

# Census of licensed fishers of the U.S. Virgin Islands (2016)

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## Executive Summary

Fisheries are important sources of sustenance, income, and employment to coastal communities in the U.S. Virgin Islands. Between 2005 and 2015, fishers landed, on average, about 1.4 million pounds of seafood worth \$7.4 million per year (NMFS, 2017). This study presents the results of the 3rd census of licensed commercial fishers (hereafter referred to as fishers) of the U.S. Virgin Islands (USVI), which was conducted from July to September 2016, to update previous censuses conducted during the 2003-04 and 2010-11 (Kojis, 2004; Kojis and Quinn, 2011a). This study describes the present socioeconomic and demographic characteristics of fishers in the territory and provides information on their boats, fishing gear and fishing related activities.

In total 260 unique fishers were identified from the 2015-16 and 2016-17 Department of Planning and Natural Resources, Division of Fish and Wildlife fisher registration lists. Of the 119 commercial fishers on St. Thomas and St. John (STT/STJ) lists, 91 were interviewed (76.5% of registered fishers) and 122 of 141 (86.5%) registered fishers were interviewed on St. Croix (STX).

While the population of the USVI has increased from 22,012 in 1930 (Fiedler and Jarvis, 1932) to a peak of 108,612 in 2000, declining to 103,961 in 2014, the number of fishers as both a percentage of the population and number of individuals has steadily declined. In 1930, 1.8% of the population were fishers, while in 2016, only 0.25% of the population were fishers. The number of licensed commercial fishers declined 32.1% in the USVI since the more recent surveys commenced in 2004, with the largest decline between 2004 and 2011. The decline was more precipitous on STX (-36.8%) than on STT/STJ (-25.6%). There has been a moratorium on the issuance of new fishing licenses since 2001. Only transfers to family members or helpers are currently officially permitted.

Mean ages for fishers were 56.9 (STX) and 55.0 (STT/STJ) years and the mean number of years they had fished as licensed fisher and helper was 26.7 and 30.8 years respectively. The mean household size for fishers on STX was 2.7 and on STT/STJ 2.5. About 54% of STX fishers and 37% of STT/STJ fishers had not completed high school. On STT/STJ, the majority of fishers were of French descent while on STX the largest percentage of fishers was Hispanic. Since 2004, when the first census was conducted, the average age and levels of formal education increased. In general, younger fishers had more years of formal education than older fishers.

This study also found that fewer fishers on STT/STJ (27.5%) derived 100% of their income from fishing compared to STX (38.9%). STX fishers were more financially dependent on fishing than STT/STJ fishers. Fewer fishers on STX engaged in other employment activities (39.3%) than on STT/STJ (44.7%).

The average boat length was 24.6 ft on STT/STJ and 21.9 ft on STX. Fishing boats were typically made of fiberglass or fiberglass and wood. Most fishers on STT/STJ owned a boat with a single outboard motor, and almost half of STX fishers owned a boat with two outboard motors. Single outboard engines averaged about 110 hp on STT/STJ and 90 hp on STX. About 68% of the STT/STJ boats and 91% of STX boats were powered by

outboard engines. On average, STX fishers valued their boat in its present condition (including all on-board gear) and fishing equipment at \$39,000, which is about one-third the value provided by STT/STJ fishers (\$102,000).

Fishers reported targeting a variety of species using different fishing gears. The reef fish fishery remained the most important fishery in both STT/STJ and STX. Coastal pelagic fish were the second and lobster the third most important fishery targets for STT/STJ fishers. On STX spiny lobster was the second most important fishery target and deep-water pelagic fish (dolphinfish, wahoo, etc.) the third. Line fishing gear was the most commonly owned gear in both districts. Most fishers (STT/STJ – 84%, STX - 92%) owned handline gear (“yo-yo” gear). Rod and reel ownership was more common on STT/STJ (52% of fishers) than STX (36%) reflecting the more frequent targeting of large pelagic fish on STT/STJ. Trap gear was more commonly owned by STT/STJ fishers. Fishers, particularly those on STX, have diversified into other gears such as multi-hook vertical setlines, tuna reel buoy fishing, and vertical set line (single hook for pelagic fish). Also, fishers on STX more commonly owned scuba gear for spearing fish, hand gathering queen conch, and snaring lobster. Scuba gear was owned by 54% of STX fishers, but only 14% of STT/STJ fishers, who primarily used scuba to fish for personal consumption. Associated with use of scuba gear is the possibility of getting the bends also known as decompression sickness. A high percentage of fishers on STX said that they or their crew had decompression sickness in the last 12 months (48%). Of the fishers with decompression sickness on STX, 86% were treated in a hyperbaric chamber. No STT/STJ fishers reported decompression sickness or use of a hyperbaric chamber for treatment.

In spite of the extensive management efforts undertaken by federal and territorial agencies, <14% of the fishers in 2016 believed that fishing has improved relative to 5 years ago. Forty percent of fishers in the USVI thought fishing had worsened during the same period. About 9% more fishers on STX thought fishing was worse than STT/STJ. Fishers in both districts who stated fishing was worse, overwhelmingly stated that overfishing/less fish was the number one reason for fishing being worse (41% on STT/STJ and 33% on STX). On STX, fishers ranked area closures and regulations (24%) as the second most important reason for fishing being worse. Only 4.5% of fishers on STT/STJ gave this as a reason. Instead STT/STJ fishers were concerned about too many fishers, illegal fishers, and lack of enforcement. STX fishers also expressed concern about climate, e.g. climate change and bad weather, and the lack of FADS, especially surface FADS.

Most STT/STJ fishers did not know how difficult it was to find employment outside of fishing (51%) and only 18% thought it would be very hard or hard to find employment. By contrast, over half of STX fishers stated that finding other work would be hard or very hard (51%). Similarly, a higher proportion of STX fishers compared to STT/STJ fishers reported that the financial condition of their household was worse or much worse (STT/STJ - 21% vs. STX - 45%) compared to five years ago. These differences reflect the higher unemployment rate on STX as a result of the closure of the HOVENSA LLC refinery in 2012.

The survey concluded by asking fishers to identify the main problems affecting their fishery. On STT/STJ, the top three regulatory problems identified were too many closed areas, which exacerbated competition among fishers, low annual catch levels (ACLs), and that closed seasons caused fish wastage. However, many felt that many of the closures such as the Hind Bank Marine Conservation District and Grammanik Bank Seasonal Closure had been positive. Fishers also noted that pollution, habitat loss or disturbance adversely impacted them. On STX, fishers complained about excessive regulations and too many closures. They also noted that bad weather, climate change and lionfish (primarily *Pterois volitans*) predation of reef fish were adversely impacting their livelihoods.



## Table of Contents

|   |     |
|---|-----|
| 1. Introduction .....   | 1   |
| 2. Materials and Methods .....  | 3   |
| 3. Results .....  | 7   |
| 4. Discussion.....  | 110 |
| 4.1. Description of Commercial Fishers .....  | 112 |
| 4.2. Description of the Fish Targeted, Boat Statistics, and Fishing Equipment used by Fishers ..... | 123 |
| 4.3. Observations of the Fishing Industry.....  | 137 |
| 4.4. Occupational Hazards and Health / Safety Considerations .....                                  | 146 |
| 5. Recommendations .....  | 148 |
| 6. Acknowledgments .....  | 150 |
| 7. References .....   | 151 |
| Appendix I.....   | 155 |

## List of Tables

|  |    |
|--|----|
| Table 1. Response rate for fishers in the USVI. ....   | 4  |
| Table 2.a. (Q. 2). Percentage of fishers living in each island by district and sub-region based on zip code. ....  | 8  |
| Table 2.b. (Q. 2). Frequency distribution of STT/STJ fishers' residence by estate. ....  | 9  |
| Table 2.c. (Q. 2). Frequency distribution of STX fishers' residence by estate. ....  | 11 |
| Table 3 (Q. 3). Age of fishers. ....   | 13 |
| Table 4.a. (Q. 4). Total number of years of fishing experience as licensed fisher and helper for "Average Fishers" and "Active Fishers only." ....             | 14 |
| Table 4.b. (Q. 4). Frequency distribution of the total number of years of fishing experience (as licensed fisher + helper) of "Average Fishers". ....          | 15 |
| Table 4.c. (Q. 4). Number of years fishing experience as licensed fisher. ....   | 17 |
| Table 4.d. (Q. 4). Frequency distribution of the number of years of fishing experience (as licensed fisher only) of "Average Fishers." ....                    | 18 |
| Table 4.e. (Q. 4). Frequency distribution of the total number of years of "Helper" experience for all fishers interviewed who responded to this question. .... | 18 |
| Table 4.f. (Q. 4). Number of years "Average Fishers" and "Active Fishers" fished as a helper prior to obtaining a fishing license. ....                        | 19 |
| Table 5 (Q. 5). Annual fishing frequency by fishers. ....  | 20 |
| Table 6 (Q. 6). Racial composition of fishers. ....  | 20 |
| Table 7.a. (Q. 7). Ethnic background self-identified by fishers. ....  | 21 |
| Table 7.b. (Q. 7). Origin of USVI fishers. ....  | 22 |
| Table 8.a. (Q. 8). Statistics regarding the size of fishers' households, including the fisher. ....  | 22 |
| Table 8.b. (Q. 8). Breakdown of the size of fishers' households, including the fisher. ....  | 23 |
| Table 9 (Q.9). Education level of fishers. ....  | 23 |
| Table 10.a. (Q. 10). The number and percentage of fishers who engaged in one or more types of fishing. ....  | 24 |
| Table 10.b. (Q. 10). Number and percentage of fishers carrying out each type of fishing. ....  | 25 |
| Table 10.c. (Q. 10). Rank order of fishing method based on importance to USVI fishers for generating revenue. ....   | 26 |
| Table 10.d. (Q. 10). Rank order of fishing type based on importance to STT/STJ fishers for generating revenue. ....  | 27 |
| Table 10.e. (Q. 10). Rank order of fishing type based on importance to STX fishers for generating revenue. ....  | 27 |
| Table 11.a. (Q. 11). The relative importance of specific categories of fish, mollusks, and crustaceans to fishers. ....  | 29 |
| Table 11.b. (Q. 11). The frequency of the number of categories of fish, mollusks, and crustaceans listed in Table 11a harvested by fishers. ....               | 30 |
| Table 11.c. (Q. 11). Rank order of categories of fish and shellfish based on importance to USVI fishers for generating revenue. ....                           | 31 |
| Table 11.d. (Q. 11). Rank order of categories of fish and shellfish based on importance to STT/STJ fishers for generating revenue. ....                        | 31 |
| Table 11.e. (Q. 11). Rank order of categories of fish and shellfish based on importance to STX fishers for generating revenue. ....                            | 32 |
| Table 12 (Q. 12). Jurisdiction where most fishing occurred. ....   | 33 |
| Table 13 (Q. 13 & 14). The average number of fishing trips by "Average Fishers" per month and the average number of hours per trip. ....                       | 33 |
| Table 14 (Q. 13 & 14). The average number of fishing trips by "Active Fishers only" per month and the average number of hours per trip. ....                   | 34 |
| Table 15.a. (Q. 15). The hours per week "Average Fishers" spent on fishing related activities (excluding catching fish). ....                                  | 37 |

|  |    |
|--|----|
| Table 15.b. (Q. 15). The hours per week “Active Fishers” spent on fishing related activities (excluding catching fish).....  | 37 |
| Table 15.c. (Q. 13, 14, 15). Breakdown of the level of typical weekly effort “Average Fishers” reported to carry out all fishing related activities.....   | 38 |
| Table 15.d. (Q. 13 & 14): The average time (hours) “Average Fishers” and “Active Fishers” spent carrying out all fishing activities per week. ....   | 38 |
| Table 16.a. (Q. 16). Frequency distribution of fishers who engage in non-fishing activities. ....  | 38 |
| Table 16.b. (Q. 16): Non-fishing occupations that fishers undertake.....   | 39 |
| Table 17.a. (Q. 17). Frequency distribution of the number of crew that fishers fish with. Fishers responded that they fished alone and/or with helpers and/or other fishers. ....                            | 40 |
| Table 17.b. (Q. 17). The average number of crew (helpers and other licensed fishers) used by fishers who fished with a crew. ....  | 41 |
| Table 17.c. (Q. 17). Breakdown of the number helpers employed per fisher.....  | 41 |
| Table 17.d. (Q. 17). Breakdown of the number licensed fishers a fisher fished with. ....   | 41 |
| Table 17.e. (Q. 17). Function of helpers in STT/STJ and STX and frequency of helper participation in various functions. ....   | 42 |
| Table 18 (Q. 18). Number and percentages of categories of helpers. ....  | 43 |
| Table 19.a. (Q 19). Age distribution of helpers for STT/STJ.....   | 43 |
| Table 19.b. (Q 19). Age distribution of helpers for STX. ....  | 44 |
| Table 20 (Q20). Effort required to recruit a helper for fishing activities. ....   | 44 |
| Table 21.a. (Q. 21). The number and percentage of STT/STJ fishers using landing sites. Landing sites without a STJ are on STT, except one BVI site. ....   | 45 |
| Table 21.b. (Q. 21). The number and percentage of STX fishers using landing sites.....   | 46 |
| Table 21.c. (Q. 21). The number of landing sites used by fishers. ....   | 47 |
| Table 22 (Q. 22). Frequency distribution of the proportion of fish caught that is iced in both districts. ....   | 47 |
| Table 23.a. (Q. 23). Number and percent of fishers selling their catch at various types of locations. ....   | 49 |
| Table 23.b. (Q. 23). The number and percentage of different locations or entities that fishers utilized to sell their catch. This includes non-specific locations such as "restaurant," "roadside," etc..... | 50 |
| Table 23.c. (Q. 23). Fish market sites used by STT/STJ fishers. Other markets include traditional roadside markets and other non-government market sites. ....   | 50 |
| Table 23.d. (Q. 23). Fish market sites used by STX fishers. ....   | 51 |
| Table 24.a. (Q. 24). Percentage of STT/STJ fishers who used various locations to keep their boats. Ports in STJ are listed as such. All other ports are located in STT. ....                                 | 52 |
| Table 24.b. (Q. 24). Boat storage locations on STX. ....   | 54 |
| Table 25.a. (Q. 25a). Frequency distribution of the number of fishing boats (excluding dinghies) owned by fishers and used for commercial fishing within the last three years. ....                          | 56 |
| Table 25.b. (Q. 25a). Descriptive statistics on the number of boats owned by fishers and used within the last 3 yrs. Dinghies excluded. ....   | 56 |
| Table 25.c. (Q. 25b). The ownership status of the primary fishing boat. Note: The most common response is in bold type. ....   | 57 |
| Table 25.d. (Q. 25c). Number of fishing boats and dinghies in service. ....  | 57 |
| Table 25.e. (Q. 25c). Reasons given for fishing boats and dinghies not being in service. ....  | 58 |
| Table 25.f. (Q. 25d). Age of primary boats used by fishers. ....   | 58 |
| Table 25.g. (Q. 25f). Length of the primary boats (feet) used by fishers. Dinghies excluded. ....  | 59 |
| Table 25.h. (Q. 25f). Frequency distribution of primary boat lengths used by fishers.....  | 59 |
| Table 25.i. (Q. 25f): Length of dinghies (feet) used by fishers. ....  | 60 |

|   |    |
|---|----|
| Table 25.j. (Q. 25g). Number and percentage of fishers who used inboard, outboard, or inboard/outboard engines on the primary commercial fishing boats. ....  | 60 |
| Table 25.k. (Q. 25g). Number and percentage of fishers who used one or two outboard engines on their primary fishing boat. ....   | 61 |
| Table 25.l. (Q. 25g): Number and percentage of fishers who used one or two inboard engines on their primary fishing boat. ....  | 61 |
| Table 25.m. (Q. 25h). Average horsepower of individual engines (if a boat had two engines of the same size only one counted in calculations) and total horse power per boat (if two engines, total hp includes both engines) of outboard and inboard engines used by fishers on their primary vessel. ....    | 62 |
| Table 25.n. (Q. 25h). The number and percentage of outboard engines in different horsepower (hp) classes used by fishers on their primary fishing boat.....   | 62 |
| Table 25.o. (Q. 25h). The number and percentage of inboard engines in different horsepower (hp) classes used by fishers on their primary fishing boat.....  | 63 |
| Table 25.p. (Q. 25i). The type of fuel used in engines of primary fishing boats.....  | 63 |
| Table 25.q. (Q. 25j). Frequency distribution of construction material of primary fishing boats.....   | 64 |
| Table 25.r. (Q. 25k). Breakdown of the number and percentage fishers who used various electronic equipment on their primary fishing boat. ....  | 64 |
| Table 25.s. (Q. 25l). Percentage of primary fishing boats with various fishing gear. ....   | 65 |
| Table 26.a. (Q. 26). Breakdown of the percentage of fishers who estimated the value of their vessels and gear. Includes only gear attached to or associated with boat such as winches, hydraulic reels, electronics, and safety equipment (not including fishing gear such as lines, nets, traps, etc.). .... | 66 |
| Table 26.b. (Q. 26). Summary statistics of the monetary value of all the boats and boat equipment (excluding fishing gear) owned by fishers. ....   | 66 |
| Table 27.a. (Q. 27). Summary of information on beach seine nets owned by fishers.....   | 68 |
| Table 27.b. (Q. 27). Summary of information on haul nets (seine net) gear owned by fishers.....   | 69 |
| Table 27.c. (Q. 27). Summary of information on gillnets (bait) owned by fishers. ....   | 70 |
| Table 27.d. (Q. 27). Summary of information on cast nets owned by fishers.....  | 71 |
| Table 27.e. (Q. 27). Summary of information on umbrella (lift) nets owned by fishers.....   | 72 |
| Table 27.f. (Q. 27). Summary of information on plastic lobster traps owned by fishers. ....   | 73 |
| Table 27.g. (Q. 27). Summary of information on wire lobster traps owned by fishers.....   | 74 |
| Table 27.h. (Q. 27). Summary of information on fish traps owned by fishers.....   | 75 |
| Table 27.i. (Q. 27). Summary of information on other trap gear – crab traps owned by fishers.....   | 76 |
| Table 27.j. (Q. 27). Number of traps of all types owned by individual fishers in each district.....   | 77 |
| Table 27.k. (Q. 27). Summary of information on hand line gear (plastic reel also known as “yo-yo”) owned by fishers. ....   | 78 |
| Table 27.l. (Q. 27). Summary of information on rod and reels owned by fishers.....  | 79 |
| Table 27.m. (Q. 27). Summary of information on surface longline gear owned by fishers.....  | 80 |
| Table 27.n. (Q. 27). Summary of information on bottom longline gear owned by fishers. ....  | 81 |
| Table 27.o. (Q. 27). Summary of information on vertical set line (multi-hook deep-water snapper-grouper) owned by fishers. ....   | 82 |
| Table 27.p. (Q. 27). Summary of information on vertical set line (single hook pelagic fish) owned by fishers.....   | 83 |
| Table 27.q. (Q. 27). Summary of information on tuna buoy or reel buoy fishing owned by fishers. ....  | 84 |
| Table 27.r. (Q. 27). Summary of information of skin diving gear owned by fishers. ....  | 85 |
| Table 27.s. (Q. 27). Summary of information of scuba diving gear owned by fishers.....  | 86 |
| Table 27.t. (Q. 27b). Percentage of fishers who provided values of all fishing gear owned in each value category. ....  | 87 |

