Generic Amendment 2 to the Fishery Management Plans for Puerto Rico, St. Croix, and St. Thomas and St. John: Trawl and Net Gear and Descending Devices

181st Caribbean Fishery Management Council

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This Environmental Assessment is being prepared using the 2020 CEQ NEPA Regulations. The effective date of the 2020 CEQ NEPA 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 Environmental Assessment began on DATE, 2021, and accordingly proceeds under the 2020 regulations.

Abbreviations and Acronyms Used in this Document

CFMC	(Council); Caribbean Fishery Management Council
DNER	Department of Natural and Environmental Resources
DPNR	Department of Planning and Natural Resources
EA	environmental assessment
EEZ	exclusive economic zone
E.O.	Executive Order
FMP	fishery management plan
MMA	marine managed area
MSA	(Magnuson-Stevens Act); Magnuson-Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
USVI	United States Virgin Islands

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Chapter 1. Introduction

1.1 What Action is Proposed?

At its December 2021 meeting, the Caribbean Fishery Management Council (Council) discussed an action to prohibit the use of trawl gear (bottom and mid-water trawls) in U.S. Caribbean federal waters as a precautionary approach to prevent potential negative impacts associated with trawling on the seabed (e.g., bottom trawling can potentially damage coral habitat and sponge habitat), and on target and non-target species (e.g., bottom and mid-water trawling bycatch). Trawls (any type) are an authorized gear type in the U.S. Exclusive Economic Zone (EEZ) around Puerto Rico, St. Croix, St. Thomas and St. John for use in the commercial fisheries that are not managed under the Puerto Rico Fishery Management Plan (FMP), St. Croix FMP, and St. Thomas and St. John FMP (i.e., non-federally managed species). However, there is no evidence that trawling gear is or has been used for fishing in federal waters of the U.S. Caribbean, although bottom trawls have been used in the past for exploratory research (See CFMC Dec 2021 Meeting presentation and Knake and Whiteleather 1944). Moreover, Puerto Rico territorial fishing regulations (Article 13, f) prohibit the use of trawl nets ("*redes de arrastre*") and floating drift nets ("*redes flotantes,*" does not include trammel nets or gillnets) in its jurisdictional waters (See Puerto Rico Fishing Regulations 7949 2010). The U.S. Virgin Islands (USVI) do not have specific regulations prohibiting the use of trawl gear types in their territorial waters (USVI Division of Fish and Wildlife Fisher Handbook 2019).

Federal regulations at 50 CFR 600.10 defines a *trawl* as a cone or funnel-shaped net that is towed through the waters by one or more vessels. Furthermore, the National Marine Fisheries Service (NMFS) defines bottom trawling as a fishing practice that herds and captures the target species by towing a net along the ocean floor (See NOAA Fisheries Bottom Trawls). There are different types of bottom trawling nets (or techniques) such as otter trawls, beam trawls, towed dredges, and hydraulic dredges (Hickey 2017) and many of these are used and managed in other U.S. regions to capture groundfish, shrimp, and other bottom-associated species. Another type of trawling gear is the midwater trawl net (i.e., pelagic trawl), which is a large net towed through the water column.

During its December 2021 meeting, the Council also discussed placing further prohibitions in the U.S. Caribbean EEZ on the use of gillnets and trammel nets, and prohibiting the use of purse seines, all of which are types of drift nets. Gillnets and trammel nets (in *Spanish*: filete (gillnet/single wall), trasmallo o mallorquín (trammel net), tremall (3-paned), chinchorro de ahorque) are suspended vertically in the water column by floats along the top and weights along the bottom, to entangle fish that attempt to pass through it. The nets can or cannot be fixed to the bottom. Purse seines (used in many regions to catch tunas) consist of a large wall of netting deployed around an entire area or school of fish. Federal regulations at 50 CFR 600.725 list

gillnets as an authorized gear type in the U.S. EEZ around Puerto Rico, St. Croix, St. Thomas, and St. John for (1) the commercial harvest of federally managed and non-federally managed pelagic species and for (2) the commercial harvest of other non-federally managed species in each of the island management areas. Meanwhile, purse seines and trammel nets are not authorized gear types for any fishery in any of the three island-management areas. In addition, the use of gillnets, trammel nets, as well as pots, traps, or bottom longlines is currently prohibited year-round in the seven Council-managed seasonally closed areas (also called Marine Managed Areas (MMAs) in this document): Puerto Rico – (1) Bajo de Sico; (2) Abrir La Sierra; and (3) Tourmaline; in U.S. Virgin Islands – (4) Grammanik Bank; (5) Mutton Snapper Spawning Aggregation Area; 6) Hind Bank; and (7) Red Hind Spawning Aggregation Area East of St. Croix. There are no specific prohibitions on the use of trawl gear in these or other areas, except for the Hind Bank Marine Conservation District in St. Thomas, where all fishing is prohibited year-round (Appendix A). The use of gillnets and trammel nets has been prohibited for the harvest of federally managed reef fish and spiny lobster since 2005 due to the potential for bycatch (CFMC 2005) (50 CFR 622.433(c) and 50 CFR 622.452(b)). Surface gillnets and trammel nets are allowed for the harvest of other species (e.g., baitfish [referring to species other than federally managed reef fish]) in federal waters but they must be tended at all times (50 CFR 622.437(a)(3) & (c)(2); 50 CFR 622.477(a)(3) & (c)(2); 50 CFR 622.512(a)(3), (c)(2)).

Given that there are no specific federal regulations regulating the use of gillnets or trammel nets in the U.S. EEZ around Puerto Rico, St. Croix, St. Thomas, and St. John for the harvest of federally managed pelagic species, which are new to management under the island-based FMPs (CFMC 2019 a,b,c; See Appendix B of this document for a list of managed pelagic species), the Council has discussed in past Council meetings, the need for restricting the use of these two gear types to harvest pelagic species in order to prevent any potential effects from the gear types.[1] With respect to gear types such as purse seines and trammel nets, which are neither identified as an authorized gear type in the U.S. EEZ around Puerto Rico, St. Croix, St. Thomas, and St. John (50 CFR 600.725(v)), nor specifically prohibited from use in a fishery (except that the use of trammel nets is prohibited in the federally managed reef fish and spiny lobster fisheries), a person may petition the Council to use these gear types. At that time, the Council and NMFS may take action to allow or prohibit the use of the gear.[2]

The Council is interested in potentially prohibiting the use of any trawls in Council MMAs and in the EEZ around Puerto Rico, St. Croix, St. Thomas and St. John for several reasons: (1) the

[1] Certain types of nets are regulated by NMFS in the highly migratory species (HMS) fisheries (50 CFR 635.19).

[2] 50 CFR 600.725(v): A person or vessel is prohibited from engaging in fishing or employing fishing gear when such fishing gear is prohibited or restricted by regulation under an FMP or other applicable law. However, after December 1, 1999, an individual fisherman may notify the appropriate Council, or the Director, in the case of Atlantic highly migratory species, of the intent to use a gear or participate in a fishery not already on the list. Ninety days after such notification, the individual may use the gear or participate in that fishery unless regulatory action is taken to prohibit the use of the gear or participate in the fishery (*e.g.,* through emergency or interim regulations).

use of trawls in the U.S. Caribbean EEZ has the potential to damage coral habitat including deep-water corals, as well as sponge habitat and deep-water sponges present in the area (Discussion at CFMC December 2021 Meeting); (2) trawls can entangle protected species present in the U.S. Caribbean EEZ such as sea turtles; and (3) the use of trawls in the U.S. Caribbean EEZ has the potential to negatively affect certain habitats designated as essential fish habitat (EFH) and habitat areas of particular concern for managed species under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). There are also economic considerations related to the use of certain trawling gear types (e.g., damage or loss of gear) as well as implications for the bycatch of managed and unmanaged species in the U.S. Caribbean EEZ.

Previously, in the 2004 Essential Fish Habitat Generic Amendment to the FMPs of the U.S. Caribbean and associated final environmental impact statement (CFMC 2004), the Council recommended to take action to ban the use of trawls in the U.S. Caribbean EEZ. The Council noted that this gear type was not used by commercial fishermen at the time, but recognized a potential for future use. As a rationale for its recommendation, the Council indicated that in the U.S. Caribbean, the complex mosaic of coral on the insular shelf left little space available for trawling that would not have direct impacts on coral. Thus, prohibiting trawling would prevent the use of a gear that has a high risk of adverse fishing impacts on sensitive and important habitat. These recommendations have not been included in an amendment to date.

The Council is also interested in whether continuing to identify trawls as an authorized gear type in the U.S. Caribbean EEZ (including in Council MMAs) for non-federally managed species may have potential implications on whether the existing Council MMAs qualify as conservation areas under Executive Order (E.O.) 14008.[3] E.O. 14008 establishes a goal of conserving at least 30 percent of the lands and waters in the United States by 2030. Efforts are underway to determine how much of the lands and waters already qualify as conserved. For example, the Council Coordination Committee has established a subcommittee on area-based management to review MMAs to assess the level of protection they provide. The Council has been interested in whether existing MMAs will or could meet any conservation standards developed to implement E.O. 14008.

Therefore, with respect to trawl gear, gillnets, trammel nets, and purse seines, the Council passed the following two motions during the December 2021 meeting:

Motion 1: Prohibit the use of trawling gear from within the marine protected areas (i.e., Council MMAs) of the U.S. Caribbean EEZ.
Motion 2: Request staff to develop an options paper to prohibit the use of gillnets, trammel nets, trawl nets, drift nets, and purse seines for harvesting fish in the U.S. Caribbean EEZ.

[3] E.O. 14008, Tackling the Climate Crisis at Home and Abroad, January 27, 2021.

During the August 2022 Council meeting (179th Regular Meeting), the Council made a request to include another action in this amendment. During the August 2022 meeting, the Council discussed concerns about reef fish that are released (i.e., regulatory and/or economic discards[4]), but do not survive, focusing on injuries from barotrauma. Barotrauma is the rapid expansion of gases in a fish as it is quickly reeled up from depth (see https://safmc.net/best-fishing-practices/). To improve the survivorship of released reef fish, the Council considered a measure that would encourage the use of best fishing practices to minimize impacts to released fish resulting from capture, and thus discussed the use of descending devices as tools to reduce fishing mortality for reef fish from barotrauma. The Council expressed interest in following the steps taken by the Gulf of Mexico Fishery Management Council and the South Atlantic Fishery Management Council to require that descending devices be available and ready for use for certain fisheries to reduce bycatch mortality. Therefore, at the August 2022 meeting, the Council passed a motion for staff to develop Action 3, proposing to add a requirement to have a descending device available and ready for use on a vessel when fishing for or possessing federally managed reef fish. The Council decided that it would also work on education and outreach activities with fishing communities regarding descending devices development and use.

1.2 Why is the Council Considering Action?

1.2.1 Statement of Purpose and Need

The purpose of this amendment is to prevent potential damage to habitats from certain gear types, including essential fish habitat, protect species associated with such habitats, as well as to promote best fishing practices, and enhance the survival of released fish in the EEZ around Puerto Rico, St. Croix, and St. Thomas and St. John.

The need for this amendment is to minimize potentially adverse effects of fishing to habitats and associated species, and to minimize the mortality of bycatch species.

[4] *Regulatory* discards are fish that are required by regulation to be discarded, but also include fish that may be retained but not sold. *Economic* discards are fish that are discarded because they are undesirable to the harvester. This category of discards generally includes certain species, sizes, and/or sexes with low or no market value.

1.3 Where Will the Action Have an Effect?

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

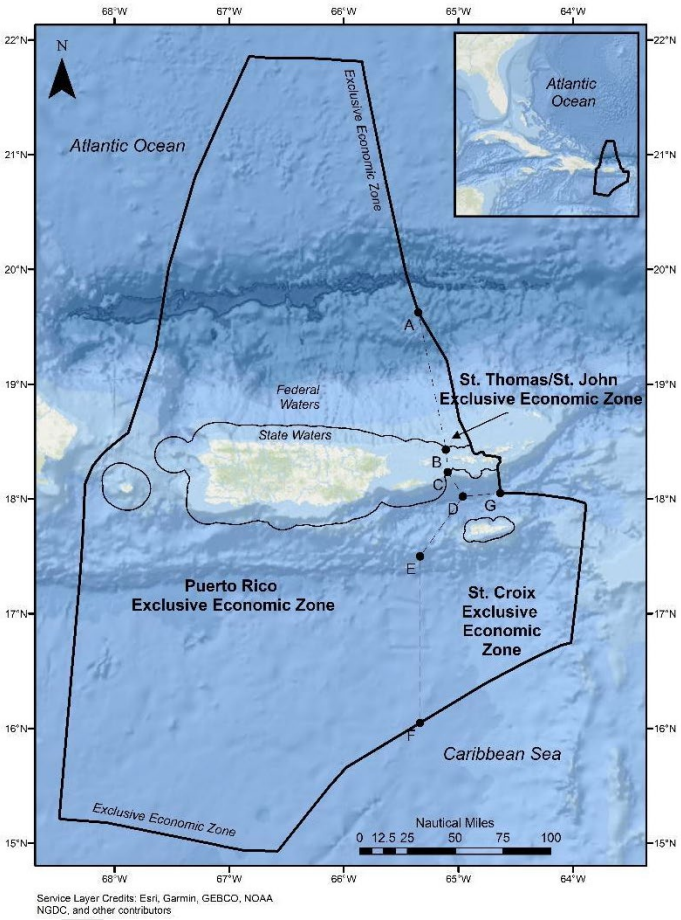

Figure 1.1. U.S. Caribbean region with boundaries between the Puerto Rico, St. Thomas and St. John, and St. Croix management areas.

Chapter 2. Proposed Actions and Alternatives

2.1 Action 1: Use of Trawl Gear, Gillnets, Trammel Nets, and Purse Seines in the U.S. Caribbean Exclusive Economic Zone (EEZ) around Puerto Rico

2.1.1 Action 1(a). Modify the Use of Trawl Gear in federal waters around Puerto Rico

Alternative 1. No action. Retain trawl gear as an authorized gear type for the commercial harvest of non-federally managed species in federal waters around Puerto Rico that is not otherwise prohibited.

Alternative 2. Prohibit the use of trawl gear for all fishing in Caribbean Fishery Management Council (Council) seasonally closed areas/marine managed areas (MMA)[5] year-round in federal waters around Puerto Rico.

Alternative 3 (Preferred). Prohibit the use of trawl gear for all fishing in federal waters around Puerto Rico.

Discussion of Action 1(a) Alternatives

Alternative 1 would retain trawl gear, including bottom and mid-water trawls, as an authorized gear type for the commercial harvest of non-federally managed species in federal waters around Puerto Rico as listed in 50 CFR 600.725(v)(V). There is no evidence that the commercial sector uses (or has used) trawl gear (with exceptions noted in Section 1.1, such as for research and exploratory fishing).

Alternative 2 and **Preferred Alternative 3** would prohibit the use of all trawl gear (i.e., bottom and mid-water trawls) for all fishing (i.e., commercial and recreational; federally managed and non-federally managed) either in Council-managed seasonally closed areas/MMAs or throughout the EEZ, respectively, around Puerto Rico. Council MMAs in Puerto Rico are the Abrir La Sierra Bank red hind spawning aggregation area (50 CFR 622.439(a)(1)), the Tourmaline red hind spawning aggregation area (50 CFR 622.439(a)(2)) and Bajo de Sico (50 CFR 622.439(a)(3)). **Alternative 2** and **Preferred Alternative 3** would prevent potentially negative ecological and biological and physical effects from the use of trawl gear in the future (e.g., habitat destruction, bycatch) in Puerto Rico Council MMAs (**Alternative 2**) or throughout the

[5] CFMC Seasonally Closed Areas/Marine Managed Areas (MMAs) in Puerto Rico are: (1) Bajo de Sico; (2) Abrir La Sierra; and (3) Tourmaline.

EEZ around Puerto Rico (**Preferred Alternative 3**). For example, potential impacts from trawling to coral and sponge habitat in the U.S. Caribbean EEZ, including the Puerto Rico EEZ could be caused by direct contact with bottom tending trawl gear and from impacts to sensitive vertical relief from near-bottom orientation of pelagic trawls in its sensitive habitats. Also, by specifically prohibiting the use of trawl gear for all commercial and recreational harvest under **Preferred Alternative 3**, fishermen would not be able to petition to use trawl gear under federal regulations for gear types that are not included in the authorized gear list (as discussed in Section 1.2).[6]

Comparison of Alternatives

Alternative 1 is the status quo and would not change any regulations applicable to the use of trawls in federal waters around Puerto Rico. **Alternative 2** would prohibit the use of trawl gear for the harvest of fish in all components of the Puerto Rico fishery that occurs within the Puerto Rico Council MMAs. **Preferred Alternative 3** would prohibit the use of trawl gear for the harvest of fish in all components of the Puerto Rico fishery that occurs within the EEZ around Puerto Rico. Because trawl gear has not historically been used in the U.S. Caribbean EEZ, including the Puerto Rico EEZ, and is not currently used, **Alternative 2** and **Preferred Alternative 3** are administrative actions and are not expected to have any additional physical, biological/ecological, social, and economic effects when compared to **Alternative 1**. However, **Alternative 2** and **Preferred Alternative 3** would prevent trawl gear from being used in the future, and thus could be more beneficial to the physical and biological environment by preventing potential bycatch and/or habitat effects resulting from trawling activities in federal waters around Puerto Rico (**Preferred Alternative 3**) or in Puerto Rico Council MMAs (**Alternative 2**), with the former being more beneficial in protective fishery and habitat resources throughout the Puerto Rico EEZ. Furthermore, prohibiting the use of trawl gear in all components of the Puerto Rico fishery (**Preferred Alternative 3**) within the Puerto Rico EEZ would prevent future use of trawl gear that could result from a petition for its use,[7] which could occur under **Alternative 1** and **Alternative 2** (outside the Puerto Rico Council MMAs), thus providing more benefits to the physical, biological/ecological environment.

[6] 50 CFR 600.725(v): A person or vessel is prohibited from engaging in fishing or employing fishing gear when such fishing gear is prohibited or restricted by regulation under an FMP or other applicable law. However, after December 1, 1999, an individual fisherman may notify the appropriate Council, or the Director, in the case of Atlantic highly migratory species (HMS), of the intent to use a gear or participate in a fishery not already on the list. Ninety days after such notification, the individual may use the gear or participate in that fishery unless regulatory action is taken to prohibit the use of the gear or participate in the fishery (*e.g.,* through emergency or interim regulations).

2.1.2 Action 1(b). Modify the use of Gillnets in federal waters around Puerto Rico

Alternative 1. No action. Retain gillnets as an authorized gear type for the commercial harvest of federally managed and non-federally managed pelagic species and the commercial harvest of non-federally managed species in federal waters around Puerto Rico, and as a prohibited gear type for reef fish and spiny lobster in the EEZ around Puerto Rico and inside Council Seasonally Closed Areas or Council MMAs.

Alternative 2. Prohibit the use of gillnets[7] in federal waters around Puerto Rico:

Sub-alternative 2a. For all fishing.

Sub-alternative 2b. For all fishing, except for the following fish species belonging to the halfbeaks (Family Hemiramphidae), gar (Family Belonidae), and flyingfish (Family Exocoetidae). A surface gillnet used in the EEZ around Puerto Rico to fish for any baitfish must be tended at all times. Mesh size may not be smaller than 0.75 inches square or 1.5-inch stretch. May not be used 20 ft from bottom.

Sub-alternative 2c. For fishing for federally managed pelagic species.

Discussion of Action 1(b) Alternatives

Alternative 1 would retain gillnets as an authorized gear type for the commercial harvest of federally managed and non-federally managed pelagic fish and for the commercial harvest of other non-federally managed species (e.g., species that are not managed by the Council), as listed in 50 CFR 600.725(v)(V). Federal regulations allow for the use of gillnets for the commercial harvest of non-federally managed species (e.g., baitfish such as ballyhoo or flying fish) subject to a requirement that the gear be tended at all times, and the use of gillnets is prohibited year-round for fishing for spiny lobster and federally managed reef fish.[8] The use of gillnets for the commercial harvest of federally managed pelagics, non-federally managed pelagics, and other non-federally managed species could increase the potential for bycatch of target species that are prohibited with this gear type (i.e., federally managed reef fish and spiny lobster) and would also increase the potential for the catch of undersized managed and non-managed species (i.e., federally managed pelagics and non-federally managed species), which could increase potential for overfishing and negatively affect the populations. Although the use of gillnets to harvest

[7] As noted in Alternative 1, the use of gillnets is already prohibited inside Council Seasonally Closed Areas or Council MMAs. Gillnets are also prohibited for all fishing for federally managed reef fish and spiny lobster.

[8] Cast nets are authorized for the commercial and recreational harvest of non-federally managed species. Cast nets are surface nets typically used to fish for baitfish such as ballyhoo, sardines, and other species. The Council did not include cast nets in the motion to prepare this amendment.

pelagic species in federal waters is less common than in Puerto Rico territorial waters, landings of some pelagic species with gillnets are reported (see below in Sub-alternative 2b). **Alternative 1** would be compatible with regulations for gillnets in Puerto Rico territorial waters, which allow the use of gillnets.

Sub-alternative 2a proposes to prohibit the use of gillnets to harvest all commercial and recreational species (i.e., federally managed and non-federally managed) in the EEZ around Puerto Rico. **Sub-alternative 2b** would prohibit the use of gillnets to harvest all commercial and recreational species (i.e., federally managed and non-federally managed) in the EEZ around Puerto Rico, with the exception of baitfish belonging to the halfbeak, gar, and flyingfish families. **Sub-alternative 2b** would define a gillnet used for baitfish as one with mesh size openings that may not be bigger than 0.25 inch from knot to knot and that must be tended at all times. These specifications would be compatible with Puerto Rico's specifications for gillnets used as bait nets in territorial waters. Currently, gillnet is an authorized gear type for the commercial harvest of federally managed pelagic fish (See Appendix B) and non-federally managed pelagic fish (e.g., sardines, herring, ballyhoo, non-managed mackerel), and for the commercial harvest of non-federally managed species in the U.S. Caribbean EEZ, including the EEZ around Puerto Rico. Federal regulations prohibit the use of gillnets for the harvest of managed reef fish and spiny lobster in all U.S. Caribbean federal waters and prohibit the use of gillnets in all Council MMAs, and allow the use of gillnets (and trammel nets) to fish for any other species, which must be tended at all times (50 CFR 622.437(a)(3)). With respect to non-federally managed species, the Magnuson-Stevens Act gives the Councils and NMFS the authority to regulate fishing activity to support the conservation and management of fisheries. This could include regulations that pertain to fishing for non-managed species. Per Section 303(b)(12) and (14) of the Magnuson-Stevens Act, FMPs can "include management measures in the plan to conserve target and non-target species and habitats, considering the variety of ecological factors affecting fishery populations" and can "prescribe such other measures, requirements, or conditions and restrictions as are determined to be necessary and appropriate for the conservation and management of the fishery." These provisions, taken together, provide broad discretion to manage fishing for non-federally managed species for the benefit of federally managed species.

Although the use of gillnets for the commercial harvest of federally managed and non-federally managed pelagic species or other non-federally managed species in federal waters is considered to be minimal due to depth and distance from the coast of the location of federal waters (Table 2.2.1, [see Leroy 2007]), **Sub-alternatives 2a** and **2b** would prevent negative ecological and biological effects resulting from the use of gillnets (e.g., prevention of bycatch of undersized individuals, protected species, other target and non-target species). Federally managed species reported in Puerto Rico commercial landings with gillnet from federal waters include barracuda, cero and king mackerels, blackfin, and little tunny (Table 2.2.1) (Note that "federal waters" may also include harvest from waters around offshore islands belonging to Puerto Rico jurisdiction).

Allowing the use of surface gillnets for catching certain species of baitfish commercially and/or recreationally would allow fishermen to continue using these specific bait nets in federal waters (**Sub-alternative 2b**), and would prevent fishermen from using gillnets for other federally managed and non-federally managed species. Specifying the maximum mesh size and the requirement the net be tended at all times in **Sub-alternative 2b** would make the regulation compatible with Puerto Rico state regulations and would also prevent bycatch.

Sub-alternative 2c was included within this action per request of the Council at its December 2022 regular meeting. **Sub-alternative 2c** would prohibit the use of gillnets for the harvest of federally managed pelagic species (i.e., dolphin, pompano dolphin, wahoo, little tunny, blackfin tuna, king mackerel, cero mackerel, and great barracuda), and would retain gillnets as an authorized gear type for the commercial harvest of non-federally managed in federal waters around Puerto Rico, and as a prohibited gear for reef fish and spiny lobster. Negative ecological and biological effects resulting from the use of gillnets for non-federally managed species could be expected from this sub-alternative (e.g., bycatch of undersized individuals, protected species, and other target and non-target species). In addition, **Sub-alternative 2c** would not specify mesh size restrictions.

Table 2.1.1. Adjusted landings in pounds for the top species (federally managed and non-federally managed) reported for gillnet gear and trammel net gear in Puerto Rico Commercial Landings for 2014-2019 by State, Federal, or Unknown waters*.

		GILL NET			TRAMMEL NET		
Management Status	Species	State	Federal	Unknown	State	Federal	Unknown
Managed	BARRACUDA	2,251	Conf	429	.	.	.
Managed	DOLPHINFISH	Conf	.	.	Conf	.	Conf
Managed	MACKEREL,CERO	11,641	733	593	Conf	.	.
Managed	MACKEREL,KING	8,756	1,117	933	62	.	Conf
Managed	TUNA,BLACKFIN	1,222	.	241	.	.	Conf
Managed	TUNNY,LITTLE	1,460	Conf	Conf	449	.	Conf
Managed	WAHOO	Conf	.	.	.	.	.
Not-managed	BALLYHOO	214,720	2,608	42,371	832	Conf	Conf
Not-managed	BARBU	142	.	.	.	.	.
Not-managed	BARRACUDA,SOUTHERN	Conf	.	.	.	.	.
Not-managed	JACK,BAR	36,374	1,767	3,907	530	.	38
Not-managed	JACK,HORSE-EYE	3,845	105	796	.	.	.
Not-managed	JACK,YELLOW	258	.	83	.	.	.
Not-managed	JACKS	7,002	297	821	200	.	.
Not-managed	MOJARRA,YELLOWFIN	1,014	.	750	.	.	.
Not-managed	MOJARRAS,UNSPECIFIE	26,100	1,136	1,725	Conf	.	.
Not-managed	MULLET,WHITE	42,196	1,164	4,875	Conf	.	Conf
Not-managed	SNOOK,COMMON	55,871	2,733	4,966	Conf	Conf	Conf
Not-managed	STINGRAYS,UNSPECIFI	Conf	Conf	Conf	3,115	.	Conf
Not-managed	TUNA AND MACKERELS,	312	.	.	.	.	.
Not-managed	TUNA,ALBACORE	2,792	.	Conf	.	.	.
Not-managed	TUNA,SKIPJACK	725	Conf	.	.	.	.
Not-managed	TUNA,YELLOWFIN	Conf	.	Conf	.	.	.
Conf = confidential information							

*The values for the federal waters and unknown categories may include landings from waters around Puerto Rico jurisdictional offshore islands that are within the 9-200 nm.

Comparison of alternatives

Alternative 1 is the status quo alternative (no changes to gillnet regulations in the EEZ around Puerto Rico) and would be less beneficial to the biological and ecological environment in federal waters off Puerto Rico, but more beneficial to the socio-economic environment than **Sub-alternative 2a**. **Alternative 1** would continue to allow the use of gillnets for the commercial harvest of pelagic species and non-federally managed species, increasing the potential of adverse effects from use of the gear, but allowing fishermen that use gillnet for harvesting these species to continue to do so. **Sub-alternative 2c** would also be less beneficial to the biological and ecological environments in federal waters than **Sub-alternative 2a**, but more beneficial than **Alternative 1** because although it would prohibit the use of gillnets to harvest federally managed pelagics, it would still allow for the use of gillnet to harvest non-federally managed species, thus retaining the potential of adverse effects from use of the gear. **Sub-alternative 2c** would also be more beneficial to the socio-economic environment than **Sub-alternative 2a** (but less than

Alternative 1) because it will allow fishermen that use gillnets to continue harvesting non-federally managed species. With respect to certain species of baitfish, **Alternative 1**, **Sub-alternative 2b**, and **Sub-alternative 2c** are not different, as all would continue to allow gillnets for catching those species, with no additional effects to the biological environment, socio-economic environment, or administrative environment. Physical effects are not expected to result from the use of gillnets under any of the alternatives. **Sub-alternative 2b** would be partially compatible with Puerto Rico regulations for the mesh size of surface gillnets, facilitating enforcement of federal regulations and would be more beneficial to the ecological and biological environment because it would prevent bycatch by setting a maximum mesh size for the bait nets. Administrative effects would be slightly higher under **Sub-alternatives 2a, 2b, and 2c** than **Alternative 1**. **Sub-alternative 2c** would be the most difficult to enforce, followed by **Sub-alternative 2b** because of the specification of allowed species, which is not compatible with Puerto Rico regulations.

2.1.3 Action 1(c). Modify the use of Trammel nets in federal waters around Puerto Rico

Alternative 1. No action. Retain trammel nets as neither an authorized gear type for any fisheries in the EEZ around Puerto Rico, nor an otherwise prohibited gear type, except for federally managed reef fish and spiny lobster.

Alternative 2. Prohibit the use of trammel nets for all fishing in the EEZ around Puerto Rico.

2.1.4 Action 1(d). Modify the Use of Purse Seines in federal waters around Puerto Rico

Alternative 1. No action. Retain purse seines as neither an authorized gear type for any fisheries in the EEZ around Puerto Rico, nor an otherwise prohibited gear type.

Alternative 2. Prohibit the use of purse seines for all fishing in federal waters around Puerto Rico.

Discussion of Action 1(c) and Action 1(d) Alternatives

Alternative 1 of **Action 1(c)** and **Action 1(d)** would retain trammel nets and purse seines as neither an authorized gear type for any fisheries in the EEZ around Puerto Rico, nor an otherwise prohibited gear type, except that the use of trammel nets to harvest of federally managed reef fish and spiny lobster is prohibited. **Alternative 2** of **Action 1(c)** would prohibit the use of trammel nets and **Alternative 2 of Action 1(d)** would prohibit the use of purse seines for all fishing in the

U.S. EEZ around Puerto Rico. These gear types are not listed as authorized under any U.S. Caribbean fisheries, including Puerto Rico, in federal regulations at 50 CFR 600.725(v)(V), therefore **Alternatives 2 of Actions 1(c) and 1(d),** respectively, are administrative actions. As noted above, trammel nets are specifically prohibited for fishing for federally managed reef fish and spiny lobster in federal waters around all three-island management areas, including Puerto Rico. These gear types are also prohibited in Council MMAs (2005 Caribbean Sustainable Fisheries Act Amendment). Similar to surface gillnets, federal regulations allow the use of trammel nets (or gillnets) to fish for any other species, but they must be tended at all times (50 CFR 622.437(a)(3)). Trammel nets are prohibited for use in USVI territorial waters and no landings with trammel net were reported from 2012-2021. Purse seines (except purse seines authorized for HMS species) are not used in federal and territorial waters of the U.S. Caribbean, **Alternative 2 of Action 1(c)** and **Alternative 2 of Action 1(d)** would specifically prohibit the use of these gear types for the harvest of all fish species in the Puerto Rico fishery, including for the use of surface trammel nets for baitfish. As a prohibited gear type, fishermen would not be able to petition to use this gear as otherwise allowed under federal regulations for gear that are not included in the authorized gear list.[9]

Comparison of alternatives in Action 1(c) Trammel nets and Action 1(d) Purse seines

Effects to the physical, biological, ecological, and socio-economic environments from **Alternative 2** in **Action 1(c)** and **Alternative 2** in **Action 1(d)** are not expected to be different from those of **Alternative 1** of **Action 1(c)** and **Action 1(d)** because neither trammel nets nor purse seines are currently authorized gear types for use in U.S. Caribbean federal waters for any fishing. In addition, there are no landings with trammel nets from Puerto Rico federal waters as it is banned in territorial waters. However, **Alternatives 2** of **Actions 1(c)** and **1(d)** could be slightly more beneficial to the biological and ecological environment of the Puerto Rico EEZ because they further restrict potential future use of these gear types through a petition to the Council. Administrative effects are expected to be slightly higher for both action alternatives than for its respective no action alternative (**Alternative 1**).

[9] 50 CFR 600.725(v): A person or vessel is prohibited from engaging in fishing or employing fishing gear when such fishing gear is prohibited or restricted by regulation under an FMP or other applicable law. However, after December 1, 1999, an individual fisherman may notify the appropriate Council, or the Director, in the case of Atlantic HMS, of the intent to use a gear or participate in a fishery not already on the list. Ninety days after such notification, the individual may use the gear or participate in that fishery unless regulatory action is taken to prohibit the use of the gear or participate in the fishery (*e.g.,* through emergency or interim regulations).

2.2 Action 2: Use of Trawl Gear, Gillnets, Trammel Nets, and Purse Seines in the U.S. Caribbean EEZ around St. Croix, USVI

2.2.1 Action 2(a). Modify the Use of Trawl Gear in federal waters around St. Croix, USVI

Alternative 1. No action. Retain trawl gear as an authorized gear type for the commercial harvest of non-federally managed species in the federal waters around St. Croix that is not otherwise prohibited.

Alternative 2. Prohibit the use of trawl gear for all fishing in Caribbean Fishery Management Council (Council) seasonally closed areas/marine managed areas (MMA)[10] year-round in federal waters around St. Croix.

Alternative 3 (Preferred). Prohibit the use of trawl gear for all fishing in federal waters around St. Croix.

Discussion of Action 2(a) Alternatives

Alternative 1 would retain the trawl gear types authorized for harvest under the St. Croix fishery components, including bottom and mid-water trawls, as an authorized gear type for the commercial harvest of non-federally managed species in federal waters around St. Croix as listed in 50 CFR 600.725(v)(V). There is no evidence that the commercial sector uses (or has used) trawl gear (with exceptions noted in Section 1.1, such as for research and exploratory fishing).

Alternative 2 and **Preferred Alternative 3** would prohibit the use of all trawl gear (i.e., bottom and mid-water trawl) for all fishing (i.e., commercial and recreational; federally managed and non-federally managed) either in Council-managed seasonally closed areas/MMAs or throughout the EEZ, respectively, around St. Croix. Council MMAs in St. Croix are the Mutton snapper aggregation area (50 CFR 622.479(a)(1)) and the Red hind spawning aggregation area east of St. Croix (50 CFR 622.479(a)(2)). **Alternative 2** and **Preferred Alternative 3** would prevent potentially negative ecological and biological and physical effects from the use of trawl gear in the future (e.g., habitat destruction, bycatch) in St. Croix Council MMAs (**Alternative 2**) or throughout the EEZ around St. Croix (**Preferred Alternative 3**). For example, potential impacts from trawling to coral and sponge habitat in the U.S. Caribbean EEZ, including the St. Croix EEZ could be caused by direct contact with bottom tending trawl gear and from impacts to sensitive vertical relief from near-bottom orientation of pelagic trawls in its sensitive habitats.

[10] CFMC Seasonally Closed Areas/Marine Managed Areas (MMAs) in St. Croix are: – (1) Mutton Snapper Spawning Aggregation Area; and (2) Red Hind Spawning Aggregation Area East of St. Croix.

