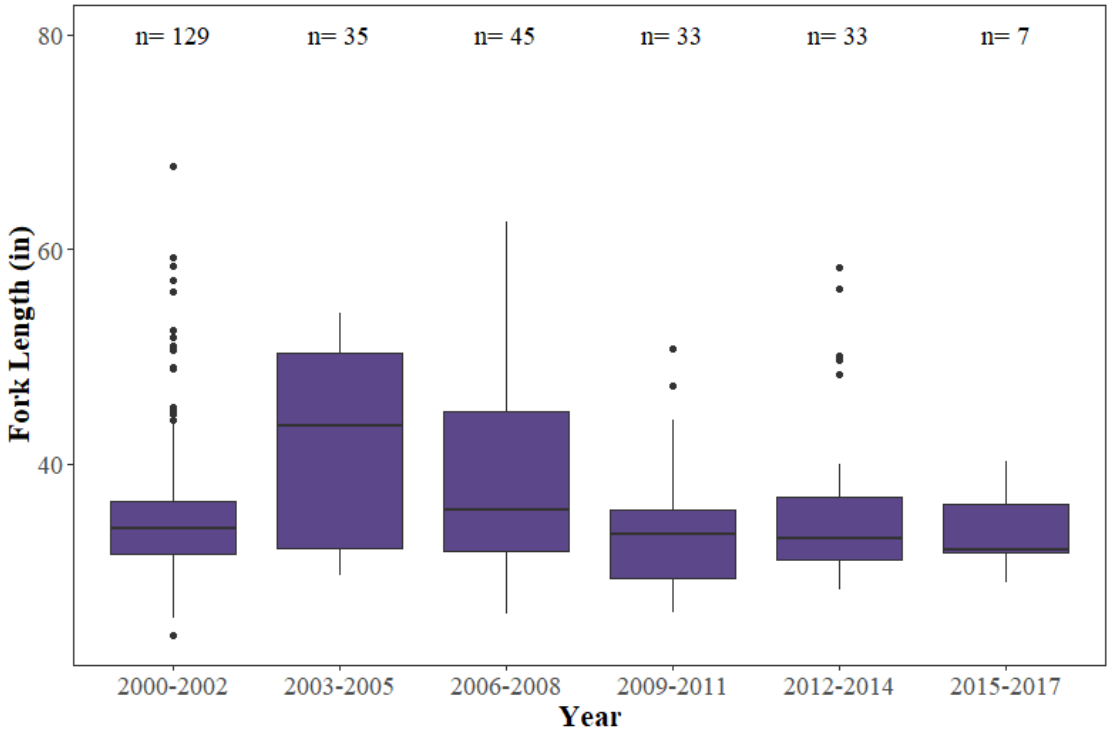

Figure 2. Boxplot of wahoo lengths caught in federal waters around Puerto Rico, lengths are binned in three year intervals.