|   |     |
|---|-----|
| Table 27.u. (Q. 27b). Summary statistics of the monetary value of all the fishing gear owned by fishers. ....   | 87  |
| Table 28.a. (Q. 28). Number of fishers who used scuba equipment to fish who said they or their crew experienced decompression sickness in the last 12 months. ....  | 88  |
| Table 28.b. (Q. 28 & 29). Frequency of occurrence of fishers who used scuba equipment who said that they experienced decompression sickness in the last 12 months. ....   | 89  |
| Table 29.a. (Q. 29). Frequency of occurrence of fishers and crew on STX who used scuba equipment while fishing and who experienced decompression sickness who were treated in hyperbaric chamber. ....  | 89  |
| Table 29.b. (Q. 29). Breakdown of the number of times fishers on STX had the decompression sickness (DCS) in the last 12 months and the frequency with which they were treated in a hyperbaric chamber based on the number of times they had DCS. ....  | 89  |
| Table 29.c. (Q. 29). Breakdown of the number of times crew on STX had decompression sickness (DCS) in the last 12 months and the frequency with which they were treated in the hyperbaric chamber based on the number of times they had DCS. ....   | 90  |
| Table 30.a. (Q. 30). Fishers' opinions on the condition of fishing today versus five years ago. ....  | 90  |
| Table 30.b. (Q. 30). Reasons for fishers' opinions on the condition of fishing today versus five years ago. ....  | 91  |
| Table 31.a. (Q. 31). Frequency distribution of fishers' opinions of the effort required to find other employment. ....  | 95  |
| Table 31.b. (Q. 31). Age distribution of fisher's opinions of the effort required to find other employment for USVI. ....   | 95  |
| Table 31.c. (Q. 31). Age distribution of fisher's opinions of the effort required to find other employment for STT/STJ. ....  | 96  |
| Table 31.d. (Q. 31). Age distribution of fisher's opinions of the effort required to find other employment for STX. ....  | 96  |
| Table 31.e. (Q. 31). Types of jobs sought by fishers. ....  | 97  |
| Table 32.a. (Q. 32). Frequency distribution of fishers' opinions of the financial condition of their household compared to five years ago. ....   | 98  |
| Table 32.b. (Q. 32). The reasons fishers said that their financial well-being was "better" compared with five years ago. ....   | 98  |
| Table 32.c. (Q. 32). The reasons fishers said that their financial well-being was "about the same" compared with five years ago. ....   | 99  |
| Table 32.d. (Q. 32). The reasons fishers said that their financial well-being was "worse" compared with five years ago. ....  | 100 |
| Table 33 (Q. 33). The main socio-economic problems that fishers said affected their fishery. District specific comments are indicated for emphasis. Those comments without a STT/STJ or STX preceding it apply to both districts. N = number of fishers providing similar socio-economic problems. .... | 103 |
| Table 34.a. (Q. 34). Proportion of fishers' household income derived from fishing. ....   | 108 |
| Table 34.b. (Q. 26). Descriptive statistics of the percentage of household income fishers derive from fishing. ....   | 109 |
| Table 34.c. (Q. 26). Descriptive statistics of the percentage of household income fishers derived from fishing. Note: fishers who are listed as retirees in this table said they were not employed. ....  | 109 |
| Table 35 (Q. 35). Number and percentage of fishers belonging to a fishing organization. ....  | 110 |
| Table 36.a. Comparison of the number of fishers in the USVI between 1930 and 2016. ....   | 111 |
| Table 36.b. Comparison of the number of fishers between 2004 and 2016, including the percentage change in the USVI fisher population relative to 2004 levels. ....  | 112 |
| Table 37.a. Racial composition of STT/STJ fishers in three surveys conducted in 2004, 2011 and 2016. ....   | 114 |
| Table 37.b. Racial composition of STX fishers in three surveys conducted in 2004, 2011 and 2016. ....   | 114 |
| Table 38.a. Ethnic composition of STT/STJ fishers in three surveys conducted in 2004, 2011 and 2016. ....   | 114 |
| Table 38.b. Ethnic composition of STX fishers in three surveys conducted in 2004, 2011 and 2016. ....   | 115 |

|  |     |
|--|-----|
| Table 39. Comparison of formal education levels of STT/STJ and STX fishers between 2004 and 2016. ....   | 117 |
| Table 40.a. Comparison of fishing effort in STT/STJ in 2004, 2011 and 2016. Shaded columns show fisher effort when broken down by various fishing activities. Non-shaded columns show the effort that fishers said they expended when asked if full time, part time, or opportunistic (Kojis, 2004) or what their participation level was in all fishing activities when provided an option of >36 hrs, 15 - <36 hrs, <15 hrs, or 0 (Kojis and Quinn, 2011a, this study). ....                 | 120 |
| Table 40.b. Comparison of fishing effort in STX in 2004, 2011 and 2016. Shaded columns show fisher effort when broken down by various fishing activities. Non-shaded columns show the effort that fishers said they expended when asked if full time, part time, or opportunistic (Kojis, 2004) or what their participation level was in all fishing activities when provided an option of >36 hrs, 15 - <36 hrs, <15 hrs, or 0 in 2011 and 2016. Zero response is incorporated in “<15.” .... | 120 |
| Table 41.a. Proportion of fishers’ income on STT/STJ derived from fishing. ....  | 122 |
| Table 41.b. Proportion of fishers’ income on STX derived from fishing. ....  | 122 |
| Table 42. Comparison of the rank of fish and shellfish among years and between districts. ....   | 124 |
| Table 43. Changes in the number of boats (including dinghies) and percentage of boat ownership from 1930 to 2016. ....   | 126 |
| Table 44. Percentage of boats with engines from 1930 to 2016. ....   | 127 |
| Table 45. Number and percentage of various types of electronic equipment used on fishing boats in the USVI from 2004 to 2016. ....   | 127 |
| Table 46.a. The type of fuel used in engines of fishing boats including dinghies on STT/STJ and STX. ....  | 128 |
| Table 46.b. The type of fuel used in engines of fishing boats including dinghies. ....   | 128 |
| Table 47.a. Comparison over time of the length of the primary fishing boats used by fishers. ....  | 129 |
| Table 47.b. Frequency distribution of primary boat lengths used by fishers in the USVI. ....   | 130 |
| Table 48. Comparison over time of the percentage of fishers who used various electronic equipment on their primary fishing boats. ....   | 131 |
| Table 49. Comparison of total number of each type of gear owned by fishers in 1930, 1968, 2004, 2011 and 2016. ....  | 132 |
| Table 50. Comparison of the number of pots (fish, modified fish, and lobster pots) owned by fishers between 1930 and 2016. ....  | 134 |
| Table 51. Comparison over time of the percentage of fishers who owned and used scuba and skin diving gear. ....  | 136 |
| Table 52. Comparison over time of the percentage of household income fishers earned from fishing. ....   | 140 |
| Table 53. Comparison over time of fishers’ opinions on the effort required to find other employment. ....  | 141 |
| Table 54. Comparison over time of fisher opinions on the condition of fishing in the USVI. ....  | 141 |
| Table 55. Comparison over time of fisher participation in various fisher organizations. ....   | 146 |

## List of Figures

|  |     |
|--|-----|
| Figure 1. Map of St. Thomas, St. John and St Croix, U.S. Virgin Islands. ....  | 2   |
| Figure 2 (Q.2). Names and locations of estates on St. Thomas, U.S. Virgin Islands. ....  | 10  |
| Figure 3 (Q.2). Names and locations of estates on St. John, U.S. Virgin Islands. ....  | 10  |
| Figure 4 (Q.2). Names and locations of estates on St. Croix. ....  | 12  |
| Figure 5 (Q.3). Age distribution of “Average Fishers”. ....  | 13  |
| Figure 6 (Q.3). Percentage of “Average Fishers” in each age class in each district. ....   | 14  |
| Figure 7 a and b (Q. 4). Total fishing experience as licensed fisher and helper for each district: a) percentage of<br>fishers with years of fishing experience in each district and b) number of fishers in each district grouped by years<br>of experience. ....   | 16  |
| Figure 8 (Q. 14). Number of trips per month for STT/STJ and STX “Average Fishers” ....   | 34  |
| Figure 9. Location of landing sites and fish markets on St. Thomas. ....   | 53  |
| Figure 10. Location of landing sites and fish markets on St. John. ....  | 53  |
| Figure 11. Location of landing sites and fish markets on St. Croix. ....   | 54  |
| Figure 12. Map of Puerto Rico and the US Virgin Islands (after Jacobsen and Browder, 1987) showing the extent<br>of the insular shelves (<200m depth) of the Puerto Rico Bank (Puerto Rico and the northern Virgin Islands), and<br>the insular shelf surrounding STX. The line with fish symbols represents the EEZ. .... | 123 |

## List of Abbreviations

|         |  |
|---------|--|
| ACL     | Annual Catch Limit                                     |
| CFMC    | Caribbean Fishery Management Council                   |
| DFW     | Division of Fish and Wildlife                          |
| DPNR    | Department of Planning and Natural Resources           |
| LCF     | Licensed commercial fisher                             |
| MSA     | Magnuson Stevens Act                                   |
| NMFS    | National Marine Fisheries Service                      |
| NOAA    | National Oceanic and Atmospheric Administration        |
| NVI     | Northern Virgin Islands (St. Thomas, St. John and BVI) |
| SFA     | Sustainable Fishery Act                                |
| STT/STJ | St. Thomas/St. John District                           |
| STX     | St. Croix District                                     |
| TRC     | Trap Reduction Committee                               |
| USVI    | United States Virgin Islands                           |





## 1. Introduction

The United States Virgin Islands (USVI) fisheries provide an important source of income and food to the local population. Local fish is a traditional part of the diet and is held in high esteem by Virgin Islanders, especially older ones. The USVI has two distinctive small scale fisheries: one in the northern USVI, which includes St. Thomas and St. John (STT/STJ), and the other on St. Croix (STX). The objective of this project was to update the previous commercial fishermen censuses of the USVI (Kojis, 2004; Kojis and Quinn 2011a). These censuses provide critical data about the demographics of fishers and their households, capital invested in fishing vessels and gear, perceptions about the health of fish resources and coral reef habitats, and socio-economic issues impacting fishermen livelihoods. The data collected will be used to describe the current socio-economic environment in fishery management plans, to monitor and assess socio-economic changes over time, and to evaluate the socio-economic impact of -management actions.

The US Virgin Islands is an unincorporated territory of the United States and lies in the northeast Caribbean. It consists of three major islands, STT, STJ and STX, and about 50 cays (Fig. 1). STT/STJ, part of the northern USVI, lie on the Puerto Rico Bank that extends from western Puerto Rico to eastern Anegada in the British Virgin Islands (BVI). St. Croix, the largest island of the USVI, is approximately 40 miles to the south of St. Thomas and is separated from the Puerto Rico Bank by a deep trench. The territory is politically and administratively separated into two districts, STT/STJ and STX.

The USVI commercial fishery is a small scale, artisanal fishery primarily catching benthic, coastal pelagic and deep-water pelagic fish and two species of shellfish: spiny lobster and queen conch. The fishery is operated almost exclusively by men from small boats who return daily with their catch and market the catch themselves. A detailed summary of the history of previous surveys conducted in the USVI, extending back to 1930 (Fiedler and Jarvis, 1932), is found in the previous census reports (Kojis, 2004; Kojis and Quinn, 2011a).



Figure 1. Map of St. Thomas, St. John and St Croix, U.S. Virgin Islands.

The first survey of USVI commercial fishers occurred in 1930 (Fielder and Jarvis, 1932) after President Hoover visited the territory and sought to improve the quality of island life by economic development. Almost 30 years passed until the next survey occurred. In 1959, Idyll and Randall (1959) surveyed STJ commercial fishers. A couple of years later a brief summary of the STX fishery was presented at a meeting (Anon. 1961 in Swingle et al., 1970). Swingle et al. (1970) conducted a survey in 1968 sampling full-time and part-time fishers. Since there was no commercial fishers' license requirement between 1930 and 1968, the population of commercial fishers could only be estimated when these surveys were conducted. In 1996 a rapid socioeconomic evaluation was undertaken to ascertain the impact of a proposed area closure (marine conservation district) south of St. John (Downs and Petterson, 1997). In the early 2000's, NOAA funded a number of socio-economic studies to help understand fishers' level of dependence and engagement on local marine living resources and to assist in the fishing community designation process (IAI, 2007; Valdes-Pizzini et al., 2010; Stoffle et al., 2011; Valdes-Pizzini and Agar, 2012).

This report primarily tracks the changes in the USVI fishery and fisher demographics during the 13-year period starting with the 2003-04 fishing year, when the first of the more recent censuses was conducted (Kojis, 2004). Most questions in this census were identical to questions asked in 2004 and 2011, although there were a few additional questions and minor modifications to questions.

The three 21<sup>st</sup> century surveys facilitate a better understanding of a traditional island livelihood and help to conserve fish stocks so that they can provide livelihoods for current and future generations of fishers, while sustaining a rich, diverse and productive tropical marine environment. The information is important in assessing changes over time. Coupled with data on catch and effort from the commercial fisher catch reports, bio statistical data collected by port samplers, independent fishery surveys (e.g. Olsen, 1988; Mateo and Tobias, 2001; Mateo and Tobias, 2004; Whiteman, 2005), and local biological data on fish and shellfish resources (e.g., Nemeth, 2005; Kojis and Quinn, 2011b), fisheries management measures can be structured to better work towards sustaining fisheries and fishing livelihoods in the territory.

## 2. Materials and Methods

The data used in this study were derived from in-person and telephone interviews with commercially licensed fishers (hereafter fishers) and key informants, and secondary data sources, which included governmental reports and databases. Because many fishers do not renew their fishing licenses in July, as required by USVI law, we estimated the fisher universe using the (2015-16 and 2016-17) lists of fishers provided by the Department of Planning and Natural Resources (DPNR), Division of Fish and Wildlife (DFW).<sup>1</sup> These two lists generated a fisher population of 260 of which 119 lived in STT/STJ and 141 lived in STX.

In total, we contacted 213 fishers (or, in the case of fishers who were deceased, off island or imprisoned, their families) which is about 82% of the population of fishers in USVI (Table 1). On a district basis, we interviewed 76.5% (91 of 119 fishers) of the STT/STJ fishers and 86.9% (122 of 141 fishers) of the STX fishers.

Of the STT/STJ fishers contacted, 75 fishers (82%) said they were active and 16 fishers (18%) stated that they were no longer commercially fishing (Table 1). Of the 119 fishers, including both the ones interviewed and the ones not interviewed<sup>2</sup>, on the STT/STJ list, at least 23 (19.3%) no longer fished because of various reasons, including: a) ten fishers that have applied for and received sleeper status from DFW (sleeper status allows fishers to retain their fishing license even though they have, presumably temporarily, stopped fishing; only some sleepers were able to be contacted); b) one that DFW stated was

---

<sup>1</sup>The 2016 fisher lists were provided on August 3<sup>rd</sup> (STT/STJ) and August 4<sup>th</sup> (STX)

<sup>2</sup>For fishers not interviewed, information about non-fishing status was obtained from DFW.

no longer fishing and did have sleeper status; c) two that their family said had moved off island, and d) ten who said they were no longer fishing. Twenty one fishers (18%) were unable to be contacted or refused to be interviewed (7 fishers, 6%).

Eighty seven percent (122 of 141) of STX fishers were contacted. Of the fishers contacted, 98 fishers (80%) were actively fishing and 24 (20%) were not commercially fishing. See footnote five in Table 1 for a breakdown of reasons that STX fishers were not commercially fishing.

Table 1. Response rate for fishers in the USVI.

| District | Licensed fisher universe | Number of fishers interviewed <sup>1</sup> |                    |                 | Number of non-responses |                        |                   | Response rate (%) |
|----------|--------------------------|--|--------------------|-----------------|-------------------------|------------------------|-------------------|-------------------|
|          |                          | Total                                      | By activity status |                 | Total                   | By non-response reason |                   |                   |
|          |                          |  | Active             | In-active       |                         | Refusal                | Unable to contact |                   |
| STT/STJ  | 119                      | 91   | 75                 | 16 <sup>2</sup> | 28                      | 7 <sup>3</sup>         | 21 <sup>4</sup>   | 76.5%             |
| STX      | 141                      | 122  | 98                 | 24 <sup>5</sup> | 19                      | 1                      | 18                | 86.5%             |
| USVI     | 260                      | 213  | 173                | 40              | 37                      | 8                      | 39                | 81.9%             |

<sup>1</sup>Fishers contacted include family members where fishers were deceased, off island, or imprisoned.