Also, by specifically prohibiting the use of trawl gear for all commercial and recreational harvest under **Preferred Alternative 3**, fishermen would not be able to petition to use trawl gear under federal regulations for gear types that are not included in the authorized gear list (as discussed in Section 1.2).[11]

Comparison of Alternatives

Alternative 1 is the status quo and would not change any regulations applicable to the use of trawls in federal waters around St. Croix. **Alternative 2** would prohibit the use of trawl gear for the harvest of fish in all components of the St. Croix fishery that occurs within St. Croix Council MMAs. **Preferred Alternative 3** would prohibit the use of trawl gear for the harvest of fish in all components of the St. Croix fishery that occurs within the EEZ around St. Croix. Because trawl gear has not historically been used in the U.S. Caribbean EEZ, including the St. Croix EEZ, and is not currently used, **Alternative 2** and **Preferred Alternative 3** are both administrative actions and are not expected to have any additional physical, biological/ecological, social, and economic effects when compared to **Alternative 1**. However, **Alternative 2** and **Preferred Alternative 3** would prevent trawl gear from being used in the future, and thus could be more beneficial to the physical and biological environment by preventing potential bycatch and/or habitat effects resulting from trawling activities in federal waters around St. Croix (**Preferred Alternative 3**) or in St. Croix Council MMAs (**Alternative 2**), with the former being more beneficial in protective fishery and habitat resources throughout the St. Croix EEZ. Furthermore, prohibiting the use of trawl gear in all components of the St. Croix fishery (**Preferred Alternative 3**) within the St. Croix EEZ would prevent future use of trawl gear that could result from a petition for its use,[7] which could occur under **Alternative 1** and **Alternative 2** (outside the St. Croix Council MMAs), thus providing more benefits to the physical, biological/ecological environment.

[11] 50 CFR 600.725(v): A person or vessel is prohibited from engaging in fishing or employing fishing gear when such fishing gear is prohibited or restricted by regulation under an FMP or other applicable law. However, after December 1, 1999, an individual fisherman may notify the appropriate Council, or the Director, in the case of Atlantic highly migratory species (HMS), of the intent to use a gear or participate in a fishery not already on the list. Ninety days after such notification, the individual may use the gear or participate in that fishery unless regulatory action is taken to prohibit the use of the gear or participate in the fishery (*e.g.,* through emergency or interim regulations).

2.2.2 Action 2(b). Modify the Use of Gillnets in Federal Waters around St. Croix, USVI

Alternative 1. No action. Retain gillnets as an authorized gear type for the commercial harvest of federally managed and non-federally managed pelagic species and the commercial harvest of non-federally managed species in federal waters around St. Croix, and as a prohibited gear type for reef fish and spiny lobster in the EEZ around St. Croix and inside Council Seasonally Closed Areas or Council MMAs.

Alternative 2. Prohibit the use of gillnets[12] in federal waters around St. Croix:

Sub-alternative 2a. For all fishing in the St. Croix EEZ.

Sub-alternative 2b (Preferred). For all fishing in the St. Croix EEZ, except for the following fish species belonging to the halfbeaks (Family Hemiramphidae), gar (Family Belonidae), and flyingfish (Family Exocoetidae). A surface gillnet (single-walled) used in the EEZ around St. Croix to fish for any baitfish must be tended at all times. Mesh size may not be smaller than 0.75 inches square or 1.5-inch stretch. May not be used 20 ft from bottom.

Discussion of Action 2(b) Alternatives

Alternative 1 would retain gillnets as an authorized gear type for the commercial harvest of federally managed and non-federally managed pelagic fish and for the commercial harvest of other non-federally managed species (e.g., species that are not managed by the Council), as listed in 50 CFR 600.725(v)(V). Federal regulations allow for the use of gillnets for the commercial harvest of non-federally managed species (e.g., baitfish such as ballyhoo or flying fish), subject to a requirement that the gear be tended at all times, and the use of gillnets is prohibited year-round for fishing for spiny lobster and federally managed reef fish.[13] The use of gillnets for the commercial harvest of federally managed pelagics, non- federally managed pelagics, and other non-federally managed species could increase the potential for bycatch of target species that are prohibited with this gear type (i.e., federally managed reef fish and spiny lobster) and would also increase the potential catch of undersized managed and non-managed species (pelagics, non-federally managed species), which could increase potential for the catch of undersized managed and non-managed species (i.e., federally managed pelagics and non-federally managed species), which could increase potential for overfishing and negatively affect the populations. Although the use of gillnets to harvest pelagic species in federal waters is less common than in St. Croix

[12] The use of gillnets is already prohibited inside Council Seasonally Closed Areas or Council MMAs. Gillnets are also prohibited for all fishing for federally managed reef fish and spiny lobster.

[13] Cast nets are authorized for the commercial and recreational harvest of non-federally managed species. Cast nets are surface nets typically used to fish for baitfish such as ballyhoo, sardines, and other species. The Council did not include cast nets in the motion to prepare this amendment.

territorial waters, landings of some pelagic species with gillnets are reported. **Alternative 1** would not be compatible with regulations for gillnets in the USVI, which prohibit the use of gillnets in territorial waters, except surface gillnets for the harvest of certain species of baitfish and has construction specifications.

Sub-alternative 2a proposes to prohibit the use of gillnets to harvest all commercial and recreational species (i.e., federally managed and non-federally managed) in the EEZ around St. Croix. **Sub-alternative 2b** would prohibit the use of gillnets to harvest all commercial and recreational species (i.e., federally managed and non-federally managed) in the EEZ around St. Croix, with the exception of baitfish belonging to the halfbeak, gar, and flyingfish families. **Sub-alternative 2b** would define a gillnet used for baitfish as one with mesh size openings that may not be smaller than 0.75 inches square or 1.5-inch stretch and that must be tended at all times. These specifications are partially compatible with USVI's specifications for surface gillnets used as bait nets in territorial waters. Currently, gillnet is an authorized gear type for the commercial harvest of federally managed pelagic fish (See Appendix B) and non-federally managed pelagic fish (e.g., sardines, herring, ballyhoo, non-managed mackerel), and for the commercial harvest of non-federally managed species in the U.S. Caribbean EEZ, including the EEZ around St. Croix. Federal regulations prohibit the use of gillnets for the harvest of managed reef fish and spiny lobster in all U.S. Caribbean federal waters and prohibit the use of gillnets in all Council MMAs, and allow the use of gillnets (and trammel nets) to fish for any other species, which must be tended at all times (50 CFR 622.437(a)(3)). With respect to non-federally managed species, the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) gives the Councils and the National Marine Fisheries Service (NMFS) the authority to regulate fishing activity to support the conservation and management of fisheries. This could include regulations that pertain to fishing for non-managed species. Per Section 303(b)(12) and (14) of the Magnuson-Stevens Act, FMPs can "include management measures in the plan to conserve target and non-target species and habitats, considering the variety of ecological factors affecting fishery populations" and can "prescribe such other measures, requirements, or conditions and restrictions as are determined to be necessary and appropriate for the conservation and management of the fishery." These provisions, taken together, provide broad discretion to manage fishing for non-federally managed species for the benefit of federally managed species.

Although the use of gillnets for the commercial harvest of federally managed and non-federally managed pelagic species or other non-federally managed species in federal waters is considered to be minimal due to depth and distance from the coast of the location of federal waters, **Sub-alternatives 2a** and **2b** would prevent negative ecological and biological effects resulting from the use of gillnets (e.g., prevention of bycatch of undersized individuals, protected species, other target and non-target species). Based on commercial landings from 2012-2021 of federally managed species from EEZ waters around St. Croix, the only federally managed species

harvested with gillnets is redtail parrotfish (confidential data), and the two non-federally managed species harvested with gillnets are ballyhoo (6,211 pounds [lbs]) and needlefish (100 lbs). Allowing the use of surface gillnets for catching certain species of baitfish commercially and/or recreationally would allow fishermen to continue using these specific bait nets in federal waters (**Sub-alternative 2b**), and would prevent fishermen from using gillnets for other federally managed and non-federally managed species. Specifying the mesh size and the requirement the net be tended at all times in **Sub-alternative 2b** would make the regulation compatible with USVI state regulations and would also prevent bycatch.

Comparison of alternatives

Alternative 1 is the status quo alternative (no changes to gillnet regulations in the EEZ around St. Croix) and would be less beneficial to the biological and ecological environment in federal waters off St. Croix, but more beneficial to the socio-economic environment than **Sub-alternative 2a**. **Alternative 1** would continue to allow the use of gillnets for the commercial harvest of pelagic species and non-federally managed species, increasing the potential of adverse effects from use of the gear, but allowing fishermen that use gillnet for harvesting these species to continue to do so. Administrative effects would be slightly higher under **Sub-alternative 2a** than **Alternative 1**. With respect to certain species of baitfish, **Alternative 1** and **Sub-alternative 2b** are not different, as both would continue to allow gillnets for catching those species, with no additional effects to the biological environment, socio-economic environment, or administrative environment. Physical effects are not expected to result from the use of gillnets under any of the alternatives. **Sub-alternative 2b** would be partially compatible with USVI regulations for surface gillnets, facilitating enforcement of federal regulations and would be more beneficial to the ecological and biological environment because it would prevent bycatch by setting a maximum mesh size for the bait nets.

2.2.3 Action 2(c). Modify the Use of Trammel nets in federal waters around St. Croix, USVI

Alternative 1. No action. Retain trammel nets as neither an authorized gear type for any fisheries[14] in the EEZ around St. Croix, nor an otherwise prohibited gear type, except for federally managed reef fish and spiny lobster.

Alternative 2 (Preferred). Prohibit the use of trammel nets for all fishing in federal waters around St. Croix.

[14] See 50 CFR 600.725(v)(V) for a list of fisheries https://www.ecfr.gov/current/title-50/chapter-VI/part-600/subpart-H/section-600.725

2.2.4 Action 2(d). Modify the Use of Purse Seines in federal waters around St. Croix, USVI

Alternative 1. No action. Retain purse seines as neither an authorized gear type for any fisheries in the EEZ around St. Croix, nor an otherwise prohibited gear type.

Alternative 2 (Preferred). Prohibit the use of purse seines for all fishing in federal waters around St. Croix.

Discussion of Action 2(c) and Action 2(d) Alternatives

Alternative 1 of **Action 2(c)** and **Action 2(d)** would retain trammel nets and purse seines as neither an authorized gear type for any fisheries in the EEZ around St. Croix, nor an otherwise prohibited gear type, except that the use of trammel nets to harvest of federally managed reef fish and spiny lobster is prohibited. **Alternative 2** of **Action 2(c)** would prohibit the use of trammel nets and **Alternative 2** of **Action 2(d)** would prohibit the use of purse seines for all fishing in the U.S. EEZ around St. Croix. These gear types are not listed as authorized under any U.S. Caribbean fisheries, including St. Croix, in federal regulations at 50 CFR 600.725(v)(V), therefore **Alternatives 2 of Actions 2(c) and 2(d),** respectively, are administrative actions. As noted above, trammel nets are specifically prohibited for fishing for federally managed reef fish and spiny lobster in federal waters around all three-island management areas, including St. Croix. These gear types are also prohibited in Council MMAs (2005 Caribbean SFA). Similar to surface gillnets, federal regulations allow the use of trammel nets (or gillnets) to fish for any other species, but they must be tended at all times (50 CFR 622.477(a)(3)). Trammel nets are prohibited for use in USVI territorial waters and no landings with trammel net were reported from 2012-2021. Purse seines (except purse seines authorized for HMS species) are not used in federal and territorial waters of the U.S. Caribbean, **Alternative 2** of **Action 2(c)** and **Alternative 2 of Action 2(d)** would specifically prohibit the use of these gear types for the harvest of all fish species in the St. Croix fishery, including for the use of surface trammel nets for baitfish. As a prohibited gear type, fishermen would not be able to to petition to use this gear as otherwise allowed under federal regulations for gear that are not included in the authorized gear list[15].

Comparison of alternatives in Action 2(c) Trammel nets and Action 2(d) Purse seines

[15] 50 CFR 600.725(v): A person or vessel is prohibited from engaging in fishing or employing fishing gear when such fishing gear is prohibited or restricted by regulation under an FMP or other applicable law. However, after December 1, 1999, an individual fisherman may notify the appropriate Council, or the Director, in the case of Atlantic HMS, of the intent to use a gear or participate in a fishery not already on the list. Ninety days after such notification, the individual may use the gear or participate in that fishery unless regulatory action is taken to prohibit the use of the gear or participate in the fishery (*e.g.,* through emergency or interim regulations).

Effects to the physical environment are not expected from any alternatives in **Action 1(c)** because this gear typically has no interaction with the bottom. Although purse seines may interact with the bottom, physical effects are not expected because this gear is not authorized for use in federal waters of the U.S. Caribbean EEZ. Similarly, effects to the biological and ecological and socio-economic environments from **Alternative 2** in **Action 2(c)** and **Alternative 2 in Action 2(d)** are not expected to be different from those of **Alternative 1** of **Action 2(c) and Action 2(d)** because both trammel nets and purse seines are currently not authorized for use in federal waters for any fishing. In addition, there are no landings with trammel nets from USVI federal waters as it is banned in territorial waters. However, **Alternatives 2 of Actions 2(c) and 2(d)** could be slightly more beneficial to the biological and ecological environment of the St. Croix EEZ because they further restrict potential future use of these gear types through a petition to the Council. Administrative effects are expected to be slightly higher for both action alternatives than for its respective no action alternative (**Alternative 1**).

2.3 Action 3: Use of Trawl Gear, Gillnets, Trammel Nets, and Purse Seines in the U.S. Caribbean EEZ around St. Thomas and St. John, USVI

2.3.1 Action 3(a). Modify the use of Trawl Gear in federal waters around St. Thomas and St. John, USVI

Alternative 1. No action. Retain trawl gear as an authorized gear type for the commercial harvest of non-federally managed species in federal waters around St. Thomas and St. John that is not otherwise prohibited.

Alternative 2. Prohibit the use of trawl gear for all fishing in Caribbean Fishery Management Council (Council) seasonally closed areas/marine managed areas (MMA)[16] year-round in federal waters around St. Thomas and St. John.

Alternative 3 (Preferred). Prohibit the use of trawl gear for all fishing in federal waters around St. Thomas and St. John.

Discussion of Action 3(a) Alternatives

Alternative 1 would retain trawl gear, including bottom and mid-water trawls, as an authorized gear type for the commercial harvest of non-federally managed species in federal waters around St. Thomas and St. John as listed in 50 CFR 600.725(v)(V). There is no evidence that the

[16] CFMC Seasonally Closed Areas/Marine Managed Areas (MMAs) in St. Thomas and St. John are: (1) Grammanik Bank; and (2) Hind Bank.

commercial sector uses (or has used) trawl gear (with exceptions noted in Section 1.1, such as for research and exploratory fishing).

Alternative 2 and **Preferred Alternative 3** would prohibit the use of all trawl gear (i.e., bottom and mid-water trawl) for all fishing (i.e., commercial and recreational; federally managed and non-federally managed) either in Council-managed seasonally closed areas/MMAs or throughout the EEZ, respectively, around St. Thomas and St. John. Council MMAs in St. Thomas and St. John are the Grammanik Bank (50 CFR 622.514(a)(1)) and the Hind Bank Marine Conservation District (MCD) (50 CFR 622.514(a)(2)). All fishing is already prohibited in the Hind Bank MCD. **Alternative 2** and **Preferred Alternative 3** would prevent potentially negative ecological and biological and physical effects from the use of trawl gear in the future (e.g., habitat destruction, bycatch) in St. Thomas and St. John Council MMAs (**Alternative 2**) or throughout the EEZ around St. Thomas and St. John (**Preferred Alternative 3**). For example, potential impacts from trawling to coral and sponge habitat in the U.S. Caribbean EEZ, including the St. Thomas and St. John EEZ could be caused by direct contact with bottom tending trawl gear and from impacts to sensitive vertical relief from near-bottom orientation of pelagic trawls in its sensitive habitats. Also, by specifically prohibiting the use of trawl gear for all commercial and recreational harvest under **Preferred Alternative 3**, fishermen would not be able to petition to use trawl gear under federal regulations for gear types that are not included in the authorized gear list (as discussed in Section 1.2).[17]

Comparison of Alternatives

Alternative 1 is the status quo and would not change any regulations applicable to the use of trawls in federal waters around St. Thomas and St. John. **Alternative 2** would prohibit the use of trawl gear in all St. Thomas and St. John Council MMAs (specifically in the Grammanik Bank, because all fishing is already prohibited within the Hind Bank MCD year-round). **Preferred Alternative 3** would prohibit the use of trawl gear for the harvest of fish in all components of the St. Thomas and St. John fishery that occurs within the EEZ around Puerto Rico. Because trawl gear has not historically been used in the U.S. Caribbean EEZ, including the St. Thomas and St. John EEZ, and is not currently used, **Alternative 2** and **Preferred Alternative 3** are both administrative actions and are not expected to have any additional physical, biological/ecological, social, and economic effects when compared to **Alternative 1**. However, **Alternative 2** and **Preferred Alternative 3** would prevent trawl gear from being used in the future, and thus could be more beneficial to the physical and biological environment by

[17] 50 CFR 600.725(v): A person or vessel is prohibited from engaging in fishing or employing fishing gear when such fishing gear is prohibited or restricted by regulation under an FMP or other applicable law. However, after December 1, 1999, an individual fisherman may notify the appropriate Council, or the Director, in the case of Atlantic highly migratory species (HMS), of the intent to use a gear or participate in a fishery not already on the list. Ninety days after such notification, the individual may use the gear or participate in that fishery unless regulatory action is taken to prohibit the use of the gear or participate in the fishery (*e.g.,* through emergency or interim regulations).

preventing potential bycatch and/or habitat effects resulting from trawling activities in federal waters around St. Thomas and St. John (**Preferred Alternative 3**) or in St. Thomas and St. John Council MMAs (**Alternative 2**), with the former being more beneficial in protective fishery and habitat resources throughout the St. Thomas and St. John EEZ. Furthermore, prohibiting the use of trawl gear in all components of the St. Thomas and St. John fishery (**Preferred Alternative 3**) within the St. Thomas and St. John EEZ would prevent future use through a petition for its use,[7] which could occur under **Alternative 1** and **Alternative 2** (outside the St. Thomas and St. John Council MMAs), thus providing more benefits to the physical, biological/ecological environment.

2.3.2 Action 3(b). Modify the use of Gillnets in federal waters around St. Thomas and St. John, USVI

Alternative 1. No action. Retain gillnets as an authorized gear type for the commercial harvest of federally managed and non-federally managed pelagic species and the commercial harvest of non-federally managed species in federal waters around St. Thomas and St. John, and as a prohibited gear type for reef fish and spiny lobster in the EEZ around St. Thomas and St. John and inside Council Seasonally Closed Areas or Council MMAs.

Alternative 2. Prohibit the use of gillnets[18] in federal waters around St. Thomas and St. John:

Sub-alternative 2a. For all fishing in the EEZ.

Sub-alternative 2b (Preferred). For all fishing in the EEZ, except for the following fish species belonging to the halfbeaks (Family Hemiramphidae), gar (Family Belonidae), and flyingfish (Family Exocoetidae). A surface gillnet used in the EEZ around St. Thomas and St. John to fish for any baitfish must be tended at all times. Mesh size may not be smaller than 0.75 inches square or 1.5-inch stretch. May not be used 20 ft from bottom.

Discussion of Action 3(b) Alternatives

Alternative 1 would retain gillnets as an authorized gear type for the commercial harvest of federally managed and non-federally managed pelagic fish and for the commercial harvest of other non-federally managed species (e.g., species that are not managed by the Council), as listed in 50 CFR 600.725(v)(V). Federal regulations allow for the use of gillnets for the commercial harvest of non-federally managed species (e.g., baitfish such as ballyhoo or flying fish), subject to a requirement that the gear be tended at all times, and the use of gillnets is prohibited year-

[18] The use of gillnets is already prohibited inside Council Seasonally Closed Areas or Council MMAs. Gillnets are also prohibited for all fishing for federally managed reef fish and spiny lobster.

round for fishing for spiny lobster and federally managed reef fish.[19] The use of gillnets for the commercial harvest of federally managed pelagics, non- federally managed pelagics, and other non-federally managed species with gillnets could increase the potential for bycatch of target species that are prohibited with this gear type (i.e., federally managed reef fish and spiny lobster) and would also increase the potential catch of undersized managed and non-managed species (pelagics, non-federally managed species), which could increase potential for the catch of undersized managed and non-managed species (i.e., federally managed pelagics and non-federally managed species), which could increase potential for overfishing and negatively affect the populations. Although the use of gillnets to harvest pelagic species with gillnets in federal waters is less common than in St. Thomas and St. John territorial waters, landings of some pelagic species with gillnets are reported (see below in **Preferred Sub-alternative 2(b)**). **Alternative 1** would not be compatible with regulations for gillnets in the USVI, which prohibits the use of gillnets in territorial waters, except surface gillnets for the harvest of certain species of baitfish and has construction specifications.

Sub-alternative 2a proposes to prohibit the use of gillnets to harvest all commercial and recreational species (i.e., federally managed and non-federally managed) in the EEZ around St. Thomas and St. John. **Preferred Sub-alternative 2b** would prohibit the use of gillnets to harvest all commercial and recreational species (i.e., federally managed and non-federally managed) in the EEZ around St. Thomas and St. John, with the exception of baitfish belonging to the halfbeak, gar, and flyingfish families. **Sub-alternative 2b** would define a gillnet used for baitfish as one with mesh size openings that may not be smaller than 0.75 inches square or 1.5-inch stretch and that must be tended at all times. These specifications are partially compatible with USVI's specifications for surface gillnets used as bait nets territorial waters. Currently, gillnet is an authorized gear type for the commercial harvest of federally managed pelagic fish (See Appendix B) and non-federally managed pelagic fish (e.g., sardines, herring, ballyhoo, non-managed mackerel), and for the commercial harvest of non-federally managed species in the U.S. Caribbean EEZ, including the EEZ around St. Thomas and St. John. Federal regulations prohibit the use of gillnets for the harvest of managed reef fish and spiny lobster in all U.S. Caribbean federal waters and prohibit the use of gillnets in all Council MMAs, and allow the use of gillnets (and trammel nets) to fish for any other species, which must be tended at all times (50 CFR 622.437(a)(3)). With respect to non-federally managed species, the Magnuson-Stevens Act gives the Councils and NMFS the authority to regulate fishing activity to support the conservation and management of fisheries. This could include regulations that pertain to fishing for non-managed species. Per Section 303(b)(12) and (14) of the Magnuson-Stevens Act, FMPs can "include management measures in the plan to conserve target and non-target species and

[19] Cast nets are authorized for the commercial and recreational harvest of non-federally managed species. Cast nets are surface nets typically used to fish for baitfish such as ballyhoo, sardines, and other species. The Council did not include cast nets in the motion to prepare this amendment.

habitats, considering the variety of ecological factors affecting fishery populations" and can "prescribe such other measures, requirements, or conditions and restrictions as are determined to be necessary and appropriate for the conservation and management of the fishery." These provisions, taken together, provide broad discretion to manage fishing for non-federally managed species for the benefit of federally managed species.

Although the use of gillnets for the commercial harvest of federally managed and non-federally managed pelagic species or other non-federally managed species in federal waters is considered to be minimal due to depth and distance from the coast of the location of federal waters, **Sub-alternatives 2a** and **Sub-alternative 2b** would prevent negative ecological and biological effects resulting from the use of gillnets (e.g., prevention of bycatch of undersized individuals, protected species, other target and non-target species). Based on commercial landings from 2012-2021 of federally-managed species from EEZ waters around St. Thomas and St. John, species harvested with gillnet include red hind, coney, yellowtail snapper, blue runner (all landings are minor and confidential). Allowing the use of surface gillnets for catching certain species of baitfish commercially and/or recreationally would allow fishermen to continue using these specific bait nets in federal waters (**Sub-alternative 2b**), and would prevent using gillnets for other managed and non-managed species. Specifying the mesh size and requirement to tend the net at all times in **Sub-alternative 2b** would make the regulation compatible with USVI territorial regulations and would also prevent bycatch.

Comparison of alternatives

Alternative 1 is the status quo alternative (no changes to gillnet regulations in the EEZ around St. Thomas and St. John) and would be less beneficial to the biological and ecological environment in federal waters off St. Thomas and St. John, but more beneficial to the socio-economic environment than **Sub-alternative 2a**. **Alternative 1** would continue to allow the use of gillnets for the commercial harvest of pelagic species and non-federally managed species, increasing the potential of adverse effects from use of the gear, but allowing fishermen that use gillnet for harvesting these species to continue to do so. Administrative effects would be slightly higher under **Sub-alternative 2a** than **Alternative 1**. With respect to certain species of baitfish, **Alternative 1** and **Sub-alternative 2b** are not different, as both would continue to allow gillnets for catching those species, with no additional effects to the biological environment, socio-economic environment, or administrative environment. Physical effects are not expected to result from the use of gillnets under any of the alternatives. **Sub-alternative 2b** would be partially compatible with USVI regulations for surface gillnets, facilitating enforcement of federal regulations and would be more beneficial to the ecological and biological environment because it would prevent bycatch by setting a maximum mesh size for the bait nets.

2.3.3 Action 3(c). Modify the use of Trammel nets in federal waters around St. Thomas and St. John, USVI

Alternative 1. No action. Retain trammel nets as neither an authorized gear type for any fisheries in the EEZ around St. Thomas and St. John, nor an otherwise prohibited gear type, except for federally-managed reef fish and spiny lobster.

Alternative 2. Prohibit the use of trammel nets for all fishing in federal waters around St. Thomas and St. John.

2.3.4 Action 3(d). Modify the use of Purse Seines in federal waters around St. Thomas and St. John, USVI

Alternative 1. No action. Retain purse seines as neither an authorized gear type for any fisheries in the EEZ around St. Thomas and St. John, nor an otherwise prohibited gear type.

Alternative 2. Prohibit the use of purse seines for all fishing in federal waters around St. Thomas and St. John.

Discussion of Action 3(c) and Action 3(d) Alternatives

Alternative 1 of **Action 3(c)** and **Action 3(d)** would retain trammel nets and purse seines as neither an authorized gear type for any fisheries in the EEZ around Puerto Rico, nor an otherwise prohibited gear type, except that the use of trammel nets to harvest of federally-managed reef fish and spiny lobster is prohibited. **Alternative 2** of **Action 3(c)** would prohibit the use of trammel nets and **Alternative 2 of Action 3(d)** would prohibit the use of purse seines for all fishing in the U.S. EEZ around St. Thomas and St. John. These gear types are not listed as authorized under any U.S. Caribbean fisheries, including St. Thomas and St. John, in federal regulations at 50 CFR 600.725(v)(V), therefore **Alternatives 2 of Actions 3(c)** and **3(d),** respectively, are administrative actions. As noted above, trammel nets are specifically prohibited for fishing for federally managed reef fish and spiny lobster in federal waters around all three-island management areas, including St. Thomas and St. John. These gear types are also prohibited in Council MMAs (2005 Caribbean Sustainable Fisheries Act Amendment). Similar to surface gillnets, federal regulations allow the use of trammel nets (or gillnets) to fish for any other species, but they must be tended at all times (50 CFR 622.512(a)(3)). Trammel nets are prohibited for use in USVI territorial waters and no landings with trammel net were reported from 2012-2021. Purse seines (except purse seines authorized for HMS species) are not used in federal and territorial waters of the U.S. Caribbean, **Alternative 2 of Action 3(c)** and **Alternative 2 of Action 3(d)** would specifically prohibit the use of these gear types for the harvest of all fish species in the St. Thomas and St. John fishery, including for the use of surface trammel nets for baitfish. As a prohibited gear type, fishermen would not be able to petition to

use of this gear as otherwise allowed under federal regulations for gear that are not included in the authorized gear list.[20]

Comparison of alternatives in Action 3(c) Trammel nets and Action 3(d) Purse seines

Effects to the physical, biological/ecological, and socio-economic environments from **Alternative 2 in Action 3(c) and Alternative 2 in Action 3(d)** are not expected to be different from those of **Alternative 1 of Action 3(c) and Action 3(d)** because both trammel nets and purse seines are currently not authorized for use in federal waters for any fishing. In addition, there are no landings with trammel nets from USVI federal waters as it is banned in territorial waters. However, **Alternatives 2 of Actions 3(c) and 3(d)** could be slightly more beneficial to the biological/ecological environment of the St. Thomas and St. John EEZ because they further restrict potential future use of these gear types through a petition to the Council. Administrative effects are expected to be slightly higher for both action alternatives than for its respective no action alternative (**Alternative 1**).

2.4 Action 4: Requirements for the Use of Descending Devices in the Reef Fish Component of the Puerto Rico, St. Croix, and St. Thomas and St. John FMPs

2.4.1 Proposed Alternatives for Action 4

Alternative 1. No action. Descending devices are not required to be on board a vessel fishing for or possessing species in the reef fish component of the Puerto Rico, St. Croix, and St. Thomas and St. John FMPs.

Alternative 2 (Preferred). Require a descending device* be on board a commercial or recreational vessel and readily available for use while fishing for or possessing species in the reef fish component of any of the FMPs:

Preferred Sub-alternative a. Puerto Rico
Preferred Sub-alternative b. St. Croix
Preferred Sub-alternative c. St. Thomas and St. John

[20] 50 CFR 600.725(v): A person or vessel is prohibited from engaging in fishing or employing fishing gear when such fishing gear is prohibited or restricted by regulation under an FMP or other applicable law. However, after December 1, 1999, an individual fisherman may notify the appropriate Council, or the Director, in the case of Atlantic HMS, of the intent to use a gear or participate in a fishery not already on the list. Ninety days after such notification, the individual may use the gear or participate in that fishery unless regulatory action is taken to prohibit the use of the gear or participate in the fishery (*e.g.,* through emergency or interim regulations).

* For the purpose of this requirement, a "descending device" means an instrument to which is attached a minimum of a 16-ounce weight and a length of line that will release the fish at the depth from which the fish was caught or a minimum of a 60 ft/18m. The descending device attaches to the fish's mouth or is a container that will hold the fish. The device must be capable of releasing the fish automatically, by the actions of the operator of the device, or by allowing the fish to escape on its own. Since minimizing surface time is critical to increasing survival, descending devices shall be readily available for use while engaged in fishing.[21]

Discussion of Action 4 Alternatives

Alternative 1 would retain the status quo and not require a descending device be onboard a vessel fishing for or possessing federally- managed reef fish in the EEZ around Puerto Rico, St. Croix, and St. Thomas and St. John.

Preferred Alternative 2 would require a descending device be rigged and ready for use on a vessel when fishing for or possessing federally managed reef fish in federal waters around Puerto Rico (**Sub-alternative 2a**), St. Croix (**Sub-alternative 2b**), and St. Thomas and St. John (**Sub-alternative 2c**) (See Appendix B for a list of reef fish species managed under each FMP). Using descending devices has been shown to be a low cost, effective way of reducing fishing mortality from discards and this tool has been adopted by both the South Atlantic Fishery Management Council (South Atlantic Council) and the Gulf of Mexico Fishery Management Council (Gulf Council). [22] By proposing the use of descending devices, the Council expects to reduce fishing mortality of regulatory and economic discards[23] of federally-managed reef fish, which is one of the components of the island fisheries' most vulnerable to barotrauma. The Council intent is that descending devices only be used when a fish may be experiencing barotrauma (e.g., caught in deep water, protruding stomach, etc.). Also, to ensure that descending devices on board are effective, devices must meet requirements in the definitions provided in **Preferred Alternative 2**.

As mentioned above, having a descending device on board a vessel is required in the South Atlantic and the Gulf of Mexico. The final rule (85 FR 36166) for Amendment 29 to the Fishery Management Plan of the South Atlantic Region published on June 15, 2020, specifying the requirements for a descending device. A descending device is also required for Gulf of Mexico reef fish in federal waters through the application of the Descend Act in 2022 (Direct

[21] This definition of a descending device would be similar to the one described by the South Atlantic Fishery Management Council and Gulf of Mexico Fishery Management Council.

[22] See Florida Fish and Wildlife Commission for an educational video on how to make an effective homemade descending device: https://www.youtube.com/watch?v=Y0o9lxCxEAM.

[23] Regulatory discards are fish that are required by regulation to be discarded, but also include fish that may be retained but not sold. Economic discards are fish that are discarded because they are undesirable to the harvester. This category of discards generally includes certain species, sizes, and/or sexes with low or no market value.

Enhancement of Snapper Conservation and the Economy through Novel Devices Act of 2020). The Descend Act defines a Descending Device as an instrument that will release a fish at a depth sufficient for the fish to be able to recover from the effects of barotrauma; is a weighted hook, lip clamp, or box that will hold the fish while it is lowered to depth, or another device determined to be appropriate by the Secretary of Commerce; and is capable of releasing the fish automatically, releasing the fish by actions of the operator of the device, or by allowing the fish to escape on its own.[24]

Under **Preferred Sub-Alternatives 2a, 2b, and 2c**, requiring a descending device be rigged and ready for use would add some minor economic impacts to recreational and commercial fishermen because they would need to incur in expenses to purchase or create the device. Although, those expenses are expected to be minor because descending devices can be created with materials fishers may already have in their possession, and are low cost and easy to use (see Appendix C for examples of descending devices). Requiring a descending device to be rigged and ready for use would benefit the biological environment of the managed reef fish by increasing their opportunities for survival and reducing fishing mortality from discards due to barotrauma. Because enforcing regulations specifically requiring the device to be used (versus the device being rigged and ready to use) is complicated, the Council, similar to actions taken by the South Atlantic Council and the Gulf Council, would require the device be on board, rigged and ready for use.

Comparison of Alternatives

Preferred Sub-Alternatives 2a, 2b, and 2c would be equally more beneficial to the biological and ecological environment of reef fish than **Alternative 1**, as any of them would require a descending device to be rigged and ready for use, which could decrease fishing mortality of Council-managed reef fish from barotrauma in each of the island management areas. In the short-term, socio-economic effects from **Preferred Sub-Alternatives 2a, 2b, and 2c** are expected to be larger than from **Alternative 1** due to the cost and effort for fishers to obtain and keep onboard a descending device. Administrative effects from **Preferred Sub-Alternatives 2a, 2b, and 2c** would also be higher than **Alternative 1** because of the regulatory action needed to effect the requirement and the additional efforts to enforce these regulations for all reef fish fishermen (commercial and recreational), in federal waters of the three management areas, and to conduct outreach and education activities.

[24] NMFS published a final rule (87 FR 2355) clarifying the definition of a descending device and venting tool that published on January 14, 2022, where it further defines it as a device capable of releasing a fish at the depth from which the fish was caught; and specifies that the device must use a minimum of a 16-ounce weight and a minimum length of 60 feet length of line attached to the descending device. It must be rigged and ready for use when fishing for Gulf of Mexico reef fish. These regulations for the descending device in the Gulf of Mexico at § 622.30, match regulations for a descending device in the South Atlantic at § 622.188.

Chapter 3. Affected Environment (in progress)

This section describes the environment and resources included within federal waters off Puerto Rico, St. Thomas and St. John, and St. Croix that would be affected by the proposed action. Additional information on the physical, habitat, biological/ecological, economic, social, and administrative environments of Puerto Rico and the U.S. Virgin Islands (USVI) have been described in detail in the Puerto Rico Fishery Management Plan (FMP) (CFMC 2019a), the St. Thomas and St. John FMP (CFMC 2019b), and the St. Croix FMP (CFMC 2019c), and are incorporated 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, both of which separate the Caribbean Sea from the western central Atlantic Ocean. The USVI are part of the Virgin Islands chain, which lies in the northeastern Caribbean about 50 mi (80 km) east of Puerto Rico's main island, and consists of four major islands: St. Thomas, St. John, St. Croix, and Water Island (DPNR 2005). The U.S. Caribbean exclusive economic zone (EEZ) covers an area of approximately 75,687 mi^2 (196,029 km^2).