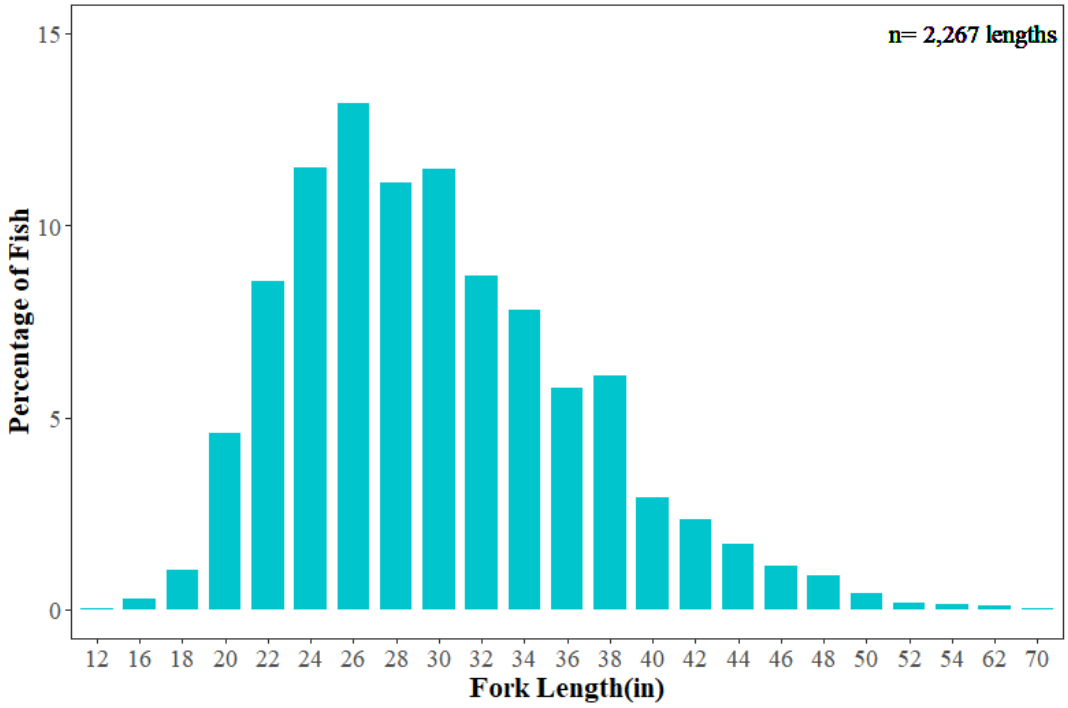

Figure 3. Puerto Rico dolphin length distribution (in inches fork length) from the recreational sector from 2000 to 2017, two-inch bins.

Source – Marine Recreational Fisheries Statistics Survey (MRFSS).

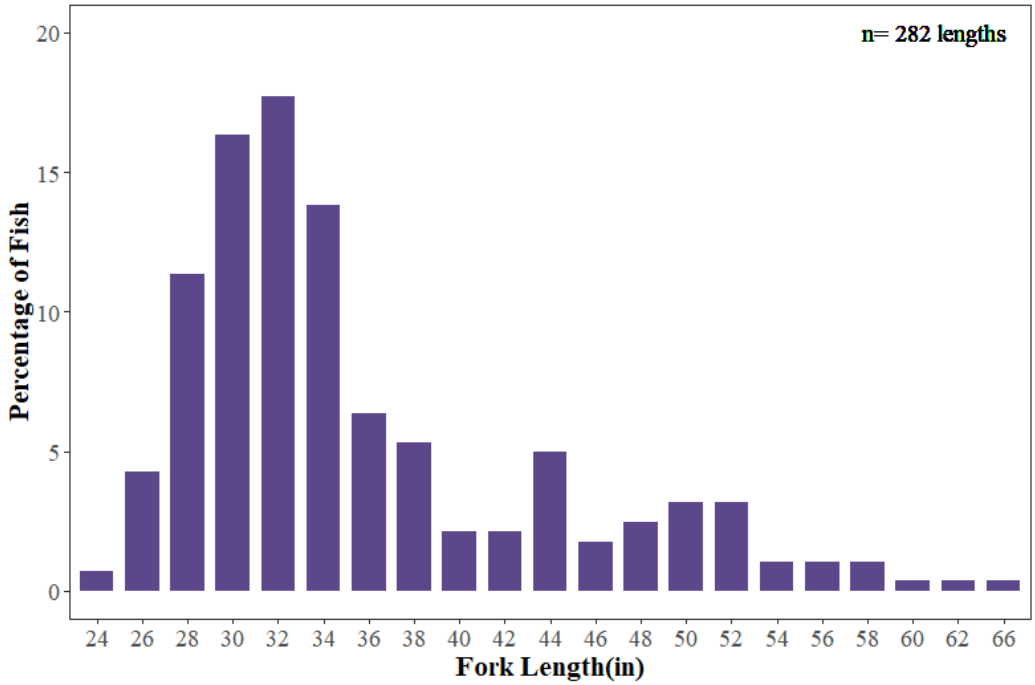

Figure 4. Puerto Rico wahoo length distribution (in inches fork length) from the recreational sector from 2000 to 2017, two-inch bins.

Source – Marine Recreational Fisheries Statistics Survey (MRFSS).

Table 1. Dolphin size limits investigated and the projected reduction in harvest associated with each scenario.

Alternative	Dolphin Size Limit Scenarios	Projected Reduction
Alternative 1:	No Action – Do not establish a minimum size limit for the recreational harvest of dolphin in federal waters around Puerto Rico	-
Alternative 2:	Establish a 20" fork length minimum length for the recreational harvest of dolphin in federal waters around Puerto Rico	-1.3%
Alternative 3:	Establish a 24" fork length minimum length for the recreational harvest of dolphin in federal waters around Puerto Rico	-14.5%

Table 2. Wahoo size limits investigated and the projected reduction in harvest associated in each scenario.

Alternative	Wahoo Size Limit Scenarios	Projected Reduction
Alternative 1:	No Action – Do not establish a minimum size limit for the recreational harvest of wahoo in federal waters around Puerto Rico	-
Alternative 2:	Establish a 32" fork length minimum length for the recreational harvest of wahoo in federal waters around Puerto Rico	-32.6%
Alternative 3:	Establish a 40" fork length minimum length for the recreational harvest of wahoo in federal waters around Puerto Rico	-75.9