<sup>2</sup>Includes six fishers who were sleepers and ten who said they were not fishing.

<sup>3</sup>Includes one sleeper, who refused to be interviewed, and six other fishers.

<sup>4</sup>Includes two fishers who were off island, three sleepers, one fisher who DFW said was no longer fishing and 15 fishers who simply unable to be contacted.

<sup>5</sup>Includes seven fishers who were contacted and said they were not fishing, three deceased fishers (family contacted), 10 sleepers (total of 11 sleepers but one was not contacted), 1 fisher in prison (family contacted), 1 fisher who had moved off island (family contacted), and 2 fishers who were in the process of transferring their licenses and not fishing.

Fishers were interviewed using a standardized survey instrument that contained both closed and open-ended questions. The questionnaire utilized was similar to the ones used in the 2003-04 fisher census (Kojis, 2004) and the subsequent census in 2010-2011 (Kojis and Quinn, 2011a). The 2016 questionnaire was revised after a review of the results of the 2010 questionnaire and comments and additions provided by National Marine Fisheries Service (NMFS) staff. The current questionnaire can be found in Appendix I.

The current survey asked questions related to:

- 1) the demography of fishers;
- 2) the type of boats, boat gear, and fishing gear that they use;
- 3) the amount of time spent conducting fishing related activities;
- 4) the capital invested in boats and gear;

- 5) the incidence of the bends in fishers who use scuba gear;
- 6) the contribution of fishing to their overall income;
- 7) changes in their financial condition, fishing success and ability to obtain employment outside fishing; and
- 8) the main socioeconomic problems affecting the fishery.

Additions and changes to the current census included:

- 1) a change in the order in which some questions were asked,
- 2) omission of questions that obtained repetitive information,
- 3) omission of some questions about gear size, and
- 4) the addition of questions related to the incidence and treatment of the bends and the value of boats and fishing gear.

Prior to the fieldwork, an in-person training program was conducted for interviewers on STT and STX. Training included an explanation and written information on the purpose of the census and detailed information on how to conduct interviews and record fisher responses. Most of the interviewers were current or former DFW staff familiar with the commercial fishers and several had conducted the 2003-4 and/or 2010-11 interviews. One was a former DPNR Coastal Zone Management employee.

Interviewing commenced during the annual fisher registration in July 2016 (the fishing year in the USVI extends from July 1<sup>st</sup> to June 30<sup>th</sup>). In-person fisher surveys were conducted in STT/STJ at DPNR headquarters at Cyril E. King Airport and in STX at the DPNR, Division of Environmental Enforcement (DEE) office in Anna's Hope. DFW made presentations to the fishers and certified that all catch reports had been submitted and then fishers submitted their paperwork to the DEE to obtain their license.

On STT, DFW used the DPNR conference room at Cyril E. King Airport and then fishers went down the hall to the DEE offices. Interviewers for this project were not allowed in the DFW conference room so they sat in chairs just outside the conference room and requested interviews either before or after fishers had seen DFW. There were a number of fishers who said they had limited time and were in a rush to get to DEE. Dr. Kojis checked to see if it might be better to conduct interviews while fishers waited at DEE. However, there was no room in the DEE offices to conduct interviews and few fishers were waiting outside in the hall. Also, concurrent with this survey another group was interviewing fishers about lionfish in the USVI and were conducting their survey at the DEE location. Fishers participating in the lionfish survey were given a \$20 gift cards for Home Depot upon completion of the survey.

Consequently, a number of the fishers approached for this survey on STT/STJ refused to be interviewed because they said they were fatigued or did not have time because they had already spent time interviewing for the lionfish survey or they requested a gift card to participate in this survey.

On STX, DFW conducted presentations and checked for catch report submission in one office and then fishers were asked to wait in the main office area while DEE processed paperwork and took photographs for the licenses. Interviewers sat in the main office. After DFW completed their presentation and document checking, interviewers were able to easily access fishers while they waited for DEE to complete their paperwork and take photos. Fishers on STX were much more cooperative in part because we were able to interview fishers as they waited for DEE to complete their paperwork and, therefore, we were not delaying them. Also, the Chief of Enforcement was present and encouraged fishers to do the census. The lionfish survey was also being conducted on STX at the same time and location as this census, and this made some fishers concerned about the time all the interviews were taking.

As questionnaires were completed, particularly those from new interviewers, they were reviewed by Dr. Kojis on site. After registration, when interviewing continued by telephone or personal contact for fishers who were either missed during registration or who had not registered during the formal registration process, Dr. Kojis contacted interviewers to clarify responses or ask interviewers to contact the fisher again if questions were missed. Interviewers were asked to conduct face to face interviews with fishers where possible.

In-person and telephone interviews were conducted between July and September 2016. Most in-person interviews were conducted during the annual fisher registration in July on each island. Once registration was completed, interviewers attempted to contact every fisher who had not been interviewed during registration on at least six separate occasions (different days of the week and times of the day) by phone or in-person. If a fisher had not been able to be contacted during those six attempts, interviewers were asked to mail the questionnaire to the fisher with an enclosed stamped envelope with Dr. Kojis' address. A subsample of respondents interviewed by telephone was contacted in each district to verify that the surveys had been conducted. Respondents were advised that any information provided will be considered private and will be treated as confidential in accordance with NOAA Administrative Order 216-100, Confidential Fisheries Statistics and section 402(b) of the MSA (16 U.S.C. 1881, et seq.; MSA, 2007).

Participation by commercial fishers in the census was voluntary. Most fishers were cooperative and many enjoyed talking about their fishing techniques, knowledge of fish behavior, and concerns about the fishery. However, fishers were generally more willing to be interviewed when the initial study was done in 2003-04 (Kojis, 2004). Since the 2004 census, a number of federal and territorial fisheries

management measures have been implemented that are highly controversial e.g. annual catch limits, year-round and seasonal closing of spawning aggregation sites, no-take fishing areas associated with monuments and local parks, and seasonal closures for certain species. Since, 2011, annual catch limits have been implemented resulting in short fishing seasons when the annual catch has been exceeded for specific species/families. As in 2011, some fishers were reluctant to cooperate, stating in some cases that the data might be used against them. Also, as noted earlier, there was another survey being conducted during registration. Fishers, especially on STT, often stated that they were in a hurry and didn't have time for both surveys. Some of these fishers, who were clearly in a rush, provided a current phone number which we used to interview them by phone at a later date.

Data from the questionnaires were entered into an MS Excel spreadsheet and proofed by the authors. Most of the results presented in the report were pooled. Only open ended questions are representative of single anonymous fishers. When a range of values were provided because of fisher uncertainty, e.g. how many hours the fisher spent selling fish each week, a mean value was entered in the cell and the range provided as a comment in the database. Also, if there was an explanatory comment on the questionnaire, it was often inserted in the database as a comment or listed in an adjacent column entitled comments. These comments were included for open ended questions as well as for other questions where fishers provided information relating to the question. In some cases, responses were summarized.

In addition to surveying fishers, we conducted semi-structured interviews with key informants to help contextualize our findings. Key informants included established fishers, fishery managers and port agents. Unless otherwise noted, the tabulated summary statistics are frequencies or sample means with their standard error in parentheses.

### **3. Results**

#### **Question 1. Name of commercial fisher and permit number**

This is confidential information and will not be reported in this document. Interviewees were advised that the data were being collected for pooled statistical purposes only. While the gender of the fisher was not recorded, it is inferred from the name and knowledge of the community.

Fishers in both districts were predominantly male. Of the surveyed women, only two women in each district were licensed fishers. These appear to be the only women based on the names of fishers not surveyed. Two were wives of formerly prominent fishers who contributed substantially to their husband's fishing business (one in each district). The other two were not currently fishing, one because



she had just received a license and the other because she was hanging on to her license to transfer to family members and/or sell.

## **Question 2. Estate and Island where the fisher lives and zip code**

Fishers in STT/STJ predominately lived on STT (Table 2a). STJ has a much smaller population than STT (3,989 vs 50,316 in 2014, respectively, USVI Bureau of Economic Research 2015), largely because it is dominated by the Virgin Islands National Park (VINP). The VINP comprises approximately half of the island. The Coral Reef National Monument and the waters of the VINP include most of the territorial waters surrounding the island.

STX island is over twice the size of either STT or STJ, but the population of STX (49,656 in 2014; USVI Bureau of Economic Research 2015) is similar to that of STT. Because of its larger size, STX has three zip codes that refer to various physical locations on the island. All three islands also have zip codes relating to various post offices on the islands. On STX these post office zip codes are variations of the island major city physical location zip codes, e.g. all Christiansted post office zip codes start with 0082\_. Only physical location zip codes are included in Table 2a. If a fisher on STX indicated a post office zip code, it was changed to a physical zip code.

Table 2.a. (Q. 2). Percentage of fishers living in each island by district and sub-region based on zip code.

| <b>Location of Zip Code</b> | <b>Zip Code</b> | <b>N<sup>1</sup></b> | <b>Percent of Fishers Living in Zip Code in Each District</b> |
|-----------------------------|-----------------|----------------------|---|
| St. Thomas                  | 00802           | 113                  | 95.0%   |
| St. John                    | 00830           | 6                    | 5.0%  |
| STT/STJ District            |                 | 119                  | 100.0%  |
|                             |                 |                      |   |
| Christiansted, STX          | 00820           | 47                   | 36.4%   |
| Frederiksted, STX           | 00840           | 43                   | 33.3%   |
| Kingshill, STX              | 00850           | 39                   | 30.2%   |
| STX District                |                 | 129                  | 100.0%  |

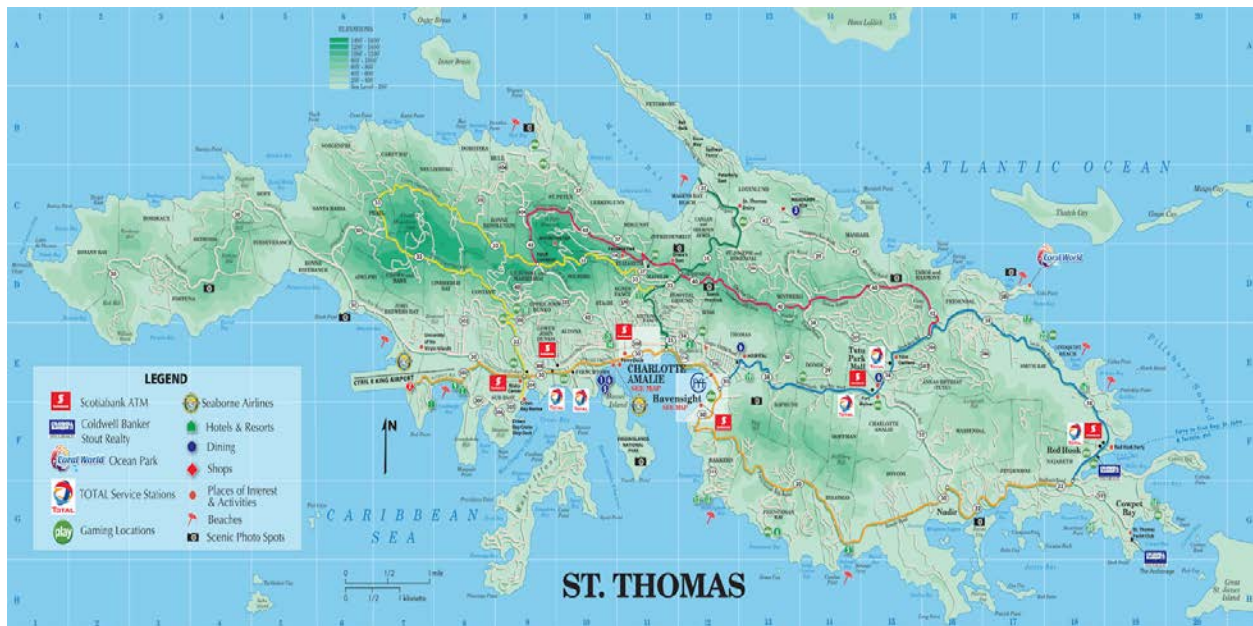
<sup>1</sup>Number of fishers.

Fishers in STT/STJ live in 37 different estates on the two islands (Tables 2b, Figs. 2, 3). However, there were two primary locations that fishers lived near: Frenchtown, including the Estates of Frenchtown, Altona, and Altona & Welgunst, and Hull Bay, including the estates of Hull Bay, Lerkenlund, and St. Peter.

Table 2.b. (Q. 2). Frequency distribution of STT/STJ fishers' residence by estate.

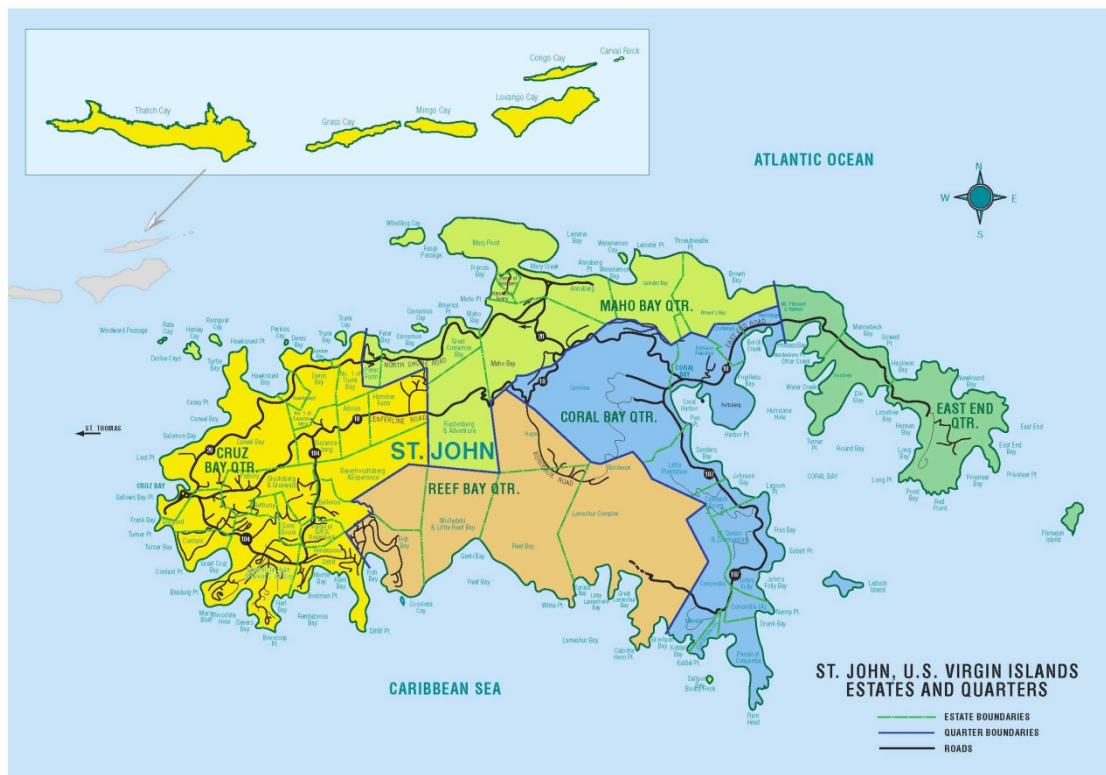
| Estate                 | N   | Percent |
|------------------------|-----|---------|
| Altona                 | 2   | 1.7%    |
| Altona & Welgunst      | 2   | 1.7%    |
| Anna's Fancy           | 1   | 0.8%    |
| Anna's Retreat         | 1   | 0.8%    |
| Bonne Resolution       | 2   | 1.7%    |
| Cabrita Point          | 1   | 0.8%    |
| Caret Bay              | 3   | 2.5%    |
| Charlotte Amalie       | 4   | 3.4%    |
| Coki Point             | 2   | 1.7%    |
| Contant                | 1   | 0.8%    |
| Coral Bay, STJ         | 3   | 2.5%    |
| Crown & Hawk           | 1   | 0.8%    |
| Dorothea               | 5   | 4.2%    |
| East End               | 1   | 0.8%    |
| Enighed, STJ           | 2   | 1.7%    |
| Estate Nazareth        | 1   | 0.8%    |
| Fortuna                | 2   | 1.7%    |
| Frenchtown             | 16  | 13.5%   |
| Frydendal              | 2   | 1.7%    |
| Frydenhoj              | 2   | 1.7%    |
| Hull Bay               | 8   | 6.7%    |
| Lerkenlund             | 11  | 9.2%    |
| Lindberg Bay           | 4   | 3.4%    |
| Linton Fancy           | 1   | 0.8%    |
| Lovenlund              | 1   | 0.8%    |
| Mandahl                | 2   | 1.7%    |
| Mariendahl             | 2   | 1.7%    |
| Misgunst               | 1   | 0.8%    |
| Moved to Alaska        | 1   | 0.8%    |
| Nadir                  | 1   | 0.8%    |
| Old Tutu               | 1   | 0.8%    |
| Red Hook               | 1   | 0.8%    |
| Rosendahl              | 2   | 1.7%    |
| Savan                  | 1   | 0.8%    |
| Smith Bay              | 5   | 4.2%    |
| St Peter               | 13  | 10.9%   |
| Thomas                 | 1   | 0.8%    |
| Tutu                   | 1   | 0.8%    |
| Unknown (1 STJ, 3 STT) | 4   | 3.4%    |
| West Caret             | 1   | 0.8%    |
| Wintberg               | 3   | 2.5%    |
| # fishers responding   | 119 | 100%    |

All estates are on STT unless indicated by STJ.