3.1.1 Puerto Rico

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

south (~16,400 ft [5,000 m] deep). To the east, Puerto Rico shares the shallow-water shelf platform with St. Thomas and St. John, USVI.

3.1.2 St. Croix

The St. Croix EEZ is located 3 - 200 nautical miles (6 – 370 km) from the shoreline and covers approximately 9,216 mi^2 (23,870 km^2). The island of St. Croix is surrounded by the Caribbean Sea. St. Croix is located about 46 mi (74 km) south of St. Thomas and St. John and lies on a different geological platform than Puerto Rico, St. Thomas, and St. John. St. Croix is separated

from those islands by a 2.5 mi (4 km) deep trench (CFMC 2004). The St. Croix shelf is much narrower and shallower than that of the northern islands (Goenaga and Boulon 1992), and has a total area of approximately 99 nm^2 (343 km^2) (Gordon 2010). Most of the shelf area is less than 80 ft (24.4 m) deep (Kojis and Quinn 2011).

3.1.3 St. Thomas and St. John

The St. Thomas and St. John EEZ is located 3 - 200 nautical miles (6 – 370 km) from the shoreline and covers approximately 1,103 mi^2 (2,856 km^2). The islands of St. Thomas and St. John are bordered by the Atlantic Ocean to the north and the Caribbean Sea to the south. The island of St. Thomas is bordered to the west by the Puerto Rico islands of Vieques and Culebra, and to the east by St. John, which is bordered on the east by the British Virgin Islands. The shelf shared by the islands of St. Thomas and St. John is about 8 mi (12.9 km) wide on the south and 20 mi (32.2 km) wide on the north (Goenaga and Boulon 1992) with an area of approximately 510 nm^2 (1751 km2). Most of the shelf area is greater than 80 ft (24.4 m) deep (Kojis and Quinn 2011).

3.1.4 Habitat Environment and Essential Fish Habitat

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

Essential Fish Habitat

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 information for species affected by this amendment is described in the island-based FMPs and is summarized below.

Specific categories of EFH identified in the island-based FMPs, which are utilized by federally managed fish and invertebrate species, include both estuarine/inshore and marine/offshore areas. Specifically, estuarine/inshore EFH includes estuarine emergent and mangrove wetlands, submerged aquatic vegetation, intertidal flats, palustrine emergent and forested systems, and the estuarine water column. Additionally, marine/offshore EFH includes live/hard bottom habitats, coral and coral reefs, seagrass and algal plains, sand and shell substrate, and the marine water

column. Essential fish habitat includes the spawning area in the water column above the adult habitat. Due to the steep continental slopes that occur off Puerto Rico and the USVI, the majority of fish habitat occurs within the 100 fathoms (183 m) contour line, as does the majority of fishing activity for Caribbean Fishery Management Council (Council)-managed species. Beyond 100 fathoms, the sea bed drops off dramatically and is difficult to fish, as it requires larger vessels and more gear (e.g., more line for fish traps, handlines, etc.), both of which are not typical of U.S. Caribbean fisheries. As a result of the lack of discrete habitat mapping, as well as explicit spatial effort information, especially in the area between the 100-fathom contour and the outer boundary of the U.S. Caribbean EEZ, assumptions had to be made regarding the distribution of species with deep-water or pelagic life stages. Thus, for those deep-water species, in instances when the literature, data, or expert opinion reported the presence of one or more life stage occurring deeper than 100 fathoms (183 m), EFH was assumed to extend to the outer boundary of the U.S. Caribbean EEZ.

3.2 Description of the Biological and Ecological Environments

The Puerto Rico FMP (CFMC 2019a), St. Croix FMP (CFMC 2019c), and the St. Thomas and St. John FMP (CFMC 2019b), include a description of the biological environment for the species managed in federal waters in the respective island/island group management area, including reef fish, deep-water reef fish and pelagic species (mostly caught incidentally while pursuing deep-water reef fish), which are incorporated herein by reference and summarized below. Reef fish and pelagic species are managed as stocks or stock complexes. See Appendix A for a complete list of species managed under the Reef Fish and Pelagic groups on each of the island-based FMPs.

3.2.1 Description of the Species Affected by this Amendment

The waters off Puerto Rico, St. Thomas and St. John, and St. Croix support hundreds of marine fish species and invertebrates including corals and organisms associated with coral reefs. Species affected by this amendment affect federally managed reef fish and pelagic species, as well as species not managed by the Council. The reef fish component of the Puerto Rico fishery in the Puerto Rico FMP contains 51 species of fish and the pelagic fish component contains 9 species of fish. The reef fish component of the St. Croix fishery includes 41 species and the pelagic fish component contains two species of fish. The reef fish component of the St. Thomas and St. John fishery includes 45 species and the pelagic fish component includes two species of fish (See Appendix A). Many of these stocks are taken primarily in commercial, subsistence, and/or recreational fisheries. Appendices I and J in the island-based FMPs contain specific information about the distribution and habitat, life history, diet, reproduction and spawning characteristics for all species managed under the FMPs.

3.2.1.1 Life History and Biology

Appendix J in each of the island-based FMPs contains a comprehensive description of the life history and biology of each of the species that may be affected by this amendment (for a list of Council-managed species affected by this amendment, see Appendix A of this document).

3.2.2 Bycatch

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

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

Year-round:

- Nassau grouper: No person may fish for or possess Nassau grouper in or from the EEZ around Puerto Rico, St. Croix, and St. Thomas and St. John. Such fish caught in the EEZ around Puerto Rico, St. Croix, and St. Thomas and St. John must be released immediately with a minimum of harm.
- Goliath grouper: No person may fish for or possess goliath grouper in or from the EEZ around Puerto Rico, St. Thomas and St. John, and St. Croix. Such fish caught in the EEZ around Puerto Rico, St. Thomas and St. John, and St. Croix must be released immediately with a minimum of harm.
- Juvenile yellowtail snapper: Federal law requires that catches of yellowtail snapper under 12 inches (30.5 cm) in fork total length be returned to the water immediately with a minimum of harm.

Seasonal:

- Red hind, yellowfin, yellowedge, red, tiger, and black groupers; silk, black, blackfin, and vermilion snappers; lane and mutton snappers: federal law prohibits fishing for and possession of these species during specified closed seasons and closed areas established by island area.

In Puerto Rico, St. Croix, and St. Thomas and St. John, reef fish and pelagic fish are mainly harvested commercially in federal waters using hook and line gear (Traps fishing too for reef fish) and in territorial waters of Puerto Rico, some harvest of these groups are reported with nets such as gillnets and trammel nets. Recreational harvest of reef fish and pelagic fish in federal

waters is thought to mostly be conducted with hook and line, though recreational data are not available at this time.

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

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 (Mignucci-Giannoni 1998), including waters around Puerto Rico. All 17 species are protected under the MMPA. Three of these species (i.e., sperm, sei, and fin whales) are also listed as endangered under the ESA.[25] In addition to these three marine mammals, five species or distinct population segments (DPS) of sea turtles (green - North Atlantic DPS and the South Atlantic DPS; hawksbill; leatherback; loggerhead - Northwest Atlantic DPS); four species or DPSs of fish (Nassau grouper; scalloped hammerhead shark - Central and Southwest Atlantic DPS; oceanic whitetip shark; giant manta ray); and seven species of coral (elkhorn coral, staghorn coral, rough cactus coral, pillar coral, lobed star coral, mountainous star coral, and boulder coral) occur in the U.S. Caribbean and are also protected under the ESA. ESA designated critical habitat for the green sea turtle, hawksbill sea turtle, leatherback sea turtle, and *Acropora* corals also occur within the Council's jurisdiction. Critical habitat for green and hawksbill sea turtles occurs entirely within Puerto Rico territorial waters, and over 99% of the critical habitat for leatherback sea turtles around St. Croix occurs within USVI territorial 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 territorial waters.

The National Marine Fisheries Service (NMFS) completed a biological opinion on September 21, 2020, evaluating the impacts of the Puerto Rico, St. Thomas and St. John, and St. Croix fisheries on Endangered Species Act (ESA)-listed species that occur in the U.S. Caribbean region (NMFS 2020b). In the biological opinion, NMFS determined that the authorization of the fisheries conducted under each of the island-based FMPs is not likely to 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

[25] 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).

determined that the authorization of the island-based fisheries is not likely to jeopardize the continued existence of the North Atlantic DPS of green sea turtle, South Atlantic DPS of green sea turtle, hawksbill sea turtle, Nassau grouper, oceanic whitetip shark, Central and Southwest Atlantic DPS of scalloped hammerhead shark, elkhorn coral, staghorn coral, rough cactus coral, pillar coral, lobed star coral, mountainous star coral, 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 Puerto Rico, St. Thomas and St. John, or St. Croix fisheries in a manner that would cause effects to ESA-listed species or critical habitat that were not considered in the 2020 biological opinion.

A proposed rule to designate critical habitat for the threatened non-acroporid corals, *Orbicella annularis, O. faveolata, O. franksi, Dendrogyra cylindrus, and Mycetophyllia ferox*, published on November 27, 2020 (85 FR 76302). A second proposed rule to list the queen conch as threatened under the ESA published on September 8, 2022 (87 FR 55200), and a third proposed rule to designate critical habitat for the threatened Nassau grouper published on October 17, 2022 (87 FR 62930). Sustainable Fisheries Division staff and Protected Resources Division staff have developed action plans for conferencing on these proposed rules to ensure NMFS's ESA Section 7 responsibilities are addressed with respect to existing island-based FMPs and their implementing regulations.

Sustainable Fisheries Division staff is working in cooperation with the Protected Resources Division to follow the steps outlined in the Queen Conch and Nassau grouper and non-acroporid critical habitat action plans. The authorization of the island-based FMPs and their implementing regulations are not anticipated to be likely to jeopardize any proposed species or result in the destruction or adverse modification of proposed critical habitat so all planned conferences are elective.

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

Each of the island-based FMPs contain a comprehensive description of the fisheries and sectors occurring within the respective EEZ and are incorporated here by reference. The following sections describe the fisheries affected by this amendment. (In PROGRESS)

3.4 Description of the Economic Environment

3.4.1 Economic Description of the Fishery

3.4.2.1 Puerto Rico

3.4.2.1.1 General Commercial Fishery Information and Landings Statistics

The fisheries of Puerto Rico provide a desired source of food to the local population and tourists in addition to an important source of income to the local population. This income is derived from purchases associated with both commercial and recreational activities (e.g., fuel, ice, food) as well as the sale of landed products by 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.[26] 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. Specifically, 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. Given this to be the case, one would not expect extensive fishing activities in federal waters.[27]

Based on available trip ticket data, an estimated $9.0 million of seafood products was landed in 2014 based on 2.33 million pounds (Table 3.4.1)[28]. In general, landings during the 2014-19 period were relatively stable with the exception of 2017 when landings fell about 25% (to 1.77

[26] Shivlani (2022) notes that full-time fishermen may have been oversampled in his study given that almost a third of those reporting landings in 2018 (via the trip ticket) took less than ten trips.
[27] This, of course, does not address the issue of the reasons for the relatively small vessels. One might hypothesize that the costs of fishing in federal waters are high relative to revenues and, thus, there is little desire to fish in federal waters (and larger vessels). Alternatively, financing constraints may be a limiting factor.
[28] These landings are considered 'estimates' because not all landings are reported and landings that are reported are thus adjusted using an expansion factor determined by DNER staff at the Fisheries Research Laboratory. In addition, as noted by Shivlani (2022) "[a]part from the obvious dearth of fisheries information, a major issue facing data-poor fisheries is often the quality (and often veracity) of the underlying data. A factor that compounds the data-poor situation for most of Puerto Rican fisheries is the unlicensed effort that occurs outside the (albeit limited) reporting system… (p.4). To the extent that this is substantial, the estimates may be a 'poor' reflection of actual activity.

million pounds) from the previous year.[29] Landings rebounded the following year, however, to 2.41 million pounds with 2019 landings only slightly exceeding the estimated total for 2018.

Table 3.4.1. Estimated Annual Landings (Pounds, Value, and Price) of Seafood Harvested in Puerto Rico Territorial and Federal Waters, 2014-2019.

Year	Landings	Value		Price	
	Pounds	Current	Deflated[a]	Current	Deflated
	----------$1,000s----------			-----$/Lb.-----	
2014	2,330.6	9,018.0	9,739.7	3.87	4.18
2015	2,370.5	9,5944.2	10,348.6	4.05	4.37
2016	2,369.5	10,001.6	10,653.6	4.22	4.50
2017	1,770.9	7.988.2	8,331.5	4.51	4.70
2018	2,408.7	11,326.9	11,532.1	4.70	4.79
2019	2,466.9	12,051.0	12,051.0	4.88	4.88

[a] Deflated based on the 2019 Consumer Price Index.

The value of these landings, which averaged $10.0 million during the period of analysis, gradually increased during the six-year period. The increased value primarily reflects an increase in per pound price given stability in pounds landed. As indicated, the price per pound equaled $4.88 in 2019 compared to $3.87 in 2014 and the price still exhibited a large increase even after adjusting for inflation (Table 3.4.1). Overall, the increased price may reflect an increase in demand, a change in composition of the landed product, or some amalgam.

3.4.2.1.2 Commercial Landings from Catches in Territorial and Federal Waters

Seafood produced from the waters surrounding Puerto Rico is harvested in both territorial and federal waters. Fishermen, when completing trip tickets, are asked to state whether landings represent catch taken from territorial or federal waters. Though requested, this information is not always provided. Landings for which area of catch (i.e., territorial or federal waters) was not reported fell from in excess of 400 thousand pounds in 2014 to about 60 thousand pounds in 2019 (Table 3.4.2). Landings for which territorial waters was stated as the area fished averaged 1.73 million pounds annually during the 2014-19 period and accounted for more than 80% of those landings where area of catch was given (i.e., territorial or federal waters). Estimated landings where the designated fishing area was federal waters averaged about 365 thousand pounds annually during 2014-19 or about 18% of total landings where area of catch was reported on the trip ticket. It is thus clear that the vast majority of seafood produced in Puerto Rico is taken from territorial rather than federal waters. Finally, the annual percentages from derived from reported area of catches can be used, under the assumption that unreported landings follow

[29] The decline in 2017 landings is undoubtedly related, at least in part, to the impacts of Hurricane Maria which made landfall in Puerto Rico on September 20th.

the same ratio, to proportion the 'unknown' catch between territorial and federal waters. These estimates are also presented in Table 3.4.2. Based on this partitioning, 2014-2019 landings from territorial waters have approximated 1.9 million pounds annually while landings from federal waters have approximated 400 thousand pounds. This information would suggest that about 20% of the total Puerto Rican landings in recent years has been derived from federal waters.[30]

Table 3.4.2. Estimated Annual Landings (Pounds) Associated With Catch From Territorial and Federal Waters in Puerto Rico for 2014-2019.

Year	Territorial Waters	Federal Waters	Unknown Waters	Total Landings	Expanded Territorial Waters	Expanded Federal Waters
	----------1,000 Lbs----------					
2014	1,511.9	390.8	428.0	2,330.6	1,852.0	478.7
2015	1,573.2	398.4	398.8	2,370.5	1,891.4	479.0
2016	1,861.5	346.8	161.2	2,369.5	1,997.4	372.1
2017	1,485.5	233.1	52.4	1,770.9	1,530.7	240.2
2018	2,021.7	314.7	72.3	2,408.7	2,084.3	324.5
2019	1,901.7	505.1	60.1	2,466.9	1,949.3	517.7

The value of landings associated with the poundage information presented in Table 3.4.2 is given in Table 3.4.3. In general, the same patterns observed with poundage occur also with value. Specifically, the vast majority of the value of harvested product is taken in territorial waters. Estimated value of landings where the designated fishing area was federal waters averaged about $1.70 million annually during 2014-19 or about 21% of total value of landings where area of catch was reported on the trip ticket. The value of landings from territorial waters, by comparison, averaged $7.5 million annually or about 79% of the total value of landings where area of catch was reported on the trip ticket. Finally, partitioning of the 'unknown' landings value (i.e., trips where area of catch is not reported) resulted in an estimate of value of landings from territorial waters equal to $8.14 million annually during 2014-2019 compared to an estimate of $1.86 million from federal waters.

[30] A comparison of the 20% estimate (i.e., the proportion of harvest, in pounds, coming from federal waters) with the findings reported by Shivlani (i.e., only 4.4% of the interviewed fishermen fished exclusively in federal waters while another 12.1% reported some fishing in federal waters) leads one to hypothesize that catch per trip in federal waters exceeds that in territorial waters and/or those fishermen reporting trips in federal waters make, on average, more annual trips than those fishermen fishing exclusively in territorial waters. Both of these hypotheses appear plausible. Specifically, the larger boats likely used in federal waters allows for higher per trip catches for a multitude of reasons (e.g., a larger crew) . Likewise, the larger boats allow for fishing in more unfavorable conditions which would result in an increased number of trips and, hence, annual catch in federal waters.

Table 3.4.3. Estimated Value of Landings Associated with Catch from Territorial and Federal Waters of Puerto Rico for 2014-2019.

Year	Territorial Waters	Federal Waters	Unknown Waters	Total Landings	Expanded Territorial Waters	Expanded Federal Waters
	----------$ 1000s----------					
2014	5,795.7	1,646.5	1,575.8	9,018.0	7,022.9	1,995.1
2015	6,310.2	1,686.5	1,597.5	9,594.2	7,570.8	2,023.4
2016	7,799.3	1,560.7	641.6	10,001.6	8,333.9	1,667.7
2017	6,616.5	1,117.0	254.7	7,988.2	6,834.4	1,153.8
2018	9,487.3	1,525.6	313.9	11,326.9	9,757.8	1,569.1
2019	9,068.8	2,690.0	302.2	12,051.0	9,291.8	2,759.2

3.4.2.1.3 Commercial Landings of Managed and Non-managed Species

A large number of species (in excess of 100) are landed in Puerto Rico. Many of these species are managed under the auspices of the Caribbean Fishery Management Council which has jurisdiction in federal waters.[31] Annual landings of managed and non-managed species for the 2014-2019 period are presented in Table 3.4.4. As indicated, the overwhelming majority of landings, expressed on either weight or value basis, represent managed species (by the Caribbean Fishery Management Council). In terms of poundage, 83% of landings during 2014-2019 represent managed species with almost 90% of value during the period representing species which can be managed under the auspices of the Caribbean Fishery Management Council. The higher percentage by value reflects, undoubtedly, some of the higher priced species (e.g., lobster) being managed.

Table 3.4.4. Estimated Landings (Pounds and Value) of Managed and Unmanaged Species in Puerto Rico, 2014-2019.

Year	Managed Species		Non-managed Species		Percent Managed Species	
	----------1,000s Lbs. and $1000s----------				--------%---------	
	Pounds	Value	Pounds	Value	Pounds	Value
2014	1,922.9	8,156.0	407.7	862.0	82.5	90.4
2015	1,951.6	8,522.2	418.9	1,072.0	82.3	88.8
2016	1,976.2	9,050.3	393.3	951.4	83.4	90.5
2017	1,455.1	7,097.6	315.8	890.6	82.2	88.9
2018	2,020.8	10,238.3	388.0	1,088.6	83.9	90.4
2019	2,052.9	10,658.9	414.0	1,392.1	83.2	88.4

[31] In addition to federal management of species, Puerto Rico also manages some species.

3.4.2.1.4 Commercial Landings of Managed and Non-managed Species by Gear Fished and Territorial Versus Federal Waters, Yearly Averages for 2014-2019.

In his survey of Puerto Rican fishermen, Shivlani (2022) queried those interviewed regarding gears fished. Overall, line gear[32] was by far the most prevalent gear mentioned with about 80% reported using it. This was followed by fishing pots/lobster pots (33.2%), scuba (31.7%), nets (30.7%), and free diving (17.6%).[33]

The trip ticket data can also be used to examine gear usage. Relevant information pertaining to gears used under various scenarios (i.e., territorial versus federal waters and managed versus non-managed species) is provided in Tables 3.4.5 (pounds) and 3.4.6 (value)[34].
With respect to managed species, five gears (bottom line, hand line, scuba, snare, and fish pot) represented three-quarters of all estimated landings, expressed in pounds, during the 2014-2019 period (Table 3.4.5). Due to the higher per pound price, these five gears contributed more than 80% of the value of managed species landed during the 2014-2019 period (Table 3.4.6).

On an absolute poundage basis, bottom line (172.5 thousand pounds), troll line (55.2 thousand pounds), hand line (30.4 thousand pounds) rod & reel (23.5 thousand pounds), and snare (23.0 thousand pounds) dominate poundage taken from federal waters. These five gears, combined, account for an estimated 84% of the harvest of managed species from federal waters expressed on a weight basis (Table 3.4.5).

Table 3.4.5. Estimated Average Annual Landings (Pounds) of Managed and Non-managed Species by Gear and Territorial Versus Federal Waters in Puerto Rico, 2014-2019.

Gear	Managed Species				Non-managed Species			
	Territorial Waters	Federal Waters	Total	% Federal Waters	Territorial Waters	Federal Waters	Total	% Federal Waters
	-------1000s Lbs.--------				------1000s Lbs.------			
Beach Seine	14.9	2.3	17.2	13.2	30.6	1.3	31.9	4.0
Bottom Line	191.1	172.5	363.6	47.4	5.0	1.7	6.7	25.1

[32] Types of line gear are numerous (see Shivlani, 2022) including gillnets which 17.3% of interviewees reported owning and castnets (owned by 45.9%).
[33] Percentages exceed 100 because many fishermen report using more than one gear.
[34] As discussed in Section 3.4.2.1.2, a relatively small proportion of Puerto Rico seafood landings represent catches taken from federal waters (about 18% of landings given in terms of pounds and 21% by value). Given the relatively low percentage of landings derived from federal waters, it stands to reason that the harvest of managed species in federal waters is limited. For the 2014-2019 period, an estimated 19% of federally managed species were taken from federal waters with expanded landings (i.e., taking into account the 'unknown' landings in a manner similar to that discussed in Section 3.4.2.1.1) equaling about 400 thousand pounds (valued at $1.76 million) annually. With respect to the unmanaged species, less than 9% of landings were estimated to be taken from federal waters with estimated annual landings equal to 33.5 thousand pounds (($87.8 thousand).

Gear	Managed Species				Non-managed Species			
	Territorial Waters	Federal Waters	Total	% Federal Waters	Territorial Waters	Federal Waters	Total	% Federal Waters
	-------1000s Lbs.--------				------1000s Lbs.------			
By Hand	1.8	0.18	1.98	9.3	1.3	0.02	1.32	1.8
Cast Net	0.76	0.13	0.89	14.6	32.3	2.4	34.7	7.0
Fish Pot	218.1	20.0	238.1	8.4	56.5	7.8	64.3	12.1
Gill Net	24.3	1.9	26.2	7.2	92.8	3.1	95.9	3.3
Hand Line	241.9	30.4	272.3	11.1	38.6	3.5	42.1	8.3
Land Crab Trap	0.21	0	0.21	0	3.5	0.15	3.65	4.1
Lobster Pot	53.7	5.2	58.9	8.8	1.2	0.03	1.23	2.3
Long Line	13.4	0.96	14.36	6.7	2.8	0.33	3.13	10.6
Rod & Reel	42.4	23.5	65.9	35.6	7.3	1.9	9.2	20.9
Scuba Dive	271.4	16.5	287.9	5.7	18.5	1.1	19.6	5.8
Skin Dive	9.4	0.89	10.29	8.6	8.7	0.34	9.04	3.7
Snare	231.9	23.0	254.9	9.0	2.2	0.15	2.35	6.3
Spear Fish	121.7	11.2	132.9	8.4	27.8	2.1	29.9	7.0
Trammel Net	26.5	0.77	27.27	2.8	14.0	0.33	14.33	2.2
Troll Line	68.9	55.2	124.1	44.5	13.0	7.2	20.2	35.8
TOTAL	1,532.4	364.2	1,896.6	NA	356.1	33.5	389.6	NA

The harvest of non-managed species in federal waters, as noted in Section 3.4.2.1.3, is limited averaging just 33.5 thousand pounds annually during 2014-2019. Fish pots (7.8 thousand pounds valued at $18.3 thousand annually), troll line (7.2 thousand pounds valued at $15.1 thousand annually), hand lines (3.5 thousand pounds valued at $8.4 thousand annually), gill nets (3.1 thousand pounds valued at $5.6 thousand, and cast nets (2.4 thousand pounds valued at $8.0 thousand) accounted for more than 70% of the harvest of non-managed species in federal waters during 2014-2019 when evaluated on a weight basis and almost 65% when evaluated on a value basis.

Table 3.4.6. Estimated Average Annual Landings (Value) of Managed and Non-managed Species by Gear and Territorial Versus Federal Waters in Puerto Rico, 2014-2019.

Gear	Managed Species				Unmanaged Species			
	Territorial Waters	Federal Waters	Total	% Federal Waters	Territorial Waters	Federal Waters	Total	% Federal Waters
	----------$1,000s----------				----------$1000's----------			
Beach Seine	45.2	7.0	52.2	13.4	98.6	2.9	101.5	2.9
Bottom Line	1,018.4	973.5	1,991.5	48.9	15.0	5.9	20.9	28.3
By Hand	9.5	1.0	10.5	9.6	5.6	0.10	5.7	1.7
Cast Net	1.9	0.40	2.3	17.7	64.7	8.0	72.7	11.0
Fish Pot	988.6	87.4	1,076.0	8.1	117.7	18.3	136.0	13.5
Gill Net	80.2	5.9	86.1	6.8	165.9	5.6	171.5	3.3
Hand Line	804.0	104.0	908.0	11.5	94.1	8.4	102.5	8.2
Land Crab Trap	2.1	0	2.1	0	75.7	3.2	78.9	4.1
Lobster Pot	343.1	34.8	377.9	9.2	2.6	0.09	2.7	3.2
Long Line	45.8	3.8	49.6	7.7	6.8	0.69	7.5	9.3
Rod & Reel	132.5	80.7	213.2	37.8	22.3	6.0	28.3	21.3
Scuba Dive	1,495.7	94.1	1,589.8	5.9	80.4	4.7	85.1	5.5
Skin Dive	41.2	4.1	45.3	9.0	34.3	1.1	35.4	3.1
Snare	1,509.7	146.6	1,656.3	8.9	9.9	0.66	10.6	6.3
Spear Fish	358.1	30.8	388.9	7.9	94.6	6.2	100.8	6.2
Trammel Net	123.8	3.9	127.7	3.1	34.5	0.82	35.3	2.3
Troll Line	197.6	178.3	375.9	47.4	32.4	15.1	47.5	31.8
TOTAL	7,197.4	1,756.4	8,953,8	NA	955.0	87.8	1,042.8	NA

3.4.2.1.5 Economic Description of the Recreational Fishery in Puerto Rico

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 3.4.7). 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.[35]

Table 3.4.7. Recreational Angler Trips in Puerto Rico by Mode and in Total, 2012-2017.

Year	Shore	Charter	Private	Total
	----------1,000 trips----------			
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

Recreational angler trips, as collected under the MRIP program, are segmented by whether the trip is from shore, private boat, or charter. As indicated in Table 3.4.7, 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.

Of the estimated 509 thousand angler trips taken annually in Puerto Rico waters during 2012-2017, about 9.1% of these trips were reportedly taken in Federal waters. Catch in federal waters appears to be highly dominated by dolphin.

3.4.2.2 St. Croix and St. Thomas and St. John

3.4.2.2.1 General Commercial Fishery Information and Landings Statistics

The number of commercial fishermen reporting landings in St. Croix between 2012 and 2021 averaged 62 annually and ranged from a high of 85 in 2012 to a low of 44 in 2018 (Table 3.4.8). These fishermen reported an average of 2,195 trips annually during this period with a range from 804 (2018) to 3,791 (2012). Reported annual landings during this period ranged from more than 500 thousand pounds in 2012 to just over 100 thousand pounds in 2018. Catch per trip, which averaged 154 pounds, ranged from about 120 pounds in 2019 to 200 pounds in 2020.

Table 3.4.8. Reported Number of Fishermen, Trips, and Landings for St. Croix, 2012-2021.

Year	Number of Fishermen	Reported Number of Trips	Reported Landings	Retained Catch per Trip
			----------Lbs.----------	
2012	85	3,791	510,925[a]	134.8

[35] Surveying would have ended about the time of the hurricane and has yet to be resumed. Hence, recreational data for Puerto Rico ends in 2017.

Year	Number of Fishermen	Reported Number of Trips	Reported Landings	Retained Catch per Trip
			----------Lbs.----------	
2013	78	3,331	469,896	141.1
2014	62	2,666	398,856	149.6
2015	59	2,369	379,839	160.3
2016	74	2,489	433,874	174.3
2017	65	2,134	389,504	182.5
2018	44	804	107,333	133.5
2019	48	962	114,983	119.5
2020	51	1,292	258,747	200.3
2021	58	2,116	302,173	142.8

[a] This figure excludes some confidential landings (likely very small) which also suggests that the retained catch per trip may be slightly underestimated.

With respect to St. Thomas and St. John, the reported number of fishermen averaged 68 annually during 2012-2021 (Table 3.4.9). The annual number of reported trips during the period averaged about 2,000 which equates to slightly less than 30 trips per fisherman. Annual landings averaged 365 thousand pounds and ranged from just over 300 thousand pounds in 2021 to more than 430 pounds in 2016. On a per trip basis, the retained catch per trip fell within the range of about 160 pounds to about 200 pounds.

Table 3.4.9. Reported Number of Fishermen, Trips, and Landings for St. Thomas and St. John, 2012-2021.

Year	Number of Fishermen	Reported Number of Trips	Reported Landings	Retained Catch per Trip
			----------Pounds----------	
2012	74	2,440	392,581	160.9
2013	67	2,021	348,272	172.3
2014	72	2,013	414,511	205.9
2015	65	2,144	394,075	183.8
2016	65	2,482	433,055	174.5
2017	64	1,918	346,010	180.4
2018	67	1,756	346,801	197.5
2019	71	1,685	342,224	203.1
2020	70	1,775	325,421	183.3
2021	63	1.752	307,073[a]	175.3

[a] This figure excludes some confidential landings (likely very small) which also suggests that the retained catch per trip may be slightly underestimated.

3.4.2.2.2 Commercial Landings from Catches in Territorial and Federal Waters

Landings associated with catches from territorial waters, federal waters, and unknown waters in St. Croix are presented in Table 3.4.10. Using the procedure adopted for Puerto Rico, the harvest from unknown waters was portioned between territorial waters and federal waters with these estimates being denoted as 'Expanded Territorial Waters' and 'Expanded Federal Waters'. Landings associated with catch from territorial waters (expanded) averaged almost 156 thousand pounds per year while landings associated with catch from federal waters averaged about 181 thousand pounds per year. According to Kojis et al (2017), 14.6% of the St. Croix fishermen fished exclusively in federal waters while another 26.4% fished about equally in territorial and federal waters. The remaining 59.1% fish primarily in territorial waters.

Table 3.4.10. Landings Associated with Catch from Territorial and Federal Waters in St. Croix, 2012-2021.

Year	Territorial Waters	Federal Waters	Unknown Waters	Total Landings	Expanded Territorial Waters	Expanded Federal Waters
	----------Lbs.----------					
2012	247,920	263,005	Conf	510,925[a]	247,920	263,005
2013	322,615	134,595	12,687	469,896	331,567	138,329
2014	230,140	147,158	21,558	398,856	243,290	155,566
2015	121,438	191,552	66,848	379,839	147,375	232,464
2016	149,678	242,645	41,551	433,874	165,530	268,344
2017	130,172	235,654	23,678	389,504	138,597	250,907
2018	40,635	65,278	1,420	107,333	41,180	66,153
2019	53,364	47,676	13,944	114,983	60,728	54,255
2020	76,288	166,336	16,123	258,747	81,357	177,390
2021	97,212	202,896	2,065	302,173	97,881	204,292

[a] This figure excludes some confidential landings (likely very small) which also suggests that expanded landings from territorial and federal waters for 2012 may be slightly underestimated.

Landings associated with catches from territorial waters, federal waters, and unknown waters in St. Thomas and St. John are presented in Table 3.4.11. Catch from federal waters of St. Thomas St. John (expanded) accounted for almost two-thirds of total landings during the 2012-2021 period with average annual production approximating 234 thousand pounds. Catch from territorial waters (expanded), by comparison, averaged about 131 thousand pounds annually during 2012-21. According to Kojis et al. (2017), about 4.6% of St. Thomas commercial fishermen fish exclusively in federal waters while another 42.5% fish both territorial and federal waters about equally. The remaining 52.9% fish primarily in territorial waters.

Table 3.4.11. Estimated Landings Associated with Catch From Territorial and Federal Waters in St. Thomas and St. John, 2012-2021.

Year	Territorial Waters	Federal Waters	Unknown Waters	Total Landings	Expanded Territorial Waters	Expanded Federal Waters
	----------Lbs.----------					
2012	132,680	258,680	1,776	392,581	132,726	259,855
2013	69,312	234,230	44,730	348,272	79,525	268,747
2014	92,036	282,491	39,984	414,511	101,861	312,649
2015	124,429	247,655	21.991	394,075	131,783	262,292
2016	164,693	244,587	23,775	433,055	174,260	258,795
2017	162,102	181,110	2,798	346,010	163,423	182,586
2018	176,543	168,974	1,284	346,810	177,199	169,602
2019	132,898	207,278	2,047	342,224	133,698	208,526
2020	105,320	216,335	3,766	325,421	106,553	218,868
2021	105,657	199,681	1,735	307,073	106,528	200,815

3.4.2.2.3 Commercial Landings of Managed and Non-managed Species

Catches of managed and unmanaged species by territorial and federal waters for St. Croix is presented in Table 3.4.12 with similar information for St. Thomas and St. John given in Table 3.4.13. As was the case in Puerto Rico, commercial landings in St. Croix are dominated by species managed by the Caribbean Fishery Management Council. Specifically, more than 85% of landings in St. Croix are derived from federally managed species. As indicated from the information in Table 3.4.12, furthermore, the majority of these landings are reportedly caught in federal waters (about 52% during the ten-year period ending in 2021).

Table 3.4.12. Landings of Managed and Non-managed Species in St. Croix, 2012-2021.

Year	----------Managed Species----------				---------Non-managed Species---------			
	Territorial Waters	Federal Waters	Unknown Waters	Total	Territorial Waters	Federal Waters	Unknown Waters	Total
2012	219,467	239,102	Conf	458,569[a]	28,453	23,903	.	52,356
2013	249,462	126,928	8,253	384,643	73,152	7,667	4,434	85,253
2014	178,978	125,616	15,367	319,961	51,162	21,542	6,191	78,895
2015	111,600	158,435	49,636	319,670	9,839	33,118	17,212	60,169
2016	133,604	187,072	32,525	353,202	16,073	55,573	9,026	80,672
2017	118,332	181,118	20,795	320,245	11,840	54,536	2,883	69,259
2018	35,262	46,964	1,246	83,472	5,373	18,314	174	23,861
2019	48,959	42,446	12,811	104,215	4,405	5,230	1,133	10,768
2020	71,763	130,787	12,708	215,258	4,525	35,549	3,415	43,489
2021	90,228	142,156	1,264	233,647	6,984	60,740	801	68,526

[a] This figure excludes some confidential landings (likely very small).