B.3. Dolphin and Wahoo Recreational Bag Limit Analysis

The Caribbean Fisheries Management Council (Council) is considering implementing recreational bag limits for dolphin (*Coryphaena hippurus*) and wahoo (*Acanthocybium solandri*), in the federal waters around Puerto Rico. St. Croix, and St. Thomas/St. John. The only recreational catch data from the U.S. Caribbean was collected in Puerto Rico, via the Marine Recreational Fishery Statistics Survey (MRFSS). Dockside samplers collected catch and effort data from recreational anglers from 2000-2017. A total of 1,935 dolphin angler trips and 445 wahoo angler trips were intercepted during that time period. The data were trimmed further to represent only angler trips that identified that the majority of their fishing trip occurred in federal waters, reducing the total angler trips to 930 dolphin trips and 248 wahoo trips. The majority of federal waters angler trips intercepted occurred on private vessels, with only 9.6% of dolphin trips and 17.3% of wahoo trips occurring on charter vessels. Boxplots were used to investigate potential differences in harvest levels on private boat versus charter trips (**Figures 1** and **2**). The number of fish harvested per angler showed similar harvest patterns for dolphin and wahoo trips, allowing for those fishing modes to be aggregated in subsequent analyses. A bag limit analysis was conducted with the remaining data, to evaluate the potential impacts of the bag limit alternatives being considered by the Council for dolphin and wahoo.

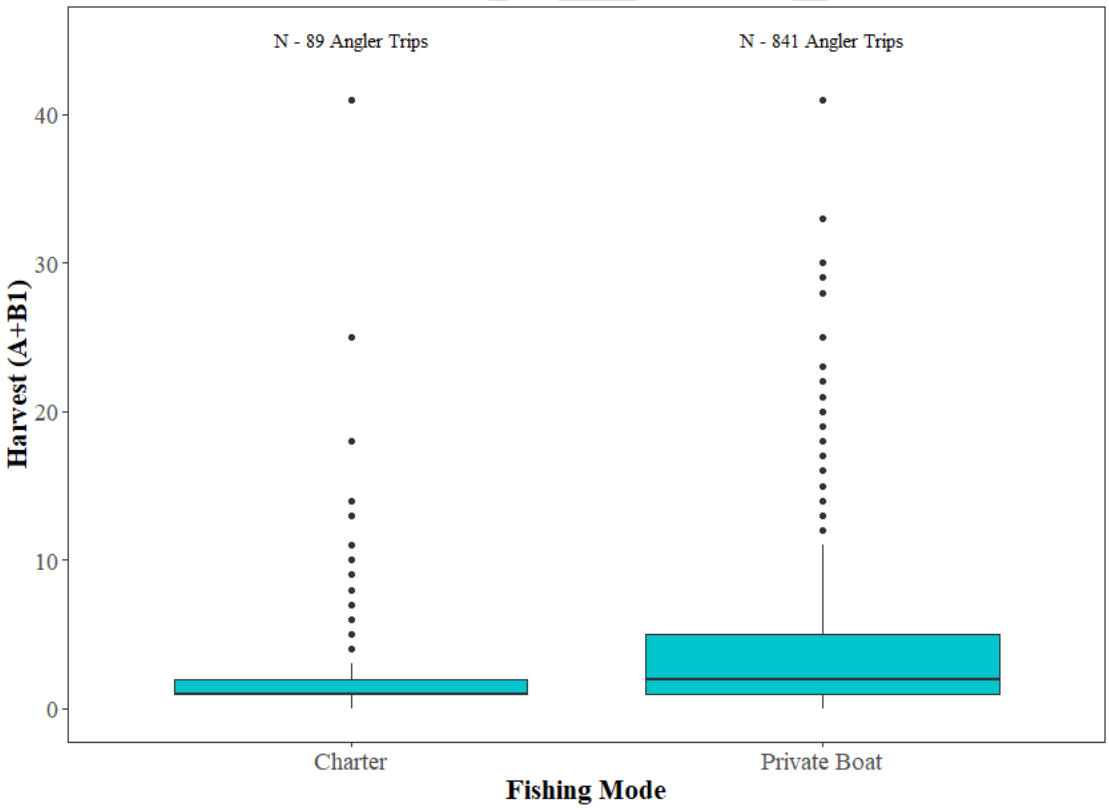

Figure 1. Boxplot of dolphin harvest (observed and reported catch) from recreational anglers intercepted after fishing in federal waters, between 2000 and 2017.