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Figure 2 (Q.2). Names and locations of estates on St. Thomas, U.S. Virgin Islands.



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Figure 3 (Q.2). Names and locations of estates on St. John, U.S. Virgin Islands.

Fishers on STX resided in 50 estates (Table 2c, Fig. 4). Two estates close to government boat facilities had the highest percentage of fishers, though fishers appeared to be scattered throughout the island. The two estates with the highest number of fishers were Clifton Hill, which is close to the Molasses Dock ramps and Frederiksted, which is close to the Frederiksted dock and ramp. The third major boat ramp/dock facility used by commercial fishers is in Gallows Bay. Some fishers utilize the beach at Gallows Bay to launch and store their boats and sell fish. Gallows Bay was a traditional fishing village, but as fishers began to trailer their boats, they moved throughout the island.

Table 2.c. (Q. 2). Frequency distribution of STX fishers' residence by estate.

| <b>Estate</b>       | <b>N</b> | <b>Percent</b> |
|---------------------|----------|----------------|
| Anna's Hope         | 2        | 1.5%           |
| Barron Spot         | 1        | 0.7%           |
| Belvedere           | 1        | 0.7%           |
| Bethlehem           | 1        | 0.7%           |
| Calquohoun          | 1        | 0.7%           |
| Cane Carlton        | 4        | 2.9%           |
| Castle Coakley      | 3        | 2.2%           |
| Christiansted       | 5        | 3.7%           |
| Clifton Hill        | 8        | 5.8%           |
| Concordia           | 1        | 0.7%           |
| Constitution Hill   | 1        | 0.7%           |
| Diamond             | 1        | 0.7%           |
| Fredensborg         | 3        | 2.2%           |
| Frederiksted        | 11       | 8.0%           |
| Gallows Bay         | 4        | 2.9%           |
| Glynn               | 5        | 3.7%           |
| Grove Place         | 2        | 1.5%           |
| Hannah's Rest       | 1        | 0.7%           |
| Humbug              | 1        | 0.7%           |
| Jealousy            | 1        | 0.7%           |
| Kingshill           | 3        | 2.2%           |
| La Grande Princesse | 4        | 2.9%           |
| La Grange           | 1        | 0.7%           |
| Little Princess     | 1        | 0.7%           |
| Mon Bijou           | 6        | 4.4%           |
| Mount Pleasant      | 3        | 2.2%           |
| Mount Washington    | 1        | 0.7%           |
| New Works           | 3        | 2.2%           |
| Peter's Rest        | 1        | 0.7%           |
| Princess            | 1        | 0.7%           |
| Profit              | 3        | 2.2%           |
| Profit Hill         | 1        | 0.7%           |
| Queens Quarters     | 2        | 1.5%           |
| Rattan              | 1        | 0.7%           |
| Richmond            | 5        | 3.7%           |

| Estate               | N   | Percent |
|----------------------|-----|---------|
| Sion Farm            | 3   | 2.2%    |
| Sion Hill            | 1   | 0.7%    |
| Smithfield           | 1   | 0.7%    |
| St. John             | 2   | 1.5%    |
| Stony Ground         | 1   | 0.7%    |
| Sunny Acres          | 2   | 1.5%    |
| Tamarind             | 2   | 1.5%    |
| Teague Bay           | 2   | 1.5%    |
| Two Williams         | 1   | 0.7%    |
| Upper Love           | 1   | 0.7%    |
| Water Gut            | 2   | 1.5%    |
| Whim                 | 12  | 8.8%    |
| White Lady           | 2   | 1.5%    |
| Williams Delight     | 8   | 5.8%    |
| Work & Rest          | 4   | 2.9%    |
| # fishers responding | 137 | 100%    |



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Figure 4 (Q.2). Names and locations of estates on St. Croix.

### Question 3. Age of fishers

Age statistics for “Average Fishers,” e.g. those fishers on the combined 2015-16 or 2016-17 lists that either provided their age or had been interviewed in 2010 and whose age could be estimated, and “Active Fishers,” e.g. those fishers on the same lists who indicated they were currently fishing, is provided in Table 3. Average Fishers include active plus inactive fishers. Active Fishers were slightly younger than Average Fishers in both districts (mean: STT/STJ – 2.7 yrs younger, STX – 1.3 yrs; median: STT/STJ – 2 yrs, STX - 1.5 yrs younger) (Table 3). The oldest Active Fisher was slightly younger than the oldest Average Fisher (STT/STJ – 7 yrs younger, STX – 4 yrs). In each district, the oldest fisher was an Average Fisher (STT/STJ - 86 and STX – 89). Several of the oldest fishers in the Average Fishers category were no longer active though they retained their licenses.

Table 3 (Q. 3). Age of fishers.

| Variables                   | STT/STJ                      |                                  | STX             |                     | USVI            |                     |
|-----------------------------|------------------------------|----------------------------------|-----------------|---------------------|-----------------|---------------------|
|                             | Average Fishers <sup>1</sup> | Active Fishers only <sup>2</sup> | Average Fishers | Active Fishers only | Average Fishers | Active Fishers only |
| Mean age (SD <sup>3</sup> ) | 55.0<br>(±14.7)              | 52.2<br>(±13.3)                  | 56.9 (±13.6)    | 55.3<br>(±13.6)     | 56.1<br>(±14.1) | 54.0<br>(±13.5)     |
| Median age                  | 57.5                         | 55.0                             | 57.5            | 56.0                | 57.5            | 55.5                |
| Modal age                   | 58                           | 58                               | 50              | 50                  | 60              | 58.0                |
| Range                       | 22 - 86                      | 22 - 79                          | 23 - 89         | 23 - 85             | 22 - 89         | 22 - 85             |
| # of fishers responding     | 98                           | 73                               | 120             | 97                  | 218             | 170                 |

<sup>1</sup>Average Fishers included all fishers interviewed, irrespective of whether they were currently active fishers. This included fishers who were on the Division of Fish and Wildlife's commercial fisher lists for 2015-16 and/or 2016-17 and interviewed. For the age data, it also included fishers who were not interviewed in 2016 but whose age was recorded in 2010 and thus their age could be calculated based on their age in 2010 plus 6 years.

<sup>2</sup>Fishers who said they were currently actively fishing.

<sup>3</sup>SD = Standard Deviation

The largest numbers and greatest percentage of Average Fishers in both districts were between the ages of 51 and 60 (Fig. 5 & 6). In both districts, approximately 65% of fishers were over 50 years old (STT/STJ – 64.3%, STX – 65.8%). Only about 5% of Average Fishers were 30 years or younger.

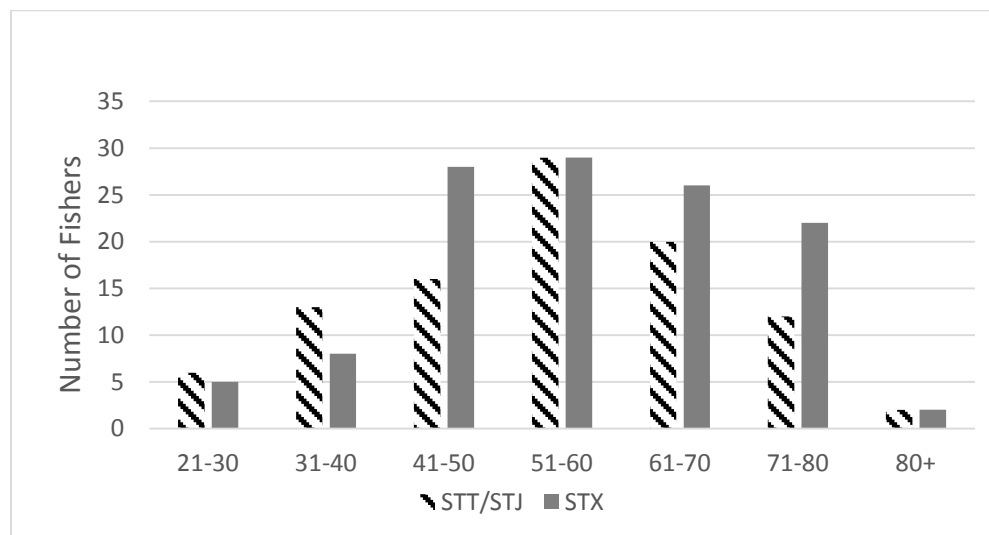


Figure 5 (Q.3). Age distribution of "Average Fishers".

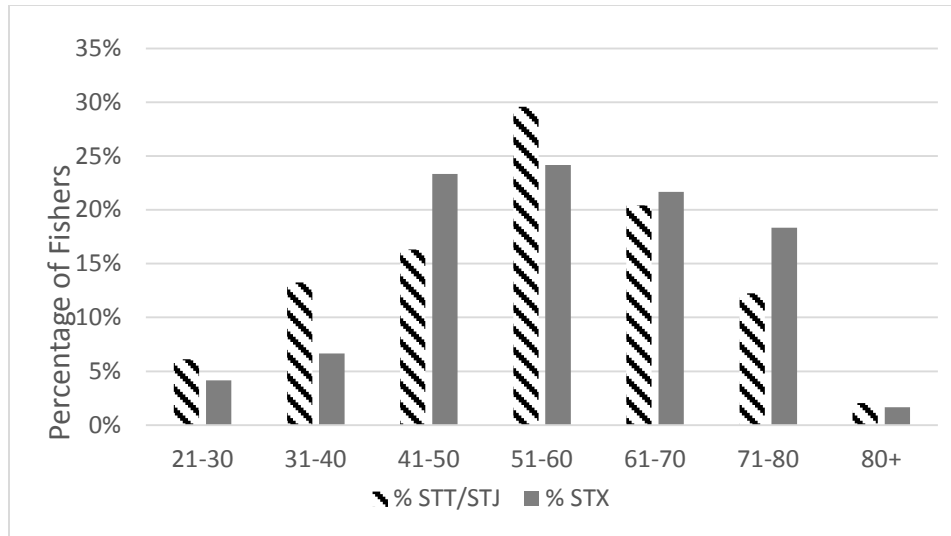


Figure 6 (Q.3). Percentage of "Average Fishers" in each age class in each district.

**Question 4: How many years have commercially fished? As Commercial Fisher \_\_\_\_\_ and Helper \_\_\_\_\_ = Total \_\_\_\_\_ Years.**

***Total fishing experience (licensed fisher + helper)***

On average, St. Thomian and St. Johnian fishers had more years of overall fishing experience than their Crucian counterparts (Table 4a). The median, mode and range of fishing experience were also higher on STT/STJ. This was true for Average Fishers as well as Active Fishers only. There was little difference in the results whether Average Fishers or only Active Fishers were included in the analysis.

Table 4.a. (Q. 4). Total number of years of fishing experience as licensed fisher and helper for "Average Fishers" and "Active Fishers only."

| Variables                                  | STT/STJ                      |                                  | STX                          |                                  | USVI                         |                                  |
|--|------------------------------|----------------------------------|------------------------------|----------------------------------|------------------------------|----------------------------------|
|  | Average Fishers <sup>1</sup> | Active fishers only <sup>2</sup> | Average Fishers <sup>1</sup> | Active fishers only <sup>2</sup> | Average Fishers <sup>1</sup> | Active fishers only <sup>2</sup> |
| Mean fishing experience (SD <sup>3</sup> ) | 30.8<br>(±14.2)              | 30.1<br>(±13.9)                  | 26.7<br>(±13.7)              | 27.1<br>(±13.6)                  | 28.4<br>(±14.0)              | 28.3<br>(±13.8)                  |
| Median fishing experience                  | 30.0                         | 30.0                             | 26.0                         | 27.0                             | 30                           | 30                               |
| Modal fishing experience                   | 40                           | 30                               | 30                           | 30                               | 30                           | 30                               |
| Range of fishing experience                | 1-70                         | 1-65                             | 0-63                         | 0-63                             | 0-70                         | 0-65                             |
| # of fishers responding <sup>2</sup>       | 88                           | 71                               | 115                          | 97                               | 203 <sup>4</sup>             | 168                              |

<sup>1</sup>Total fishing experience of fishers on the DFW 2015-16 and 2016-17 commercial fisher lists who were not interviewed in 2016 but had been interviewed in 2010, was calculated based on the fishing experience recorded in 2010 plus 6 years.

<sup>2</sup>Fishers who said they were currently actively fishing.

<sup>3</sup>SD = Standard Deviation

<sup>4</sup>Includes fishers who only provided total fishing experience. These fishers weren't included in Tables 4c and 4d.

More than half of Average Fishers in both districts fished as licensed fisher and helper for more than 25 years (Table 4b). Respondents in STT/STJ, on average, fished longer than respondents in STX (Tables 4a, b, Figs. 7a, b). In STT/STJ, 62.4% of respondents had fished for more than 25 years (Table 4b), while in STX, 55.6% of respondents had fished for this length of time. A higher percentage of respondents in STX fished for less than 16 years (20.9%) than STT/STJ (14.8%).

Table 4.b. (Q. 4). Frequency distribution of the total number of years of fishing experience (as licensed fisher + helper) of “Average Fishers”.

| Number of years         | STT/STJ   |              | STX       |              | USVI      |              |
|-------------------------|-----------|--------------|-----------|--------------|-----------|--------------|
|                         | N         | Percent      | N         | Percent      | N         | Percent      |
| 0                       | 0         | 0.0%         | 1         | 0.9%         | 1         | 0.5%         |
| >0-≤5                   | 2         | 2.3%         | 8         | 7.0%         | 10        | 4.9%         |
| 6-10                    | 7         | 8.0%         | 8         | 7.0%         | 15        | 7.4%         |
| 11-15                   | 4         | 4.5%         | 7         | 6.1%         | 11        | 5.4%         |
| 16-20                   | 9         | 10.2%        | <b>18</b> | <b>15.7%</b> | 27        | 13.3%        |
| 21-25                   | 11        | 12.5%        | 15        | 13.0%        | 26        | 12.8%        |
| 26-30                   | <b>15</b> | <b>17.0%</b> | 17        | 14.8%        | <b>32</b> | <b>15.8%</b> |
| 31-35                   | 9         | 10.2%        | 13        | 11.3%        | 22        | 10.8%        |
| 36-40                   | <b>15</b> | <b>17.0%</b> | 12        | 10.4%        | 27        | 13.3%        |
| 41-45                   | 6         | 6.8%         | 6         | 5.2%         | 12        | 5.9%         |
| 46-50                   | 2         | 2.3%         | 5         | 4.3%         | 7         | 3.4%         |
| >50                     | 8         | 9.1%         | 5         | 4.3%         | 13        | 6.4%         |
| # of fishers responding | 88        | 100.0%       | 115       | 100.0%       | 203       | 100.0%       |

Note: The most common response is in bold type.



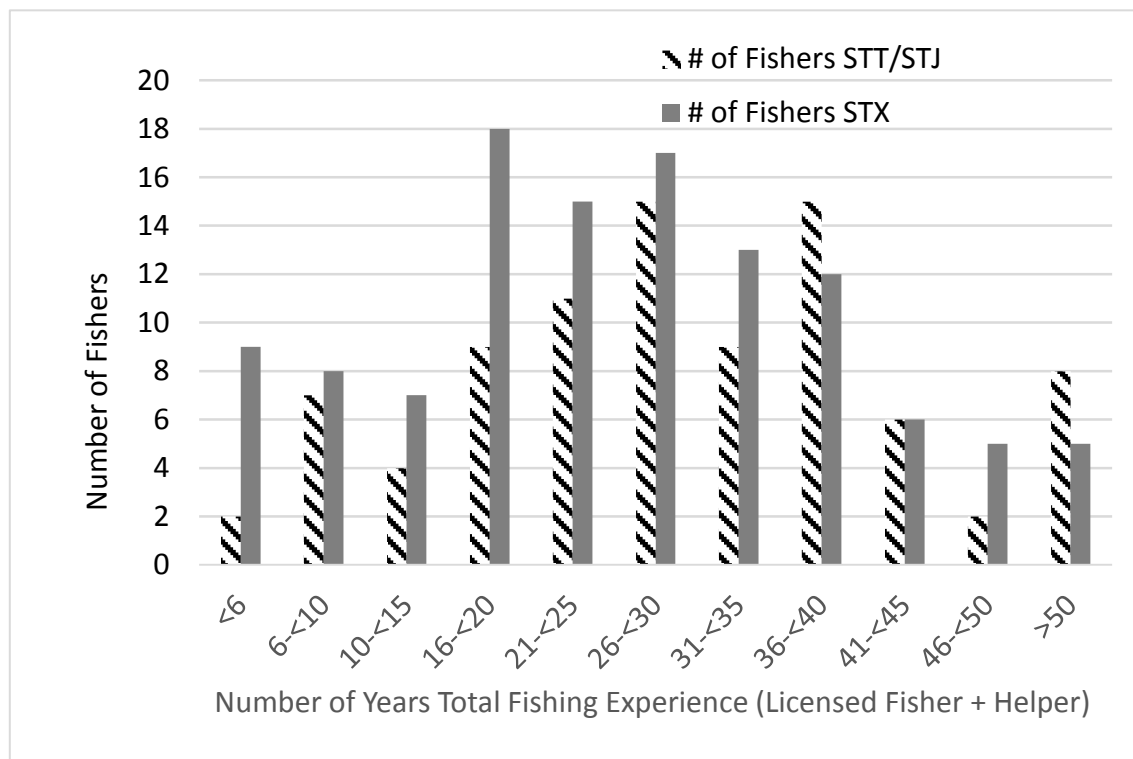
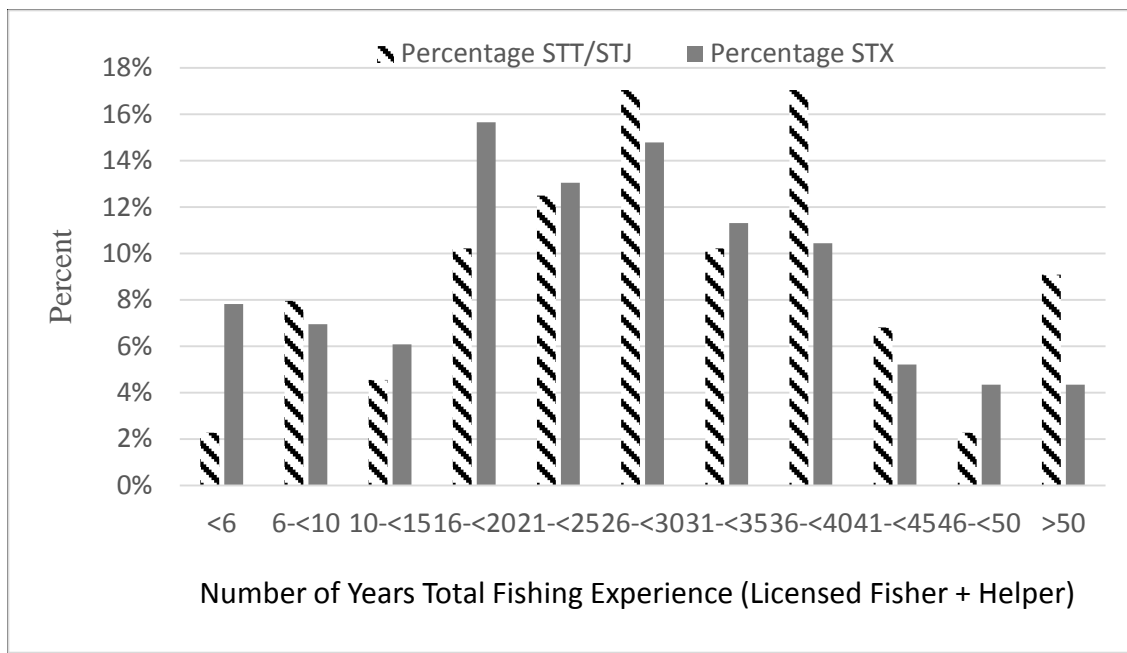


Figure 7 a and b (Q. 4). Total fishing experience as licensed fisher and helper for each district: a) percentage of fishers with years of fishing experience in each district and b) number of fishers in each district grouped by years of experience.