As was the case for both Puerto Rico and St. Croix, landings of managed species in St. Thomas and St. John dominate total landings; about 86% during 2012-2021 (Table 3.4.13). About two-thirds of managed-species landings are caught in federal waters. By comparison, about 55% of the landings of non -managed species represent catches from federal waters.

Table 3.4.13. Estimated Landings of Managed and Non-managed Species in St. Thomas and St. John, 2012-2021.

Year	----------Managed Species----------				---------Non-managed Species---------			
	Territorial Waters	Federal Waters	Unknown Waters	Total	Territorial Waters	Federal Waters	Unknown Waters	Total
2012	110,434	232,877	1,244	344,555	21,691	25,803	532	48,026
2013	59,380	209,804	35,859	305,043	9,932	24,426	8,871	43,229
2014	69,751	251,508	23,923	345,183	22,285	30,983	16,060	69,328
2015	102,774	220,582	18,778	342,134	21,655	27,073	3,212	51,941
2016	140,716	213,436	20,516	374,667	23,978	31,152	3,259	58,388
2017	136,200	159,221	1,839	297,260	25,902	21,889	959	48,749
2018	146,996	142,957	659	290,612	29,547	26,017	625	56,189
2019	112,674	181,300	1,110	295,084	20,225	25,978	937	47,140
2020	89,507	193,001	1,590	284,097	15,814	23,335	2,176	41,324
2021	90,399	177,979	1,735	270,113	15,258	21,701	Conf	36,959

3.4.2.2.4 Commercial Landings of Managed and Non-managed Species by Gear Fished and by Territorial Versus Federal Waters, Total for the 2012-2021 Period.

Total commercial landings for St. Croix, by gear type and by territorial versus federal waters, for the 2012-2021 period are presented in Table 3.4.14. As indicated, a relatively few gear types dominate the reported landings of both managed and non-managed species over the 2012-2021 period. Harvest of managed species in federal waters, for example, tends to be dominated by handlines (430 thousand pounds), by hand with scuba (397 thousand pounds), spearfishing with scuba (169 thousand pounds), and fish traps (139 thousand pounds). Gears of any net type appear to account for only a small percentage of managed-species landings derived from federal waters with landings associated with cast nets (the largest, non-confidential net gear) being only about four-thousand pounds (Table 3.4.14). Cast nets, however, tend to account for a higher percentage of non-managed species taken from federal waters with over 68 thousand pounds being reported over the 2012-2021 period. An additional six-thousand pounds of non-managed species were harvested from federal waters over the 2012-2021 period using surface gillnets (Table 3.4.14).

Table 3.4.14. Landings of Managed and Non-managed Species by Gear and State Versus Federal Waters in St. Croix, Total for 2012-2021 Period.

	Managed			Non-managed		
Gear Type	State	Unknown	Federal	State	Unknown	Federal
BEACH SEINE	Conf	Conf	Conf	Conf	Conf	Conf
BOTTOM FISHING HOOK AND LINE	.	Conf	.	.	Conf	.
BUOY (YO-YO)	60	.	862	Conf	.	Conf
BY HAND	82,655	2,506	35,600	369	.	298
BY HAND WHILE SKIN DVING	4,581	Conf	427	49	.	.
BY HAND WITH SCUBA	572,376	20,814	397,410	3,998	318	3,699
BY SNARE WITH SCUBA	48,323	1,712	31,017	Conf	.	Conf
CAST NET	Conf	Conf	4,035	19,746	6,628	68,264
DRIFT LONGLINE	430	.	314	Conf	.	Conf
DROP NET (LIFT NET)	.	.	.	Conf	.	.
FISH TRAP	158,375	30,243	139,462	17,119	5,308	6,737
GILL NET	Conf	.	.	1,715	.	.
GILL NET, FISHED USING SCUBA	3,317	.	.	Conf	.	.
GILL NET, SURFACE	Conf	.	Conf	19,277	3,276	6,311
HAND GAFF WHILE SCUBA DIVING	.	Conf	.	.	.	.
HAND GAFF WHILE SKIN DIVING	Conf	.	.	.	.	.
HAND SNARE WHILE SKIN DIVING	267	.	Conf	Conf	.	.
HANDLINE	162,968	40,970	430,491	107,863	17,280	187,113
HOOK AND LINE WITH POWER WINCH	3,896	596	9,353	2,858	839	6,269
HOOK AND LINE-UNKNOWN TYPE	4,456	2,408	14,930	1,417	792	1,447
LOBSTER TRAP	4,575	935	4,287	241	Conf	49
LONGLINE	1,017	.	5,091	548	.	4,535
NET-UNKNOWN TYPE	5,735	Conf	Conf	13,109	3,622	1,304
ROD AND REEL	2,250	2,830	11,462	4,100	924	1,940
SEINE NET	70,423	18,507	Conf	10,149	1,287	Conf
SKIN DIVING AND SCUBA	1,811	.	Conf	.	.	.
SPEAR OR BY HAND-UNKNOWN TYPE	Conf	Conf	.	.	Conf	.
SPEARFISHING WHILE SKIN DVING	469	.	Conf	Conf	.	.
SPEARFISHING WITH SCUBA	98,155	8,755	169,475	4,633	549	21,334
SPEARGUN WITH SCUBA	4,724	Conf	847	392	Conf	Conf
TRAP-UNKNOWN TYPE	13,685	9,050	9,554	2,415	3,232	894
Conf = confidential information						

Total commercial landings for St. Thomas and St. John, by gear type and by territorial versus federal waters, for the 2012-2021 period are presented in Table 3.4.15. As was the case with respect to St. Croix, a high preponderance of the landings are derived from a very limited number of gears. In federal waters, fish traps easily dominate harvests of federally managed species (totaling 1.146 million pounds over the ten-year period ending in 2021 with combined landings of managed species from federal waters associated with the next three most prevalent gears (lobster traps unknown-type of traps, and handlines) totaling only 732 thousand pounds. With respect to non-managed species harvested in federal waters, fish traps dominate total

landings over the ten-year period ending in 2021 (174 thousand pounds) with rod and reel (41 thousand pounds) placing a distant second. There are no reported harvests from federal waters of either managed species or non-managed species taken using surface gillnets (Table 3.4.15).

Table 3.4.15. Landings of Managed and Non-managed Species by Gear and State Versus Federal Waters in St. Thomas and St. John, Total for 2012-2021 Period

	Managed			Non-managed		
Gear Type	State	Unknown	Federal	State	Unknown	Federal
BEACH SEINE	17,065	Conf	Conf	20,306	Conf	Conf
BOTTOM FISHING HOOK AND LINE	Conf	.	.	.	.	.
BUOY (YO-YO)	.	.	Conf	Conf	.	Conf
BY HAND	4,988	126	139	6,962	32	Conf
BY HAND WHILE SKIN DVING	884	Conf	Conf	11,822	1,935	Conf
BY HAND WITH SCUBA	9,655	Conf	3,307	451	Conf	Conf
BY SNARE WITH SCUBA	9,533	.	2,094	Conf	.	.
CAST NET	1,500	.	Conf	16,585	388	2,641
DRIFT LONGLINE	Conf	.	Conf	Conf	.	.
FISH TRAP	384,676	34,105	1,146,394	55,602	5,198	174,170
GILL NET, SURFACE	Conf	.	.	387	.	.
HAND SNARE WHILE SKIN DIVING	1,224	.	Conf	Conf	.	.
HANDLINE	195,099	15,757	146,103	12,197	4,284	9,236
HAWAIIAN SLING WHILE SKIN DIVING	51	.	Conf	Conf	.	.
HAWAIIAN SLING WITH SCUBA	Conf	.	Conf	Conf	.	.
HOOK AND LINE WITH POWER WINCH	1,350	1,956	4,624	949	Conf	1,949
HOOK AND LINE-UNKNOWN TYPE	7,110	11,447	12,645	2,427	1,553	5,248
LOBSTER TRAP	273,602	7,160	388,458	4,442	104	3,870
LONGLINE	.	.	Conf	.	.	Conf
NET-UNKNOWN TYPE	8,891	Conf	.	5,302	Conf	432
ROD AND REEL	10,571	5,002	70,151	7,887	1,150	41,384
SEINE NET	71,347	15,310	3,240	53,600	13,662	945
SKIN DIVING AND SCUBA	Conf	.	Conf	Conf	.	.
SPEAR OR BY HAND-UNKNOWN TYPE	Conf	Conf	Conf	Conf	.	.
SPEARFISHING	Conf	.	.	Conf	.	.
SPEARFISHING WHILE SKIN DVING	352	.	.	29	.	.
SPEARFISHING WITH SCUBA	3,044	.	.	1,299	.	.
SPEARGUN	Conf	.	.	Conf	.	.
SPEARGUN WHILE SKIN DIVING	73	.	.	Conf	.	.
SPEARGUN WITH SCUBA	554	.	.	Conf	.	.
TRAP-UNKNOWN TYPE	52,949	7,679	197,609	4,213	732	14,023
TROLLED HOOK AND LINE	.	.	Conf	.	.	Conf
Conf = confidential information						

3.5 Description of the Social Environment

This section describes the social environment potentially affected by the regulatory actions described in this amendment. Links to original source materials used to develop the description are available in the references section, and readers are referred to the Island-based FMPs, which contain a wide range of descriptive material pertinent to the regulatory topics of interest.

3.5.1 Puerto Rico

Pursuit of living marine resources is an ancient aspect of life in Puerto Rico. Evidence of dependence on fish and other marine species dates to between ~4,700 and 4,200 years before present on the main island of Borikén[36] (Napolitano et al. 2019). Use of seafood may have occurred even earlier in settlements that are now underwater (Rivera-Collazo 2019). Living marine resources undoubtedly supported island residents over the subsequent centuries (Ramos 2010). Today, a complex island society and culture characterize Puerto Rico, with long-standing cultural traditions extending to many parts of the world (Duany 2002; Reichard 2020). The current population estimate is 3,221,789 persons, nearly 99% of whom self-identify as Hispanic (U.S. Census Bureau 2022). Although fishing is routinely undertaken by relatively few residents, the activity remains an important organizing feature of social life and source of food and income across the region (Agar et al. 2022).

3.5.1.1 Commercial/Artisanal Fishing and Social Aspects of Fishing in Puerto Rico

Puerto Rico's commercial fisheries are primarily artisanal in nature (Agar et al. 2020). Harvesters tend to use relatively small vessels, a limited number of crewmembers, and a variety of gears suited to the target species at hand (Agar and Shivlani 2017). As for all fishing operations, knowledge of the ecosystem and behaviors of the target species are essential to success, and such knowledge is often highly refined in this island region. As might be expected of an artisanal-type fishery, revenue tends to be limited. This is not the sole measure of success, however, since most participants combine sale of seafood with consumption and sharing in extended family and community settings (Valle-Esquivel et al. 2011). Opportunities for expansion of commercial operations are limited in the absence of an export market. This does not indicate economic isolation, however, since tourists from around the world bring demand for seafood products and interest in recreational fishing opportunities, and supply chains in other regions provide engines, fuel, oil, gear, and other materials used by local fleets.

Commercial pursuit of deep-water snappers, groupers, and related species is extensive on the west coast of Puerto Rico, though it certainly occurs elsewhere. Fishing with trap gear is common throughout, and pelagic fishing is a mainstay for many operations. Capture, sale,

[36] Borikén is the indigenous Taíno word for the main island of what is now called Puerto Rico.

and/or consumption of spiny lobster and queen conch are important as well. Typical gears include trolled and static hook and line; traps; beach seines, gill, cast, and trammel nets; slings and spears; hand lines; and various longline and bottom gear (Valle-Esquivel et al. 2011). Landings data indicate that net gear is most commonly deployed in the nearshore zone. Evidence of net gear being deployed in federal waters is limited at best, and landings data indicates acquisition of bait (ballyhoo) for pursuit of pelagics (Mastitski, pers. comm., February 2023). Figure 3.5.1 depicts the principal municipios where netted fish are landed following fishing effort undertaken almost exclusively within nine nautical miles from shore.

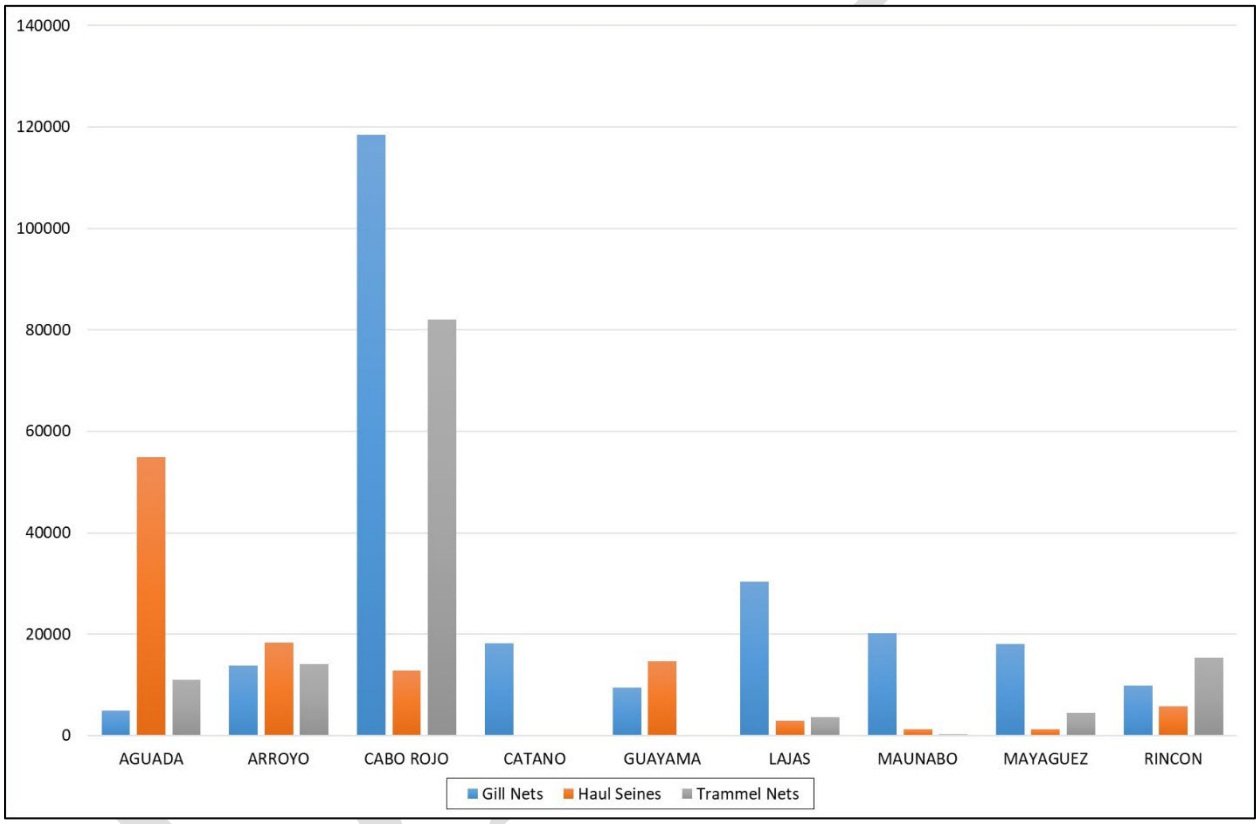

Figure 3.5.1. *Municipios* (municipalities) where net-based landings occurred during the period 2016-2020.
Source: SEFSC, Community ALS File, February 2023.

For-hire fishing opportunities are numerous around Puerto Rico, with offshore charters very typically using hook and line gear to troll for pelagic species. Operators also use static hook and line gear for deep-water snappers and groupers in the benthic zone, and various gear and approaches for tarpon, snook, and jacks in the mangroves, shallow reefs, and sandy flats around the bays and islets that characterize much of the inshore zone. Throw nets are often used to capture bait. A small number of local captains are involved in both the commercial pelagic and for-hire fishing sectors. But these operations are distinct, with recreational services provided in vessels and conditions that are best suited for relatively comfortable half- or full-day offshore

trips, and with commercial operations involving longer, more arduous trips and specialized vessels, gear, and operating conditions that are not well-suited for the casual fishing enthusiast. Available data indicate that 1,074 licensed harvesters were living in Puerto Rico in 2016, increasing to 1,275 in 2018, and diminishing to ~1,200 by 2022 (National Marine Fisheries Service 2022). As indicated in Figure 3.5.2 below, harvesters reside across the main island, but especially in the coastal *municipios*. Operations tend to involve multiple family members, many of whom work on the ocean on a part-time basis, often earning additional income through construction or similar part-time or opportunity-based work (Griffith and Valdés-Pizzini 2002; Griffith et al. 2007). Griffith et al. (2007) determined that over 40% of fishing-oriented households earned all income through fishing, and Matos-Caraballo and Agar (2011) found that 84% earned more than half of annual household income through fishing. Some females fish commercially around Puerto Rico, but males are most typically involved, with many females supporting the overall household economy (Griffith and Valdés-Pizzini 2002). As of the late 2000s, the typical commercial harvester was 49 years old, had at least a high school diploma, and possessed 29 years of fishing experience on average (Matos-Caraballo and Agar 2011).

Boat trailers and ramps are increasingly used, as various moorings and harbors are lost to development around the main island (Griffith et al. 2013). Matos-Caraballo and Agar (2011) determined that about 92% of persons in the harvest sector land their catch in their home municipalities. This connection to place indicates the importance of fisheries-related social life in communities, neighborhoods, and extended family settings around this island region. As such, approximately 34% of licensed harvesters were living on the west coast of Borikén during the late 2000s (mainly in Cabo Rojo, Rincón, Mayagüez, and Aguadilla), with 27% on the south coast (Lajas, Salinas, Guánica, and Ponce), roughly 20% on the north coast (San Juan and Arecibo), and another 20% on the east coast (Vieques, Fajardo, and Naguabo). This pattern of distribution is further reflected in Figure 3.5.2, which depicts municipio-specific extent of engagement in commercial/artisanal fishing activities for the period 2016 through 2020. Engagement here is a generalizable composite indicator based on: (a) reported landings averaged over the time-series, (b) ex-vessel revenue associated with those landings, and (c) number of licensed harvesters and seafood retailers present in a given municipio (administrative unit).

For participants especially active in commercial fisheries around Puerto Rico, the relationship between fishing effort, market demand, and pricing is profound. Many harvesters market their own catch in community settings, while some also sell to buyers from local retail establishments and/or restaurants, and other businesses located elsewhere on the island. Community research conducted during the mid- and late-2000s indicates places where fisheries are particularly important organizing features of local society, culture, and economy. For example, Griffith et al. (2007) identified communities with extensive dependence on fishing and related economic activities, including neighborhoods in Fajardo (Maternillo, Mansión del Sapo, and Puerto Real);

La Estrella in Rincón; Pozuelo in Guayama; Punta Santiago in Humacao; La Playa in Ponce; Puerto Real in Cabo Rojo; and La Parguera in Lajas.

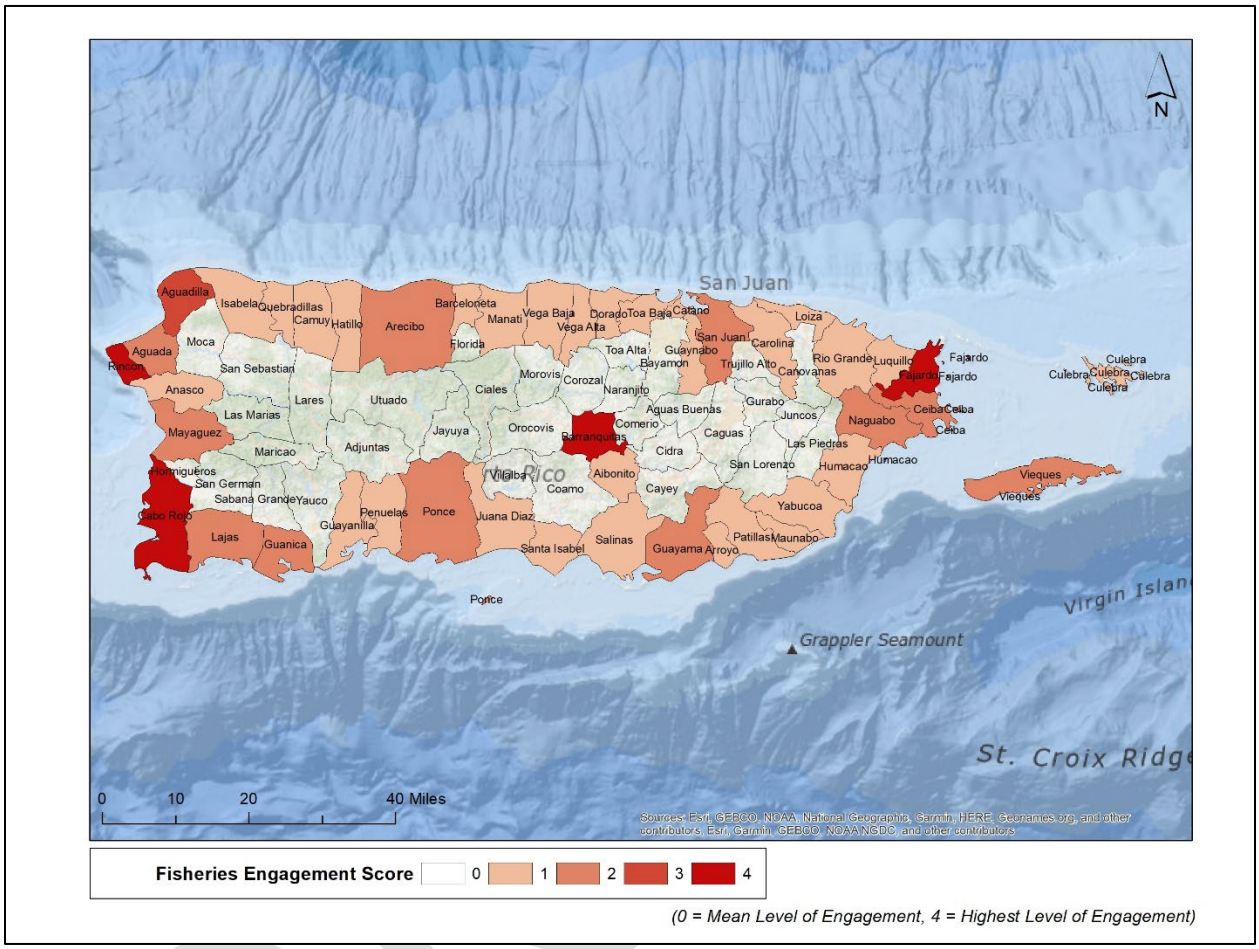

Figure 3.5.2. Commercial/artisanal fisheries engagement, 2016-2020: Municipios de Puerto Rico
Source: SERO/SEFSC ALS database, accessed March 2023.

Fishing and seafood are particularly important in certain family and community settings around Puerto Rico. Some islanders inherit the fishing way of life; others grow to base their lives around fishing, with all who persist eventually increasing their knowledge of the ocean, atmosphere, and marine resources. Such knowledge generates respect in certain communities, and the seafood itself is folded into old and evolving recipes for festivals and daily meals, and onto many plates, palates, hearts, and minds. Such topics are addressed in Griffith and Pizzini (2002), who discuss the lives of harvesters and their families in this island and ocean setting.

Macro-Social Change and Marine Fisheries: The Hurricane Season of 2017

The hurricane season of 2017 was active and damaging in the Atlantic Basin, where 17 named storms, 10 hurricanes, and six major hurricanes developed. Following initial damage from

Hurricane Irma, Hurricane Maria lingered over Puerto Rico for 30 hours as a high-end Category 4 storm with peak winds of 155 mph, generating storm surge, flooding, landslides, agriculture impacts, infrastructure damage, and extensive loss of life (NOAA 2017; Milken Institute School of Public Health 2018; Coto 2020; Chan et al. 2018). With regard to island fisheries, conditions were challenging for participants even before the hurricanes of 2017. Rates of household poverty continue to be inordinately high in Puerto Rico, consistently exceeding 43% since 2005. As of 2021, the household poverty rate was 40.5%—more than double the rate for Mississippi which (at 19.5%) has the highest poverty rate of all 50 states. The national rate of household poverty was 11.6% in 2021. Estimated median household income during 2021 was $21,967 in Puerto Rico, and $70,784 among households in the 50 states (U.S. Census Bureau 2021).

The pre-existing poverty problem was compounded by the 2017 hurricane season. Poverty must be considered in social context, which in Puerto Rico often involves the pooling of resources in extended family and community settings. However, the relative lack of money in the average Puerto Rico household, coupled with fiscal deficit problems on the part of government (U.S. Government Accountability Office 2018), leave island residents highly vulnerable to disasters that generate economic shock and long-term social impacts. After Maria, the situation led many families to meet basic needs in urbanized areas on the island (Acosta et al. 2020). The situation also led to extensive out-migration, with some 133,500 residents leaving in 2018—a 36.9% increase in migration above the rate for the prior year (Glassman 2019). The storm caused trauma for many, with problems likely to linger for many years. Pasch et al. (2017:7) estimate physical damages caused by Hurricane Maria at $90.0 billion, indicating a long recovery period.

Hurricane Maria generated a range of fishery-specific impacts. Many vessels sunk, harbors and moorings were damaged, essential supply chains were disrupted, and basic services were absent for many months. Lack of power and communications severely constrained fishing operations (Agar et al. 2020). In some cases, fishery participants and/or their family members were injured or lost their lives. Agar et al. (2020) conducted a social and economic assessment of Maria's impacts during the first year of the event. The work involved 664 in-person interviews or 78.3% of commercial harvesters thought to be active following Maria. The resulting data are useful both for understanding contemporary fishing around Puerto Rico, and for gauging hurricane impacts. Key characteristics of fishing operations maintained by harvesters involved in the study include: (a) a mean participant age of 52.7 years; (b) extensive reliance on fishing revenue, accounting for 58.6% of household income on average (71.8% on the west coast); (c) an average of 3.6 fishing trips per week, with a range of 3.8 trips/week on the south coast to 4.1 trips/week on the west coast; (d) 33.1 fishing hours per week on average, with a range of 40.5 hours on the east coast to 26.3 hours on the west; (e) average vessel length of ~20 feet using ~100 hp engines on average; and (g) vessels and gear valued at $18,123 on average, with a range of $11,063 on the south coast to $22,117 on the north (Agar et al. 2020:383).

Impacts from Maria were particularly difficult for harvesters based on the heavily impacted east and north coastlines. Agar et al. (2020:378) write that "Maria caused [overall] commercial landings to fall by 20%, owing to the loss of productive assets, extended power outages, and loss of customers. While most fishing resumed when electric service was restored, estimated losses totaled $17.8 million, with damages to vessel, engine, gear, and shore side infrastructure accounting for more than half of losses, and foregone revenue the remaining 49%. The east coast was hardest hit, as were participants who use traps, handlines, and commercial dive gear (Agar et al. 2020:378). Citing NMFS landings information (2019), Agar et al. (2020:386) state that 75% of revenue losses were concentrated on queen conch (27%), yellowtail snapper (15%), spiny lobster (14%), lane snapper (7%), dolphinfish (6%) and queen snapper (6%). Around 6,700 traps were lost during the storm. Agar et al. (2020:386) also report that 165 or 16.3% of commercial harvesters active in 2016 departed the industry after the hurricane. The majority did not significantly alter their operations, however, with the exception of those forced to use alternative launch sites or avoid places where habitat had been damaged by the storm.

The COVID-19 Pandemic and Fishery Impacts in Puerto Rico

NOAA Fisheries (2021) provides specific understanding of initial pandemic effects in each fishery management region around the country, including Puerto Rico, where NMFS social scientists conducted interviews with 318 commercial fishermen during late summer of 2020. Among key findings, 96% of respondents reported that the pandemic affected fishing operations during its first six months in the U.S. About 87% reported reduced revenue, with a decline of 65% on average. When asked about pandemic-related factors that hurt their operations most, 79% reported a lack of markets or buyers, 71% reported the effects of state and local government restrictions, and 48% reported health safety measures. About 94% stopped fishing for some time during the first half of 2020, with 33% stopping for more than 3 months (NOAA Fisheries 2021). A modified version of NOAA Fisheries survey implemented with 47 seafood dealers around Puerto Rico indicated that 93% experienced reduced revenue, with a 56% decrease on average. About 43% of affected businesses reported loss of employees. When asked to identify the top COVID-19 related factors impacting their businesses during its initial months in the U.S., 87% indicated state and local market restrictions, 77% reported loss of marketing potential, and 70% chose implementation of health safety measures. About 87% of affected businesses were closed for at least some period during the first half of 2020. Reduced sales to restaurants and stores affected 94% of respondents, and diminished availability of seafood affected 81% of respondents (NOAA Fisheries 2021). It should also be noted that a series of earthquakes affected Puerto Rico during initial months of the pandemic. This event reportedly affected fishing activities in conjunction with the pandemic, further slowing for-hire operations, diminishing sale of seafood to restaurants and bars, damaging fishing infrastructure, and affecting the ocean floor and the behavior of fish populations themselves (Agar et al. 2022).

3.5.2 St. Croix, St. Thomas and St. John

For centuries now, persons of West Indian, African, French, and Danish descent have worked and lived in small communities scattered throughout the steep, rocky islands of St. Thomas and St. John, and the larger, less mountainous island of St. Croix (Rogozinski 1994:82; Olwig 1993: 37). In conjunction with small-scale farming, many early settlers became productive harvesters of seafood.[37] Firms and individuals from the U.S. eventually arrived in the islands, largely in pursuit of broad political and economic interests, and the U.S. government purchased the islands from the Danish in 1917 (Austin 2020). Mainland and local policymakers "eventually created a robust manufacturing sector in the USVI after World War II," though many such firms have subsequently struggled here (Austin 2020:3). Closure of the Hess HOVENSA refinery on St. Croix in 2012 was particularly detrimental, leading to loss of ~2,000 jobs. Tourism and related services have increasingly come to dominate the economies of all the USVI. Of significance in relation to the 2017 hurricane season, the vast majority (~95%) of farmed acres, and some 75% of farms in the USVI were located on St. Croix in recent years. Hurricane Maria altered the St. Croix landscape, and agricultural infrastructure was profoundly affected, with recovery continuing to date, as on St. Thomas and St. John.

The estimated combined population of the U.S. Virgin Islands was 107,268 in 2017 (U.S. Census Bureau 2016) but dropped to 87,146 persons by time of the 2020 Census (U.S. Census Bureau 2021). Authors such as Akin (2021) explain this 19% decline partly in relation to exodus after the hurricanes, though it is likely that the 2016 estimate did not sufficiently account for population decline associated with closure of the HOVENSA facility earlier in the decade. Levels of poverty remain significantly higher in the USVI than elsewhere in the U.S., reaching 18.6% in the island region by the time of the 2020 Census (U.S. Census Bureau 2021). The unemployment rate was 13.6% in the USVI and 6.7% on the mainland in 2020, with median household income estimated at $40,408 in the islands and $67,521 on the continent that year (U.S. Census Bureau 2021; U.S. Bureau of Labor Statistics 2021; Shrider et al. 2021)).

3.5.2.1 Social and Cultural Aspects of Fishing on St. Thomas, St. John, and St. Croix

Fishing in the USVI has long been artisanal in nature. This was the case in the 1930s, when "some 400 fishermen were active in the islands, most of whom rowed or sailed small vessels to the fishing grounds" (IAI 2006:11). Fish traps and handlines were most commonly used at that time, and fishing was typically combined with small-scale farming. The growth of island populations, industries, and infrastructure was heavily influenced by increasing rates of leisure tourism during the 20th century (IAI 2006). With specific regard to fishing activities in the region, demand for seafood expanded late in the 20th century in conjunction with increasing numbers of visitors, restaurants, and tourist destinations. At the same time, local fishing-oriented

[37] A more thorough review of historical aspects of fishing and subsistence living on St. Thomas and St. John is provided in IAI (2006, 2007).

families were increasingly able to supplement ocean-based income with that from part-time or periodic work arrangements that complemented the shifting availability of marine resources. Certain individuals now hold high-paying positions around the islands, and in some cases on the continent, benefiting households and communities that continue to be engaged in local fisheries. Although purely recreational individual boat-based fishing is said by observers to be relatively rare in the USVI, small fleets of charter and guided fishing operations are active in this island region. As is the case in Puerto Rico, existing charter fishing operations typically involve offshore pelagic trolling and static hook and line bottom fishing.

It is notable that large-scale change in certain ways enhanced the evolution of island culture in the USVI, including cultural aspects of fishing. For instance, technological advancements have radically improved communication options and speed of contact between participants within and across fishery sectors. Information of all kinds, such as the presence of bait or fish in a given location, pending weather conditions, and shifting market factors are now immediately available to all with a cell phone or computer. Such technologies have helped perpetuate a traditional lifestyle that emphasizes artisanal fishing, social relationships between local families, and various cultural traditions in the island's fishing-oriented communities.

The concept of fishing community can be defined in terms of networks of people who regularly interact to undertake fishing-related activities at sea or on land (e.g., see Valdez-Pizzini et al. 2010). Island districts, and even whole islands, have been examined and considered in this way. For example, Stoffle et al. (2009) envision the island of St. Croix as a fishing community in and of itself. As indicated in Figure 3.5.3 below, the concept of fishing community can also be envisioned in terms of variable levels of participation within and across existing political boundaries. This graphic depicts relative levels of engagement in marine fisheries by island district, as indicated by: (a) numbers of persons active in the harvest sector, (b) the local presence of fisheries-related infrastructure, and (c) the extent of local landings and value of living marine resources (see Colburn et al. 2016; Jepson and Colburn 2013; Jepson 2008).

Contemporary Commercial/Artisanal Fisheries on St. Thomas, St. John, and St. Croix

Many species of reef fish, the snapper/grouper complex of species, and various pelagic species, have long been of primary interest to fishery participants active in the USVI. Spiny lobster, whelks, conchs, and other shellfish are also important here. Commercial/artisanal fisheries as a whole continue to be essential sources of employment, food, and income in the U.S. Virgin Islands, with participants landing an average of 1.4 million pounds of seafood worth $7.4 million each year between 2005 and 2015 (NOAA Fisheries 2017).