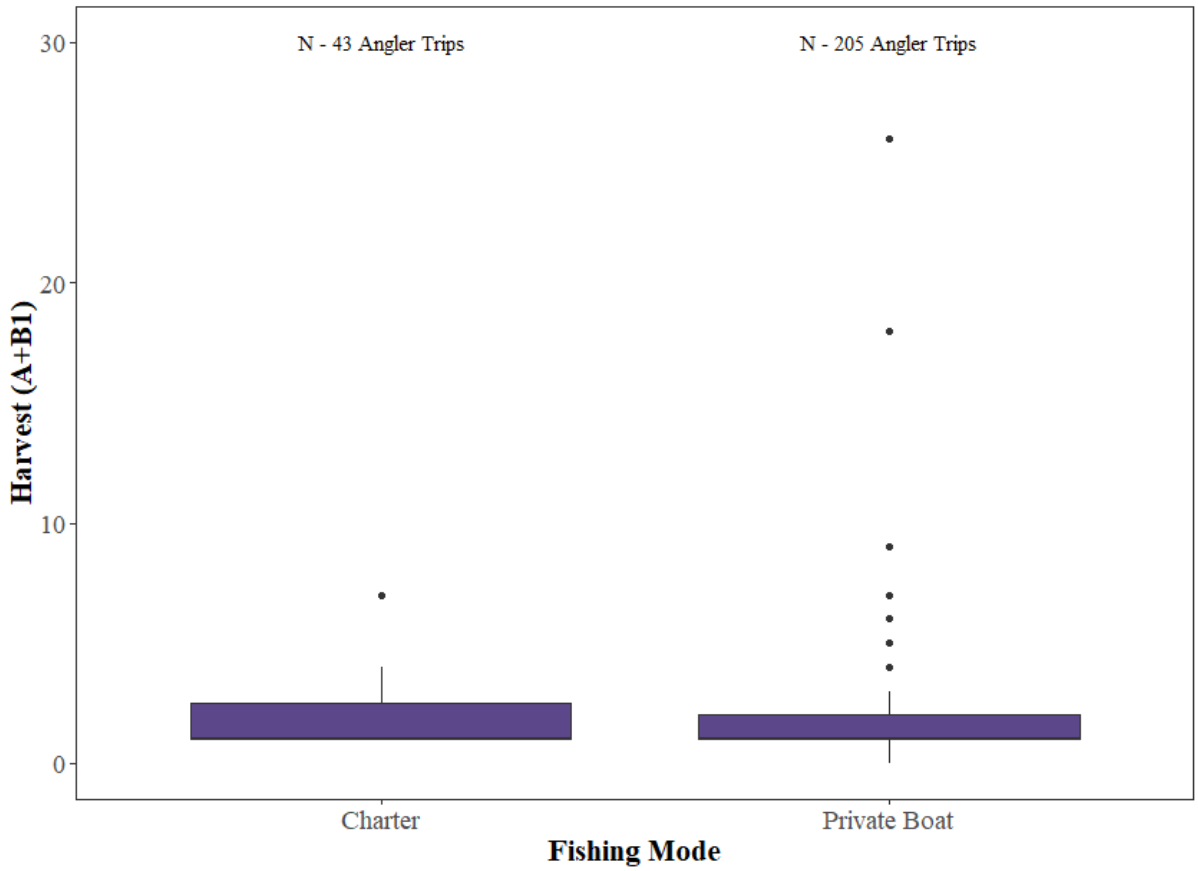

Figure 2. Boxplot of wahoo harvest (observed and reported catch) from recreational anglers intercepted after fishing in federal waters, between 2000 and 2017.

The harvest of recreational angler trips were investigated to determine the level of harvest per angler on trips in Puerto Rico. An adjusted per angler harvest value was calculated for each interview to account for angler interviews with grouped catch for the entire vessel being associated with only a single angler. A ratio of the number of anglers that contributed to catch was divided by the number of anglers interviewed from each vessel with grouped catch. This ratio was multiplied by the observed harvest (A) and reported catch (B1) to calculate an estimate of the total harvest for each species that accounts for all anglers contributing to the landings. The adjusted harvest per angler estimate was then calculated by dividing the adjusted total harvest for each species by the number of contributing anglers for each grouped catch interview. If all anglers from a vessel were interviewed, the harvest values were not adjusted. The distribution of harvest per angler was then plotted for each species (**Figure 3** and **4**). The majority of both dolphin and wahoo trips harvested only 1 fish from each species per angler. A bag limit analysis was conducted to quantify the potential reduction in harvest associated with adopting the proposed bag limits (**Tables 1** and **2**). Any angler trips with harvest levels equal to or less than the proposed person/vessel bag limit remained unmodified. For all trips that landed more than the bag limit alternative, the harvest value was replaced with the bag limit alternative. For example, if an angler harvested 20 dolphin, this value was replaced with 10 to correspond with

the maximum number of fish allowed under the corresponding alternative. For any trips where the vessel landed more than the vessel limit associated with each alternative, the angler catch was reduced to the max vessel limit divided by the total number of anglers on the vessel. In this scenario, if a vessel with 5 anglers landed 40 dolphin, the angler harvest was reduced to 8 fish per person (30 fish vessel limit/5 anglers = 6 fish maximum per person). Next, the total harvest for all trips associated with each species was summed for the original data and for each alternative. The projected reduction corresponds with the difference between the current scenario (100%) and the ratio of the sum for each alternative divided by the current scenario. The projected reductions for the most restrictive alternatives correspond with a 14.62% reduction for dolphin and a 9.56% reduction for wahoo. These results hinge on the assumptions that fishing behavior and landings from 2000-2017 correspond with the current harvesting behavior of recreational anglers in federal waters. These are the only recreational data available for the U.S. Caribbean, and are also specific to Puerto Rico only. The potential reductions estimated here may not be appropriate proxies for St. Croix or St. Thomas/St. John.