### ***Commercial Fishers***

The average number of years Average Fishers had fished as a licensed commercial fisher was 26.3 years in STT/STJ and 22.2 years in STX (Table 4c). Average Fishers on STT/STJ have an average of 4.1 more years of fishing experience than fishers on STX, while Active Fishers on STT/STJ had 3.1 more years of experience than fishers on STX. The more extensive fishing experience on STT/STJ is further supported by the median and modal fishing experience of STT/STJ fishers of 30 years compared with 20 years on STX.

Table 4.c. (Q. 4). Number of years fishing experience as licensed fisher.

| Variables                                 | STT/STJ                      |                                  | STX               |                     | USVI            |                     |
|---|------------------------------|----------------------------------|-------------------|---------------------|-----------------|---------------------|
|   | Average Fishers <sup>1</sup> | Active Fishers only <sup>2</sup> | Average Fishers   | Active Fishers only | Average Fishers | Active Fishers only |
| Mean fishing experience (SD) <sup>3</sup> | 26.3<br>(±14.6)              | 25.4<br>(±14.7)                  | 22.2<br>(±13.9)   | 22.3<br>(±14.0)     | 23.9 (±14.3)    | 23.5<br>(±14.4)     |
| Median fishing experience                 | 30                           | 26                               | 20                | 20                  | 24              | 24                  |
| Modal fishing experience                  | 30                           | 30                               | 20                | 20                  | 20              | 20                  |
| Range of fishing experience               | 1-61                         | 1 - 61                           | 0-63 <sup>4</sup> | 0 - 63              | 0-63            | 0-63                |
| # of fishers responding                   | 81                           | 67                               | 114               | 97                  | 195             | 164                 |

<sup>1</sup>Total fishing experience of fishers on the DFW 2015-16 and 2016-17 commercial fisher lists who were not interviewed in 2016 but had been interviewed in 2010, was calculated based on the fishing experience recorded in 2010 plus 6 years.

<sup>2</sup>Fishers who said they were currently actively fishing.

<sup>3</sup>SD = Standard Deviation

<sup>4</sup>On STX, a couple fishers had only recently received their licenses and had not started commercial fishing yet.

A higher percentage of fishers on STT/STJ had >25 years of fishing experience than fishers on STX (STT/STJ – 53.1%, STX – 37.7%) (Table 4d). Only 8.6% of fishers on STT/STJ had five years or less of licensed fishing experience compared to 14.9% on STX (Table 4d). The low percentage of potentially new entrants ( $\leq 5$  yrs) to the fishery (Table 4e) was in part because of a moratorium on issuance of new licenses that has been in effect since 24 August 2001, though clearly STX had more new entrants (7 fishers on STT/STJ vs. 17 fishers on STX; Table 4d). Fishers are allowed to transfer licenses but no or few new licenses have been issued since 2001.

Table 4.d. (Q. 4). Frequency distribution of the number of years of fishing experience (as licensed fisher only) of “Average Fishers.”

| Number of years         | STT/STJ   |              | STX       |              | USVI      |              |
|-------------------------|-----------|--------------|-----------|--------------|-----------|--------------|
|                         | N         | Percent      | N         | Percent      | N         | Percent      |
| 0                       | 0         | 0.0%         | 1         | 0.9%         | 1         | 0.5%         |
| +0-≤5                   | 7         | 8.6%         | 16        | 14.0%        | 23        | 11.8%        |
| 6-10                    | 11        | 13.6%        | 12        | 10.5%        | 23        | 11.8%        |
| 11-15                   | 2         | 2.5%         | 9         | 7.9%         | 11        | 5.6%         |
| 16-20                   | 13        | 16.0%        | <b>23</b> | <b>20.2%</b> | <b>36</b> | <b>18.5%</b> |
| 21-25                   | 5         | 6.2%         | 10        | 8.8%         | 15        | 7.7%         |
| 26-30                   | <b>14</b> | <b>17.3%</b> | 16        | 14.0%        | 30        | 15.4%        |
| 31-35                   | 8         | 9.9%         | 10        | 8.8%         | 18        | 9.2%         |
| 36-40                   | <b>14</b> | <b>17.3%</b> | 9         | 7.9%         | 23        | 11.8%        |
| 41-45                   | 1         | 1.2%         | 1         | 0.9%         | 2         | 1.0%         |
| 46-50                   | 1         | 1.2%         | 4         | 3.5%         | 5         | 2.6%         |
| >50                     | 5         | 6.2%         | 3         | 2.6%         | 8         | 4.1%         |
| # of fishers responding | 81        | 100.0%       | 114       | 100.0%       | 195       | 100.0%       |

Note: The most common response is in bold type.

### Helpers

About half (STT/STJ – 53%, STX – 49%) of fishers were not helpers prior to obtaining their commercial fishing license (Table 4e). The average number of years a fisher was a helper prior to obtaining his commercial fishing license was only 5.4 years in the USVI (Table 4f) with 72.9.1% of fishers either never working as helpers or working as helpers less than 6 years (Table 4e). The standard deviation was greater than the mean (Table 4f) indicating a large variation among fishers in the number of years spent as a helper.

Table 4.e. (Q. 4). Frequency distribution of the total number of years of “Helper” experience for all fishers interviewed who responded to this question.

| No. years               | STT/STJ   |              | STX       |              | USVI      |              |
|-------------------------|-----------|--------------|-----------|--------------|-----------|--------------|
|                         | N         | Percent      | N         | Percent      | N         | Percent      |
| <b>0</b>                | <b>43</b> | <b>53.1%</b> | <b>56</b> | <b>49.1%</b> | <b>99</b> | <b>50.8%</b> |
| >0-5                    | 17        | 21.0%        | 26        | 22.8%        | 43        | 22.1%        |
| 6-10                    | 14        | 17.3%        | 19        | 16.7%        | 33        | 16.9%        |
| 11-15                   | 4         | 4.9%         | 2         | 1.8%         | 6         | 3.1%         |
| 16-20                   | 2         | 2.5%         | 8         | 7.0%         | 10        | 5.1%         |
| 21-25                   | 0         | 0.0%         | 0         | 0.0%         | 0         | 0.0%         |
| 26-30                   | 1         | 1.2%         | 3         | 2.6%         | 4         | 2.1%         |
| 31-35                   | 0         | 0.0%         | 0         | 0.0%         | 0         | 0.0%         |
| # of fishers responding | 81        | 100.0%       | 114       | 100.0%       | 195       | 100.0%       |

Note: The most common response is in bold type.

Table 4.f. (Q. 4). Number of years “Average Fishers” and “Active Fishers” fished as a helper prior to obtaining a fishing license.

| Variables   | STT/STJ                      |                                  | STX             |                     | USVI            |                     |
|---|------------------------------|----------------------------------|-----------------|---------------------|-----------------|---------------------|
|   | Average Fishers <sup>1</sup> | Active Fishers only <sup>2</sup> | Average Fishers | Active Fishers only | Average Fishers | Active Fishers only |
| Mean helper fishing experience (SD <sup>3</sup> ) | 8.4<br>(±5.8)                | 8.7<br>(±6.0)                    | 4.4<br>(±6.9)   | 4.8<br>(±7.3)       | 5.4<br>(±6.8)   | 5.8<br>(±7.2)       |
| Median helper fishing experience                  | 7.5                          | 8.5                              | 1               | 1                   | 3               | 4                   |
| Modal helper fishing experience                   | 10                           | 10                               | 0               | 0                   | 0               | 0                   |
| Range of helper fishing experience                | 1-30                         | 1-30                             | 0-30            | 0-30                | 0-30            | 0-30                |
| # of fishers responding                           | 38                           | 34                               | 114             | 97                  | 152             | 131                 |

**Question 5: Fishing frequency: Fish year-round      Seasonal (month): \_\_\_\_\_**

**Species \_\_\_\_\_**

About 93% of fishers fish year-round (Table 5). The few fishers who reported fishing seasonally in each district were:

*St. Thomas/St. John – seasonal fishers*

- Six months of year for “potfish”, yellowtail, hardnose (1 fisher)
- Oct – Nov – pelagic fish - dolphinfish, kingfish, tuna, wahoo (1 fisher)
- No months provided (7 fishers). Four of the seven fishers provided information on species that they seasonally fish:
  - hard nose (blue runner), yellowtail snapper
  - yellowtail snapper, hard nose, red hind, ole wife (queen trigger fish), lobster (fisher had not fished for 3 yrs)
  - mahi, wahoo, snapper
  - “potfish” & gar

One fisher in STT/STJ who said he fished year-round indicated that he also seasonally fished for blue runner and yellowtail in August.

*St. Croix – seasonal fishers*

- Conch fisher only – the season for queen conch extends from November 1 to May 31<sup>st</sup> annually (1 fisher)
- Pelagic fishers who fished from November to May annually for dolphinfish and other migratory pelagic fish (2 fishers)
- Fished only in summers because he worked rest of year (1 fisher)

A couple STX fishers reported fishing year-round for most species but seasonally for snapper or dolphinfish. They were considered year-round fishers.

Table 5 (Q. 5). Annual fishing frequency by fishers.

| Fishing Frequency       | STT/STJ   |              | STX        |              | USVI       |              |
|-------------------------|-----------|--------------|------------|--------------|------------|--------------|
|                         | N         | Percent      | N          | Percent      | N          | Percent      |
| Year-round              | <b>76</b> | <b>89.4%</b> | <b>105</b> | <b>96.3%</b> | <b>181</b> | <b>93.3%</b> |
| Seasonal                | 9         | 10.6%        | 4          | 3.7%         | 13         | 6.7%         |
| # of fishers responding | 85        | 100.0%       | 109        | 100.0%       | 194        | 100.0%       |

Note: The most common response is in bold type.

**Question 6: Race: White    Black/African American    Mixed    Other**

There were major differences in racial self-identification between districts. On STT/STJ 57.9% of fishers identified as white while only 7.8% did so on STX (Table 6). On STX more fishers identified as black (40.9%) while only 26.2% did so on STT/STJ. Mixed race and other (Hispanic, Latin) comprised the racial composition of 51.3% of fishers on STX, but only 15.9% on STT/STJ. A Hispanic or Latin person can be of any race. On STX, many fishers responded the same to race and ethnicity declaring that they were Hispanic when asked their ethnicity and Hispanic or Latin when asked their race.

Table 6 (Q. 6). Racial composition of fishers.

| Race                 | STT/STJ   |              | STX             |              | USVI      |              |
|----------------------|-----------|--------------|-----------------|--------------|-----------|--------------|
|                      | N         | Percent      | N               | Percent      | N         | Percent      |
| Black                | 28        | 26.2%        | <b>47</b>       | <b>40.9%</b> | <b>75</b> | <b>33.7%</b> |
| Mixed                | 15        | 14.0%        | 30              | 26.1%        | 45        | 20.3%        |
| White                | <b>62</b> | <b>57.9%</b> | 9               | 7.8%         | 71        | 32.0%        |
| Other                | 2         | 1.9%         | 29 <sup>1</sup> | 25.2%        | 31        | 14.0%        |
| # fishers responding | 107       | 100.0%       | 115             | 100.0%       | 222       | 100.0%       |

<sup>1</sup> Respondents who stated that they were Hispanic or Latin when asked their race.

Note: The most common response is in bold type.

**Question 7: Ethnicity/descent: Hispanic (origin) \_\_\_\_\_ French descent**

**West Indian (origin) \_\_\_\_\_ Other \_\_\_\_\_**

The ethnic background in STT/STJ differs substantially from STX (Tables 7a). The majority of fishers on STT/STJ self-identified as French with none identifying as only of Hispanic descent. On STX fishermen self-identified as primarily Hispanic (Table 7a) and none self-identified as only of French descent. The next largest ethnic group, West Indian, comprised 28.8% of the fishers on STT/STJ and 35.3% of the fishers on STX and were overall the most common ethnicity of fishers in the USVI. A small percentage on both islands said they were of at least two ethnicities.

Table 7.a. (Q. 7). Ethnic background self-identified by fishers.

| Ethnic Group                            | STT/STJ   |              | STX       |              | USVI      |              |
|---|-----------|--------------|-----------|--------------|-----------|--------------|
|   | N         | Percent      | N         | Percent      | N         | Percent      |
| Continental                             | 5         | 4.8%         | 6         | 5.1%         | 11        | 4.9%         |
| Crucian                                 | 0         | 0.0%         | 1         | 0.8%         | 1         | 0.4%         |
| French descent                          | <b>63</b> | <b>60.6%</b> | 0         | 0.0%         | 63        | 28.3%        |
| French West Indian                      | 3         | 2.9%         | 1         | 0.8%         | 4         | 1.8%         |
| French Hispanic                         | 1         | 1.0%         | 0         | 0.0%         | 1         | 0.4%         |
| Hispanic                                | 0         | 0.0%         | <b>69</b> | <b>58.0%</b> | 69        | 30.9%        |
| Mixed ethnicity (2 or more ethnicities) | 2         | 1.9%         | 0         | 0.0%         | 2         | 0.9%         |
| West Indian                             | 30        | 28.8%        | 42        | 35.3%        | <b>72</b> | <b>32.3%</b> |
| # fishers responding                    | 104       | 100.0%       | 119       | 100%         | 223       | 100.0%       |

Note: The most common response is in bold type.

Respondents on STT/STJ were predominately of French descent while respondents on STX were predominately Crucian (Table 7b). Almost all fishers who responded French descent were part of a migration of French fishermen and farmers from St. Bartholomew and France in the latter half of the 1800's. Since "origin" was not included for those who said they were of French descent, they could have responded, St. Bartholomew, France or more likely St. Thomian or US Virgin Islander if asked their origin.

Respondents often were unsure how to answer the question regarding origin. Some said where they were born such as St. Thomas, Virgin Islands, Puerto Rico and others gave their family's country of origin, e.g. Irish, Danish, Anguilla, etc. This question needed to be more specific. Either fishers could have been asked: "What was your island/country of birth?" or "What was the island/country of your parent's birth?" Alternatively, specific answers could have been listed such as: European (which country? \_\_\_\_\_), Native American, Puerto Rican, US Virgin Islands, British Virgin Islands, Other Caribbean Island (which island? \_\_\_\_\_), Central American (which country? \_\_\_\_\_), etc.