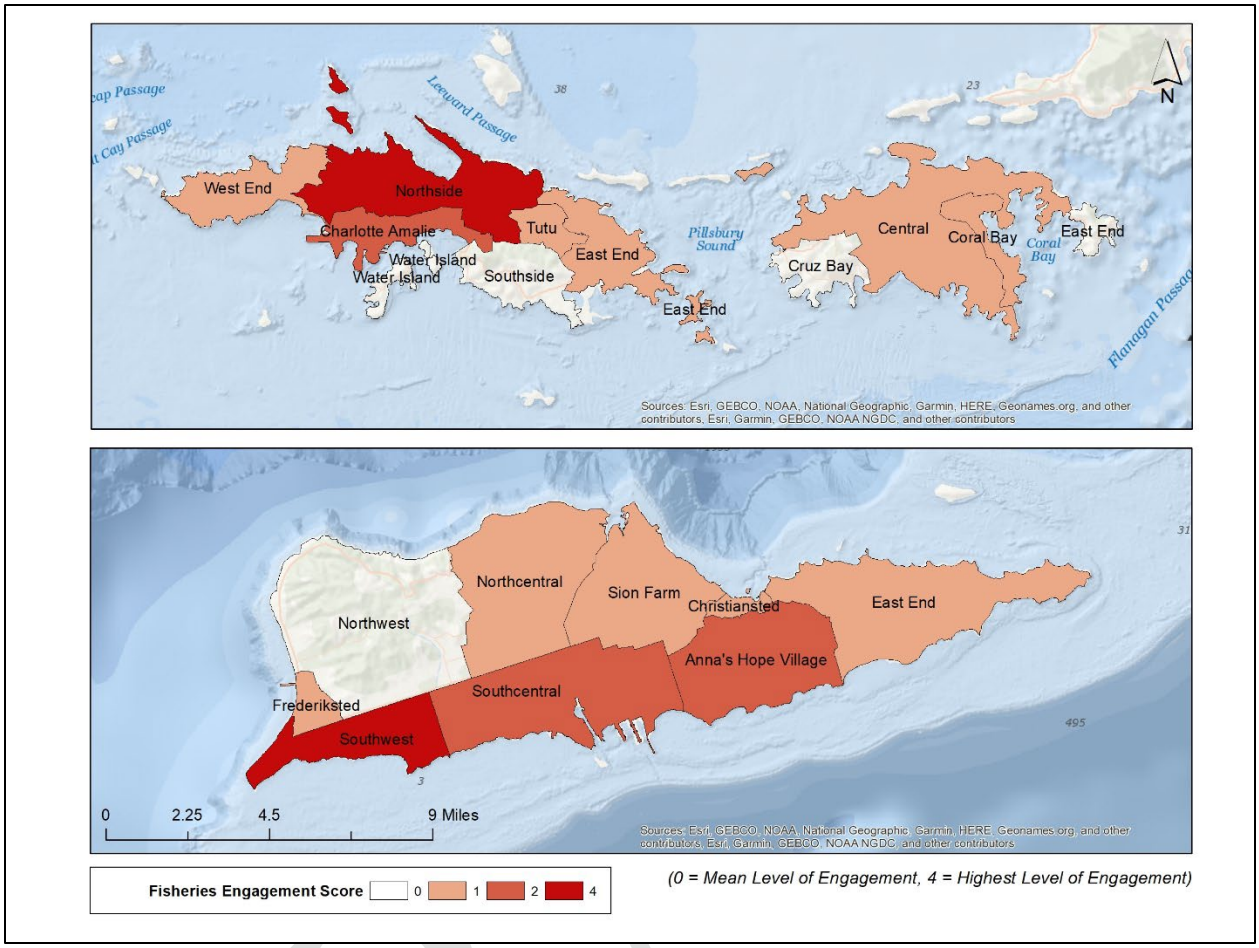

Figure 3.5.3. Commercial/artisanal fisheries engagement by island district, 2016-2020.
Source: SERO/SEFSC ALS database, accessed March 2023.

Kojis (2017) describes the region's fisheries in detail as they were functioning just prior to the 2017 hurricane season. The author provides extensive information about the nature and extent of participation, use of various gears, demographic aspects of participants, and other important information. Some 260 commercial fishery participants were identified in the USVI in 2016, with 119 residing on St. Thomas and St. John, and 141 on St. Croix. Fishing fleets and activities around the USVI are small-scale in nature, with the majority of harvesters regularly working less than three miles from shore. Labor is extensive, and many rely on their own knowledge and skills on the water and can fabricate and repair gear, maintain vessels and engines, and market their landings. Kojis et al. (2017) found that commercial fishery participants spend an average of 34.2 hours/week in the conduct of fishing-related activities, with little variation across the islands. As summarized in Table 3.5.1, Kojis et al. (2017) provide useful insight into the nature of contemporary commercial/artisanal fishing and fishery participants around the USVI.

Table 3.5.1. Social, economics, demographic, and operational aspects of fishing in the USVI*

Fishing-Related Variable	St. Croix	St. Thomas/St. John
Mean Age of Participant in Years	56.9	55.0
Years of Fishing Experience	26.7	30.8
Average Size of Immediate Household	2.7	2.5
Most Commonly Reported Ethnic Ancestry	Hispanic	French
% Achieving High School Diploma	46%	63%
% Engaging in other Employment	39.3%	44.7%
% of Participants Dependent Solely on Fishing	38.9%	27.5%
Mean Length of Fishing Vessel	21.9 ft.	24.6 ft.
Mean Size of Outboard Engines	90 hp	110 hp
% Using Twin-Engine Craft	~50%	Few
Present Value of Fishing Vessel and All Gear	$39,000	$102,000

*Based on Kojis et al. (2017)

With regard to species deemed most important by local fishery participants participating in Kojis et al.'s study (2017), reef fish remained the most important and commonly pursued across the islands. Coastal pelagic species were deemed secondarily important among participants on St. Thomas and St. John, followed by spiny lobster. St. Croix participants considered spiny lobster to be the second-most important fishery locally, with deep-water pelagic fishing the third most important. Hook and line gear is owned by 88% of participants in total, with relatively more fishermen from St. Thomas and St. John using rods and reels to capture large pelagics. Trap gear is relatively less commonly used on St. Croix than elsewhere (Kojis et al. 2017). Scuba gear is more commonly used to spear fish, snare spiny lobsters, and hand-gather queen conch on St. Croix, with such gear used by 54% of participants on St. Croix and 14% on St. Thomas/St. John.

Of direct relevance to the present document, Kojis et al. (2017) assert that with the exception of cast (throw) nets, which are used primarily for capturing bait for fishing with rod and reel or handlines, relatively few commercial fishery participants recently owned and/or used net gear around the islands (Table 3.5.2). Moreover, only two of 191 respondents reported using net gear beyond three mile from the shoreline. As per Kojis et al. (2017), more fishery participants on St. Thomas and St. John were using any type of net gear during the course of their research than on St. Croix (26.3% vs. 14.6%). This likely relates in part to the fact that gill and trammel nets were banned for use in the territorial waters of St. Croix in 2008 due to concerns about environmental impacts (see Agar et al. 2019). Harvesters from St. Thomas and St. John traditionally used seine nets to pursue jacks and yellowtail snapper, with gill nets historically deployed off St. Croix to capture a variety of species. Use of gill nets for species such as gar, ballyhoo, and flying fish is still permissible in territorial waters, and certain St. Croix-based participant continue to use umbrella nets—mainly to pursue scads (*Decapturus punctatus*) (Kojis et al. 2017).

Table 3.5.2. Summary information regarding ownership and use of nets in the USVI*.

Location	N**	Number/% Sampled Who Own Beach Seines	Number/% Sampled Who Own Haul Seines	Number/% Sampled Who Own Gill Nets	Number/% Sampled Who Own Cast Nets	Number/% Using Any Nets >3 Miles from Shore
St. Thomas/ St. John	82	6/7.3%	12/14.6%	2/2.4%	55/67.1%	0/0%
St. Croix	109	4/3.6%	5/4.5%	12/11%	68/62.4%	2/1.8%

*Based on Kojis et al. (2017:81); **N = total number of research participants responding to questions about nets.

Among the most important issues discussed by fishery participants in the islands during the 2017 study by Kojis et al., was the perceived status of island fisheries. Of note, only ~14% of study participants stated that the region's fisheries had improved since a similar study was conducted during 2010-2011 (Kojis et al. (2017). The overwhelming explanation across the sample was that preferred species had diminished in formerly highly productive fishing grounds, with participants on St. Croix also asserting that regulations and area closures had diminished productivity. With regard to social and economic concerns, perspectives between island districts varied considerably, with 45% of participants on St. Croix reporting that the household economy was worse or much worse than five years previously, while only 21% of St. Thomas and St. John fishery participants reported this condition.

Recent Macro-Social Change: Impacts of the 2017 Hurricane Season in the USVI

As discussed in relation to Puerto Rico, 2017 was a particularly damaging tropical storm season in the USVI. After causing major damage on Caribbean islands to the south, Category 5 Hurricane Irma passed directly over St. John and St. Thomas on September 6. Two weeks later, the dangerous right semi-circle of Hurricane Maria, also then a Cat-5 storm, passed over St. Croix before making landfall in Puerto Rico. Cangialosi et al. (2018) assert that, in addition to three deaths, the effects of Irma itself were profound across the USVI.

Crosson (2018) estimates that fleets on St. Croix endured some $2,148,665 in damages, stemming from: loss or damage to commercial fishing vessels and fishing gear; lost income; and loss or damage to infrastructure. Estimated combined damages resulting from the same problems on St. Thomas and St. John totaled $3,632,806 (Crosson 2018). Charter fishing fleets also endured significant damages across the USVI, as did various gear suppliers and seafood businesses (Stoffle et al. 2020). As discussed in Stoffle et al. (2020), "the [USVI] commercial and for-hire fisheries still had not yet fully recovered at the time of this study in 2019, almost twenty-two months after the impact of the two hurricanes, with some fishermen unable to either rebuild or recover at all." Indicating the extent of early impacts, Stoffle et al. (2020) report that total unemployment in the USVI rose by some 12% or 4,500 lost jobs soon after the storms

impacted the region, and that by May 2018, only 600 jobs had returned. Austin (2018) indicates lingering implications of the hurricanes for the fishing industry and larger economy, both still recovering in 2019, just prior to the arrival of the COVID-19 pandemic.

The COVID-19 Pandemic and Fishery Impacts on St. Croix, St. Thomas, and St. John

During mid-March 2020, USVI Governor Albert Bryan, Jr. announced that in response to a local outbreak of coronavirus in the islands, the entry of tourists would be prohibited. This closure remained in place until mid-July when the outbreak appeared to be under control. Following a brief reopening, the islands were once again shut down to limit a subsequent outbreak. Soon after closures were implemented in the USVI, NOAA Fisheries social scientists conducted interviews with 87 fishery participants on St. Croix, St. Thomas, and St. John, with a second round of interviews finalized in February 2021. Key findings include nearly universal loss of revenue among both commercial and for-hire operators between January 2020 and July 2020, with average decreases of 53% and 58% respectively, along with widespread loss of crew in both sectors (NOAA Fisheries 2021). When asked to identify the principal pandemic-related factors affecting their operations, 63% of commercial harvesters stated that health safety measures generated the greatest effects, followed by state and local government restrictions (61%), and lack of markets or buyers (56%). A lack of clients was reported by 79% of charter operators, followed by government restrictions (74%), and implementation of health and safety measures onboard (42%) (NOAA Fisheries 2021). Given preexisting challenges and severity of the entire sequence of exogenous events affecting fisheries in Puerto Rico and across the USVI beginning in 2017, the situation indicates need for attention to cumulative effects across the region.

3.5.3 Environmental Justice 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 those who are members of historically underserved communities. Here, the phrase "underserved communities" refers to populations and persons that, in historic terms, 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 achieving EJ part of their missions "by developing programs, policies, and activities to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities, as well as the accompanying economic challenges of such impacts."

Various data are available to indicate the presence of 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 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 useful for identification and analysis of community-level vulnerabilities (see 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 communities in the U.S. Caribbean region where residents are engaged in the territorial and federally managed fisheries discussed in the previous sections of this amendment. Mean standardized community vulnerability reference points for each 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 .5 standard deviation level indicate vulnerability to regulatory and other sources of social change. Of note, the various forms of information used to generate the indices depicted below are currently being updated by social scientists at NOAA's Southeast Fisheries Science Center. Readers are also referred to the recent work of Guannel et al. (2022) who have developed various indices suitable for assessing social vulnerability to natural hazards potentially affecting the U.S. Virgin Islands in the years to come.

As depicted in Figure 3.5.4 below, most sub-districts on St. Croix exceed the 0.5 and 1.0 standard deviation thresholds for one or more vulnerability indices developed to characterize social, demographic, and economic conditions around the island. The East End sub-district is the sole exception here, as might be expected given its resort-oriented economy. Meanwhile, the Southwest, South-central, and Sion Farm sub-districts each exceed the vulnerability indices for poverty and population composition. It is emphasized here that conditions are likely to have worsened in recent years given challenges resulting from the 2017 hurricane season and from pandemic-induced business closures and related problems during 2020.

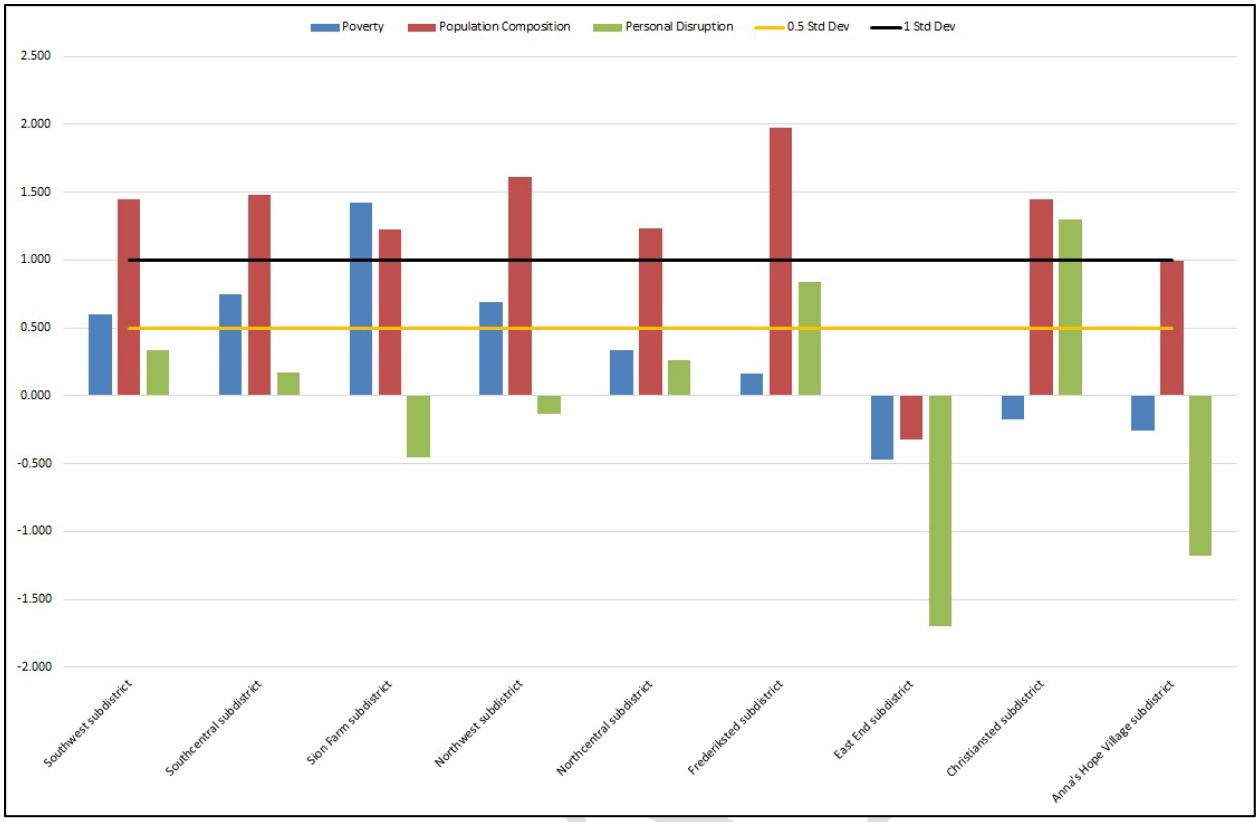

Figure 3.5.4. Social vulnerability indices for St. Croix coastal sub-districts.
(Source: SERO County Social Vulnerability Indicators database [ACS 2014], CFMC 2019a)

As depicted in Figure 3.5.5 below, social indicators data reveal that most sub-districts on St. Thomas and St. John are relatively less vulnerable to social change than are those on St. Croix. However, local social, economic, and demographic vulnerabilities are indeed indicated for the sub-district of Charlotte Amalie, where poverty and local population composition indices exceed the 1.0 standard deviation threshold for local vulnerability to various sources of social change.

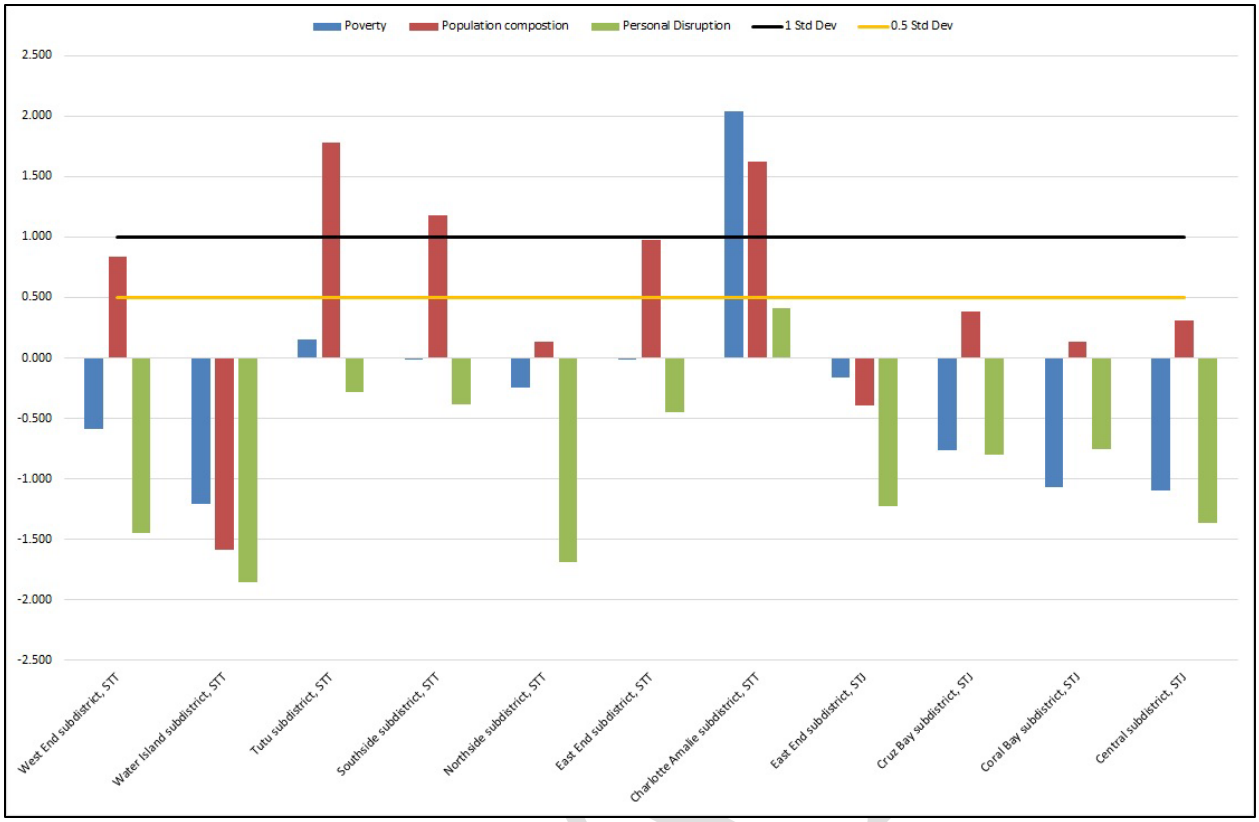

Figure 3.5.5. Social vulnerability indices for St. Thomas and St. John coastal sub-districts. (Source: SERO County Social Vulnerability Indicators database [ACS 2014], CFMC 2019b)

Finally, as depicted in Figure 3.5.6, available social indicators data make clear that virtually all municipalities of Puerto Rico are, in socioeconomic and demographic terms, vulnerable to various sources of change. Moreover, social and economic conditions in the subject municipalities undoubtedly worsened in recent years given challenges experienced by householders during and after the 2017 hurricane season, and in relation to pandemic-related problems during 2020 and beyond. Indeed, Mehta et al. (2021) report that Hurricane Maria of itself generated economic impacts totaling some $100 billion among communities in Puerto Rico. Similarly, Chowdhury et al. (2019) describe major health care impacts from Hurricanes Irma and Maria on St. Thomas and St. John, and Stoffle et al. (2020) examine unprecedented infrastructure damage on St. Croix, including extensive losses in the fisheries sectors.

Given extensive social vulnerabilities noted of communities across the U.S Caribbean in recent years, the communities depicted in this section do bear the potential for environmental justice concerns in the context of new fishing regulations and/or other distinct or cumulative sources of change in the region. However, the full range of pertinent up-to-date information is not yet available to assess this issue in full. As such, although no fisheries-specific environmental justice problems are identified here in relation to prospective regulatory changes, the absence of such issues cannot be assumed at this time.

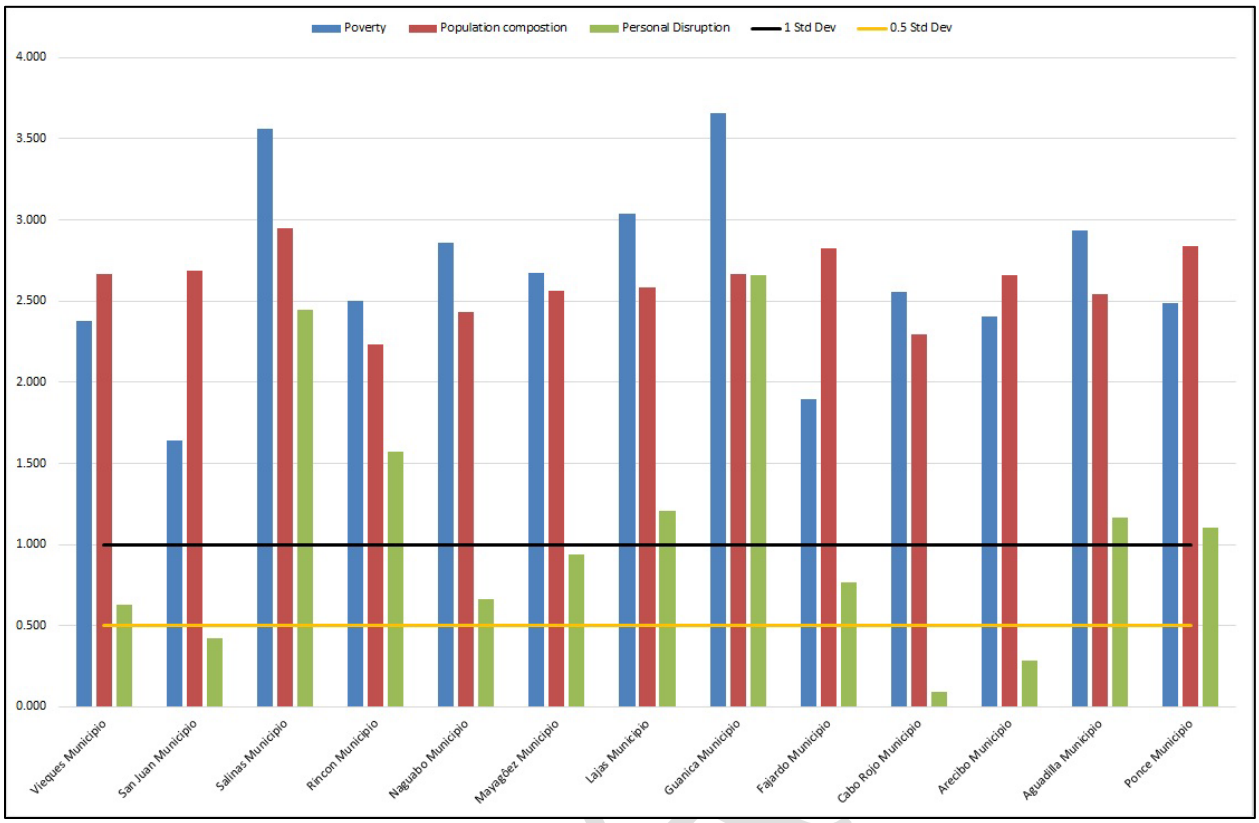

Figure 3.5.6. Social vulnerability indices for coastal municipalities in Puerto Rico.
(Source: SERO County Social Vulnerability Indicators database [ACS 2014], CFMC 2019c)

3.6 Description of the Administrative Environment

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

3.6.1 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 nm from shore, as well as authority over U.S. anadromous species and continental shelf resources that occur beyond the EEZ.

Responsibility for federal fishery management decision-making is divided between the U.S. Secretary of Commerce (Secretary) and eight regional Fishery Management Councils that

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

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

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

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

3.6.2.1 Puerto Rico

The Commonwealth of Puerto Rico has jurisdiction over commonwealth fisheries in waters extending up to 9 nm from shore. Those fisheries are managed by Puerto Rico's Department of Natural and Environmental Resources (DNER) per Puerto Rico Law 278 of November 29, 1998 as amended, known as Puerto Rico's Fisheries Law, which establishes public policy regarding

fisheries. Section 19 of Article VI of the Constitution of the Commonwealth of Puerto Rico provides the foundation for the fishery rules and regulations. Puerto Rico Fishing Regulations 6902, implemented in 2004, included regulations for the management of marine managed areas for fisheries purposes and imposed regulations for the protection of several species such as the Nassau grouper and the red hind. Puerto Rico Regulations 7949, implemented in 2010, is the current regulatory mechanism for management of fishery resources in Puerto Rico territorial waters as well as for those resources and areas with shared jurisdiction with the U.S. government through the Council.

3.6.2.2 U.S. Virgin Islands

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

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

Puerto Rico DNER: http://www.drna.pr.gov/

USVI DPNR: https://dpnr.vi.gov/

Chapter 4. Environmental Consequences (in progress)

4.1 Action 1: Use of Trawl Gear, Gillnets, Trammel Nets, and Purse Seines in the U.S. Caribbean Exclusive Economic Zone (EEZ) around Puerto Rico

Summary of Sub-actions and Alternatives for Action 3

Action 1 -Puerto Rico	Alt. 1	Alt 2.	Alt 3
1(a) Trawl Gear	No action. Retain as authorized for commercial non-FMP species	Prohibit use for all fishing in MMAs	**(Preferred)** Prohibit use for all federal waters
1(b) Gillnet	No action. Retain as an authorized gear type for the commercial harvest of FMP and non-FMP pelagic species and non-FMP managed species, and for reef fish and spiny lobster and inside Council Seasonally Closed Areas or Council MMAs.	Prohibit use: **Sub-alternative 2a.** For all fishing in the EEZ. **Sub-alternative 2b (Preferred).** For all fishing in the EEZ, except for the following fish species belonging to the halfbeaks (Family Hemiramphidae), gar (Family Belonidae), and flyingfish (Family Exocoetidae). A surface gillnet used in the EEZ around St. Thomas and St. John to fish for any baitfish must be tended at all times. Mesh size may not be smaller than 0.75 inches square or 1.5-inch stretch. May not be used 20 ft from bottom. **Sub-alternative 2c.** For fishing for all managed pelagic species	–
1(c) Trammel net	Retain trammel nets as neither an authorized gear type for any fisheries in the EEZ around St. Thomas and St. John, nor an otherwise prohibited gear type, except for FMP reef fish and spiny lobster.	Prohibit for all fishing	–
1(d) Purse seine	Retain purse seines as neither an authorized gear type for any fisheries in the EEZ around St. Thomas and St. John, nor an otherwise prohibited gear type.	Prohibit for all fishing	–

4.1.1 Effects on the Physical Environment

4.1.1.1 Action 1(a): Modify the Use of Trawl Gear in the Federal Waters Around Puerto Rico

Action 1(a) addresses the use of trawl gear in federal waters around Puerto Rico. Trawl gear, which includes bottom and mid-water trawls has the potential to impact sensitive habitat present in the U.S. Caribbean such as coral and sponge habitat. Direct contact to with these habitats, which may include species and critical habitat listed under the Endangered Species Act (ESA),

could occur with bottom tending trawl gear and impact to sensitive vertical relief from near-bottom orientation of pelagic trawls.

Alternative 1 is the status quo and would not change any regulations applicable to the use of trawls in federal waters around Puerto Rico. It would retain the trawl gear, including bottom and mid-water trawls, as an authorized gear type for the commercial harvest of non-federally managed species within the Puerto Rico fishery components. However, there is no evidence that the commercial sector uses (or has used) trawl gear (with exceptions noted in Section 1.1, such as for research and exploratory fishing).

Alternative 2 would prohibit the use of trawl gear for fishing in the Puerto Rico Council MMAs, while **Preferred Alternative 3** would prohibit the use of trawl gear for all fishing that occurs within the Puerto Rico EEZ. Because trawl gear has not historically been used in the U.S. Caribbean EEZ, including the Puerto Rico EEZ, and is not currently used, **Alternative 2** and **Preferred Alternative 3** are both administrative actions and are not expected to have any physical effects when compared to **Alternative 1**. However, by preventing the potential future use of the trawl gear, both **Alternative 2** and **Preferred Alternative 3** could be more beneficial to the physical environment by preventing potential habitat effects, such as to essential fish habitat (EFH) for federally managed species, from trawling activities in federal waters around Puerto Rico (**Preferred Alternative 3**) or in Puerto Rico Council MMAs (**Alternative 2**), with the former being more beneficial in protecting fishery and habitat resources throughout the Puerto Rico EEZ, including ESA listed species and critical habitat present in the area. For instance, the Biological Opinion for the Island-based FMPs (NMFS 2018d) estimated that fishing occurs in about 18% of the fishable area in federal waters off Puerto Rico and **Preferred Alternative 3** would be expected to protect these resources throughout all of the 18%, while **Alternative 2** would only protect a smaller portion of the fishable habitat from any potential physical effects from trawling. Prohibiting the use of trawl gear in all fishery components of the Puerto Rico fishery (**Preferred Alternative 3**) would prevent fishermen from petitioning for its use, which could occur under **Alternative 1** and **Alternative 2**, thus providing more benefits to the physical environment.

4.1.1.2 Action 1(b). Modify the Use of Gillnets in Federal Waters Around Puerto Rico

Gillnets (in *Spanish*: filete (gillnet/single wall) hang vertically in the water column (can or cannot be fixed to the bottom) and are not expected to interact with the bottom (i.e., habitat, essential fish habitat, critical habitat for ESA listed species). Therefore, physical effects are not expected from **Alternative 1** or **Alternative 2, Sub-alternatives 2a, 2b,** or **2c.**

4.1.1.3 Action 1(c). Modify the Use of Trammel Nets in Federal Waters Around Puerto Rico

Trammel nets (in *Spanish*: trasmallo) hang vertically in the water column and are not expected to interact with the bottom (i.e., habitat, essential fish habitat, critical habitat for ESA listed species). Therefore, physical effects are not expected from **Alternative 1** or **Alternative 2.**

4.1.1.4 Action 1(d). Modify the Use of Purse Seines in Federal Waters Around Puerto Rico

Purse seines (used in many regions to catch tunas) consist of a large wall of netting deployed around an entire area or school of fish. Regardless of authorization or not for use in federal waters, purse seines are not expected to interact with the bottom, and therefore, no physical effects are expected from **Alternative 1** or **Alternative 2.**

4.1.2 Effects on the Biological/Ecological Environment

4.1.2.1 Action 1(a): Modify the Use of Trawl Gear in the Federal Waters Around Puerto Rico

Alternative 1 is the status quo and would not change any regulations applicable to the use of trawls in federal waters around Puerto Rico. **Alternative 2** would prohibit all trawl gear year-round in all Puerto Rico Council MMAs, while **Preferred Alternative 3** would prohibit the use of trawl gear for all fishing within the Puerto Rico EEZ. Because trawl gear has not historically been used in the U.S. Caribbean EEZ, including the Puerto Rico EEZ, and is not currently used, **Alternative 2** and **Preferred Alternative 3** are both administrative actions and are not expected to have any additional biological or ecological effects when compared to **Alternative 1**. However, by preventing any future use of the trawl gear, both **Alternative 2** and **Preferred Alternative 3** could be more beneficial to the biological and ecological environment by preventing potential bycatch and/or habitat effects from trawling activities in federal waters around Puerto Rico (**Preferred Alternative 3**) or in Puerto Rico Council MMAs (**Alternative 2**), with the former being more beneficial in protective fishery and habitat resources throughout the Puerto Rico EEZ. For instance, the Biological Opinion for the Island-based FMPs (NMFS 2018d) estimated that fishing occurs in about 18% of the fishable area in federal waters off Puerto Rico and **Preferred Alternative 3** would be expected to protect these resources throughout all the 18%, while **Alternative 2** would only protect a smaller portion of the fishable habitat from any potential physical effects from trawling. Also, prohibiting the use of trawl gear in all fishery components of the Puerto Rico fishery (**Preferred Alternative 3**) would prevent fishermen from petitioning for its use, which could occur under **Alternative 1** and **Alternative 2**, thus providing more benefits to the biological and ecological environment.

4.1.2.2 Action 1(b). Modify the Use of Gillnets in Federal Waters Around Puerto Rico

As discussed in Section 2.1, gillnets have the potential to result in large bycatches of reef fish species and spiny lobster, and also impacting ESA listed species such as sea turtles, which negatively impacts their populations. **Alternative 1** would retain gillnets as an authorized gear type for the commercial harvest of federally managed and non-federally managed pelagic fish and for the commercial harvest of other non-federally managed species (e.g., species that are not managed by the Council), as listed in 50 CFR 600.725(v)(V). Federal regulations allow for the use of gillnets for catching non-federally managed species (e.g., baitfish such as ballyhoo or flying fish), subject to the requirement that the gear must be tended at all times, and the use of

gillnets is prohibited year-round for fishing for spiny lobster and federally managed reef fish.[38] The commercial harvest of federally managed pelagics, non-federally managed pelagics, and other non-federally managed species with gillnets could increase the potential for bycatch of target species that are prohibited with this gear type (i.e., reef fish, spiny lobster) and would also increase the potential catch of undersized managed and non-managed species (pelagics, non-federally managed species) and of ESA-listed species (i.e., sea turtles), which could increase potential for overfishing and negatively affect their populations.

Sub-alternative 2a proposes to prohibit the use of gillnets for the harvest of all commercial and recreational species (i.e., federally managed and non-federally managed) in the EEZ around Puerto Rico. **Sub-alternative 2b** would prohibit with the use of gillnets to harvest all commercial and recreational species (i.e., federally managed and non-federally managed) in the EEZ around Puerto Rico, with the exception of baitfish belonging to the halfbeak, gar, and flyingfish families. **Sub-alternative 2b** would define a gillnet used for baitfish as one with mesh size opening that may not be smaller than 0.75 inches square or 1.5-inch stretch and that must to be tended at all times. Although the use of gillnets for the commercial harvest of federally managed and non-federally managed pelagic species or other non-federally managed species in federal waters is considered to be minimal due to depth and distance from the coast of the location of federal waters, **Sub-alternative 2a** and **Sub-alternative 2b** would prevent negative ecological and biological effects from the use of gillnets (e.g., prevention of bycatch of undersized individuals, ESA protected species, other target and non-target species). Allowing the use of surface gillnets for catching certain species of baitfish commercially and/or recreationally would allow fishermen to continue using these specific bait nets in federal waters (**Sub-alternative 2b**), and would prevent using gillnets for other federally managed and non-federally managed species. Specifying the mesh size and requirement to tend the net at all times in **Sub-alternative 2b** would prevent bycatch.

In summary, **Alternative 1** is the status quo alternative (no changes to the current gillnet regulations in the EEZ around Puerto Rico) and would be less beneficial to the biological and ecological environment in federal waters off Puerto Rico than **Sub-alternative 2a**. This is because **Alternative 1** would continue to allow the use of gillnets for the commercial harvest of pelagic species and non-federally managed species, increasing the potential of adverse effects from use of the gear. **Sub-alternative 2b** would be more beneficial to the ecological and biological environment because it would prevent bycatch by setting a minimum mesh size for the bait nets.

[38] Cast nets are authorized for the commercial and recreational harvest of non-federally managed species. Cast nets are surface nets typically used to fish for baitfish such as ballyhoo, sardines, and other species. The Council did not include cast nets in the motion to prepare this amendment.