Table 1. Dolphin bag limits investigated and projected reduction in harvest in federal waters.

Alternative	Dolphin Bag Limit Scenarios	Projected Reduction
Alternative 1:	No Action – Do not establish a recreational bag limit for dolphin in federal waters in Puerto Rico	-
Alternative 2:	Establish a recreational bag limit in federal waters of Puerto Rico 10 dolphin per day, not to exceed 30 dolphin per vessel per day, whichever is less	3.11%
Alternative 3:	Establish a recreational bag limit in federal waters around Puerto Rico of 5 dolphin per person day, not to exceed 15 dolphin per vessel per day, whichever is less	14.62%

Table 2. Wahoo bag limits investigated and projected reduction in harvest in federal waters.

Alternative	Wahoo Bag Limit Scenarios	Projected Reduction
Alternative 1:	No Action – Do not establish a recreational bag limit for wahoo in federal waters around Puerto Rico	-
Alternative 2:	Establish a recreational bag limit in federal waters around Puerto Rico of 5 wahoo per person per day, not to exceed 10 wahoo per vessel per day, whichever is less	1.38%
Alternative 3:	Establish a recreational bag limit in federal waters around Puerto Rico of 2 wahoo per person per day, not to exceed 6 wahoo per vessel per day, whichever is less	9.56%

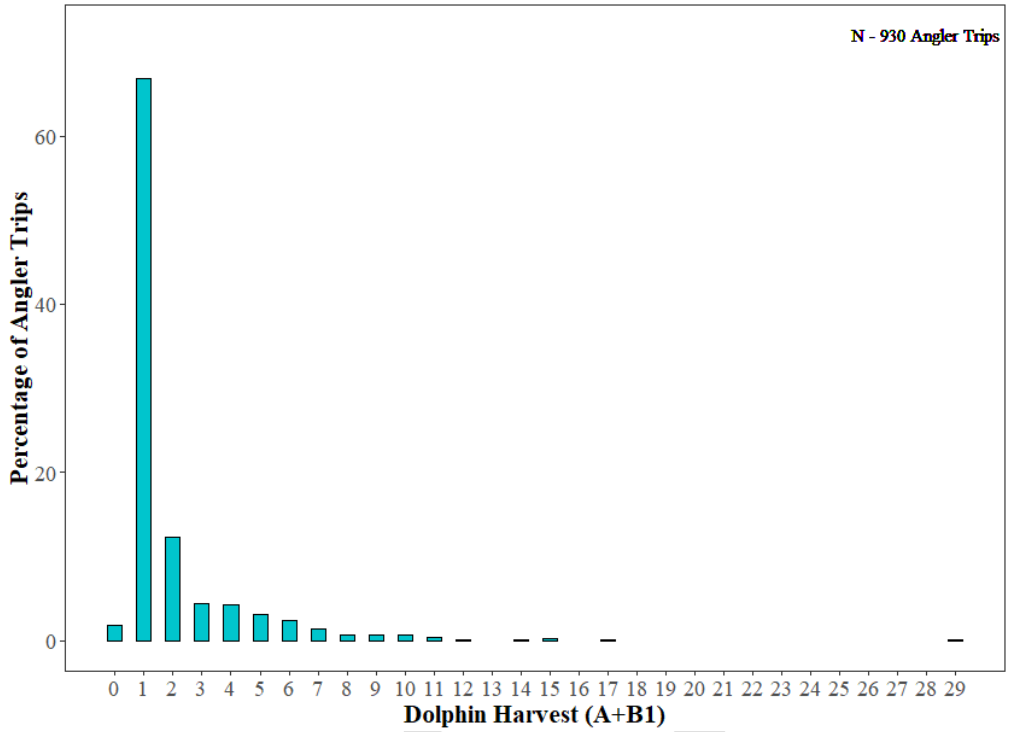

Figure 3. Distribution of dolphin harvest (observed catch + reported catch) per angler for angler trips intercepted after fishing in federal waters, between 2000 and 2017.