Table 7.b. (Q. 7). Origin of USVI fishers.

| Origin                      | STT/STJ   |              | STX       |              | USVI      |              |
|-----------------------------|-----------|--------------|-----------|--------------|-----------|--------------|
|                             | N         | Percent      | N         | Percent      | N         | Percent      |
| Anguilla                    | 2         | 2.5%         | 1         | 0.9%         | 3         | 1.6%         |
| Antigua                     | 0         | 0.0%         | 1         | 0.9%         | 1         | 0.5%         |
| British                     | 1         | 1.2%         | 2         | 1.8%         | 3         | 1.6%         |
| BVI                         | 3         | 3.7%         | 0         | 0.0%         | 3         | 1.6%         |
| Central America             | 1         | 1.2%         | 0         | 0.0%         | 1         | 0.5%         |
| Continental                 | 1         | 1.2%         | 5         | 4.5%         | 6         | 3.1%         |
| Crucian                     | 1         | 1.2%         | <b>51</b> | <b>45.5%</b> | 52        | 26.9%        |
| Danish                      | 0         | 0.0%         | <b>1</b>  | 0.9%         | 1         | 0.5%         |
| Dominica                    | 1         | 1.2%         | 3         | 2.7%         | 4         | 2.1%         |
| Dominican Republic          | 0         | 0.0%         | 7         | 6.3%         | 7         | 3.6%         |
| France <sup>1</sup>         | <b>60</b> | <b>74.1%</b> | 0         | 0.0%         | <b>60</b> | <b>31.1%</b> |
| Granada                     | 1         | 1.2%         | 0         | 0.0%         | 1         | 0.5%         |
| Montserrat                  | 0         | 0.0%         | 1         | 0.9%         | 1         | 0.5%         |
| Puerto Rico                 | 0         | 0.0%         | 28        | 25.0%        | 28        | 14.5%        |
| St. Kitts Nevis             | 0         | 0.0%         | 7         | 6.3%         | 7         | 3.6%         |
| St. Lucia                   | 0         | 0.0%         | 4         | 3.6%         | 4         | 2.1%         |
| St. Thomas                  | 6         | 7.4%         | 0         | 0.0%         | 6         | 3.1%         |
| St. Vincent                 | 0         | 0.0%         | 1         | 0.9%         | 1         | 0.5%         |
| Trinidad                    | 1         | 1.2%         | 0         | 0.0%         | 1         | 0.5%         |
| Virgin Islands <sup>2</sup> | 3         | 3.7%         | 0         | 0.0%         | 3         | 1.6%         |
| # fishers responding        | 81        | 100.0%       | 112       | 100%         | 193       | 100.0%       |

<sup>1</sup>These were fishers who said they were of French descent.

<sup>2</sup>These were fishers of French descent that stated their origin was the Virgin Islands.

Note: The most common response is in bold type.

### Question 8: Household size (including fisher)

Fishers in both districts had similar household sizes averaging 2.6 persons (Table 8a). Over three quarters of fishers on each island had a household size of between one and three persons, with the highest percentage of households having two persons (Table 8b). Small household size was a corollary of an older fisher population. Fishers, who spoke further about their household, often said they lived alone or only lived with their wife; their children had grown and left home.

Table 8.a. (Q. 8). Statistics regarding the size of fishers' households, including the fisher.

|  | STT/STJ           | STX               | USVI              |
|--|-------------------|-------------------|-------------------|
| Mean household size (SD <sup>1</sup> ) | 2.5 ( $\pm 1.2$ ) | 2.7 ( $\pm 1.4$ ) | 2.6 ( $\pm 1.3$ ) |
| Median household size                  | 2                 | 2                 | 2                 |
| Modal household size                   | 2                 | 2                 | 2                 |
| Range of household size                | 1 - 7             | 1 - 7             | 1 - 7             |
| # of fishers responding                | 86                | 113               | 199               |

<sup>1</sup>SD = Standard Deviation

Table 8.b. (Q. 8). Breakdown of the size of fishers' households, including the fisher.

| Household size       | STT/STJ   |              | STX       |              | USVI      |              |
|----------------------|-----------|--------------|-----------|--------------|-----------|--------------|
|                      | N         | Percent      | N         | Percent      | N         | Percent      |
| 1                    | 13        | 15.1%        | 19        | 16.8%        | 32        | 16.1%        |
| 1.5                  | 0         | 0.0%         | 1         | 0.9%         | 1         | 0.5%         |
| 2                    | <b>38</b> | <b>44.2%</b> | <b>43</b> | <b>38.1%</b> | <b>81</b> | <b>40.7%</b> |
| 3                    | 20        | 23.3%        | 24        | 21.2%        | 44        | 22.1%        |
| 4                    | 11        | 12.8%        | 14        | 12.4%        | 25        | 12.6%        |
| 5                    | 2         | 2.3%         | 8         | 7.1%         | 10        | 5.0%         |
| 6                    | 1         | 1.2%         | 2         | 1.8%         | 3         | 1.5%         |
| 7                    | 1         | 1.2%         | 2         | 1.8%         | 3         | 1.5%         |
| # fishers responding | 86        | 100%         | 113       | 100%         | 199       | 100.0%       |

Note: The most common response is in bold type.

### Question 9. Level of education completed.

Fishers were assigned to one of nine categories based on their level of education (Table 9). A higher proportion of fishers in STT/STJ (63.1%) were at least high school graduates compared with fishers in STX (46.4%). The percentage of fishers that did not complete high school was 53.7% on STX compared to 36.7% on STT/STJ. Less than 2% of the fishers had no formal education.

Table 9 (Q.9). Education level of fishers.

| Education Level      | STT/STJ   |              | STX       |              | USVI      |              |
|----------------------|-----------|--------------|-----------|--------------|-----------|--------------|
|                      | N         | Percent      | N         | Percent      | N         | Percent      |
| None                 | 1         | 1.1%         | 2         | 1.8%         | 3         | 1.5%         |
| Elementary school    | 11        | 12.6%        | 20        | 17.9%        | 31        | 15.6%        |
| Junior high school   | 6         | 6.9%         | 27        | 24.1%        | 33        | 16.6%        |
| Some high school     | 14        | 16.1%        | 11        | 9.9%         | 25        | 12.6%        |
| High school diploma  | <b>34</b> | <b>39.1%</b> | <b>36</b> | <b>32.1%</b> | <b>70</b> | <b>35.2%</b> |
| Some college         | 5         | 5.7%         | 1         | 0.9%         | 6         | 3.0%         |
| College degree       | 9         | 10.3%        | 4         | 3.6%         | 13        | 6.5%         |
| Post graduate degree | 7         | 8.0%         | 8         | 7.1%         | 15        | 7.5%         |
| Trade School         | 0         | 0.0%         | 3         | 2.7%         | 3         | 1.5%         |
| # fishers responding | 87        | 100.0%       | 112       | 100.0%       | 199       | 100.0%       |

Note: The most common response is in bold type.

### Question 10. Type of fishing based on gear in rank order.

Fishers were asked what type of commercial fishing they carried out in general terms, *i.e.* trap fishing (fish and lobster traps), line fishing, net fishing, diving (fishers were also asked if they used scuba and or snorkeled/free dived), charter fishing, or subsistence (food only). To catch and sell fish or use certain fishing gear, *i.e.* traps or nets, you must have a commercial fishing license. As a result, charter fishers



who sell excess catch are required to have commercial fishing licenses as must fishers who do not sell fish, but deploy a couple of traps to catch fish for personal consumption.

Most fishers engage in more than one type of fishing (Table 10a), though they may be primarily dependent on one type of fishing, especially if they are trap fishers (Agar et al., 2008). More fishers on STT/STJ engaged in two or more types of fishing (80.8%) than STX (70%; Table 10a).

Table 10.a. (Q. 10). The number and percentage of fishers who engaged in one or more types of fishing.

| Number of different methods of fishing | STT/STJ        |              | STX       |              | USVI      |              |
|--|----------------|--------------|-----------|--------------|-----------|--------------|
|  | N <sup>1</sup> | Percent      | N         | Percent      | N         | Percent      |
| 1                                      | 19             | 19.2%        | 33        | 30.0%        | 52        | 24.9%        |
| 2                                      | <b>36</b>      | <b>36.4%</b> | <b>40</b> | <b>36.4%</b> | <b>76</b> | <b>36.4%</b> |
| 3                                      | 26             | 26.3%        | 24        | 21.8%        | 50        | 23.9%        |
| 4                                      | 10             | 10.1%        | 9         | 8.2%         | 19        | 9.1%         |
| 5                                      | 7              | 7.1%         | 3         | 2.7%         | 10        | 4.8%         |
| 6                                      | 1              | 1.0%         | 1         | 0.9%         | 2         | 1.0%         |
| # fishers responding                   | 99             | 100.0%       | 110       | 100.0%       | 209       | 100.0%       |

<sup>1</sup>Number of fishers responding in the affirmative in each category.

Note: The most common response is in bold type.

While line fishing was the most common fishing technique carried out in both STT/STJ and STX districts (77.8% and 91.8%, respectively; Table 10b), many fishers line fished in conjunction with other methods, which may actually be more important in terms of size of catch and financial remuneration. Line fishing includes fishing with hand lines, rods and reels, tuna buoys, deep-water snapper fishing, surface and bottom long lines, etc.

Trap fishing was the second most common type of fishing in STT/STJ but ranked third on STX. Almost half (43.4%) STT/STJ fishers interviewed said they fished with traps while less than a third (31.8%) of STX fishers said they fished using traps (Table 10b).

Diving was a much more important fishing method on STX than STT/STJ, especially scuba diving (Table 10b). Sixty-nine STX fishers (62.7%) used skin and/or scuba diving to fish. Eleven (10.0%) only free dived, 49 (44.5%) only scuba dived and nine (8.2%) did both. In contrast, only 32 (32.3%) of fishers on STT/STJ dived to fish. Twenty (20.2%) of divers free dived only, five (5.1%) scuba dived only and seven (7.1%) did both.

A higher percentage of fishers used net gear on STT/STJ (26.3%) than on STX (14.6%). Fishers on STT/STJ traditionally use seine nets to capture schools of yellowtail snapper and jacks. Gill net fishing on STX was fairly common until the ban on gill and trammel nets in 2006 in the EEZ and 2008 in

territorial waters (gill nets are still permitted for specific types of fish such as ballyhoo, gar, and flying fish). Only on STX do fishers use umbrella nets. They use them primarily to catch scads (*Decapturus punctatus*). While only a few fishers were charter boat fishers, there was a higher proportion of charter fishers on STT/STJ (9.1%) compared with STX (3.6%). Only six fishers said that they predominately fished for food (subsistence fished), with a higher proportion on STT/STJ (5.1%) than STX (0.9%).

Table 10.b. (Q. 10). Number and percentage of fishers carrying out each type of fishing.

| Type of fisher                    | STT/STJ        |              | STX        |              | USVI       |              |
|-----------------------------------|----------------|--------------|------------|--------------|------------|--------------|
|                                   | N <sup>1</sup> | Percent      | N          | Percent      | N          | Percent      |
| Line fisher                       | <b>77</b>      | <b>77.8%</b> | <b>101</b> | <b>91.8%</b> | <b>178</b> | <b>85.2%</b> |
| Trap fisher                       | 43             | 43.4%        | 35         | 31.8%        | 78         | 37.3%        |
| Scuba dive fisher only            | 5              | 5.1%         | 49         | 44.5%        | 54         | 25.8%        |
| Free dive fisher only             | 20             | 20.2%        | 11         | 10.0%        | 31         | 14.8%        |
| Skin and scuba fisher             | 7              | 7.1%         | 9          | 8.2%         | 16         | 7.7%         |
| Net fisher                        | 26             | 26.3%        | 16         | 14.6%        | 42         | 20.1%        |
| Charter boat operator             | 9              | 9.1%         | 4          | 3.6%         | 13         | 6.2%         |
| Subsistence fisher                | 5              | 5.1%         | 1          | 0.9%         | 6          | 2.9%         |
| # fishers responding <sup>2</sup> | 99             |              | 110        |              | 209        |              |

<sup>1</sup>Number of fishers responding in the affirmative in each category, irrespective of ranking.

<sup>2</sup>Individual fishers often stated that they carried out several types of fishing.

Note: The most common response is in bold type.

Fishers were asked to rank the type of fishing that they did in order of financial importance - which type of fishing generated the most revenue. Not all fishers felt they could do this, in part because several types of fishing were equally important. When a fisher carried out several types of fishing but could not provide ranks, each type was given a rank of one. The ranking fishers provided for each type of fishing that they conducted is shown in Tables 10c-e.

Overall line fishing, covering a wide variety of line based gear, was the most important revenue generating gear used by fishers in the USVI (Table 10c). Trap and scuba dive fishing were similar in their revenue generating importance in the territory, as were net fishing and free diving. Charter and subsistence fishing were the least important for territorial commercial fishers. However, there were major differences in the importance of gears for revenue generation between districts (Tables 10 d, e).

Table 10.c. (Q. 10). Rank order of fishing method based on importance to USVI fishers for generating revenue.

| Gear Type            | Revenue Ranking (count) |    |    |   |           | N <sup>1</sup> |
|----------------------|-------------------------|----|----|---|-----------|----------------|
|                      | 1 (most)                | 2  | 3  | 4 | 5 (least) |                |
| Line                 | 102                     | 59 | 35 | 1 | 0         | 197            |
| Trap                 | 50                      | 18 | 8  | 1 | 1         | 78             |
| Scuba diving         | 33                      | 29 | 8  | 3 | 0         | 73             |
| Free diving          | 10                      | 19 | 10 | 4 | 0         | 43             |
| Net fishing          | 14                      | 10 | 12 | 6 | 0         | 42             |
| Charter              | 5                       | 6  | 1  | 1 | 0         | 13             |
| Subsistence          | 3                       | 1  | 1  | 0 | 1         | 6              |
| # fishers responding |                         |    |    |   |           | 209            |

<sup>1</sup>Number of fishers responding

Line and trap fishing were reported to be the gears that yielded the most revenue on STT/STJ (Table 10d). Forty-five percent of fishers ranked line fishing as number one for revenue generation, while 33% ranked traps number one. In contrast, STX fishers ranked line fishing and scuba diving as the gears that generated the most revenue (Table 10e). Fifty-two percent of Crucian fishers' ranked line fishing number one and 29% ranked scuba diving as number one.

Net fishing was the third and fifth most important method of fishing on STT/STJ and STX, respectively (Table 10d, e). While scuba diving ranked second on STX, it only ranked fifth on STT/STJ where free diving had a higher rank than scuba. The difference in the importance of scuba and free diving in each district is at least in part a function of the importance of queen conch in the commercial fishery. STX fishers commonly target and sell queen conch, while STT/STJ fishers primarily gather queen conch for personal use and often free dive for it.

Subsistence fishing is by definition, non-revenue generating. However, it may contribute significantly to a family's food supply and thus household non-monetary income. Only five fishers indicated that they subsistence fished (Tables 10d, e). Three fishers ranked subsistence fishing as the most important type of fishing that they did, one ranked it as the second, and one as the third.

Table 10.d. (Q. 10). Rank order of fishing type based on importance to STT/STJ fishers for generating revenue.

| Gear Type            | Revenue Ranking (count) |    |    |   |           | N <sup>1</sup> |
|----------------------|-------------------------|----|----|---|-----------|----------------|
|                      | 1 (most)                | 2  | 3  | 4 | 5 (least) |                |
| Line                 | 45                      | 23 | 28 | 1 | 0         | 77             |
| Trap                 | 33                      | 9  | 1  | 0 | 0         | 43             |
| Net fishing          | 7                       | 8  | 9  | 2 | 0         | 26             |
| Free diving          | 1                       | 7  | 8  | 2 | 0         | 18             |
| Scuba diving         | 1                       | 4  | 7  | 1 | 0         | 13             |
| Charter              | 4                       | 3  | 1  | 1 | 0         | 9              |
| Subsistence          | 2                       | 1  | 1  | 0 | 1         | 5              |
| # fishers responding |                         |    |    |   |           | 99             |

<sup>1</sup>Number of fishers responding

Table 10.e. (Q. 10). Rank order of fishing type based on importance to STX fishers for generating revenue.

| Gear Type            | Revenue Ranking (count) |    |    |   |           | N <sup>1</sup> |
|----------------------|-------------------------|----|----|---|-----------|----------------|
|                      | 1 (most)                | 2  | 3  | 4 | 5 (least) |                |
| Line                 | 57                      | 31 | 12 | 1 | 0         | 101            |
| Scuba diving         | 32                      | 25 | 1  | 2 | 0         | 60             |
| Trap                 | 17                      | 9  | 7  | 1 | 1         | 35             |
| Free diving          | 9                       | 12 | 2  | 2 | 0         | 25             |
| Net fishing          | 7                       | 2  | 3  | 4 | 0         | 16             |
| Charter              | 1                       | 3  | 0  | 0 | 0         | 4              |
| Subsistence          | 1                       | 0  | 0  | 0 | 0         | 1              |
| # fishers responding |                         |    |    |   |           | 110            |

<sup>1</sup>Number of fishers responding

### Question 11: What species do you commercially fish for? Rank based on revenue generated.

Fishers were asked to state the categories of fish that they commercially fished for, e.g. reef fish, coastal pelagic, conch, etc., and to rank each category in order of financial importance, *i.e.* what kind of fish made them the most money based on quantity of fish caught in each category and price for which they could sell the fish. See Appendix I – the survey form – for the specific categories of fish listed in the question.

#### *Number of different categories of fish targeted by fishers*

Fisheries in USVI are multi-species in nature. A wide variety of fish categories are targeted (Table 11a). Most categories listed in Table 11a comprise a myriad of species, thus, irrespective of whether a fisher targets one category or more, most harvest many species. Reef fish were targeted by most (>80%) of fishers in the USVI. This category includes a wide variety of species in a variety of families including the grouper, snapper, triggerfish, grunt, parrotfish, wrasse, surgeonfish, squirrelfish, etc. families.

Over 50% of fishers targeted the high value spiny lobster (Table 11a). This category is largely comprised of *Panulirus argus* though a few spotted lobsters (*P. guttatus*) and shovelnose or slipper lobsters (Scyllaridae) may be caught and sold (Kojis pers. obs.).

Dolphinfish (mahi mahi) and wahoo were harvested by about a quarter of fishers on STT/STJ and more than 50% of fishers on STX. This category includes three species, two species of dolphinfish (*Coryphaena hippurus*, the common dolphinfish and *C. equiselius*, the Pompano dolphinfish) and one species of wahoo, *Acanthocybium solandri* (Table 11a).

Coastal pelagic fish (jacks and several mackerel species) were an important fishery category in both districts, but were more commonly harvested by fishers on STT/STJ (44.3%) than STX (31.2%) (Table 11a). One of the important coastal pelagic species on STT/STJ is the schooling "hardnose," (*Caranx crysos*). This species is targeted using special line fishing techniques or haul nets. STT/STJ has a much larger shelf than STX, which likely contributes to the greater importance of coastal pelagic fish in STT/STJ.