4.1.2.3 Action 1(c). Modify the Use of Trammel Nets in Federal Waters Around Puerto Rico

Alternative 1 would retain current regulations applicable to the use of trammel net in federal waters around Puerto Rico. **Alternative 2** would specifically prohibit the use of trammel nets for all harvest in the Puerto Rico EEZ, including the use of surface trammel nets for baitfish, therefore it would not be possible for fishermen to request the use of the gear as otherwise allowed under federal regulations for gear that are not included in the authorized gear list, as discussed in Section 1.2 of this document.

Effects to the biological/ecological environments from **Alternative 2** are not expected to be different from those of **Alternative 1** because trammel nets are currently not authorized for use in federal waters for any fishing. However, **Alternative 2** could be slightly more beneficial to the biological and ecological environment of the Puerto Rico EEZ because it further restricts potential future use of trammel nets through a petition to the Council, eliminating any potential effects from bycatch of undersized organisms or large amounts, preventing overfishing, and also preventing any effects to ESA listed species such as sea turtles.

4.1.2.4 Action 1(d). Modify the Use of Purse Seines in Federal Waters Around Puerto Rico

Purse seines consist of a large wall of netting deployed around an entire area or school of fish and have the potential to capture large amounts of fish, without discrimination, which could affect the biological and ecological environment of Puerto Rico fishery if they were to be used in the region. Effects to the biological/ecological environments from **Alternative 2** are not expected to be different from those of **Alternative 1** because purse seines are currently not authorized for use in federal waters for any fishing. However, **Alternative 2** could be slightly more beneficial to the biological/ecological environment of the Puerto Rico EEZ because it further restricts potential future use of this gear type through a petition to the Council and thus would prevent impacts to fish populations and ESA-listed species from bycatch.

4.1.3 Effects on the Economic Environment

4.1.3.1 Action 1(a): Modify the Use of Trawl Gear in the Federal Waters Around Puerto Rico

Alternative 1 (no action) would retain trawl gear as an authorized gear type for the commercial harvest of non-federally managed species in the federal waters around Puerto Rico that is not otherwise prohibited. Given the status quo nature of **Alternative 1**, there will be no direct economic effects associated with Alternative 1. As noted in Chapter 2, there is no evidence that the commercial sector uses (or has used) trawl gear (except for research and exploratory fishing) and thus there will be no immediate economic effects (direct or indirect) associated with **Alternative 1**. There could, however, be long-term economic impacts should trawling in the federal waters around Puerto Rico occur. Specifically, the use of trawl gear could potentially negatively impact the critical habitat needed for recruitment and survival. This could lead to a

reduction in catch and, hence, revenues to the commercial fishermen and a reduction in catch per trip in the recreational sector. This, in turn, may lead to a reduction in revenues accruing to those businesses that provide support services to the recreational sector.

Alternative 2 would prohibit the use of trawl gear for all fishing in the Council seasonally closed areas/marine managed areas (MMA) year-round in federal waters around Puerto Rico,[39] while **Alternative 3** would prohibit the use of trawl gear for all fishing in federal waters around Puerto Rico. Given that there is no evidence that the commercial and (presumably) recreational sector uses trawl gear in federal waters around Puerto Rico, one would expect no immediate costs or benefits to either the commercial of recreational sector associated with either **Alternative 2 or Alternative 3**. To the extent that trawling could potentially become economically viable[40], however, diminution of sensitive and/or critical habitat associated with trawling could result in a reduction in the economic benefits (i.e., recruitment and survival) associated with the sensitive and/or critical habitat.

From an economic perspective, the overall net benefits associated with **Alternative 3** are believed to exceed those of either **Alternative 2** or the status quo (**Alternative 1**) conditioned on two assumptions. The first assumption is that trawling might become economically viable in the future and that it would be forthcoming in the absence of regulation. The second assumption is that trawling in federal waters would, over time, result in a diminution of the sensitive and/or critical habitat and associated carrying capacity. If either of these two assumptions are invalid, there would be no net benefits of adopting **Alternative 2** or **Alternative 3** over the status quo (**Alternative 1**). Finally, given these assumptions being met, it stands to reason that **Alternative 2** provides greater net benefits than **Alternative 1** since a portion of the fishable habitat in the EEZ of Puerto Rico would be protected from the negative impacts associated with trawling whereas none would be protected under the status quo.[41]

4.1.3.2 Action 1(b). Modify the Use of Gillnets in Federal Waters Around Puerto Rico

Alternative 1 (no action) would retain gillnets as an authorized gear type for the commercial harvest of federally managed and non-federally managed pelagic species and the commercial harvest of non-federally managed species in the federal waters around Puerto Rico, and as a prohibited gear type for reef fish and spiny lobster in the EEZ around Puerto Rico and inside the Council Seasonally Closed Areas or Council MMAs. As indicated by the information in Tables 3.4.5 and 3.4.6, there has been only limited harvests from federal waters with the use of gill nets

[39] These include the Abrir La Sierra Bank red hind spawning aggregation area, the Tourmaline red hind spawning aggregation area, and Bajo de Sico.

[40] For the purposes of discussion, it is assumed that trawling in federal waters around Puerto Rico is not occurring because it is not, under current conditions, economically viable.

[41] It should be mentioned that there is a cost to administer any regulation including enforcement of that regulation. If trawling were to become viable and adopted in federal waters but did not result in diminution of the habitat, then the costs (administration in nature) would exceed benefits (which would be zero).

during the 2014-2019 period.[42] While there would be no direct costs associated with maintaining the status quo, there could be indirect costs if future use of this gear in federal waters increases significantly (due to, say, it becoming economically viable) which then results in large bycatches of reef fish species and spiny lobsters negatively impacting the populations of these species. Direct benefits of maintaining the status quo are represented by the limited harvest using gillnets in federal waters as measured by gains to the consumer from this additional product (i.e., reduction in price as a result of this harvest) and revenue and profits to the commercial sector (given the open access nature of commercial fishery in Puerto Rico, producer surplus is likely to be small).

Alternative 2 would prohibit the use of gillnets in federal waters around Puerto Rico for all fishing (**Sub-alternative 2a**), for all fishing in the Puerto Rico EEZ, except for certain species as listed in Section 2.3.2 (**Sub-alternative 2b**), or for fishing for federally managed pelagic species (**Sub-alternative 2c**).[43] Whether the benefits of either **Sub-alternative 2a** or **Sub-alternative 2b** exceed the costs would depend heavily on whether an expansion of the use of gillnets in the federal waters surrounding Puerto Rico would result in a level of bycatch (of reef fish species, or spiny lobsters, or federally managed pelagic species) that would significantly contribute to probability of overfishing.[44] While it is widely thought that gillnets are a non-selective gear, fishermen can, presumably, place gillnets in areas that would minimize the unintended capture of reef fish and/or spiny lobsters (or, possibly, federally managed pelagic species). The extent to which this is practicable is unknown.

Under **Sub-alternative 2c**, fishing for federally managed pelagic species would be prohibited.[45] As mentioned, harvests of managed species using gill nets in the federal waters surrounding Puerto Rico are very limited averaging only 1.9 thousand pounds per year during 2014-2019. The 1.9 thousand pounds taken annually (on average) by gillnets in federal waters during 2014-2019 appears to be largely comprised of king mackerel and cero mackerel (table 2.3.1) with lesser contributions being made by barracuda and little tunny (landings of these two species are confidential due to less than three fishermen reporting the harvest of these species in federal waters using gillnets during 2014-2019).

[42] Specifically, harvests of managed species in federal waters with the use of gillnets averaged 1.9 thousand pounds per year during 2014-2019 with an associated average annual value of $5.9 thousand. Harvests of non-managed species from federal waters using gill nets averaged 3.1 thousand pounds annually during 2014-2019 with an associated average annual value of $5.6 thousand.

[43] **Sub-alternative 2.b (Preferred)** also places significant specifications regarding construction of and the use of gillnets in federal waters. These include restrictions on mesh size and the requirement that the surface nets be tended at all times (see Section 2.3.2 for additional detail.

[44] For the purposes of discussion, it is assumed that the use of gillnets in federal waters is limited because it is not, under current conditions, economically viable.

[45] This Alternative was added at the December, 2022 Council meeting.

The benefits of imposing additional restrictions on the use of gillnets in the federal waters surrounding Puerto Rico (**Alternative 2**) could be significant under the assumptions that (a) there could be a measurable expansion in the use of gillnets in federal waters and (b) that this expansion results in a substantial bycatch of reef fish and/or spiny lobsters. These benefits must, however, be weighed against the costs. These costs include a reduction in the harvest of federally managed pelagic species and non-federally managed species. While these costs are unknown, **Sub-alternative 2b** balances protection the reef fish stocks versus the costs of lost potential catch of federally managed pelagic species and non-managed species. In addition, enforcement may be facilitated with the adoption of **Sub-alternative 2.b** relative to the status quo (**Alternative 1**).

Sub-alternative 2c, as mentioned, would prohibit fishing for federally managed pelagic species in federal waters with the use of gillnets. Given that (a) it may be difficult for enforcement to prove that the intended use of the gillnet was for the harvest of federally managed pelagic species and (b) there are no regulations placed on the construction (e.g., mesh size) and placement (e.g., actively tended), benefits associated with **Sub-alternative 2c** are likely to be less than **Sub-alternative 2.b** and costs (as measured in the reduction in consumer and producer surplus due a reduction in harvest of federally managed pelagic species) are likely to be greater under **Sub-alternative 2c** than under **Sub-alternative 2b** .[46]

Evaluating benefits relative to costs, and temporarily neglecting enforcement considerations, leads to the conclusion that **Sub-alternative 2b** is superior to either the status quo (**Alternative 1**) or **Sub-alternative 2a** if and only if two conditions are met. The first is that there exists (with some amount of certainty) the possibility of a future expansion of the use of gillnets in the federal waters surrounding Puerto Rico. The second is that expansion of the use of gillnets results in a significant increase in bycatch. Even if these two conditions are not met, however, **Sub-alternative 2b** may be economically preferable to either **Sub-alternative 2a** or **Alternative 1** if adoption of **Sub-alternative 2b** substantially improves enforcement (i.e., allow enforcement to concentrate on other, perhaps more important, activities). There is insufficient information, however, to determine whether this would be the case. Finally, **Sub-alternative 2b** is believed to be superior to **Sub-alternative 2c** if there is little concern that an increased use of gillnets in federal waters would contribute to the overfishing of the federally managed pelagic species.

4.1.3.3 Action 1(c). Modify the Use of Trammel Nets in Federal Waters Around Puerto Rico

Alternative 1 (no action) would retain trammel nets as neither an authorized gear type for any fisheries in federal waters surrounding Puerto Rico, nor an otherwise prohibited gear type, except for federally-managed reef fish and spiny lobster in federal waters surrounding Puerto Rico.[47]

[46] This finding is conditioned on the assumption that the harvest of federally managed pelagic species under Sub-alternative 2b does not result in any significant probability associated with the overfishing of these species.
[47] Trammel nets are already prohibited from fishing for federally managed reef fish and spiny lobster in the federal waters surrounding Puerto Rico.

Given that trammel nets are not currently authorized for use in federal waters, there would be no direct costs in maintaining the status quo.[48]

The use of trammel nets would be prohibited for all fishing in federal waters around Puerto Rico under **Alternative 2**. This would have the same immediate effect as the **Alternative 1** because the use of trammel nets in the federal waters surrounding Puerto Rico are not authorized in the FMP. However, under the status quo, one could petition the Council for the use of trammel nets in federal waters around Puerto Rico. From an efficiency standpoint, trammel nets may be superior to other gears and, hence, an outright prohibition under **Alternative 2** may result in inefficiency in the system (assuming one or more individuals are successful in petitioning the Council for the use of trammel nets in federal waters). From an economic perspective, therefore, an argument can be made that the status quo is preferable to **Alternative 2**, subject to two caveats. First, if successfully petitioned for use, trammel nets would likely replace more traditional gears based on the assumption that there is a limited market for product landed in Puerto Rico. In areas of high unemployment, this may be an important consideration because labor requirements with trammel nets are likely to be less than requirements using traditional gears because catch per hour using trammel nets would likely exceed the catch per hour using traditional gears. With a limited market for the landed product, this translates a reduction in labor requirements. Second, if fishermen were to shift to using trammel nets in place of the traditional gears, there may be an increase in bycatch. If this is the case, the benefits of using trammel nets instead of more traditional gears, as measured by efficiency, may be more than offset by the costs of doing so (i.e., increased bycatch) which would then indicate a preference for **Alternative 2** over the status quo from an economic perspective.

4.1.3.4 Action 1(d). Modify the Use of Purse Seines in Federal Waters Around Puerto Rico

Alternative 1 (No action) would retain purse seines as neither an authorized gear type for any fisheries in federal waters surrounding Puerto Rico, nor an otherwise prohibited gear type. Given that purse seines are not currently authorized for use in federal waters around Puerto Rico (except for the harvest of highly migratory species), there are no direct costs in maintaining the status quo.

The use of purse seines would be prohibited for all fishing in federal waters surrounding Puerto Rico under **Alternative 2**. However, under the status quo, one could petition the Caribbean Council for the use of purse seines in federal waters around Puerto Rico. From an efficiency standpoint, purse seines may be superior to other, more traditional, gears and, hence, an outright

[48] It should be noted, however, that potential future use of trammel nets may be allowed via a successful petition to the Caribbean Council though take of managed reef fish and spiny lobster would still be prohibited. Furthermore, the information in tables 3.4.5 and 3.4.6 would indicate that trammel nets are, on occasion, used in federal waters; likely without a petition being made to the Council. During 2014-2019, an average 0.77 thousand pounds of managed species (valued at $3.9 thousand) were taken annually from federal waters surrounding Puerto Rico. An additional 0.33 thousand pounds (valued at $0.82 thousand) of non-managed species was also taken on an annual basis.

prohibition under **Alternative 2** may result in inefficiency in the system (assuming one or more individuals are successful in petitioning the Council for the use of purse seines in federal waters). Therefore, an argument can be made that **Alternative 1** is preferable to **Alternative 2** from an economic point of view. However, potential gains in efficiency must be weighed against any the potential costs. These costs include any increased possibility of overfishing, the reduction in need for labor in the harvesting sector, and the possibility of increased bycatch. If these costs are large, they would likely negate any benefits associated with the use of a more efficient gear in which case **Alternative 2** would yield higher economic gains than **Alternative 1**.

4.1.4 Effects on the Social Environment

For purposes of analysis in this and subsequent discussion of potential regulatory effects on the social environment, *social effects* are defined here to involve beneficial and/or deleterious human outcomes following from any loss or increase in *fishing opportunity*. Examples of social effects include, but are by no means limited to: (a) acquisition or failed acquisition of seafood for consumption by island-based individuals, families, and communities; (b) acquisition or failed acquisition of seafood for customary or traditional uses such as sharing in extended family settings or consumption at community celebrations; (c) the ability or inability to practice one's profession or avocation on the ocean; (d) the ability or inability to accumulate and transmit traditional or local ecological knowledge in the context of fishing; and (e) the ability or inability to develop and maintain interpersonal relationships within social networks of fishery participants. Of note, both beneficial and deleterious social effects potentially associated with the actions described in this amendment are, in probabilistic terms, most likely to occur in island areas where residents are most extensively engaged in regional marine fisheries, as indicated in Section 3.5 above.

4.1.4.1 Action 1(a): Modify the Use of Trawl Gear in the Federal Waters around Puerto Rico

Use of trawl gear in the federal waters surrounding Puerto Rico continues to be undocumented. **Alternative 1** (no action) does not restrict use of the gear in the federal waters, but with the potential that it could be deployed in the years to come. While this would increase fishing opportunities in the region, it could also cause physical and/or biological impacts and associated problems for Puerto Rico-based harvesters active in other fisheries. By specifying that use of trawl gear would not be allowed in the MMAs/seasonally closed areas, **Alternative 2** would diminish fishing opportunity in such areas in the future. By disallowing use of trawl gear in *all* federal waters around Puerto Rico, **Preferred Alternative 3** would also prevent related fishing opportunity. Given the potential for ecological impacts to result from use of trawl gear, however, **Alternative 2** would reduce, and **Alternative 3** would prevent such problems and thereby minimize any gear-related constraints on harvest potential and related social effects in other fisheries.

4.1.4.2 Action 1(b). Modify the Use of Gillnets in Federal Waters around Puerto Rico

Alternative 1 (no action) would continue to allow use of gillnets for harvest of (managed and non-managed) pelagic species and other non-managed species in federal waters around Puerto Rico, with prohibitions on use for harvesting reef fish and spiny lobster. However, because gillnets are used only rarely in federal waters around Puerto Rico, extensive loss of fishing opportunity and related social effects cannot be assumed. In banning use of gillnets in the region's federal waters, **Alternative 2** and **Sub-alternative 2a** would prevent new fishing opportunities and any social benefits that could possibly follow. However, such prohibitions could help avoid net-related ecological damage and allow for social benefits among participants using other gear. **Preferred Sub-alternative 2b** allows for use of properly configured and tended gillnets to capture certain bait species, with potential benefits for participants in regional hook-and-line fisheries. Inasmuch as gillnets would generate detrimental ecological impacts in federal waters, the preferred alternative could constrain other fishing opportunities over time.

4.1.4.3 Action 1(c). Modify Use of Trammel Nets in Federal Waters around Puerto Rico

Trammel nets are not legally usable in federal waters around Puerto Rico, and landings data indicate very little harvest in years past. As such, loss of fishing opportunity resulting from no action **Alternative 1** is unlikely. **Alternative 2**, which would specifically prohibit future use of trammel nets, would not enable new fishing opportunity. However, such prohibition could minimize ecological impacts, with potential benefits for persons involved in other fisheries.

4.1.4.4 Action 1(d). Modify the Use of Purse Seines in Federal Waters around Puerto Rico

Alternative 1 for this action would involve no new federal restrictions on use of purse seines. Because such gear is not presently authorized or used in federal waters, lost fishing opportunity and any subsequent social effects cannot be easily determined. **Alternative 2** would make deployment of purse seine gear illegal in the years to come. While fishing opportunities would be lost under this alternative, this could be balanced through avoidance of ecological damage that could otherwise impact other fisheries around the region.

4.1.5 Effects on the Administrative Environment

4.1.5.1 Action 1(a). Modify the Use of Trawl Gear in Federal Waters Around Puerto Rico

Administrative effects are from creation the regulations, administering such regulations, and enforcing the regulations. Because trawling does not occur in federal waters there would be no difference in administrative effects in terms of enforcement, between **Alternative 1** and **Preferred Alternative 2**, but **Preferred Alternative 2** would have an additional administrative burden from creating regulations to implement the gear use prohibition.

4.1.5.2 Action 1(b). Modify the Use of Gillnets in Federal Waters Around Puerto Rico

Under **Alternative 1**, gillnets are not listed as authorized under any U.S. Caribbean fisheries, including St. Croix, in federal regulations at 50 CFR 600.725(v)(V). In addition, federal regulations specifically prohibit the use of gillnets for spiny lobster and federally managed reef fish, but allow the use of gillnets to fish for any other species, but they must be tended at all times (50 CFR 622.437(a)(3)). **Alternative 2, Sub-alternative 2a** would specifically prohibit the use of gillnets for all harvest in the Puerto Rico fishery, including for the use of surface gillnets for baitfish. **Alternative 2, Sub-alternative 2(b)** would allow the use of gillnets just for certain species of baitfish, and **Sub-alternative 2(c)** would prohibit the use of gillnets just for the harvest of pelagic species. Administrative effects are expected to be slightly larger for **Sub-alternative 2b** than for **Alternative 1** and **Sub-alternative 2a**, because of the additional burden in enforcing a regulation that includes exceptions for using gillnets (i.e., baitfish).

4.1.5.3 Action 1(c). Modify the Use of Trammel Nets in Federal Waters Around Puerto Rico

Under **Alternative 1**, trammel nets are not listed as authorized under any U.S. Caribbean fisheries, including Puerto Rico, in federal regulations at 50 CFR 600.725(v)(V). In addition, federal regulations specifically prohibit the use of trammel nets for spiny lobster and federally managed reef fish, but allow the use of trammel nets (or gillnets) to fish for any other species, but they must be tended at all times (50 CFR 622.437(a)(3)). **Alternative 2** would specifically prohibit the use of trammel nets for all harvest in the Puerto Rico fishery, including for the use of surface trammel nets for baitfish, therefore it would not be possible for a fishermen to petition to use of this gear as otherwise allowed under federal regulations for gear that are not included in the authorized gear list.[49] Administrative effects are expected to be slightly larger for **Alternative 2** than for the no action alternative (**Alternative 1**).

[49] 50 CFR 600.725(v): A person or vessel is prohibited from engaging in fishing or employing fishing gear when such fishing gear is prohibited or restricted by regulation under an FMP or other applicable law. However, after December 1, 1999, an individual fisherman may notify the appropriate Council, or the Director, in the case of Atlantic HMS, of the intent to use a gear or participate in a fishery not already on the list. Ninety days after such notification, the individual may use the gear or participate in that fishery unless regulatory action is taken to prohibit the use of the gear or participate in the fishery (*e.g.,* through emergency or interim regulations).

4.1.5.4 Action 1(d). Modify the Use of Purse Seines in Federal Waters Around Puerto Rico

Under **Alternative 1**, purse seines are not listed as authorized under any U.S. Caribbean fisheries, including Puerto Rico, in federal regulations at 50 CFR 600.725(v)(V). **Alternative 2** would specifically prohibit the use of purse seines for all harvest in the Puerto Rico fishery. Because purse seines are not used in federal waters nor are they authorized, there would be no difference in administrative effects in terms of enforcement, between **Alternative 1** and **Alternative 2**, although **Alternative 2** would have an additional administrative burden from creating regulations to implement the broader prohibition on the use of purse seines.

4.2 Action 2: Use of Trawl Gear, Gillnets, Trammel Nets, and Purse Seines in the U.S. Caribbean EEZ around St. Croix

Summary of Sub-actions and Alternatives for Action 1

Action 2 - St. Croix	**Alt. 1**	**Alt 2.**	**Alt 3**
2(a) Trawl Gear	No action. Retain as authorized for commercial non-FMP species	Prohibit use for all fishing in MMAs	(**Preferred)** Prohibit use for all federal waters
2(b) Gillnet	No action. Retain as an authorized gear type for the commercial harvest of FMP and non-FMP pelagic species and non-FMP managed species, and for reef fish and spiny lobster and inside Council Seasonally Closed Areas or Council MMAs.	Prohibit use: **Sub-alternative 2a.** For all fishing in the EEZ. **Sub-alternative 2b (Preferred).** For all fishing in the EEZ, except for the following fish species belonging to the halfbeaks (Family Hemiramphidae), gar (Family Belonidae), and flyingfish (Family Exocoetidae). A surface gillnet used in the EEZ around St. Thomas and St. John to fish for any baitfish must be tended at all times. Mesh size may not be smaller than 0.75 inches square or 1.5 inch stretch.	–
2(c) Trammel net	Retain trammel nets as neither an authorized gear type for any fisheries in the EEZ around St. Thomas and St. John, nor an otherwise prohibited gear type, except for FMP reef fish and spiny lobster.	Prohibit for all fishing	–
2(d) Purse seine	Retain purse seines as neither an authorized gear type for any fisheries in the EEZ around St. Thomas and St. John, nor an otherwise prohibited gear type.	Prohibit for all fishing	–

4.2.1 Effects on the Physical Environment

4.2.1.1 Action 2(a): Modify the Use of Trawl Gear in the Federal Waters Around St. Croix, USVI

Action 2(a) addresses the use of trawl gear in federal waters around St. Croix. Trawl gear, which includes bottom and mid-water trawls, has the potential to impact sensitive habitat present in the U.S. Caribbean, such as coral and sponge habitat. Direct contact with these habitats, which may include species and critical habitat listed under the ESA, could occur with bottom tending trawl gear and impact to sensitive vertical relief from near-bottom orientation of pelagic trawls.

Alternative 1 is the status quo and would not change any regulations applicable to the use of trawls in federal waters around St. Croix. It would retain the trawl gear, including bottom and mid-water trawls, as an authorized gear type for the commercial harvest of non-federally managed species within the St. Croix fishery components. However, there is no evidence that the commercial sector uses (or has used) trawl gear (with exceptions noted in Section 1.1, such as for research and exploratory fishing).

Alternative 2 would prohibit the use of trawl gear for fishing in the St. Croix Council MMAs. **Preferred Alternative 3** would prohibit the use of trawl gear for all fishing that occurs within the St. Croix EEZ. Because trawl gear has not historically been used in the U.S. Caribbean EEZ, including the St. Croix EEZ, and is not currently used, **Alternative 2** and **Preferred Alternative 3** are both administrative actions and are not expected to have any physical effects when compared to **Alternative 1**. However, by preventing the potential future use of the trawl gear, both **Alternative 2** and **Preferred Alternative 3** could be more beneficial to the physical environment by preventing potential habitat effects, such as to essential fish habitat (EFH) for federally managed species, from trawling activities in federal waters around St. Croix (**Preferred Alternative 3**) or in St. Croix Council MMAs (**Alternative 2**), with the former being more beneficial in protecting fishery and habitat resources throughout the St. Croix EEZ, including ESA listed species and critical habitat present in the area. For instance, the Biological Opinion for the Island-based FMPs (NMFS 2018d) estimated that fishing occurs in about 18% of the fishable area in federal waters off St. Croix and **Preferred Alternative 3** would be expected to protect these resources throughout all of the 18%, while **Alternative 2** would only protect a smaller portion of the fishable habitat from any potential physical effects from trawling. Prohibiting the use of trawl gear in all fishery components of the St. Croix fishery (**Preferred Alternative 3**) would prevent fishermen from petitioning for its use, which could occur under **Alternative 1** and **Alternative 2**, thus providing more benefits to the physical environment.

4.2.1.2 Action 2(b). Modify the Use of Gillnets in Federal Waters Around St. Croix, USVI

Gillnets (in *Spanish*: filete (gillnet/single wall) hang vertically in the water column (can or cannot be fixed to the bottom) and are not expected to interact with the bottom (i.e., habitat,

essential fish habitat, critical habitat for ESA listed species). Therefore, physical effects are not expected from **Alternative 1** or **Alternative 2, sub-alternatives 2a** or **2b.**

4.2.1.3 Action 2(c). Modify the Use of Trammel Nets in Federal Waters Around St. Croix, USVI

Trammel nets (in *Spanish*: trasmallo) hang vertically in the water column and are not expected to interact with the bottom (i.e., habitat, essential fish habitat, critical habitat for ESA listed species). Therefore, physical effects are not expected from **Alternative 1** or **Alternative 2.**

4.2.1.4 Action 2(d). Modify the Use of Purse Seines in Federal Waters Around St. Croix, USVI

Purse seines (used in many regions to catch tunas) consist of a large wall of netting deployed around an entire area or school of fish. Regardless of authorization or not for use in federal waters, purse seines are not expected to interact with the bottom, and therefore, no physical effects are expected from **Alternative 1** or **Alternative 2.**

4.2.2 Effects on the Biological/Ecological Environment

4.2.2.1 Action 2(a): Modify the Use of Trawl Gear in the Federal Waters Around St. Croix, USVI

Alternative 1 is the status quo and would not change any regulations applicable to the use of trawls in federal waters around St. Croix. **Alternative 2** would prohibit all trawl gear in all St. Croix Council MMAs, while **Preferred Alternative 3** would prohibit the use of trawl gear for all fishing within the St. Croix fishery EEZ. Because trawl gear has not historically been used in the U.S. Caribbean EEZ, including the St. Croix EEZ, and is not currently used, **Alternative 2** and **Preferred Alternative 3** are both administrative actions and are not expected to have any additional biological or ecological effects when compared to **Alternative 1**. However, by preventing any future use of the trawl gear, both **Alternative 2** and **Preferred Alternative 3** could be more beneficial to the biological and ecological environment by preventing potential bycatch and/or habitat effects from trawling activities in federal waters around St. Croix (**Preferred Alternative 3**) or in St. Croix Council MMAs (**Alternative 2**), with the former being more beneficial in protective fishery and habitat resources throughout the St. Croix EEZ. For instance, the Biological Opinion for the Island-based FMPs (NMFS 2018d) estimated that fishing occurs in about 18% of the fishable area in federal waters off St. Croix and **Preferred Alternative 3** would be expected to protect these resources throughout all the 18%, while **Alternative 2** would only protect a smaller portion of the fishable habitat from any potential physical effects from trawling. Also, prohibiting the use of trawl gear in all fishery components of the St. Croix fishery (**Preferred Alternative 3**) would prevent fishermen from petitioning for its use, which could occur under **Alternative 1** and **Alternative 2**, thus providing more benefits to the biological and ecological environment.

4.2.2.2 Action 2(b). Modify the Use of Gillnets in Federal Waters Around St. Croix, USVI

As discussed in Section 2.1, gillnets have the potential to result in large bycatches of reef fish species and spiny lobster, and also impacting ESA listed species such as sea turtles, which

negatively impacts their populations. **Alternative 1** would retain gillnets as an authorized gear type for the commercial harvest of federally managed and non-federally managed pelagic fish and for the commercial harvest of other non-federally managed species (e.g., species that are not managed by the Council), as listed in 50 CFR 600.725(v)(V). Federal regulations allow for the use of gillnets for catching non-federally managed species (e.g., baitfish such as ballyhoo or flying fish), subject to the requirement that the gear must be tended at all times, and the use of gillnets is prohibited year-round for fishing for spiny lobster and federally managed reef fish.[50] The commercial harvest of federally managed pelagics, non-federally managed pelagics, and other non-federally managed species with gillnets could increase the potential for bycatch of target species that are prohibited with this gear type (i.e., reef fish, spiny lobster) and could also increase the potential catch of undersized managed and non-managed species (pelagics, non-federally managed species) and of ESA-listed species (i.e., sea turtles), which could increase potential for overfishing and negatively affect their populations.

Sub-alternative 2a proposes to prohibit the use of gillnets for the harvest of all commercial and recreational species (i.e., federally managed and non-federally managed) in the EEZ around St. Croix. **Sub-alternative 2b** would prohibit with the use of gillnets to harvest all commercial and recreational species (i.e., federally managed and non-federally managed) in the EEZ around St. Croix, with the exception of baitfish belonging to the halfbeak, gar, and flyingfish families. **Sub-alternative 2b** would define a gillnet used for baitfish as one with mesh size opening that may not be smaller than 0.75 inches square or 1.5-inch stretch and that must be tended at all times. Although the use of gillnets for the commercial harvest of federally managed and non-federally managed pelagic species or other non-federally managed species in federal waters is considered to be minimal due to depth and distance from the coast of the location of federal waters, **Sub-alternative 2a** and **Sub-alternative 2b** would prevent negative ecological and biological effects from the use of gillnets (e.g., prevention of bycatch of undersized individuals, ESA protected species, other target and non-target species). Allowing the use of surface gillnets for catching certain species of baitfish commercially and/or recreationally would allow fishermen to continue using these specific bait nets in federal waters (**Sub-alternative 2b**), and would prevent using gillnets for other federally managed and non-federally managed species. Specifying the mesh size and requirement to tend the net at all times in **Sub-alternative 2b** would prevent bycatch.

In summary, **Alternative 1** is the status quo alternative (no changes to the current gillnet regulations in the EEZ around St. Croix) and would be less beneficial to the biological and ecological environment in federal waters off St. Croix than **Sub-alternative 2a**. This is because

[50] Cast nets are authorized for the commercial and recreational harvest of non-federally managed species. Cast nets are surface nets typically used to fish for baitfish such as ballyhoo, sardines, and other species. The Council did not include cast nets in the motion to prepare this amendment.

Alternative 1 would continue to allow the use of gillnets for the commercial harvest of pelagic species and non-federally managed species, increasing the potential of adverse effects from use of the gear. **Sub-alternative 2b** would be partially compatible with USVI regulations for surface gillnets, facilitating enforcement of federal regulations and would be more beneficial to the ecological and biological environment because it would prevent bycatch by setting a minimum mesh size for the bait nets.

4.2.2.3 Action 2(c). Modify the Use of Trammel Nets in Federal Waters Around St. Croix, USVI

Alternative 1 would retain current regulations applicable to the use of trammel net in federal waters around St. Croix. **Alternative 2** would specifically prohibit the use of trammel nets for all harvest in the St. Croix EEZ, including the use of surface trammel nets for baitfish, therefore it would not be possible for a fishermen to request the use of the gear as otherwise allowed under federal regulations for gear that are not included in the authorized gear list, as discussed in Section 1.2 of this document.

Effects to the biological/ecological environments from **Alternative 2** are not expected to be different from those of **Alternative 1** because trammel nets are currently not authorized for use in federal waters for any fishing. However, **Alternative 2** could be slightly more beneficial to the biological and ecological environment of the St. Croix EEZ because it further restricts potential future use of trammel nets through a petition to the Council, eliminating any potential effects from bycatch of undersized organisms or large amounts, preventing overfishing, and also preventing any effects to ESA listed species such as sea turtles.

4.2.2.4 Action 2(d). Modify the Use of Purse Seines in Federal Waters Around St. Croix, USVI

Purse seines consist of a large wall of netting deployed around an entire area or school of fish and have the potential to capture large amounts of fish, without discrimination, which could affect the biological and ecological environment of St. Croix fishery if they were to be used in the region. Effects to the biological/ecological environments from **Alternative 2** are not expected to be different from those of **Alternative 1** because purse seines are currently not authorized for use in federal waters for any fishing. However, **Alternative 2** could be slightly more beneficial to the biological/ecological environment of the St. Croix EEZ because it further restricts potential future use of this gear type through a petition to the Council and thus would prevent impacts to fish populations and ESA- listed species from bycatch.

4.2.3 Effects on the Economic Environment

4.2.3.1 Action 2(a): Modify the Use of Trawl Gear in the Federal Waters Around St. Croix, USVI

Alternative 1 (no action) would retain trawl gear as an authorized gear type for the commercial harvest of non-federally managed species in the federal waters around St. Croix that is not

otherwise prohibited. Given the status quo nature of **Alternative 1**, there will be no direct economic effects associated with **Alternative 1**. As noted in Section 2.1, there is no evidence that the commercial sector uses (or has used) trawl gear (except for research and exploratory fishing) in the federal waters surrounding St. Croix and thus there will be no immediate economic effects (direct or indirect) associated with **Alternative 1**. There could, however, be long-term economic impacts should trawling in the federal waters around St. Croix occur. Specifically, the use of trawl gear could potentially negatively impact the critical habitat needed for recruitment and survival. This could lead to a reduction in catch and, hence, revenues to the commercial fishermen (as well as profits) and a reduction in catch per trip in the recreational sector (representing a loss in consumer surplus to the recreational sector). This, in turn, may lead to a reduction in revenues accruing to those businesses that provide support services to the recreational sector.

Alternative 2 would prohibit the use of trawl gear for all fishing in the Council MMAs[51] year-round in federal waters around St. Croix while **Preferred Alternative 3** would prohibit the use of trawl gear for all fishing in federal waters around St. Croix. Given that there is no evidence that the commercial and (presumably) recreational sector use trawl gear in federal waters, one would expect no immediate costs or benefits to either the commercial of recreational sector associated with adoption and implementing either **Alternative 2** or **Preferred Alternative 3**. To the extent that trawling could potentially become economically viable[52], however, diminution of sensitive and/or critical habitat associated with trawling could result in a reduction in the economic benefits (i.e., recruitment and survival) associated with the sensitive and/or critical habitat.