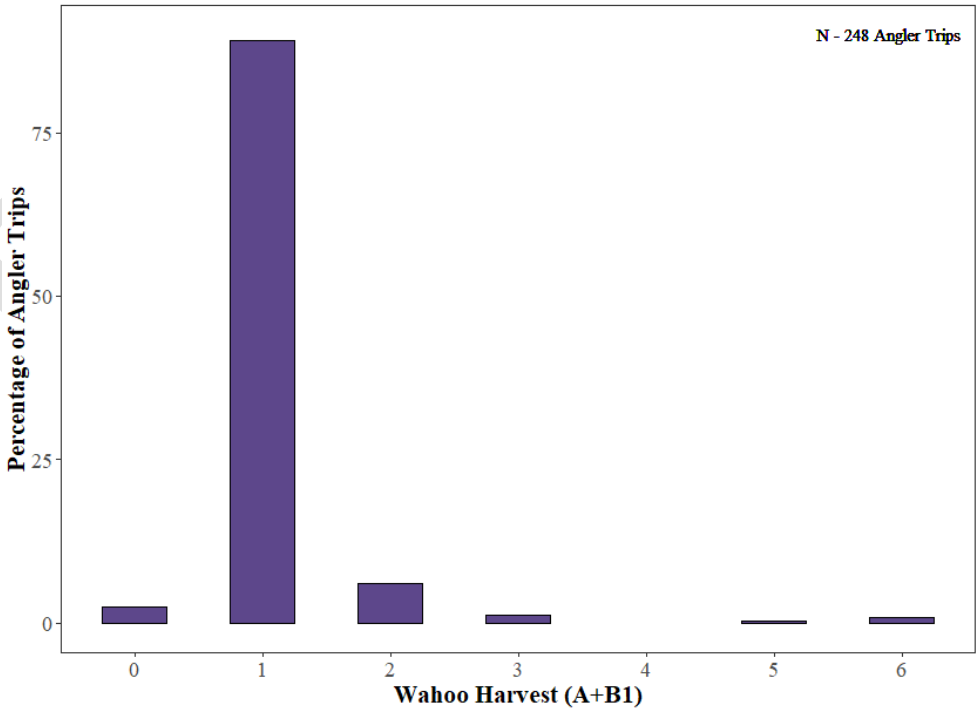

Figure 4. Distribution of wahoo harvest (observed catch + reported catch) per angler for angler trips intercepted after fishing in federal waters, between 2000 and 2017.

B.4. Wahoo Commercial Size Limit Analysis

Amendment 3 has proposed management measures for the dolphin and wahoo management plans for Puerto Rico, St. Croix, and St. Thomas. Specifically, Amendment 3 is considering implementing size limits for wahoo in Puerto Rico, St. Croix, and St. Thomas/St. John. The amendment is considering these size limit changes to both the commercial and recreational sectors. However, data on recreational sizes of wahoo were only collected in Puerto Rico, and the recreational survey collecting the length information from was discontinued in 2017. At the present time there are no surveys to collect recreational landings and length data in the U.S. Caribbean. Therefore, this analysis will only analyze the size limits for the commercial sector due to the lack of recent recreational sector length data.

The commercial length data came from the Southeast Fisheries Science Center's Trip Interview Program (TIP). TIP collects fish lengths and weights from harvested fish in the commercial sector. TIP data from 2010 to 2021 was provided from the SEFSC in January of 2023. A total of 143 wahoo lengths (Puerto Rico = 105 lengths, St. Croix = 21 lengths, and St. Thomas/St. John = 17 lengths) were collected by TIP from 2010 to 2021.

Puerto Rico

Action 2a of Amendment 3 has commercial minimum size limit alternatives for wahoo in Puerto Rico. The Action 2a alternatives are no size limit, 32-inches fork length minimum size, and a 40-inches fork length minimum size. Due to limited samples of wahoo lengths all of the TIP data from 2010 to 2017 was used for this analysis. Figure 1 provides the distribution of wahoo lengths from the TIP data for Puerto Rico from 2010 to 2021.