Deep-water snapper (silk, *Lutjanus vivanus*; vermilion, *Rhomboplites aurorubens*; queen, *Etelis oculatus*; wenchman, *Pristipomoides aquilonaris*; and blackfin snapper, *L. buccanella*) and deep-water pelagic fish (tuna and mackerel) were harvested by more fishers on STX than STT/STJ. Deep-water snapper was harvested by 52.3% of fishers on STX, but only 14.8% of fishers on STT/STJ, while 44.0% of STX fishers harvested deep-water pelagic compared to only 13.6% of STT/STJ fishers. Given the smaller shelf surrounding STX, deep water is relatively close to shore and, therefore, deep-water snapper and pelagic fish are much more accessible to the island's small boat fishery.

Queen conch (*Strombus gigas*) was targeted by 53.2% of fishers on STX (Table 11a). Few fishers harvest this species on STT/STJ (7.7%). STT/STJ fishers often said it is too much trouble to clean queen conch for sale. Conch landings on STX increased significantly during the 2000s, causing concern among territorial fisheries authorities that conch was being overharvested. New regulations were implemented throughout the territory that increased the length of the closed season by two months (closed season is now 1 June to 30 October of each year) and imposed a quota of 50,000 lbs in each district.

Most fishers caught bait using cast nets to use for line fishing. Few fishers actually sold their bait (ballyhoo (*Hemiramphus brasiliensis*), scads (*Decapturus* spp., Table 11a). However, baitfish was more commonly harvested and sold on STX (5.5% of fishers) than on STT/STJ (3.4%). Ballyhoo was targeted on both STT/STJ and STX, and was sometimes transported by STX fishers to STT/STJ for sale to the charter fishing fleet during the charter (marlin) season (Jose Sanchez, pers. com.).

Whelk were targeted by more fishers on STT/STJ (14.3%) than STX (2.1%). Whelk is an intertidal mollusk, easily accessible in calm weather, and no longer abundant. - USVI has a six-month closure and a large -minimum size for this species that is frequently flaunted. All these factors generally make it a low-ranking fishery species that is most often targeted for personal consumption, though it is sold by a few vendors for a few weeks after the season opened in fall (Kojis pers. obs.) and as a specialty item at the annual spring carnival celebrations on St. Thomas.

Table 11.a. (Q. 11). The relative importance of specific categories of fish, mollusks, and crustaceans to fishers.

| Categories of fish      | STT/STJ   |                      | STX       |                      | USVI       |                      |
|-------------------------|-----------|----------------------|-----------|----------------------|------------|----------------------|
|                         | N         | Percent <sup>1</sup> | N         | Percent <sup>1</sup> | N          | Percent <sup>1</sup> |
| Reef fish               | <b>82</b> | <b>93.2%</b>         | <b>88</b> | <b>80.7%</b>         | <b>170</b> | <b>86.3%</b>         |
| Spiny lobster           | 39        | 44.3%                | 65        | 59.6%                | 104        | 52.8%                |
| Dolphinfish & wahoo     | 26        | 29.5%                | 61        | 56.0%                | 87         | 44.2%                |
| Coastal pelagic         | 39        | 44.3%                | 34        | 31.2%                | 73         | 37.1%                |
| Deepwater snapper       | 13        | 14.8%                | 57        | 52.3%                | 70         | 35.5%                |
| Queen conch             | 7         | 8.0%                 | 58        | 53.2%                | 65         | 33.0%                |
| Deep pelagic            | 12        | 13.6%                | 48        | 44.0%                | 60         | 30.5%                |
| Whelk <sup>2</sup>      | 13        | 14.8%                | 2         | 1.8%                 | 15         | 7.6%                 |
| Bait fish               | 3         | 3.4%                 | 6         | 5.5%                 | 9          | 4.6%                 |
| Other                   | 1         | 1.1%                 | 3         | 2.8%                 | 4          | 2.0%                 |
| # of fishers responding | 88        | 267.0%               | 109       | 387.2%               | 197        | 333.5%               |

<sup>1</sup>Percent totals more than 100% because fishers frequently fished more than one category.

<sup>2</sup>Whelk or West Indian top shell (*Cittarium pica*).

Note: The most common response is in bold type.

The total percentage shown in the last row of Table 11a is a metric of the diversity of the fishery. It is based on the number of responses divided by the number of respondents. Since fishers often responded that they fished more than one category, the number is greater than 100%. Dividing the percentage by 100 provides the average number of categories fished by fishers in each district and the USVI. STX fishers fished on average 3.9 categories compared to 2.7 on STT/STJ. The fisheries of both districts were typical multi-species tropical reef fisheries with no overwhelmingly dominant species.

Only 10.1% of STX fishers targeted only one category of fish or shellfish compared with 21.6% of STT/STJ fishers (Table 11b). STT/STJ generally targeted only 1-3 fish categories (78.4%). STX fishers targeted a larger variety of categories.

Table 11.b. (Q. 11). The frequency of the number of categories of fish, mollusks, and crustaceans listed in Table 11a harvested by fishers.

| No. of finfish and shellfish categories | STT/STJ   |              | STX       |              | USVI      |              |
|---|-----------|--------------|-----------|--------------|-----------|--------------|
|   | N         | Percent      | N         | Percent      | N         | Percent      |
| 1                                       | 19        | 21.6%        | 11        | 10.1%        | 30        | 15.2%        |
| 2                                       | <b>33</b> | <b>37.5%</b> | 19        | 17.5%        | <b>52</b> | <b>26.4%</b> |
| 3                                       | 17        | 19.3%        | <b>24</b> | <b>22.0%</b> | 41        | 20.8%        |
| 4                                       | 7         | 8.0%         | 10        | 9.2%         | 17        | 8.6%         |
| 5                                       | 5         | 5.7%         | 20        | 18.3%        | 25        | 12.7%        |
| 6                                       | 5         | 5.7%         | 16        | 14.7%        | 21        | 10.7%        |
| 7                                       | 1         | 1.1%         | 7         | 6.4%         | 8         | 4.1%         |
| 8                                       | 1         | 1.1%         | 2         | 1.8%         | 3         | 1.5%         |
| # of fishers responding                 | 88        | 100.0%       | 109       | 100.0%       | 197       | 100.0%       |

Note: The most common response is in bold type.

### *Ranking of revenue importance of fish and shellfish*

Tables 11c - e summarize information on the rank order in which fishers target each category of finfish or shellfish. Not all fishers felt they could rank the categories, in part because some felt several categories of fish were equally important to them. When a fisher fished for several types of fish but could not provide ranks, each category was given a rank of one. One fisher on STT/STJ listed billfish without a rank as one of the categories of fish he caught. It is illegal to sell billfish, although you can harvest it and consume it yourself or give the meat away.

Reef fish were the most important revenue generating category in the USVI (Table 11c). Spiny lobster and dolphin and wahoo were ranked second and third. Reef fish were also the most important in both districts (Tables 11d, e). While spiny lobster and coastal pelagics were the second and third most important category in STT/STJ (Table 11d), spiny lobster and dolphin and wahoo were the second and third most important on STX (Table 11e). These second and third place categories were ranked much lower than reef fish in both districts.

Table 11.c. (Q. 11). Rank order of categories of fish and shellfish based on importance to USVI fishers for generating revenue.

| Category of finfish and shellfish | Revenue Ranking (count) |           |           |          |          |          |          |           | N <sup>1</sup> |
|-----------------------------------|-------------------------|-----------|-----------|----------|----------|----------|----------|-----------|----------------|
|                                   | 1 (most)                | 2         | 3         | 4        | 5        | 6        | 7        | 8 (least) |                |
| Reef fish                         | <b>101</b>              | <b>32</b> | <b>22</b> | <b>7</b> | <b>5</b> | <b>3</b> | <b>0</b> | <b>0</b>  | <b>170</b>     |
| Spiny lobster                     | 29                      | 30        | 29        | 9        | 6        | 1        | 0        | 0         | 104            |
| Dolphin & wahoo                   | 28                      | 18        | 14        | 14       | 11       | 2        | 0        | 0         | 87             |
| Coastal pelagic                   | 16                      | 20        | 20        | 9        | 5        | 3        | 0        | 0         | 73             |
| Deepwater snapper                 | 25                      | 18        | 10        | 13       | 4        | 0        | 0        | 0         | 70             |
| Queen conch                       | 17                      | 20        | 17        | 5        | 2        | 2        | 1        | 0         | 64             |
| Deepwater pelagic                 | 10                      | 24        | 12        | 3        | 9        | 2        | 0        | 0         | 60             |
| Whelk <sup>3</sup>                | 1                       | 2         | 3         | 2        | 3        | 3        | 1        | 0         | 15             |
| Bait fish                         | 0                       | 3         | 2         | 0        | 3        | 1        | 0        | 0         | 9              |
| Other – billfish                  | 1                       | 0         | 0         | 0        | 0        | 0        | 0        | 0         | 1              |
| Other – barracuda                 | 0                       | 2         | 0         | 0        | 0        | 0        | 0        | 0         | 2              |
| Other – swordfish                 | 0                       | 0         | 1         | 0        | 0        | 0        | 0        | 0         | 1              |
| # of fishers responding           |                         |           |           |          |          |          |          |           | 197            |

<sup>1</sup>N = The number of fishers responding.

Note: The most common response is in bold type.

Table 11.d. (Q. 11). Rank order of categories of fish and shellfish based on importance to STT/STJ fishers for generating revenue.

| Category of finfish and shellfish | Revenue Ranking (count) |           |          |          |          |          |          |           | N <sup>1</sup> |
|-----------------------------------|-------------------------|-----------|----------|----------|----------|----------|----------|-----------|----------------|
|                                   | 1 (most)                | 2         | 3        | 4        | 5        | 6        | 7        | 8 (least) |                |
| Reef fish                         | <b>60</b>               | <b>15</b> | <b>4</b> | <b>0</b> | <b>2</b> | <b>1</b> | <b>0</b> | <b>0</b>  | <b>82</b>      |
| Spiny lobster                     | 13                      | 12        | 9        | 3        | 2        | 0        | 0        | 0         | 39             |
| Dolphin & wahoo                   | 9                       | 7         | 6        | 4        | 0        | 0        | 0        | 0         | 26             |
| Coastal pelagic                   | 12                      | 14        | 10       | 3        | 0        | 0        | 0        | 0         | 39             |
| Deepwater snapper                 | 1                       | 5         | 3        | 2        | 2        | 0        | 0        | 0         | 13             |
| Queen conch                       | 1                       | 2         | 1        | 1        | 0        | 1        | 0        | 0         | 6              |
| Deepwater pelagic                 | 2                       | 6         | 4        | 0        | 0        | 0        | 0        | 0         | 12             |
| Whelk <sup>3</sup>                | 1                       | 1         | 3        | 2        | 2        | 3        | 1        | 0         | 13             |
| Bait fish                         | 0                       | 2         | 0        | 0        | 0        | 1        | 0        | 0         | 3              |
| Other – Billfish                  | 1                       | 0         | 0        | 0        | 0        | 0        | 0        | 0         | 1              |
| # of fishers responding           |                         |           |          |          |          |          |          |           | 88             |

<sup>1</sup>N = The number of fishers responding.

Note: The most common response is in bold type.



Table 11.e. (Q. 11). Rank order of categories of fish and shellfish based on importance to STX fishers for generating revenue.

| Categories of finfish and shellfish | Revenue Ranking (count) |           |           |          |          |          |          |           | N <sup>1</sup> |
|-------------------------------------|-------------------------|-----------|-----------|----------|----------|----------|----------|-----------|----------------|
|                                     | 1 (most)                | 2         | 3         | 4        | 5        | 6        | 7        | 8 (least) |                |
| Reef fish                           | <b>41</b>               | <b>17</b> | <b>18</b> | <b>7</b> | <b>3</b> | <b>2</b> | <b>0</b> | <b>0</b>  | <b>88</b>      |
| Spiny lobster                       | 16                      | 18        | 20        | 6        | 4        | 1        | 0        | 0         | 65             |
| Dolphin & wahoo                     | 19                      | 11        | 8         | 10       | 11       | 2        | 0        | 0         | 61             |
| Coastal pelagic                     | 4                       | 6         | 10        | 6        | 5        | 3        | 0        | 0         | 34             |
| Deepwater snapper                   | 24                      | 13        | 7         | 11       | 2        | 0        | 0        | 0         | 57             |
| Queen conch                         | 16                      | 18        | 16        | 4        | 2        | 1        | 1        | 0         | 58             |
| Deepwater pelagic                   | 8                       | 18        | 8         | 3        | 9        | 2        | 0        | 0         | 48             |
| Whelk <sup>3</sup>                  | 0                       | 1         | 0         | 0        | 1        | 0        | 0        | 0         | 2              |
| Bait fish                           | 0                       | 1         | 2         | 0        | 3        | 0        | 0        | 0         | 6              |
| Other – barracuda                   | 0                       | 2         | 0         | 0        | 0        | 0        | 0        | 0         | 2              |
| Other - swordfish                   | 0                       | 0         | 1         | 0        | 0        | 0        | 0        | 0         | 1              |
| # of fishers responding             |                         |           |           |          |          |          |          |           | 109            |

<sup>1</sup>N = The number of fishers responding.

Note: The most common response is in bold type.

#### Question 12: Where do most of your landings come from? USVI waters Federal waters About equal

Most fishing in USVI occurred in territorial waters (<3 nm from shore) followed by fishing in both territorial and federal waters (>3 nm to 200 nm from shore; Table 12). Only 10.2% of the fishers fished exclusively in federal waters.

More STX fishers fished primarily in territorial waters (59.1%) than STT/STJ fishers (52.9%), including the combined percentage of fishers who fished exclusively in territorial waters and the percentage that said they fished about equally in both territorial and federal waters. This may be because the STX shelf (except for part of Lang Bank to the west) is narrow and lies in territorial waters. Also, the shelf edge drops off precipitously to depths of >1,000 ft. Lang Bank is frequently exposed to heavy seas, which often deters fishers in their small boats from accessing the bank, especially the offshore portion, under federal jurisdiction. Thus, the insular shelf is the main fishing grounds for STX fishers. In contrast, the shelf on STT/STJ is much wider, up to eight miles on the southern side of the islands and 20 miles on the northern side, so a relatively large part of the shelf, the primary fishing grounds, lies in federal waters.

Table 12 (Q. 12). Jurisdiction where most fishing occurred.

| Water body fished               | STT/STJ   |              | STX       |              | USVI       |              |
|---------------------------------|-----------|--------------|-----------|--------------|------------|--------------|
|                                 | N         | %            | N         | %            | N          | %            |
| USVI waters                     | <b>46</b> | <b>52.9%</b> | <b>65</b> | <b>59.1%</b> | <b>111</b> | <b>56.3%</b> |
| Federal waters                  | 4         | 4.6%         | 16        | 14.6%        | 20         | 10.2%        |
| About both water bodies equally | 37        | 42.5%        | 29        | 26.4%        | 66         | 33.5%        |
| # of fishers responding         | 87        | 100.0%       | 110       | 100.1%       | 197        | 100.00%      |

Note: The most common response is in bold type.

### Question 13: How often do you fish? \_\_\_\_# of trips per month

On average, Average Fishers on STX took about three more trips a month than Average Fishers on STT/STJ (Table 13, Fig. 8). However, their trips were shorter. A few STT/STJ fishers did trips lasting several days. STX fishers did not do trips longer than 12 hours. STT/STJ Active Fishers took an average of 0.6 more trips per month than Average Fishers, but fished 0.6 fewer hours per trip (Table 14). Active Fishers on STX took 0.4 more trips per month than Average Fishers, but had the same mean trip duration. Similar trends are seen in the median for Average and Active Fishers.