From an economic perspective, the overall net benefits associated with **Preferred Alternative 3** are believed to exceed those of either **Alternative 2** or the status quo (**Alternative 1**) conditioned on two assumptions. The first assumption is that trawling in the federal waters surrounding St. Croix might become economically viable in the future and that it would be forthcoming in the absence of regulation. The second assumption is that trawling in federal waters would, over time, result in a diminution of the sensitive and/or critical habitat and associated carrying capacity. If either of these two assumptions are invalid, there would be no net benefits of adopting **Alternative 2** or **Preferred Alternative 3** over the status quo (**Alternative 1**). Finally, given these assumptions being met, it stands to reason that **Alternative 2** provides greater net benefits than **Alternative 1** since a portion of the fishable habitat in the

[51] These include the Red hind spawning aggregation area east of St. Croix and the Mutton snapper aggregation area.
[52] For the purposes of discussion, it is assumed that trawling in federal waters is not occurring because it is not, under current conditions, economically viable.

EEZ of St. Croix would be protected from the negative impacts associated with trawling whereas none would be protected under the status quo.[53]

4.2.3.2 Action 2(b). Modify the Use of Gillnets in Federal Waters Around St. Croix, USVI

Alternative 1 (no action) would retain gillnets as an authorized gear type for the commercial harvest of federally managed and non-federally managed pelagic species and the commercial harvest of non-federally managed species in the federal waters around St. Croix, and as a prohibited gear type for federally managed reef fish and spiny lobster in the EEZ around St. Croix and inside the Council Seasonally Closed Areas or Council MMAs. As indicated by the information in Table 3.4.14, surface gill nets appear to be used in federal waters primarily for the harvest of non-managed species.[54] While there would be no direct costs associated with maintaining the status quo, there could be indirect costs if use of this gear in the federal waters surrounding St. Croix results in large bycatches of reef fish species and spiny lobster which negatively impacts the populations of these species.

Alternative 2 would prohibit the use of gillnets in federal waters around St. Croix for all fishing (**Sub-alternative 2a**) or for all fishing in the St. Croix EEZ, except for certain species as listed in Section 2.1.2 (**Preferred Sub-alternative 2b**).[55] Whether the benefits of adoption of either **Sub-alternative 2a** or **Sub-alternative 2b (Preferred)** would exceed the costs would depend heavily on whether an expansion of the use of gillnets in the federal waters surrounding St. Croix would result in a level of bycatch (of reef fish species or spiny lobster) that would significantly contribute to the probability of overfishing.[56] While it is widely thought that gillnets are a non-selective gear, fishermen can, presumably, place gillnets in areas that would minimize the unintended capture of reef fish and/or spiny lobsters. The extent to which this is practicable is unknown.

The benefits of imposing additional restrictions on the use of gillnets in the federal waters surrounding St. Croix (**Alternative 2**) could be significant under the assumptions that (a) there could be a measurable expansion in the use of gillnets in federal waters and (b) that this expansion in the use of gillnets results in a substantial bycatch of reef fish and/or spiny lobsters. These benefits must, however, be weighed against the costs. These costs include a reduction in the harvest of federally managed pelagic species and non-federally managed species. While these

[53] It should be mentioned that there is a cost to administer any regulation including enforcement of that regulation. If trawling were to become viable and adopted in federal waters but did not result in diminution of the habitat, then the costs (administration in nature) would exceed benefits (which would be zero).
[54] The information for harvest of managed species in federal waters is confidential due to a paucity of observations (i.e., less than three fishermen reporting harvest over the ten-year period ending in 2021). This leads to the tentative conclusion that harvest of managed species from federal waters using surface gillnets is minimal.
[55] **Sub-alternative 2.b (Preferred)** also places significant specifications regarding construction of and deployment of gillnets in federal waters around St. Croix. These include restrictions on mesh size and the requirement that the surface nets be tended at all times.
[56] For the purposes of discussion, it is assumed that the use of gillnets in federal waters is limited because it is not, under current conditions, economically viable.

costs are unknown, **Preferred Sub-alternative 2b** balances protection of the reef fish stocks versus the costs of lost potential catch of federally managed pelagic species and non-managed species. In addition, enforcement may be facilitated with the adoption of **Sub-alternative 2b** relative to the status quo (**Alternative 1**).

Evaluating benefits relative to costs, and temporarily neglecting enforcement considerations, **Preferred Sub-alternative 2b** is thought to be superior to either **Alternative 1** or **Sub-alternative 2a** if and only if two conditions are met. The first is that there exists (with some amount of certainty) the possibility of a future expansion of the use of gillnets in the federal waters surrounding St. Croix. The second is that expansion of the use of gillnets results in a significant increase in bycatch. Even if these two conditions are not met, however, **Preferred Sub-alternative 2b** may be economically preferable to either **Sub-alternative 2a** or **Alternative 1** if adoption of **Preferred Sub-alternative 2b** substantially improves enforcement (i.e., allow enforcement to concentrate on other, perhaps more important, activities). There is insufficient information, however, to determine whether this would be the case.

4.2.3.3 Action 2(c). Modify the Use of Trammel Nets in Federal Waters Around St. Croix, USVI

Alternative 1 (no action) would retain trammel nets as neither an authorized gear type for any fisheries in federal waters surrounding St. Croix, nor an otherwise prohibited gear type, except for federally-managed reef fish and spiny lobster in federal waters surrounding St. Croix.[57] Given that trammel nets are not currently authorized for use in federal waters, there are no direct costs in maintaining the status quo.[58]

The use of trammel nets would be prohibited for all fishing in federal waters around St. Croix under **Alternative 2**. This would have the same immediate effect as **Alternative 1** because the use of trammel nets in the federal waters surrounding St. Croix are not authorized in the FMP. However, under **Alternative 1**, one could petition the Council for the use of trammel nets in federal waters around St. Croix. From an efficiency standpoint, trammel nets may be superior to other gears and, hence, an outright prohibition under **Alternative 2** may result in inefficiency in the system (assuming one or more individuals are successful in petitioning the Council for the use of trammel nets in federal waters). Therefore, an argument can be made that the status quo is preferable to **Alternative 2,** subject to two caveats. First, if successfully petitioned for use, trammel nets would likely replace more traditional gears based on the assumption that there is a limited market for product landed in St. Croix. In areas of high unemployment, this may be an important consideration because labor requirements with trammel nets are likely to be less than requirements using traditional gears because catch per hour using trammel nets would likely

[57] Trammel nets are already prohibited from fishing for federally managed reef fish and spiny lobster in the federal waters surrounding St. Croix. However, a petition to the Council could be made that would allow trammel nets to be used in the harvest of other species.

[58] It should be noted, however, that potential future use of trammel nets may be allowed via a successful petition to the Council.

exceed the catch per hour using traditional gears. With a limited market for the landed product, this translates a reduction in labor requirements. Second, if fishermen were to shift to using trammel nets in place of the traditional gears, there may be an increase in bycatch. If this is the case, the benefits of using trammel nets instead of more traditional gears, as measured by efficiency, may be more than offset by the costs of doing so (i.e., increased bycatch) which would then indicate a preference for **Alternative 2** over the status quo from an economic perspective.

4.2.3.4 Action 2(d). Modify the Use of Purse Seines in Federal Waters Around St. Croix, USVI

Alternative 1 (no action) would retain purse seines as neither an authorized gear type for any fisheries in federal waters surrounding St. Croix, nor an otherwise prohibited gear type. Given that purse seines are not currently authorized for use in federal waters around St. Croix (except for the harvest of highly migratory species, which are not under the purview of the Council), there are no direct costs in maintaining the status quo.[59]

The use of purse seines would be prohibited for all fishing in federal waters around St. Croix under **Alternative 2**. However, under the status quo, one could petition the Caribbean Council for the use of purse seines in federal waters around St. Croix. From an efficiency standpoint, purse seines may be superior to other, more traditional, gears and, hence, an outright prohibition under **Alternative 2** may result in inefficiency in the system (assuming one or more individuals are successful in petitioning the Council for the use of purse seines in federal waters). Therefore, an argument can be made that **Alternative 1** is preferable to **Alternative 2** from an economic point of view. However, potential gains in efficiency must be weighed against any the potential costs. These costs include any increased possibility of overfishing, the reduction in need for labor in the harvesting sector, and the possibility of increased bycatch. If these costs are large, they would likely negate any benefits associated with the use of a more efficient gear in which case **Alternative 2** would yield higher economic gains than **Alternative 1**.

4.2.4 Effects on the Social Environment

For purposes of analysis in this and subsequent discussion of potential regulatory effects on the social environment, *social effects* are defined here to involve beneficial and/or deleterious human outcomes following from any loss or increase in *fishing opportunity*. Examples of social effects include, but are by no means limited to: (a) acquisition or failed acquisition of seafood for consumption by island-based individuals, families, and communities; (b) acquisition or failed acquisition of seafood for customary or traditional uses such as sharing in extended family

[59] It should be noted, however, that potential future use of purse seines may be allowed via a successful petition to the Caribbean Council.

settings or consumption at community celebrations; (c) the ability or inability to practice one's profession or avocation on the ocean; (d) the ability or inability to accumulate and transmit traditional or local ecological knowledge in the context of fishing; and (e) the ability or inability to develop and maintain interpersonal relationships within social networks of fishery participants. Of note, both beneficial and deleterious social effects potentially associated with the actions described in this amendment are, in probabilistic terms, most likely to occur in island areas where residents are most extensively engaged in regional marine fisheries, as indicated in Section 3.5 above.

4.2.4.1 Action 2(a): Modify the Use of Trawl Gear in the Federal Waters around St. Croix

Based on the best available information, trawl gear is not used in the federal waters surrounding St. Croix historically was, and remains a rarity. As such, analysis of social effects potentially resulting from prospective ban on use of trawl gear must proceed in the absence of time-series data that would otherwise indicate historic and recent patterns of use that could be altered by such restriction. For this reason, it cannot be assumed that **Alternative 1** (no action) would generate near-term social effects among participants in local fishing fleets. However, **Alternative 1** leaves open the possibility of trawl gear deployment in the future, which could increase fishing opportunities for persons who could fabricate and/or purchase and utilize trawl gear. As noted elsewhere in this amendment, however, this could negatively affect habitat (e.g., coral bottom) and/or biota (e.g., bycatch) with the potential that the broader range of fishing opportunities around the island may be diminished, along with potential social benefits. By specifying that trawl gear would not be allowed in the St. Croix MMAs, **Alternative 2** also specifies areas in which fishing opportunity would be diminished. Similarly, because **Preferred Alternative 3** would preclude use of trawl gear in *all* federal waters around St. Croix, all such opportunity and any social benefits that would otherwise follow also would be lost. Given the potential for deleterious ecological impacts to result from deployment of trawl gear, however, **Alternative 2** would reduce, and **Preferred Alternative 3** would prevent such problems and diminish potential constraints on other forms of fishing activity in the region.

4.2.4.2 Action 2(b). Modify the Use of Gillnets in Federal Waters around St. Croix

As for trawl and other net gear, gillnets are rarely used in the federal waters around St. Croix, with available landings data indicating minimal capture of species suitable for use as bait in regional pelagic fisheries. **Alternative 1** would retain properly configured and tended gillnets as an authorized gear for harvest of certain species inside specified management areas. As such, the alternative would not diminish fishing opportunity or associated social benefits—unless such use caused deleterious ecological impacts and diminished the productivity of adjacent fisheries in the future. While **Alternative 2** would prevent such impacts through prohibition of gillnets in all federal waters around the island (**Sub-alternative 2a)**, lost opportunity to capture baitfish would also occur. **Preferred Sub-alternative 2b** would allow for capture of half-beaks, gar, and/or flying fish, eliminating the potential for such impacts.

4.2.4.3 Action 2(c). Modify the Use of Trammel Nets in Federal Waters around St. Croix

Use of trammel nets to pursue reef fish and spiny lobster is currently prohibited in the federal waters around St. Croix. **Alternative 1** (no action) would impose no change in this approach, but with some potential that trammel nets could be used to pursue other species in S. Croix federal waters. As such, the alternative would generate no new loss of fishing opportunity for local fleets. In any event, trammel nets are rarely used in these federal waters, and thus any existing opportunity and social benefits are not presently realized. However, any future misuse of this gear has the potential to result in ecological damage and deleterious impacts to other fisheries in the area. Adoption of **Alternative 2** would prevent this through an entire ban on deployment. While trammel net-specific fishing opportunity would be lost, the alternative could ultimately benefit regional marine ecosystems and enhance fishing opportunity and social benefits among participants in other fisheries.

4.2.4.4 Action 2(d). Modify the Use of Purse Seines in Federal Waters around St. Croix

Alternative 1 for this action would involve no new restrictions on use of purse seine gear in the federal waters of St. Croix. Because such gear is neither authorized nor presently used by local fleets, the possibility of lost fishing opportunity and social impacts is not in question. Because **Alternative 2** would explicitly ban purse seines in federal waters, fishing opportunities would be lost under this alternative, although this could be balanced by avoidance of ecological damage.

4.2.5 Effects on the Administrative Environment

4.2.5.1 Action 2(a): Modify the Use of Trawl Gear in the Federal Waters Around St. Croix, USVI

Administrative effects are from creation the regulations, administering such regulations, and enforcing the regulations. Because trawling does not occur in federal waters there would be no difference in administrative effects in terms of enforcement, between **Alternative 1** and **Preferred Alternative 2**, but Preferred Alternative 2 would have an additional administrative burden from creating regulations to implement the gear use prohibition.

4.2.5.2 Action 2(b). Modify the Use of Gillnets in Federal Waters Around St. Croix, USVI

Under **Alternative 1**, gillnets are not listed as authorized under any U.S. Caribbean fisheries, including St. Croix, in federal regulations at 50 CFR 600.725(v)(V). In addition, federal regulations specifically prohibit the use of gillnets for spiny lobster and federally managed reef fish, but allow the use of gillnets to fish for any other species, but they must be tended at all times (50 CFR 622.477(a)(3)). **Alternative 2, Sub-alternative 2a** would specifically prohibit the use of gillnets for all harvest in the St. Croix fishery, including for the use of surface gillnets for baitfish. **Alternative 2, Sub-alternative 2(b)** would allow the use of gillnets just for certain species of baitfish. Therefore, administrative effects are expected to be slightly larger for **Sub-alternative 2b** than for **Alternative 1** and **Sub-alternative 2a**, because of the additional burden in enforcing a regulation that includes an exception for using gillnets (i.e., baitfish).

4.2.5.3 Action 2(c). Modify the Use of Trammel Nets in Federal Waters Around St. Croix, USVI

Under **Alternative 1**, trammel nets are not listed as authorized under any U.S. Caribbean fisheries, including St. Croix, in federal regulations at 50 CFR 600.725(v)(V). In addition, federal regulations specifically prohibit the use of trammel nets for spiny lobster and federally managed reef fish, but allow the use of trammel nets (or gillnets) to fish for any other species, but they must be tended at all times (50 CFR 622.477(a)(3)). **Alternative 2** would specifically prohibit the use of trammel nets for all harvest in the St. Croix fishery, including for the use of surface trammel nets for baitfish, therefore it would not be possible for a fishermen to request the use of the gear as otherwise allowed under federal regulations for gear that are not included in the authorized gear list.[60] Administrative effects are expected to be slightly larger for **Alternative 2** than for the no action alternative (**Alternative 1**).

4.2.5.4 Action 2(d). Modify the Use of Purse Seines in Federal Waters Around St. Croix, USVI

Under **Alternative 1**, purse seines are not listed as authorized under any U.S. Caribbean fisheries, including St. Croix, in federal regulations at 50 CFR 600.725(v)(V). **Alternative 2** would specifically prohibit the use of purse seines for all harvest in the St. Croix fishery. Because purse seines are not used in federal waters nor are they authorized, there would be no difference in administrative effects in terms of enforcement, between **Alternative 1** and **Alternative 2**, although **Alternative 2** would have an additional administrative burden from creating regulations to implement the broader prohibition on the use of purse seines.

[60] 50 CFR 600.725(v): A person or vessel is prohibited from engaging in fishing or employing fishing gear when such fishing gear is prohibited or restricted by regulation under an FMP or other applicable law. However, after December 1, 1999, an individual fisherman may notify the appropriate Council, or the Director, in the case of Atlantic HMS, of the intent to use a gear or participate in a fishery not already on the list. Ninety days after such notification, the individual may use the gear or participate in that fishery unless regulatory action is taken to prohibit the use of the gear or participate in the fishery (*e.g.,* through emergency or interim regulations).

4.3 Action 3: Use of Trawl Gear, Gillnets, Trammel Nets, and Purse Seines in the U.S. Caribbean EEZ around St. Thomas and St. John

Summary of Sub-actions and Alternatives for Action 2

Action 3 - St. Thomas/St. John	Alt. 1	Alt 2.	Alt 3
3(a) Trawl Gear	No action. Retain as authorized for commercial non-FMP species	Prohibit use for all fishing in MMAs	**(Preferred)** Prohibit use for all federal waters
3(b) Gillnet	No action. Retain as an authorized gear type for the commercial harvest of FMP and non-FMP pelagic species and non-FMP managed species, and for reef fish and spiny lobster and inside Council Seasonally Closed Areas or Council MMAs.	Prohibit use: **Sub-alternative 2a.** For all fishing in the EEZ. **Sub-alternative 2b (Preferred).** For all fishing in the EEZ, except for the following fish species belonging to the halfbeaks (Family Hemiramphidae), gar (Family Belonidae), and flyingfish (Family Exocoetidae). A surface gillnet used in the EEZ around St. Thomas and St. John to fish for any baitfish must be tended at all times. Mesh size may not be smaller than 0.75 inches square or 1.5 inch stretch.	–
3(c) Trammel net	Retain trammel nets as neither an authorized gear type for any fisheries in the EEZ around St. Thomas and St. John, nor an otherwise prohibited gear type, except for FMP reef fish and spiny lobster.	Prohibit for all fishing	–
3(d) Purse seine	Retain purse seines as neither an authorized gear type for any fisheries in the EEZ around St. Thomas and St. John, nor an otherwise prohibited gear type.	Prohibit for all fishing	–

4.3.1 Effects on the Physical Environment

4.3.1.1 Action 3(a): Modify the Use of Trawl Gear in the Federal Waters Around St. Thomas and St. John, USVI

Action 1(a) addresses the use of trawl gear in federal waters around St. Thomas and St. John. Trawl gear, which includes bottom and mid-water trawls, has the potential to impact sensitive habitat present in the U.S. Caribbean such as coral and sponge habitat. Direct contact with these habitats, which may include species and critical habitat listed under the ESA, could occur with bottom tending trawl gear and impact to sensitive vertical relief from near-bottom orientation of pelagic trawls.

Alternative 1 is the status quo and would not change any regulations applicable to the use of trawls in federal waters around St. Thomas and St. John. It would retain the trawl gear, including bottom and mid-water trawls, as an authorized gear type for the commercial harvest of

non-federally managed species within the St. Thomas and St. John fishery components. However, there is no evidence that the commercial sector uses (or has used) trawl gear (with exceptions noted in Section 1.1, such as for research and exploratory fishing).

Alternative 2 would prohibit the use of trawl gear for fishing in the St. Thomas and St. John Council MMAs. **Preferred Alternative 3** would prohibit the use of trawl gear for all for all fishing that occurs within the St. Thomas and St. John EEZ. Because trawl gear has not historically been used in the U.S. Caribbean EEZ, including the St. Thomas and St. John EEZ, and is not currently used, **Alternative 2** and **Preferred Alternative 3** are both administrative actions and are not expected to have any physical effects when compared to **Alternative 1**. However, by preventing the potential future use of the trawl gear, both **Alternative 2** and **Preferred Alternative 3** could be more beneficial to the physical environment by preventing potential habitat effects, such as to EFH for federally managed species, from trawling activities in federal waters around St. Thomas and St. John (**Preferred Alternative 3**) or in St. Thomas and St. John Council MMAs (**Alternative 2**), with the former being more beneficial in protecting fishery and habitat resources throughout the St. Thomas and St. John EEZ, including ESA listed species and critical habitat present in the area. For instance, the Biological Opinion for the Island-based FMPs (NMFS 2018d) estimated that fishing occurs in about 18% of the fishable area in federal waters off St. Thomas and St. John and **Preferred Alternative 3** would be expected to protect these resources throughout all of the 18%, while **Alternative 2** would only protect a smaller portion of the fishable habitat from any potential physical effects from trawling. Prohibiting the use of trawl gear in all fishery components of the St. Thomas and St. John fishery (**Preferred Alternative 3**) would prevent fishermen from petitioning for its use, which could occur under **Alternative 1** and **Alternative 2**, thus providing more benefits to the physical environment.

4.3.1.2 Action 3(b). Modify the Use of Gillnets in Federal Waters Around St. Thomas and St. John, USVI

Gillnets (in *Spanish*: filete (gillnet/single wall) hang vertically in the water column (can or cannot be fixed to the bottom) and are not expected to interact with the bottom (i.e., habitat, essential fish habitat, critical habitat for ESA listed species). Therefore, physical effects are not expected from **Alternative 1** or **Alternative 2, Sub-alternatives 2a** or **2b.**

4.3.1.3 Action 3(c). Modify the Use of Trammel Nets in Federal Waters Around St. Thomas and St. John, USVI

Trammel nets (in *Spanish*: trasmallo) hang vertically in the water column and are not expected to interact with the bottom (i.e., habitat, essential fish habitat, critical habitat for ESA listed species). Therefore, physical effects are not expected from **Alternative 1** or **Alternative 2.**

4.3.1.4 Action 3(d). Modify the Use of Purse Seines in Federal Waters Around St. Thomas and St. John, USVI

Purse seines (used in many regions to catch tunas) consist of a large wall of netting deployed around an entire area or school of fish. Regardless of authorization or not for use in federal waters, purse seines are not expected to interact with the bottom, therefore, no physical effects are expected from **Alternative 1** or **Alternative 2.**

4.3.2 Effects on the Biological/Ecological Environment

4.3.2.1 Action 3(a): Modify the Use of Trawl Gear in the Federal Waters Around St. Thomas and St. John, USVI

Alternative 1 is the status quo and would not change any regulations applicable to the use of trawls in federal waters around St. Thomas and St. John. **Alternative 2** would prohibit all trawl gear in all St. Thomas and St. John Council MMAs, while **Preferred Alternative 3** would prohibit the use of trawl gear for all fishing within the St. Thomas and St. John EEZ. Because trawl gear has not historically been used in the U.S. Caribbean EEZ, including the St. Thomas and St. John EEZ, and is not currently used, **Alternative 2** and **Preferred Alternative 3** are both administrative actions and are not expected to have any additional biological or ecological effects when compared to **Alternative 1**. However, by preventing any future use of the trawl gear, both **Alternative 2** and **Preferred Alternative 3** could be more beneficial to the biological and ecological environment by preventing potential bycatch and/or habitat effects from trawling activities in federal waters around St. Thomas and St. John (**Preferred Alternative 3**) or in St. Thomas and St. John Council MMAs (**Alternative 2**), with the former being more beneficial in protective fishery and habitat resources throughout the St. Thomas and St. John EEZ. For instance, the Biological Opinion for the Island-based FMPs (NMFS 2018d) estimated that fishing occurs in about 18% of the fishable area in federal waters off St. Thomas and St. John and **Preferred Alternative 3** would be expected to protect these resources throughout all the 18%, while **Alternative 2** would only protect a smaller portion of the fishable habitat from any potential physical effects from trawling. Also, prohibiting the use of trawl gear in all fishery components of the St. Thomas and St. John fishery (**Preferred Alternative 3**) would prevent fishermen from petitioning for its use, which could occur under **Alternative 1** and **Alternative 2**, thus providing more benefits to the biological and ecological environment.

4.3.2.2 Action 3(b). Modify the Use of Gillnets in Federal Waters Around St. Thomas and St. John, USVI

As discussed in Section 2.1, gillnets have the potential to result in large bycatches of reef fish species and spiny lobster, and also impacting ESA listed species such as sea turtles, which negatively impacts their populations. **Alternative 1** would retain gillnets as an authorized gear type for the commercial harvest of federally managed and non-federally managed pelagic fish and for the commercial harvest of other non-federally managed species (e.g., species that are not

managed by the Council), as listed in 50 CFR 600.725(v)(V). Federal regulations allow for the use of gillnets for catching non-federally managed species (e.g., baitfish such as ballyhoo or flying fish), subject to the requirement that the gear must be tended at all times, and the use of gillnets is prohibited year-round for fishing for spiny lobster and federally managed reef fish.[61] The commercial harvest of federally managed pelagics, non-federally managed pelagics, and other non-federally managed species with gillnets could increase the potential for bycatch of target species that are prohibited with this gear type (i.e., reef fish, spiny lobster) and could also increase the potential catch of undersized managed and non-managed species (pelagics, non-federally managed species) and of ESA-listed species (i.e., sea turtles), which could increase potential for overfishing and negatively affect their populations.

Sub-alternative 2a proposes to prohibit the use of gillnets for the harvest of all commercial and recreational species (i.e., federally managed and non-federally managed) in the EEZ around St. Thomas and St. John. **Sub-alternative 2b** would prohibit the use of gillnets to harvest all commercial and recreational species (i.e., federally managed and non-federally managed) in the EEZ around St. Thomas and St. John, with the exception of baitfish belonging to the halfbeak, gar, and flyingfish families. **Sub-alternative 2b** would define a gillnet used for baitfish as one with mesh size opening that may not be smaller than 0.75 inches square or 1.5-inch stretch and that must be tended at all times. Although the use of gillnets for the commercial harvest of federally managed and non-federally managed pelagic species or other non-federally managed species in federal waters is considered to be minimal due to depth and distance from the coast of the location of federal waters, **Sub-alternative 2a** and **Sub-alternative 2b** would prevent negative ecological and biological effects from the use of gillnets (e.g., prevention of bycatch of undersized individuals, ESA protected species, other target and non-target species). Allowing the use of surface gillnets for catching certain species of baitfish commercially and/or recreationally would allow fishermen to continue using these specific bait nets in federal waters (**Sub-alternative 2b**), and would prevent using gillnets for other federally managed and non-federally managed species. Specifying the mesh size and requirement to tend the net at all times in **Sub-alternative 2b** would prevent bycatch.

In summary, **Alternative 1** is the status quo alternative (no changes to the current gillnet regulations in the EEZ around St. Thomas and St. John) and would be less beneficial to the biological and ecological environment in federal waters off St. Thomas and St. John than **Sub-alternative 2a**. This is because **Alternative 1** would continue to allow the use of gillnets for the commercial harvest of pelagic species and non-federally managed species, increasing the potential of adverse effects from use of the gear. **Sub-alternative 2b** would be partially

[61] Cast nets are authorized for the commercial and recreational harvest of non-federally managed species. Cast nets are surface nets typically used to fish for baitfish such as ballyhoo, sardines, and other species. The Council did not include cast nets in the motion to prepare this amendment.

compatible with USVI regulations for surface gillnets, facilitating enforcement of federal regulations and would be more beneficial to the ecological and biological environment because it would prevent bycatch by setting a minimum mesh size for the bait nets.

4.3.2.3 Action 3(c). Modify the Use of Trammel Nets in Federal Waters Around St. Thomas and St. John, USVI

Alternative 1 would retain current regulations applicable to the use of trammel net in federal waters around St. Thomas and St. John. **Alternative 2** would specifically prohibit the use of trammel nets for all harvest in the St. Thomas and St. John EEZ, including the use of surface trammel nets for baitfish, therefore it would not be possible for a fishermen to request the use of the gear as otherwise allowed under federal regulations for gear that are not included in the authorized gear list, as discussed in Section 1.2 of this document.

Effects to the biological/ecological environments from **Alternative 2** are not expected to be different from those of **Alternative 1** because trammel nets are currently not authorized for use in federal waters for any fishing. However, **Alternative 2** could be slightly more beneficial to the biological and ecological environment of the St. Thomas and St. John EEZ because it further restricts potential future use of trammel nets through a petition to the Council, eliminating any potential effects from bycatch of undersized organisms or large amounts, preventing overfishing, and also preventing any effects to ESA listed species such as sea turtles.

4.3.2.4 Action 3(d). Modify the Use of Purse Seines in Federal Waters Around St. Croix, USVI

Purse seines consist of a large wall of netting deployed around an entire area or school of fish and have the potential to capture large amounts of fish, without discrimination, which could affect the biological and ecological environment of the St. Thomas and St. John fishery if they were to be used in the region. Effects to the biological/ecological environments from **Alternative 2** are not expected to be different from those of **Alternative 1** because purse seines are currently not authorized for use in federal waters for any fishing. However, **Alternative 2** could be slightly more beneficial to the biological/ecological environment of the St. Thomas and St. John EEZ because it further restricts potential future use of this gear type through a petition to the Council and thus would prevent impacts to fish populations and ESA- listed species from bycatch.

4.2.3 Effects on the Economic Environment

4.3.3.1 Action 3(a): Modify the Use of Trawl Gear in the Federal Waters Around St. Thomas and St. John, USVI

Alternative 1 (no action) would retain trawl gear as an authorized gear type for the commercial harvest of non-federally managed species in the federal waters around St. Thomas and St. John

that is not otherwise prohibited. Given the status quo nature of **Alternative 1**, there will be no direct economic effects associated with **Alternative 1**. As noted in Section 2.2.1, there is no evidence that the commercial sector uses (or has used) trawl gear (except for research and exploratory fishing) in the federal waters around St. Thomas and St. John and thus there will be no immediate economic effects (direct or indirect) associated with **Alternative 1**. There could, however, be long-term economic impacts should trawling in the federal waters around St. Thomas and St. John occur. Specifically, the use of trawl gear could potentially negatively impact the critical habitat needed for recruitment and survival. This could lead to a reduction in catch and, hence, revenues to the commercial fishermen (and profits) and a reduction in catch per trip in the recreational sector (i.e., a reduction in consumer surplus associated with a given trip). This, in turn, may lead to a reduction in revenues accruing to those businesses that provide support services to the recreational sector.

Alternative 2 would prohibit the use of trawl gear for all fishing in the Council's seasonally closed areas/marine managed areas (MMA) year-round in federal waters around St. Thomas and St. John[62] while **Alternative 3** would prohibit the use of trawl gear for all fishing in federal waters around St. Thomas and St. John. Given that there is no evidence that the commercial and (presumably) recreational sector uses trawl gear in federal waters, one would expect no immediate costs or benefits to either the commercial of recreational sector associated with either **Alternative 2 or Alternative 3**. To the extent that trawling could potentially become economically viable[63], however, diminution of sensitive and/or critical habitat associated with trawling could result in a reduction in the economic benefits (i.e., recruitment and survival) associated with the sensitive and/or critical habitat.

From an economic perspective, the overall net benefits associated with Alternative 3 are believed to exceed those of either **Alternative 2** or the status quo (**Alternative 1**) conditioned on two assumptions. The first assumption is that trawling might become economically viable in the future and that it would be forthcoming in the absence of regulation. The second assumption is that trawling in federal waters would, over time, result in a diminution of the sensitive and/or critical habitat and associated carrying capacity. If either of these two assumptions are invalid, there would be no net benefits of adopting **Alternative 2** or **Alternative 3** over the status quo (**Alternative 1**). Finally, given these assumptions being met, it stands to reason that **Alternative 2** provides greater net benefits than **Alternative 1** since a portion of the fishable habitat in the EEZ of St. Thomas and St. John would be protected from the negative impacts associated with trawling whereas none would be protected under the status quo.[64]

[62] These include the Grammanik Bank, and the Hind Bank Marine Conservation District.
[63] For the purposes of discussion, it is assumed that trawling in federal waters is not occurring because it is not, under current conditions, economically viable.
[64] It should be mentioned that there is a cost to administer any regulation including enforcement of that regulation. If trawling were to become viable and adopted in federal waters but did not result in diminution of the habitat, then the costs (administration in nature) would exceed benefits (which would be zero).

4.3.3.2 Action 3(b). Modify the Use of Gillnets in Federal Waters Around St. Thomas and St. John, USVI

Alternative 1 (no action) would retain gillnets as an authorized gear type for the commercial harvest of federally managed and non-federally managed pelagic species and the commercial harvest of non-federally managed species in the federal waters around St. Thomas and St. John, and as a prohibited gear type for federally managed reef fish and spiny lobster in the EEZ around St. Thomas and St. John and inside the Council Seasonally Closed Areas or Council MMAs. As indicated by the information in Table 3.4.15, there has been no reported harvests in the federal waters surrounding St. Thomas and St. John during the ten-year period ending in 2021 associated with the use of surface gill nets and one would assume minimum use of surface gill nets in territorial waters.[65] Thus, there would be no direct costs associated with maintaining the status quo. There could be indirect costs if future use of this gear in federal waters (due to, say, it becoming economically viable) results in large bycatches of reef fish species and spiny lobster which negatively impacts the populations of these species. **Alternative 2** would prohibit the use of gillnets in federal waters around St. Thomas and St. John for all fishing (**Sub-alternative 2a**) or for all fishing in the St. Thomas and St. John EEZ, except for certain species as listed in Section 2.2.2 (**Preferred Sub-alternative 2b**).[66] Whether the benefits of adoption of either **Sub-alternative 2a** or **Sub-alternative 2b (Preferred)** would exceed the costs would depend heavily on whether an expansion of the use of gillnets in the federal waters surrounding St. Thomas and St. John would result in a level of bycatch (of reef fish species or spiny lobster) that would significantly contribute to the probability of overfishing.[67] While it is widely thought that gillnets are a non-selective gear, fishermen can, presumably, place gillnets in areas that would minimize the unintended capture of reef fish and/or spiny lobsters. The extent to which this is practicable is unknown.

The benefits of imposing additional restrictions on the use of gillnets in the federal waters surrounding St. Thomas and St. John (**Alternative 2**) could be significant under the assumptions that (a) there could be a measurable expansion in the use of gillnets in federal waters and (b) that this expansion in the use of gillnets results in a substantial bycatch of reef fish and/or spiny lobsters. These benefits must, however, be weighed against the costs. These costs include a reduction in the harvest of federally managed pelagic species and non-federally managed species. While these costs are unknown, **Preferred Sub-alternative 2b** balances protection of the reef fish stocks versus the costs of lost potential catch of federally managed pelagic species

[65] The information for harvest of managed species in territorial waters is confidential due to a paucity of observations (i.e., less than three fishermen reporting harvest over the ten-year period ending in 2021). This leads to the tentative conclusion that harvest of managed species from territorial waters using surface gillnets is minimal.
[66] **Sub-alternative 2.b (Preferred)** also places significant regulations regarding construction of and the use of gillnets in federal waters. These include restrictions on mesh size and the requirement that the surface nets be tended at all times. These are listed in Section 2.2.2.
[67] For the purposes of discussion, it is assumed that the use of gillnets in federal waters is limited because it is not, under current conditions, economically viable.

and non-managed species. In addition, enforcement may be facilitated with the adoption of **Sub-alternative 2.b** relative to the status quo (**Alternative 1**).

Evaluating benefits relative to costs, and temporarily neglecting enforcement considerations, **Preferred Sub-alternative 2b** is thought to be superior to either **Alternative 1** or **Sub-alternative 2a** if and only if two conditions are met. The first is that there exists (with some amount of certainty) the possibility of a future expansion of the use of gillnets in the federal waters surrounding St. Thomas and St. John. The second is that expansion of the use of gillnets results in a significant increase in bycatch. Even if these two conditions are not met, however, **Preferred Sub-alternative 2b** may be economically preferable to either **Sub-alternative 2a** or **Alternative 1** if adoption of **Preferred Sub-alternative 2b** substantially improves enforcement (i.e., allow enforcement to concentrate on other, perhaps more important, activities). There is insufficient information, however, to determine whether this would be the case.