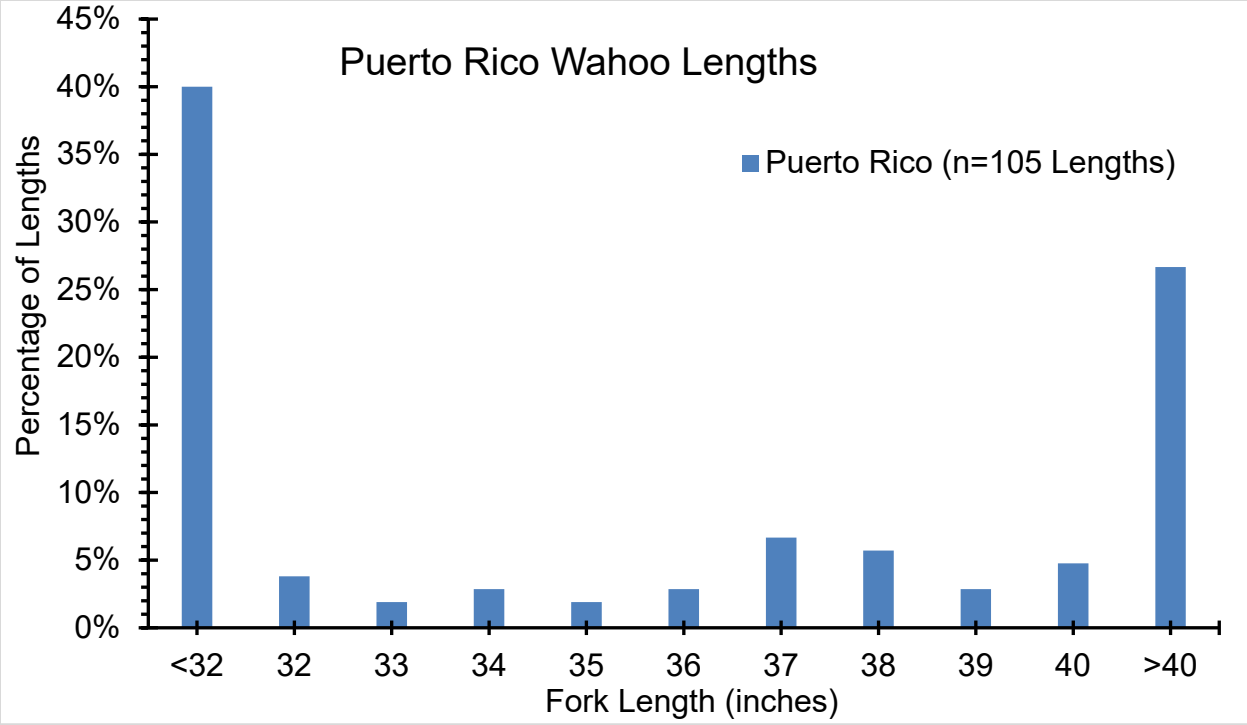

Figure 1. Puerto Rico wahoo length distribution (in inches fork length) from the commercial sector from 2010 to 2021. The data came from the Trip Intercept Program.

The commercial annual catch limit (ACL) is set in pounds so a percent reduction of landings in pounds was done to match the ACL. TIP data has both lengths and weights available for the wahoo sampled, however some TIP samples only had length available. If only length was available for a wahoo sample then weight estimates were generated by applying the wahoo weight-length equation from Uchiyama and Boggs (2006). Percent reductions in harvest by weight were calculated by imposing 32-inch and 40-inch fork length minimum size limits since Puerto Rico waters don't currently have a minimum size limit. This was done by assuming the harvest of wahoo less than 32-inches or 40-inches fork length would cease because these fish would be released if these size limits were implemented. Percent reductions in landings came from comparing the sum of the weight of the fish weights without the fish less than 32-inches fork length (Alternative 2) or 40-inches fork length (Alternative 3) to the total weight of all the fish using the equation of:

$$Percent\ Reduction = \frac{(\text{Adjusted Weight} - \text{Total Weight})}{Total\ Weight}$$

Where Adjusted Weight is the sum of the weight of all the wahoo minus the weights from the wahoo less than 32-inches fork length or 40-inches fork length, and Total Weight is the weight of all the wahoo samples.

The results of the percent reduction in Puerto Rico commercial wahoo landings from imposing a size limit were 11.9% (32-inch fork length) and 37.7% (40-inch fork length) (Table 1). This suggest that the implementation of a size limit will likely reduce the Puerto Rico wahoo commercial landings.

Table 1. Estimated percent reduction for Puerto Rico wahoo commercial landings for the proposed minimum size limit options for Amendment 3.

Size Limit Alternatives	Percent Reduction
Alternative 1: No Minimum Size Limit (Status Quo)	0
Alternative 2: 32-inch Fork Length Minimum Size Limit	11.9%
Alternative 3: 40-inch Fork Length Minimum Size Limit	37.7%

St. Croix

Action 4a of Amendment 3 has commercial minimum size limit alternatives for wahoo in St. Croix. The Action 4a alternatives are no size limit, 32-inches fork length minimum size, and a 40-inches fork length minimum size. Due to limited samples of wahoo lengths all of the TIP data from 2010 to 2021 was used for this analysis. Figure 2 provides the distribution of wahoo lengths from the TIP data for St. Croix from 2010 to 2021.