4.3.3.3 Action 3(c). Modify the Use of Trammel Nets in Federal Waters Around St. Thomas and St. John, USVI

Alternative 1 (no action) would retain trammel nets as neither an authorized gear type for any fisheries in federal waters surrounding St. Thomas and St. John, nor an otherwise prohibited gear type, except for federally-managed reef fish and spiny lobster in federal waters surrounding St. Thomas and St. John.[68] Given that trammel nets are not currently authorized for use in federal waters, there are no direct costs in maintaining the status quo.

The use of trammel nets would be prohibited for all fishing in federal waters around St. Thomas and St. John under **Alternative 2**. This would have the same immediate effect as **Alternative 1** because the use of trammel nets in the federal waters surrounding St. Thomas and St. John are not currently authorized in the FMP. However, under **Alternative 1**, one could petition the Council for the use of trammel nets in federal waters around St. Thomas and St. John. From an efficiency standpoint, trammel nets may be superior to other gears and, hence, an outright prohibition under **Alternative 2** may result in inefficiency in the system (assuming one or more individuals are successful in petitioning the Council for the use of trammel nets in federal waters). From an economic perspective, therefore, an argument can be made that the status quo (**Alternative 1**) is preferable to **Alternative 2**, subject to two caveats. First, if successfully petitioned for use, trammel nets would likely replace more traditional gears based on the assumption that there is a limited market for product landed in St. Thomas and St. John. In areas of high unemployment, this may be an important consideration because labor requirements with trammel nets are likely to be less than requirements using traditional gears because catch per hour using trammel nets would likely exceed the catch per hour using traditional gears. With a

[68] Trammel nets are already prohibited from fishing for federally managed reef fish and spiny lobster in the federal waters surrounding St. Thomas and St. John. However, a petition to the Council could be made that would allow trammel nets to be used in the harvest of other species.

limited market for the landed product, this translates a reduction in labor requirements. Second, if fishermen were to shift to using trammel nets in place of the traditional gears, there may be an increase in bycatch. If this is the case, the benefits of using trammel nets instead of more traditional gears, as measured by efficiency, may be more than offset by the costs of doing so (i.e., increased bycatch) which would then indicate a preference for **Alternative 2** over the status quo from an economic perspective.

4.3.3.4 Action 3(d). Modify the Use of Purse Seines in Federal Waters Around St. Thomas and St. John, USVI

Alternative 1 (no action) would retain purse seines as neither an authorized gear type for any fisheries in federal waters surrounding St. Thomas and St. John, nor an otherwise prohibited gear type. Given that purse seines are not currently authorized for use in federal waters around St. Thomas and St. John (except for the harvest of highly migratory species which are not under the purview of the Council), there are no direct costs in maintaining the status quo.

The use of purse seines would be prohibited for all fishing in federal waters around St. Thomas and St. John under **Alternative 2**. However, under the status quo, one could petition the Caribbean Council for the use of purse seines in federal waters around St. Thomas and St. John. From an efficiency standpoint, purse seines may be superior to other, more traditional, gears and, hence, an outright prohibition under **Alternative 2** may result in inefficiency in the system (assuming one or more individuals are successful in petitioning the Council for the use of purse seines in federal waters). Therefore, an argument can be made that **Alternative 1** is preferable to **Alternative 2** from an economic point of view. However, potential gains in efficiency must be weighed against any the potential costs. These costs include any increased possibility of overfishing, the reduction in need for labor in the harvesting sector, and the possibility of increased bycatch. If these costs are large, they would likely negate any benefits associated with the use of a more efficient gear in which case **Alternative 2** would yield higher economic gains than **Alternative 1**.

4.3.4 Effects on the Social Environment

For purposes of analysis in this and subsequent discussion of potential regulatory effects on the social environment, *social effects* are defined here to involve beneficial and/or deleterious human outcomes following from any loss or increase in *fishing opportunity*. Examples of social effects include, but are by no means limited to: (a) acquisition or failed acquisition of seafood for consumption by island-based individuals, families, and communities; (b) acquisition or failed acquisition of seafood for customary or traditional uses such as sharing in extended family settings or consumption at community celebrations; (c) the ability or inability to practice one's profession or avocation on the ocean; (d) the ability or inability to accumulate and transmit

traditional or local ecological knowledge in the context of fishing; and (e) the ability or inability to develop and maintain interpersonal relationships within social networks of fishery participants. Of note, both beneficial and deleterious social effects potentially associated with the actions described in this amendment are, in probabilistic terms, most likely to occur in island areas where residents are most extensively engaged in regional marine fisheries, as indicated in Section 3.5 above.

4.3.4.1 Action 3(a): Modify the Use of Trawl Gear in Federal Waters around St. Thomas and St. John

Use of trawl gear in federal waters around St. Thomas and St. John has not been documented in recent years. As such, **Alternative 1** (no action) would not diminish fishing opportunity, nor would it generate near-term social effects. However, taking no action would make use of trawl gear a possibility *in the future*, with new fishing opportunities for interested and capable participants. As noted elsewhere, however, this could generate ecological problems, potentially diminishing fishing opportunities and social benefits over time. Both **Alternative 2,** which would prevent use of trawl gear in MMAs in federal waters around St. Thomas and St. John, and **Preferred Alternative 3**, which would ban trawl net usage in all federal waters around St. Thomas and St. John, would diminish potential fishing opportunities and associated social benefits in the region. However, these alternatives could protect regional ecosystems and enhance harvest potential via other types of gear.

4.3.4.2 Action 3(b). Modify the Use of Gillnets in Federal Waters around St. Thomas and St. John

Alternative 1 (no action) would allow for use of gillnets in federal waters around St. Thomas and St. John, with ongoing prohibition on use of the gear to capture reef fish and spiny lobster. However, because gillnets are rarely used here, loss of fishing opportunity and social effects cannot be assumed. In banning gillnets in the federal waters, **Alternative 2** and **Sub-alternative 2a** would prevent new fishing opportunities and related social benefits, but with the possibility of avoiding ecological damage and allowing for potential benefits to participants using other gear. **Preferred Sub-alternative 2b** is an exception to this logic in that it would allow for use of properly configured gillnets to capture certain bait species, with potential benefits to participants in regional hook and line fisheries. This alternative comes with the caveat that if use of surface gillnets damages marine ecosystems around St. Thomas and St. John, some long-term constraints on fishing opportunity may result.

4.3.4.3 Action 3(c). Modify the Use of Trammel Nets in Federal Waters around St. Thomas and St. John

Use of trammel nets for harvest of reef fish and spiny lobster is prohibited in the federal waters around St. Thomas and St. John, in the Council MMAs, and in territorial waters. Moreover, no trammel net landings were reported for the period 2012 through 2021. As such, loss of fishing

opportunity and social impacts potentially resulting from no action **Alternative 1** are unlikely at best. **Alternative 2**, which would prohibit future use of trammel nets in federal waters, would prevent gear-specific fishing opportunity and any social benefits that could otherwise result. However, this could minimize ecological impacts, with possible benefits for other fisheries.

4.3.4.4 Action 3(d). Modify the Use of Purse Seines in Federal Waters around St. Thomas and St. John

Alternative 1 for this action would impose no new restrictions on use of purse seines in federal waters around St. Thomas and St. John. Because purse seines are not presently authorized or used in these waters, lost fishing opportunity and any social impacts are not easily calculated. **Alternative 2** would prohibit the use of the gear in the years to come. While fishing opportunities would be lost under this alternative, this could be balanced by avoidance of ecological damage that could impact other fisheries around the region.

4.3.5 Effects on the Administrative Environment

4.3.5.1 Action 3(a): Modify the Use of Trawl Gear in the Federal Waters Around St. Thomas and St. John, USVI

Administrative effects are from creation the regulations, administering such regulations, and enforcing the regulations. Because trawling does not occur in federal waters there would be no difference in administrative effects in terms of enforcement, between **Alternative 1** and **Preferred Alternative 2**, but **Preferred Alternative 2** would have an additional administrative burden from creating regulations to implement the gear use prohibition.

4.3.5.2 Action 3(b). Modify the Use of Gillnets in Federal Waters Around St. Thomas and St. John, USVI

Under **Alternative 1**, gillnets are not listed as authorized under any U.S. Caribbean fisheries, including St. Croix, in federal regulations at 50 CFR 600.725(v)(V). In addition, federal regulations specifically prohibit the use of gillnets for spiny lobster and federally managed reef fish, but allow the use of gillnets to fish for any other species, but they must be tended at all times (50 CFR 622.512(a)(3)). **Alternative 2, Sub-alternative 2a** would specifically prohibit the use of gillnets for all harvest in the St. Thomas and St. John fishery, including for the use of surface gillnets for baitfish. **Alternative 2, Sub-alternative 2(b)** would allow the use of gillnets just for certain species of baitfish. Therefore, administrative effects are expected to be slightly larger for **Sub-alternative 2b** than for **Alternative 1** and **Sub-alternative 2a**, because of the additional burden in enforcing a regulation that includes an exception for using gillnets (i.e., baitfish).

4.3.5.3 Action 3(c). Modify the Use of Trammel Nets in Federal Waters Around St. Thomas and St. John, USVI

Under **Alternative 1**, trammel nets are not listed as authorized under any U.S. Caribbean fisheries, including St. Thomas and St. John, in federal regulations at 50 CFR 600.725(v)(V). In addition, federal regulations specifically prohibit the use of trammel nets for spiny lobster and federally managed reef fish, but allow the use of trammel nets (or gillnets) to fish for any other species, but they must be tended at all times (50 CFR 622.512(a)(3)). **Alternative 2** would specifically prohibit the use of trammel nets for all harvest in the St. Thomas and St. John fishery, including for the use of surface trammel nets for baitfish, therefore it would not be possible for a fishermen to request the use of the gear as otherwise allowed under federal regulations for gear that are not included in the authorized gear list.[69] Administrative effects are expected to be slightly larger for **Alternative 2** than for the no action alternative (**Alternative 1**).

4.3.5.4 Action 3(d). Modify the Use of Purse Seines in Federal Waters Around St. Thomas and St. John, USVI

Under **Alternative 1**, purse seines are not listed as authorized under any U.S. Caribbean fisheries, including St. Thomas and St. John, in federal regulations at 50 CFR 600.725(v)(V). **Alternative 2** would specifically prohibit the use of purse seines for all harvest in the St. Thomas and St. John fishery. Because purse seines are not used in federal waters nor are they authorized, there would be no difference in administrative effects in terms of enforcement, between **Alternative 1** and **Alternative 2**, although **Alternative 2** would have an additional administrative burden from creating regulations to implement the broader prohibition on the use of purse seines.

[69] 50 CFR 600.725(v): A person or vessel is prohibited from engaging in fishing or employing fishing gear when such fishing gear is prohibited or restricted by regulation under an FMP or other applicable law. However, after December 1, 1999, an individual fisherman may notify the appropriate Council, or the Director, in the case of Atlantic HMS, of the intent to use a gear or participate in a fishery not already on the list. Ninety days after such notification, the individual may use the gear or participate in that fishery unless regulatory action is taken to prohibit the use of the gear or participate in the fishery (*e.g.,* through emergency or interim regulations).

4.4 Action 4: Requirements for the Use of Descending Devices in the Reef Fish Component of the Puerto Rico, St. Croix, and St. Thomas and St. John FMPs

Summary of Alternatives for Action 4

Action 4 - Puerto Rico, St. Croix, St. Thomas/St. John	Alt. 1	Alt 2.
	No action. No requirement to have descending devices on board a vessel fishing for fishing or possessing species in the reef fish component of the Puerto Rico, St. Croix, and St. Thomas and St. John FMPs.	Require a descending device be on board a commercial or recreational vessel and readily available for use while fishing for or possessing species in the reef fish component of any of the FMPs: **Preferred Sub-alternative a.** Puerto Rico **Preferred Sub-alternative b.** St. Croix **Preferred Sub-alternative c.** St. Thomas and St. John * For the purpose of this requirement, a "descending device" means an instrument to which is attached a minimum of a 16-ounce weight and a length of line that will release the fish at the depth from which the fish was caught or a minimum of 50 feet. The descending device attaches to the fish's mouth or is a container that will hold the fish. The device MUST be capable of releasing the fish automatically, by the actions of the operator of the device, or by allowing the fish to escape on its own. Since minimizing surface time is critical to increasing survival, descending devices shall be readily available for use while engaged in fishing.

4.4.1 Effects on the Physical Environment

Alternative 1 would not require a descending device be on board a vessel fishing for or possessing federally managed reef fish in the EEZ around Puerto Rico, St. Croix, and St. Thomas and St. John. While **Preferred Alternative 2** would require a descending device be rigged and ready for use on a vessel when fishing for or possessing federally managed reef fish in federal waters around Puerto Rico (**Sub-alternative 2a**), St. Croix (**Sub-alternative 2b**), and St. Thomas and St. John (**Sub-alternative 2c**. No physical effects are expected from **Alternative 1** or from any of the sub-alternatives of **Alternative 2** because descending devices do not have any interaction with the bottom.

4.4.2 Effects on the Biological/Ecological Environment

By proposing that descending devices be on board a vessel fishing for or possessing federally managed reef fish in the U.S. Caribbean EEZ, the Council expects to reduce fishing mortality of regulatory and economic discards[70] of federally managed reef fish, which is one of the

[70] Regulatory discards are fish that are required by regulation to be discarded, but also include fish that may be retained but not sold. Economic discards are fish that are discarded because they are undesirable to the harvester. This category of discards generally includes certain species, sizes, and/or sexes with low or no market value.

components of the island fisheries' most vulnerable to barotrauma. The Council's intent is that descending devices only be used when a fish may be experiencing barotrauma (e.g., caught in deep water, protruding stomach, etc.).

Under **Preferred Sub-Alternatives 2a, 2b, and 2c**, requiring a descending device to be rigged and ready for use would benefit the biological environment of the managed reef fish by increasing their opportunities for survival and reducing fishing mortality from discards due to barotrauma. **Preferred Sub-Alternatives 2a, 2b, and 2c** would be equally more beneficial to the biological and ecological environment of reef fish than **Alternative 1**, as any of them would require a descending device to be rigged and ready for use, which could decrease fishing mortality of federally managed reef fish from barotrauma in each of the island management areas.

4.4.3 Effects on the Economic Environment

Under **Alternative 1** (no action), there would continue to be no regulatory requirement for descending devices to be present on board a vessel fishing for or possessing species in the reef fish component of Puerto Rico, St. Croix, or St. Thomas and St. John. Thus, there would be no direct costs incurred from requiring the purchase or construction of these devices. This alternative, however, would forgo any improvements to fish stocks and resultant indirect economic benefits that could be achieved through the increased usage of descending devices subject to the assumptions that (a) use of descending devices would enhance the likelihood that a reef fish would survive after being returned to the water and (b) that the fishermen would use the descending device when the fish may be experiencing barotrauma.

Preferred Alternative 2 would require a descending device be onboard a commercial or recreational vessel and readily available for use while fishing for or possessing species in the reef fish component of the Puerto Rico FMP (**Preferred Sub-alternative a**), the St. Croix FMP (**Preferred Sub-alternative b**), and the St. Thomas and St. John FMP (**Preferred Sub-alternative c**). The direct costs associated with **Preferred Alternative 2** would reflect the upfront costs of purchasing or constructing qualified devices.[71]

As discussed in Section 3.4.2.1.2, only about 16.5% of commercial fishermen in Puerto Rico harvest from the federal waters surrounding Puerto Rico (4.4% fishing exclusively in federal waters and 12.1% reporting some fishing in federal waters) with about 20% of the Puerto Rico total seafood landings coming from federal waters. Using the 20% estimate as an upper-bound figure for the percentage of commercial fishermen in Puerto Rico who fish in federal waters and

[71] Based on Regulatory Amendment 29 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic, the assumed cost per commercial vessel of a qualifying descending device was found to be $18.30 (expressed in 2017 dollars). The cost for these devices in the U.S. Caribbean may be slightly greater or less than this estimate but probably fall in the ballpark of this estimate.

an average cost of a descending device being about $18.30 yields an estimated total cost of the descending device for fishermen fishing in the federal waters surrounding Puerto Rico of just over $3,000.[72] There is also an unknown cost to the recreational sector which is likely to be relatively minor since, as mentioned in Section 3.4.2.1.5, while 9.1% of recreational trips taken in Puerto Rico over the 2012-2017 period were reported to occur in federal waters, harvest of dolphin dominates catch associated with these trips. This would suggest that recreational reef fish fishing in federal waters is very limited at least for the time period of landings available.

As discussed in Section 3.4.2.2, the number of St. Croix commercial fishermen reporting landings in recent years has averaged about 62 with about 41% fishing either exclusively in federal waters or fishing about equally between territorial and federal waters. If only this segment of the commercial fishing fleet was to equip their boats with a descending device, total costs would be about $500. If all commercial fishermen were to equip their boats with a descending device, total costs would run about $1,100.[73] Costs to the recreational sector are unknown but are expected to be relatively minor based on the assumption that, like Puerto Rico, most recreational activities in federal waters are directed at pelagic species.

As discussed in Section 3.4.2.2, the number of St. Thomas and St. John commercial fishermen reporting landings in recent years has averaged about 70 with about 47% fishing either exclusively in federal waters or fishing about equally between territorial and federal waters. If only this segment of the commercial fishing fleet was to equip their boats with a descending device, total costs would be about $600. If all commercial fishermen were to equip their boats with a descending device, total costs would run about $1,300. Costs to the recreational sector are unknown but are expected to be relatively minor based on the assumption that, like Puerto Rico, most recreational activities in federal waters are directed at pelagic species.

The cost scenarios associated outlined above indicates that costs of equipping boats with descending devices is likely to be relatively minor. Benefits would depend on a couple of factors. The first is the extent to which captured reef fish are returned to the water. Given that minimum sizes are established for yellowtail snapper and parrotfish in St. Croix, one might question whether reef fish are frequently released after being caught. The second factor which needs to be considered relates to the extent to which descending devices are deployed when the situation calls for their use (e.g., when a fish may be experiencing barotrauma).

Given these unknown factors one cannot automatically conclude that the economic benefits of **Preferred Sub-alternatives 2a, 2b, and 2c** outweigh the costs of these alternatives and, hence, one cannot conclude that **Preferred Alternative 2** is, from an economic point of view, superior

[72] This estimate is based on the total number of fishermen being 837 (i.e., the number of fishermen reporting landings in 2018).
[73] This upper-bound estimate is given because while about 59% of the St. Croix commercial fishermen reported fishing primarily in territorial waters, one might assume that they will occasionally make a trip in federal waters.

to the status quo (**Alternative 1**). However, if (a) a significant quantity of reef fish is released alive and (b) the descending devices are deployed when the situation calls for their use, then one can conclude that the net benefits associated with **Alternative 2** likely exceed those associated with **Alternative 1** by a significant margin. This would be the case for each of the individual islands: Puerto Rico (**Sub-alternative 2a**), St. Croix (**Sub-alternative 2b**), and St. Thomas and St. John (**Sub-alternative 2c**).

4.4.4 Effects on the Social Environment

No action **Alternative 1** would not require that descending devices be used on fishing vessels pursuing reef fish species around the federal waters of Puerto Rico, St. Croix, or St. Thomas and St. John. Based on the best available scientific information, **Preferred Alternative 2** and **Preferred Sub-alternatives a, b, and c** have the potential to generate positive effects on fish stocks across these island areas. This has the potential to increase fishing opportunity and potential social benefits among commercial and recreational participants. While outreach and education have the potential to improve understanding of descending devices and their benefits, such knowledge may expand as a function of normal social interaction and communication.

4.4.5 Effects on the Administrative Environment

Administrative effects from **Preferred Sub-Alternatives 2a, 2b, and 2c** are expected to be larger than **Alternative 1** because of the preparation of regulations to effect the requirement and the additional efforts to enforce these regulations for all reef fish fishermen (commercial and recreational), in federal waters of the three management areas, and to conduct outreach and education activities.

4.5 Cumulative Effects Analysis

To be completed after all preferred alternatives are selected.

Chapter 5. Regulatory Impact Review (in progress)

To be completed after all alternatives are selected.

Chapter 6. Regulatory Flexibility Act Analysis (in progress)

To be completed after all alternatives are selected.

Chapter 7. List of Preparers

Name	Agency	Title
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Denise Johnson	NMFS/SFD	Economist
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Noah Silverman	NMFS/SERO	NEPA Regional Coordinator
Jose Rivera	NMFS/HCD	Fishery Biologist

CFMC = Caribbean Fishery Management Council, GC = General Counsel, HCD = Habitat Conservation Division, NEPA = National Environmental Policy Act, NMFS = National Marine Fisheries Service, NOAA = National Oceanic and Atmospheric Administration, OLE= Office of Law Enforcement, PRD = Protected Resources Division, SERO = Southeast Regional Office, SER = Southeast Region, SFD = Sustainable Fisheries Division, SEFSC = Southeast Fisheries Science Center

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 (in progress)

Appendices (in progress)

Appendix A. List of Managed Reef Fish and Pelagic Stocks Included in each of the Island-based FMPs

Puerto Rico Reef Fish

- **Snappers**: black, blackfin, silk, vermilion, wenchman, cardinal, queen, lane, mutton, dog, schoolmaster, yellowtail, cubera*
- **Groupers**: Nassau, goliath, coney, graysby, black, red, tiger, yellowfin, yellowmouth*, yellowedge, misty, red hind, rock hind
- **Parrotfishes**: blue, midnight, rainbow, queen, princess, redtail, stoplight, redband, striped
- **Surgeonfishes**: blue tang, ocean surgeonfish, doctorfish
- **Triggerfishes**: ocean, queen, gray*
- **Wrasses**: hogfish, puddingwife, Spanish hogfish
- **Angelfishes**: queen, grey, French
- **Grunts**: white grunt
- **Jacks**: crevalle jack*, African pompano*, rainbow runner*

* *New to management*

Puerto Rico Pelagics

**All new to management*

- **Tripletail**: tripletail
- **Dolphinfish**: dolphin, pompano dolphin

- **Mackerels and Tunas (Scombridae)**: little tunny, blackfin tuna, king mackerel, cero mackerel, wahoo

- **Barracudas**: great barracuda

St. Thomas and St. John Reef Fish

- **Snappers**: black, blackfin, silk, vermilion, queen, lane, mutton, yellowtail

- **Groupers**: Nassau, goliath, coney, red hind, black, red, tiger, yellowfin, yellowmouth*, yellowedge, misty

- **Parrotfishes**: blue, midnight, rainbow, queen, princess, redtail, stoplight, redband, striped, redfin

- **Surgeonfishes**: blue tang, ocean surgeonfish, doctorfish

- **Triggerfishes**: queen

- **Wrasses**: hogfish

- **Angelfishes**: queen, grey, French

- **Grunts**: white grunt, bluestriped, margate

- **Jacks**: Blue runner

- **Porgies**: jolthead, saucereye, sheepshead, sea bream

** New to management*

St. Thomas and St. John Pelagics

**All new to management*

- **Dolphinfish**: dolphin

- **Mackerels and Tunas (Scombridae)**: wahoo

St. Croix Reef Fish

- **Snappers**: black, blackfin, silk, vermilion, queen, lane, gray, mutton, schoolmaster, yellowtail
- **Groupers**: Nassau, goliath, graysby, coney, red hind, rock hind, black, red, tiger, yellowfin, misty
- **Parrotfishes**: blue, midnight, rainbow, queen, princess, redtail, stoplight, redband, striped, redfin
- **Surgeonfishes**: blue tang, ocean surgeonfish, doctorfish
- **Triggerfishes**: queen
- **Angelfishes**: queen, grey, French
- **Grunts**: white grunt, bluestriped
- **Squirrelfish**: longspine squirrelfish

St. Croix Pelagics

**All new to management*

- **Dolphinfish**: dolphin
- **Mackerels and Tunas (Scombridae)**: wahoo

Appendix B. Authorized Gear Types under each of the Island-based FMPs

Fishery	Authorized gear types
* * * * * * *	
V. Caribbean Fishery Management Council	
1. Exclusive Economic Zone around Puerto Rico	
A. Puerto Rico Reef Fish Fishery (federally managed):	
i. Commercial fishery	i. Automatic reel, bandit gear, buoy gear, handline, longline, rod and reel, trap, pot, spear.
ii. Recreational fishery	ii. Dip net, handline, rod and reel, slurp gun, spear, trap, pot.
B. Puerto Rico Pelagic Fishery (federally managed):	
i. Commercial fishery	i. Automatic reel, bandit gear, buoy gear, handline, longline, rod and reel, gillnet.
ii. Recreational fishery	ii. Spear, handline, longline, rod and reel.

C. Puerto Rico Spiny Lobster Fishery (federally managed):	
i. Commercial fishery	i. Trap, pot, dip net, hand harvest, snare.
ii. Recreational fishery	ii. Trap, pot, dip net, hand harvest, snare.
D. Puerto Rico Coral Reef Resources Fishery (FMP):	No harvest or possession in the EEZ.
E. Puerto Rico Queen Conch Fishery (federally managed):	No harvest or possession in the EEZ.
F. Puerto Rico Commercial Pelagic Fishery (non-federally managed):	Gillnet, automatic reel, bandit gear, buoy gear, handline, longline, rod and reel.
G. Puerto Rico Recreational Pelagic Fishery (non-federally managed):	Spear, handline, longline, rod and reel.
H. Puerto Rico Commercial Fishery (non-federally managed)	Automatic reel, bandit gear, buoy gear, handline, longline, rod and reel, trawl, gillnet, cast net, spear.
I. Puerto Rico Recreational Fishery (non-federally managed)	Automatic reel, bandit gear, buoy gear, handline, longline, rod and reel, spear, powerhead, hand harvest, cast net.
2. Exclusive Economic Zone around St. Croix	

A. St. Croix Reef Fish Fishery (federally managed):	
i. Commercial fishery	i. Automatic reel, bandit gear, buoy gear, handline, longline, rod and reel, trap, pot, spear.
ii. Recreational fishery	ii. Dip net, handline, rod and reel, slurp gun, spear, trap, pot.
B. St. Croix Pelagic Fishery (federally managed):	
i. Commercial fishery	i. Automatic reel, bandit gear, buoy gear, handline, longline, rod and reel, gillnet.
ii. Recreational fishery	ii. Spear, handline, longline, rod and reel.
C. St. Croix Spiny Lobster Fishery (federally managed):	
i. Commercial fishery	i. Trap, pot, dip net, hand harvest, snare.
ii. Recreational fishery	ii. Trap, pot, dip net, hand harvest, snare.
D. St. Croix Coral Reef Resource Fishery (federally managed):	No harvest or possession in the EEZ.

E. St. Croix Queen Conch Fishery (federally managed):	
i. Commercial fishery	i. Hand harvest.
ii. Recreational fishery	ii. Hand harvest.
F. St. Croix Commercial Pelagic Fishery (non-federally managed)	Gillnet, automatic reel, bandit gear, buoy gear, handline, longline, rod and reel.
G. St. Croix Recreational Pelagic Fishery (non-federally managed)	Spear, handline, longline, rod and reel.
H. St. Croix Commercial Fishery (non-federally managed)	Automatic reel, bandit gear, buoy gear, handline, longline, rod and reel, trawl, gillnet, cast net, spear.
I. St. Croix Recreational Fishery (non-federally managed)	Automatic reel, bandit gear, buoy gear, handline, longline, rod and reel, spear, powerhead, hand harvest, cast net.
3. Exclusive Economic Zone around St. Thomas and St. John	
A. St. Thomas and St. John Reef Fish Fishery (federally managed):	
i. Commercial fishery	i. Automatic reel, bandit gear, buoy gear, handline, longline, rod and reel, trap, pot, spear.

ii. Recreational fishery	ii. Dip net, handline, rod and reel, slurp gun, spear, trap, pot.
B. St. Thomas and St. John Pelagic Fishery (federally managed):	
i. Commercial fishery	i. Automatic reel, bandit gear, buoy gear, handline, longline, rod and reel, gillnet.
ii. Recreational fishery	ii. Spear, handline, longline, rod and reel.
C. St. Thomas and St. John Spiny Lobster Fishery (federally managed):	
i. Commercial fishery	i. Trap, pot, dip net, hand harvest, snare.
ii. Recreational fishery	ii. Trap, pot, dip net, hand harvest, snare.
D. St. Thomas and St. John Coral Reef Resource Fishery (federally managed):	No harvest or possession in the EEZ.
E. St. Thomas and St. John Queen Conch Fishery (federally managed):	No harvest or possession in the EEZ.
F. St. Thomas and St. John Commercial Pelagic Fishery (non-federally managed)	Gillnet, automatic reel, bandit gear, buoy gear, handline, longline, rod and reel.

G. St. Thomas and St. John Recreational Pelagic Fishery (non-federally managed)	Spear, handline, longline, rod and reel.
H. St. Thomas and St. John Commercial Fishery (non-federally managed)	Automatic reel, bandit gear, buoy gear, handline, longline, rod and reel, trawl, gillnet, cast net, spear.
I. St. Thomas and St. John Recreational Fishery (non-federally managed)	Automatic reel, bandit gear, buoy gear, handline, longline, rod and reel, spear, powerhead, hand harvest, cast net.
* * * * * * *	

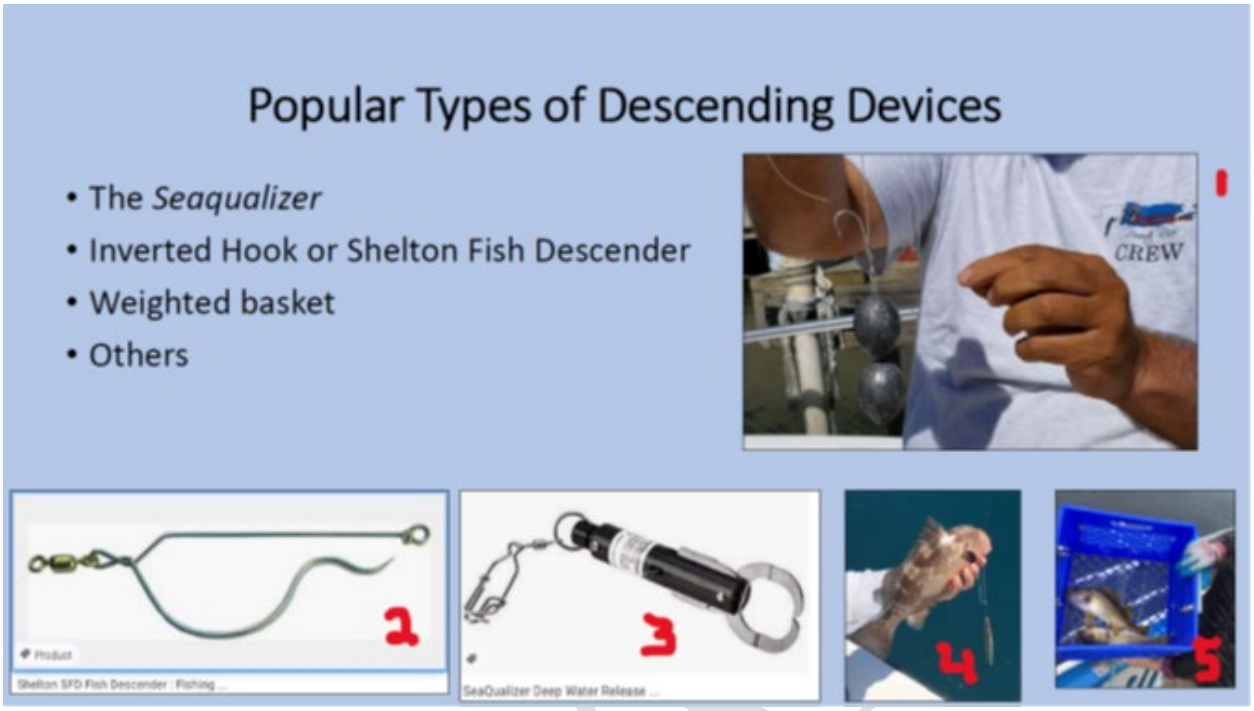
Appendix C. Seasonally Closed Areas/Marine Managed Areas in the U.S. Caribbean Exclusive Economic Zone

There are seven Caribbean Fishery Management Council seasonally closed areas/marine managed areas in federal waters that prohibit the use of certain gear types within their boundaries.

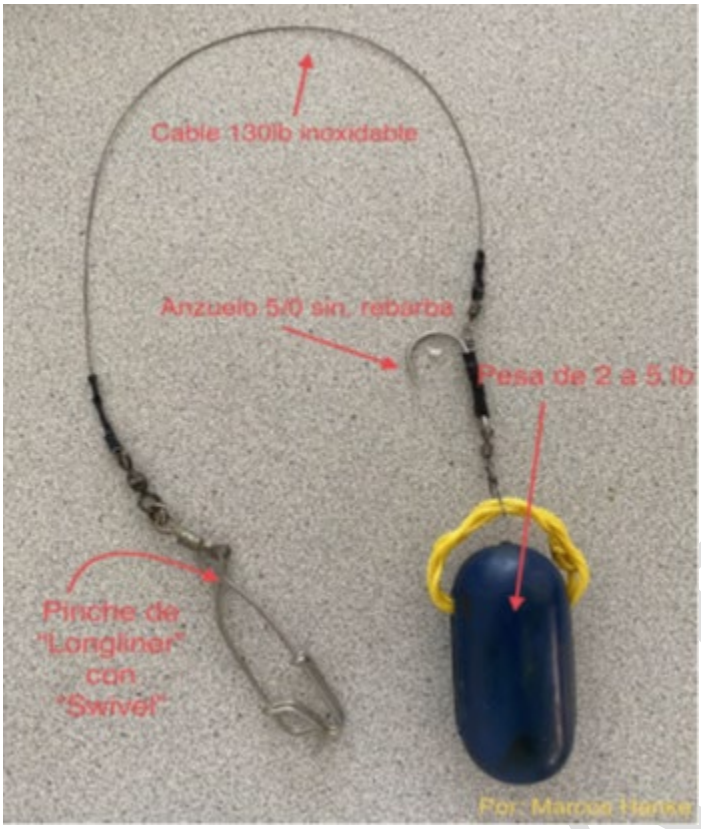
Area	Island	Seasonal Closure	Year-round Prohibition
Hind Bank Marine Conservation District	St. Thomas	Year-round	Fishing for any species and anchoring by fishing vessels are prohibited year-round.
Grammanik Bank	St. Thomas	February 1 - April 30	Fishing with pots, traps, bottom longlines, gillnets or trammel nets is prohibited year-round.
Mutton snapper spawning aggregation area	St. Croix	March 1 - June 30	Fishing with pots, traps, bottom longlines, gillnets or trammel nets is prohibited year-round.
Lang Bank	St. Croix	December 1 - February 28	Fishing with pots, traps, bottom longlines, gillnets or trammel nets is prohibited year-round.
Tourmaline Bank	Puerto Rico	December 1 - February 28	Fishing with pots, traps, bottom longlines, gillnets or trammel nets is prohibited year-round.

Area	Island	Seasonal Closure	Year-round Prohibition
Abrir La Sierra	Puerto Rico	December 1 - February 28	Fishing with pots, traps, bottom longlines, gillnets or trammel nets is prohibited year-round.
Bajo de Sico	Puerto Rico	October 1 - March 31	Fishing with pots, traps, bottom longlines, gillnets or trammel nets is prohibited year-round. Anchoring by fishing vessels is prohibited year-round.

Appendix D. Examples of Descending Devices



Source: M. Hanke, fishermen, presentation at 178th Caribbean Council Meeting


Cable 130lb inoxidable
Anzuelo 5/0 sin. rebarba
Pesa de 2 a 5 lb
Pinche de "Longliner" con "Swivel"
Por: Marcos Hanke