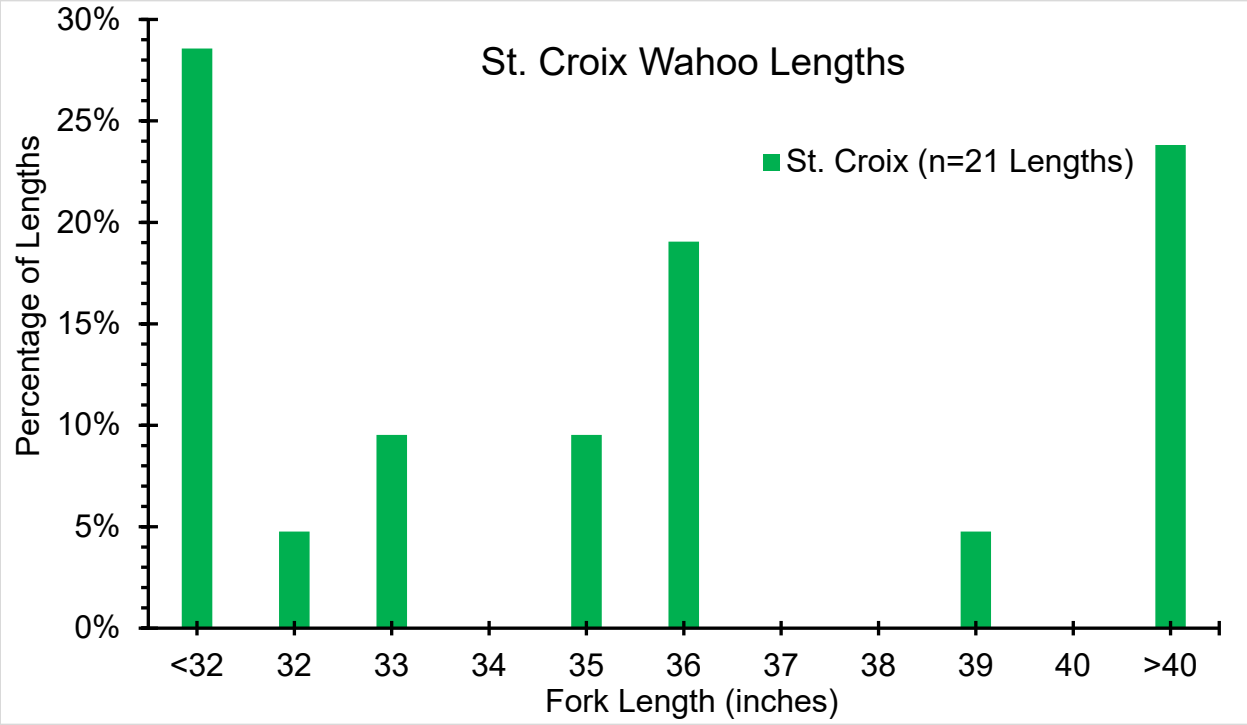

Figure 2. St. Croix wahoo length distribution (in inches fork length) from the commercial sector from 2010 to 2021. The data came from the Trip Intercept Program.

St. Croix TIP data was analyzed the same as stated earlier for the Puerto Rico wahoo size limit analysis. The results of the percent reduction in St. Croix commercial landings were low with percent reductions from 2.2% for the 32-inch fork length minimum size (Table 2). The wahoo that were harvested that were less than 32-inches fork length are small fish with low weights (mostly less than 5 pounds each), thus, having a smaller impact on the percent reduction in weight as the larger fish. However the percent reduction estimated for the 40-inch fork length minimum size limit was larger (Table 2). Based on this analysis, the implementation of a 40-inches fork length size limit for the St. Croix commercial sector is expected to have an impact on the wahoo commercial landings.

Table 2. Estimated percent reduction for St. Croix wahoo commercial landings for the proposed minimum size limit options for Amendment 3.

Size Limit Alternatives	Percent Reduction
Alternative 1: No Minimum Size Limit (Status Quo)	0
Alternative 2: 32-inch Fork Length Minimum Size Limit	2.2%
Alternative 3: 40-inch Fork Length Minimum Size Limit	44.6%

St. Thomas/St. John

Action 6a of Amendment 3 has commercial minimum size limit alternatives for wahoo in St Thomas/St. John. The Action 6a alternatives are no size limit, 32-inches fork length minimum size, and a 40-inches fork length minimum size. Unfortunately, TIP has limited wahoo samples for St. Thomas/St. John. The St. Thomas/St. John TIP data from 2010 to 2021 only has 17 wahoo samples, and all of them are above 40 inches fork length. These 17 wahoo TIP samples range from 42 to 56 inches fork length with an average of 54.4 inches fork length. Therefore, there is not an adequate range of available lengths in the St. Thomas/St. John TIP data to analyze the impact of a 32 and 40 inches fork length minimum size limit for wahoo in St. Thomas/St. John.

References

Uchiyama, J.H., and C.H. Boggs. 2006. Length-weight Relationships of Dolphinfish, *Coryphaena hippurus*, and Wahoo, *Acanthocybium solandri*: Seasonal Effects of Spawning and Possible Migration in the Central North Pacific. Marine Fisheries Review. 68:19-29.

Appendix C. 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 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 2021 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 (88 FR 16899). 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.