Table 13 (Q. 13 & 14). The average number of fishing trips by “Average Fishers” per month and the average number of hours per trip.

| Variables               | STT/STJ         |               | STX             |               | USVI            |               |
|-------------------------|-----------------|---------------|-----------------|---------------|-----------------|---------------|
|                         | Trips per month | Trip duration | Trips per month | Trip duration | Trips per month | Trip duration |
| Mean (SD <sup>1</sup> ) | 8.4<br>(±6.9)   | 8.2<br>(±6.3) | 11.5<br>(±7.4)  | 6.6<br>(±2.2) | 10.2<br>(±7.4)  | 7.3<br>(±4.6) |
| Median                  | 6.0             | 8.0           | 12.0            | 6.0           | 8.0             | 6.0           |
| Mode                    | 4.0             | 6.0           | 6.0             | 6.0           | 4.0             | 6.0           |
| Range                   | 0.1 – 36.0      | 2.5 – 60.0    | 1.0-25.0        | 2.5-12.0      | 0.1-36.0        | 2.5-60.0      |
| # of fishers responding | 85              | 86            | 108             | 108           | 193             | 194           |

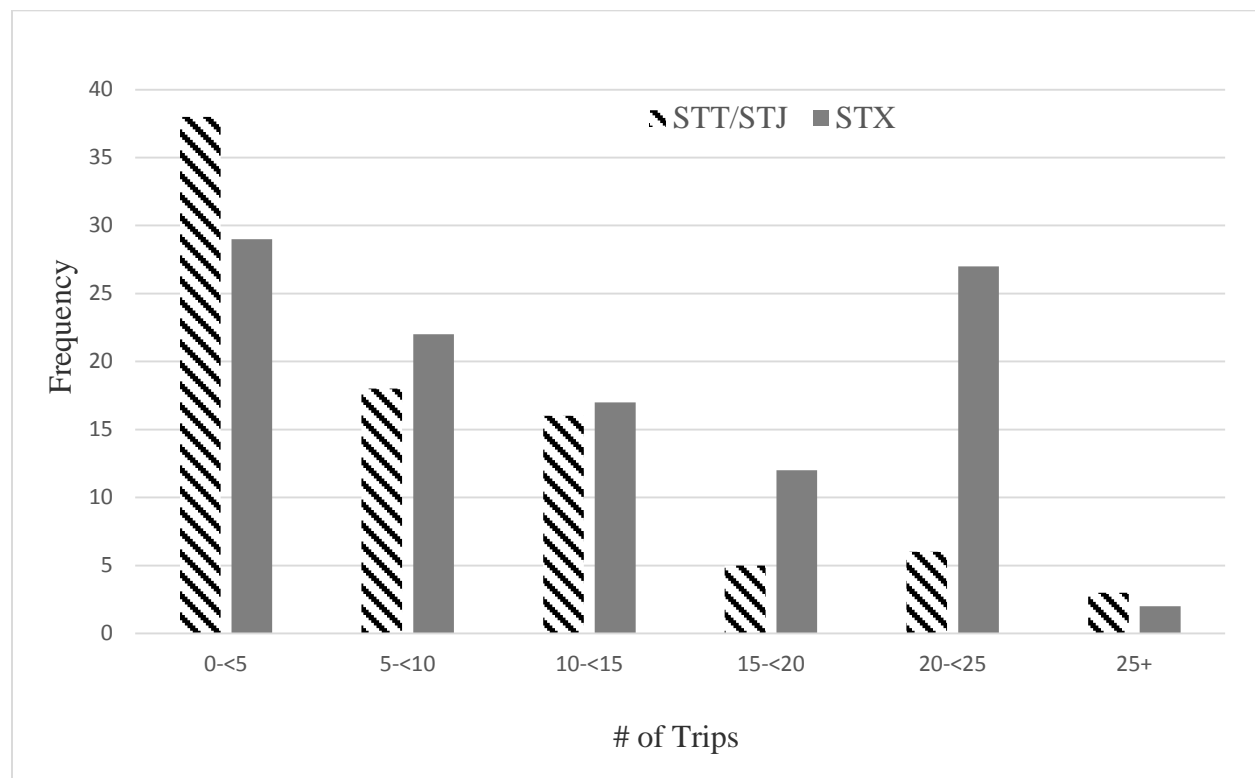
<sup>1</sup>SD = Standard Deviation

Table 14 (Q. 13 & 14). The average number of fishing trips by “Active Fishers only” per month and the average number of hours per trip.

| Variables               | STT/STJ                 |               | STX             |               | USVI            |               |
|-------------------------|-------------------------|---------------|-----------------|---------------|-----------------|---------------|
|                         | Trips per month         | Trip duration | Trips per month | Trip duration | Trips per month | Trip duration |
| Mean (SD <sup>1</sup> ) | 9.0<br>(±6.9)           | 7.6<br>(±2.6) | 11.9<br>(±7.5)  | 6.6<br>(±2.2) | 10.7<br>(±7.4)  | 7.1<br>(±2.4) |
| Median                  | 8.0                     | 8.0           | 12.0            | 6.0           | 8.0             | 6.0           |
| Mode                    | 4.0                     | 6.0           | 20.0            | 6.0           | 8.0             | 6.0           |
| Range                   | 1.0 – 36.0 <sup>2</sup> | 2.5 – 13.0    | 1.0 – 25.0      | 2.5 – 12.0    | 1.0 - 36.0      | 2.5-13.0      |
| # of fishers responding | 72                      | 73            | 96              | 96            | 168             | 169           |

<sup>1</sup>SD = Standard Deviation

<sup>2</sup>Fisher said he made more than one fishing trip on some days of the week.



Note: STT/STJ, N= 86; STX, N= 109

Figure 8 (Q. 14). Number of trips per month for STT/STJ and STX “Average Fishers”

**Question 14: On average, how long are your fishing trips? \_\_\_\_\_hours/trip (dock to dock).**

Trip duration was about 1.4 hrs (21%) shorter, on average, for STX Average Fishers compared to STT/STJ Average Fishers (Table 13). However, STX fishers, both Average and Active, fished more frequently (Tables 13, 14). STX fishers spent about seven hours (Average Fishers) or 10.1 hours (Active

Fishers) more fishing each month (STX – Average Fishers - 75.9 hrs per month, Active Fishers - 78.5 hrs per month vs STT/STJ (Average Fishers - 68.9 hrs per month, Active Fishers - 68.4 hrs per month). Differences in the time spent fishing arise because of the different gears used across districts.

The duration of the trip is influenced by the gear used. While line fishing predominated in both districts, scuba diving was more common on STX and trap fishing more common on STT/STJ. Scuba divers are limited in the amount of bottom time because of the potential for decompression sickness, limiting fishing time. STX fishers, especially divers, often leave early in the morning and return late morning to sell their fish fresh to pre-arranged customers and in the markets. Trap fishers on STT/STJ soak their traps for at least a week and then often spend a full day hauling traps. Major trap fishers may have several hundred traps and haul a portion of their traps two or three times in a week. Trap fish are often frozen for subsequent sale on non-trap haul days.

**Question 15: On average, how many hours per week do you spend:**

- a) **Repairing and maintaining boat and engine** \_\_\_\_ hours/week
- b) **Repairing and maintaining fishing gear:** \_\_\_\_ hours/week
- c) **Preparing for fishing (filling boat, filling tanks, driving to the dock/ boat ramp)** \_\_\_\_ hours/week
- d) **Fish sales** \_\_\_\_ hours/week

Many fishers spent a considerable amount of time carrying out fishing related activities during the week. Average Fishers in the USVI spent, on average, 7.1 hrs a week selling their fish, 3.2 hrs maintaining their boat and engine, 3.3 hrs maintaining their gear and 2.6 hrs preparing for fishing (Table 15a). There was a large difference among fishers in the time spent for each activity (Table 15a). The results for Active Fishers were similar, though Active Fishers spent 0.4 hrs, on average, more selling fish and 0.4 hrs less fixing their boat and engine (Tables 15a, b). Some of the difference in time spent in different activities among fishers depended upon whether the fisher owned a boat (hours fixing a boat), the type of gear they used (line fishers often only fixed their gear on the way to the fishing site), and whether or not they spent time selling their fish in government and roadside market. Fishers who reported spending less time selling sometimes used the fish they caught to make food for sale, fished specifically for pre-ordered fish and shellfish and delivered it directly to customers and/or hired someone to sell the extra fish they caught (primarily reef fish), or sold their fish directly to buyers. However, it is not common for fishers to prepare food for sale.

About 40% of fishers fished >36 hrs per week (Table 15c). Nearly 30% of fishers on both islands fished <15 hrs per week or did not fish at all. Average Fishers spent 34.2 hrs per week carrying out all fishing activities, while Active Fishers spent 0.8 hrs more (35.0 hrs per week) (Table 15d).

Table 15.a. (Q. 15). The hours per week “Average Fishers” spent on fishing related activities (excluding catching fish).

| Activity                | STT/STJ                |                   |                            |                   | STX                    |                   |                           |                   | USVI                   |                   |                            |                   |
|-------------------------|------------------------|-------------------|----------------------------|-------------------|------------------------|-------------------|---------------------------|-------------------|------------------------|-------------------|----------------------------|-------------------|
|                         | Hrs fixing boat/engine | Hrs fixing gear   | Hrs preparing for fish-ing | Hrs selling fish  | Hrs fixing boat/engine | Hrs fixing gear   | Hrs preparing for fishing | Hrs selling fish  | Hrs fixing boat/engine | Hrs fixing gear   | Hrs preparing for fish-ing | Hrs selling fish  |
| Mean (SD)               | 3.7 ( $\pm 4.9$ )      | 3.7 ( $\pm 4.8$ ) | 2.4 ( $\pm 2.5$ )          | 8.4 ( $\pm 8.8$ ) | 2.9 ( $\pm 5.2$ )      | 2.9 ( $\pm 4.0$ ) | 2.7 ( $\pm 2.9$ )         | 6.1 ( $\pm 7.0$ ) | 3.2 ( $\pm 5.1$ )      | 3.3 ( $\pm 4.4$ ) | 2.6 ( $\pm 2.7$ )          | 7.1 ( $\pm 7.9$ ) |
| Median                  | 2.0                    | 2.0               | 1.6                        | 5.5               | 2.0                    | 2.0               | 2.0                       | 4.0               | 2.0                    | 2.0               | 2.0                        | 4.0               |
| Mode                    | 2.0                    | 2.0               | 1.0                        | 0                 | 2.0                    | 2.0               | 1.0                       | 4.0               | 2.0                    | 2.0               | 1.0                        | 4.0               |
| Range                   | 0-30                   | 0-30              | 0-15                       | 0-36              | 0-50                   | 0-30              | 0-20                      | 0-32              | 0-50                   | 0-30.0            | 0-20.0                     | 0-36.0            |
| # of fishers responding | 81                     | 80                | 84                         | 78                | 107                    | 108               | 108                       | 106               | 188                    | 188               | 192                        | 184               |

Table 15.b. (Q. 15). The hours per week “Active Fishers” spent on fishing related activities (excluding catching fish).

| Activity                | STT/STJ                |                   |                           |                   | STX                    |                   |                           |                   | USVI                   |                   |                           |                   |
|-------------------------|------------------------|-------------------|---------------------------|-------------------|------------------------|-------------------|---------------------------|-------------------|------------------------|-------------------|---------------------------|-------------------|
|                         | Hrs fixing boat/engine | Hrs fixing gear   | Hrs preparing for fishing | Hrs selling fish  | Hrs fixing boat/engine | Hrs fixing gear   | Hrs preparing for fishing | Hrs selling fish  | Hrs fixing boat/engine | Hrs fixing gear   | Hrs preparing for fishing | Hrs selling fish  |
| Mean (SD)               | 3.4 ( $\pm 4.0$ )      | 3.7 ( $\pm 4.9$ ) | 2.5 ( $\pm 2.7$ )         | 8.7 ( $\pm 9.1$ ) | 2.3 ( $\pm 2.5$ )      | 2.9 ( $\pm 4.1$ ) | 2.7 ( $\pm 2.9$ )         | 6.5 ( $\pm 7.4$ ) | 2.8 ( $\pm 3.3$ )      | 3.3 ( $\pm 4.5$ ) | 2.6 ( $\pm 2.8$ )         | 7.5 ( $\pm 8.2$ ) |
| Median                  | 2.0                    | 2.0               | 1.8                       | 6.0               | 2.0                    | 2.0               | 2.0                       | 4.0               | 2.0                    | 2.0               | 2.0                       | 4.0               |
| Mode                    | 2.0                    | 2.0               | 1.0                       | 0                 | 2.0                    | 2.0               | 1.0                       | 4.0               | 2.0                    | 2.0               | 1.0                       | 4.0               |
| Range                   | 0-25                   | 0-30              | 0-15                      | 0-36              | 2.5-14.0               | 0-30.0            | 0-20.0                    | 0-32.0            | 0-25.0                 | 0-30.0            | 0-20.0                    | 0-36.0            |
| # of fishers responding | 72                     | 71                | 73                        | 69                | 95                     | 96                | 96                        | 94                | 167                    | 167               | 169                       | 163               |

Table 15.c. (Q. 13, 14, 15). Breakdown of the level of typical weekly effort “Average Fishers” reported to carry out all fishing related activities.

| Total hours conducting all fishing activities | STT/STJ   |               | STX       |               | USVI      |               |
|---|-----------|---------------|-----------|---------------|-----------|---------------|
|   | N         | Percent       | N         | Percent       | N         | Percent       |
| >36 hrs                                       | <b>38</b> | <b>41.76%</b> | <b>43</b> | <b>37.72%</b> | <b>81</b> | <b>39.51%</b> |
| 15-36 hrs                                     | 26        | 28.57%        | 39        | 34.21%        | 65        | 31.71%        |
| <15 hrs                                       | 22        | 24.18%        | 25        | 21.93%        | 47        | 22.93%        |
| Not fishing                                   | 5         | 5.49%         | 7         | 6.14%         | 12        | 5.85%         |
| # of fishers responding                       | 91        | 100.00%       | 114       | 100.00%       | 205       | 100.00%       |

Note: The most common response is in bold type.

Table 15.d. (Q. 13 & 14): The average time (hours) “Average Fishers” and “Active Fishers” spent carrying out all fishing activities per week.

| Variables               | STT/STJ         |                 | STX             |                 | USVI            |                 |
|-------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                         | Average Fisher  | Active Fisher   | Average Fisher  | Active Fisher   | Average Fisher  | Active Fisher   |
| Mean (SD <sup>1</sup> ) | 34.6<br>(±24.1) | 35.8<br>(±22.0) | 33.8<br>(±21.0) | 34.3<br>(±21.1) | 34.2<br>(±22.4) | 35.0<br>(±21.4) |
| Median                  | 32.8            | 35.0            | 30.3            | 32.0            | 31.9            | 33.5            |
| Mode                    | 7.0             | 7.0             | 34.9            | 34.0            | 34.0            | 34.0            |
| Range                   | 0.1 – 104.5     | 3.0 – 104.5     | 3.3 – 91.0      | 3.3 – 91.0      | 0.1 – 104.5     | 3.0 – 104.5     |
| # of fishers responding | 85              | 72              | 108             | 96              | 194             | 168             |

<sup>1</sup>SD = Standard Deviation

**Question 16. Besides fishing, do you engage in other employment activities? Yes No**

**If YES, specify:** \_\_\_\_\_

Fishing was the sole employment for 50.8% of USVI fishers (Table 16a). Fifty-five percent of STT/STJ and 61% of STX fishers said that they did not engage in other employment, including retirees.

Table 16.a. (Q. 16). Frequency distribution of fishers who engage in non-fishing employment.

| Participation in non-fishing employment | STT/STJ   |              | STX       |              | USVI       |              |
|---|-----------|--------------|-----------|--------------|------------|--------------|
|   | N         | Percent      | N         | Percent      | N          | Percent      |
| Yes                                     | 38        | 44.7%        | 44        | 39.3%        | 82         | 41.6%        |
| No                                      | <b>42</b> | <b>49.4%</b> | <b>58</b> | <b>51.8%</b> | <b>100</b> | <b>50.8%</b> |
| Retired                                 | 5         | 5.9%         | 10        | 8.9%         | 15         | 7.6%         |
| # of fishers responding                 | 85        | 100.00%      | 112       | 100.00%      | 197        | 100.00%      |

Note: The most common response is in bold type.

More than 40% of USVI fishers were employed outside the fishing sector (Table 16a). Some fishers supplemented their fishing income with a second job, others had a full-time job and used fishing to supplement their income, and others worked intermittent jobs such as construction and filled in the gaps with fishing. Fishers worked a wide variety of jobs (Table 16b). Almost 25% said they worked in either federal or local government jobs. Construction was the next most common job with many stating that they did carpentry and/or masonry work.

Table 16.b. (Q. 16): Non-fishing occupations that fishers undertake.

| Employment              | STT/STJ  |              | STX       |              | USVI      |              |
|-------------------------|----------|--------------|-----------|--------------|-----------|--------------|
|                         | N        | Percent      | N         | Percent      | N         | Percent      |
| Architecture            | 1        | 2.8%         | 0         | 0.0%         | 1         | 1.3%         |
| Bartender               | 1        | 2.8%         | 0         | 0.0%         | 1         | 1.3%         |
| Barber                  | 1        | 2.8%         | 0         | 0.0%         | 1         | 1.3%         |
| Banking                 | 0        | 0.0%         | 1         | 2.3%         | 1         | 1.3%         |
| Boat Captain            | 2        | 5.6%         | 4         | 9.1%         | 6         | 7.5%         |
| Boiler Maker            | 0        | 0.0%         | 1         | 2.3%         | 1         | 1.3%         |
| Commercial diving       | 1        | 2.8%         | 0         | 0.0%         | 1         | 1.3%         |
| Construction            | 5        | 13.9%        | 9         | 20.5%        | 14        | 17.5%        |
| Church                  | 0        | 0.0%         | 2         | 4.5%         | 2         | 2.5%         |
| Consulting              | 0        | 0.0%         | 1         | 2.3%         | 1         | 1.3%         |
| Electrician             | 1        | 2.8%         | 1         | 2.3%         | 2         | 2.5%         |
| Farmer                  | 3        | 8.3%         | 2         | 4.5%         | 5         | 6.3%         |
| Full time               | 1        | 2.8%         | 0         | 0.0%         | 1         | 1.3%         |
| Government job          | <b>9</b> | <b>25.0%</b> | <b>10</b> | <b>22.7%</b> | <b>19</b> | <b>23.8%</b> |
| Home repairs            | 1        | 2.8%         | 0         | 0.0%         | 1         | 1.3%         |
| Employed                | 1        | 2.8%         | 0         | 0.0%         | 1         | 1.3%         |
| Landscaping             | 0        | 0.0%         | 4         | 9.1%         | 4         | 5.0%         |
| Marine industries       | 1        | 2.8%         | 1         | 2.3%         | 2         | 2.5%         |
| Medicine                | 2        | 5.6%         | 0         | 0.0%         | 2         | 2.5%         |
| Odd jobs                | 1        | 2.8%         | 0         | 0.0%         | 1         | 1.3%         |
| Pilot                   | 1        | 2.8%         | 0         | 0.0%         | 1         | 1.3%         |
| Property Management     | 1        | 2.8%         | 1         | 2.3%         | 2         | 2.5%         |
| Restaurant owner        | 0        | 0.0%         | 2         | 4.5%         | 2         | 2.5%         |
| Sales                   | 1        | 2.8%         | 2         | 4.5%         | 3         | 3.8%         |
| Self employed           | 1        | 2.8%         | 0         | 0.0%         | 1         | 1.3%         |
| Tourist industry        | 1        | 2.8%         | 1         | 2.3%         | 2         | 2.5%         |
| Truck driving           |          | 0.0%         | 2         | 4.5%         | 2         | 2.5%         |
| # of fishers responding | 36       | 100.0%       | 44        | 100%         | 80        | 100.0%       |

Note: The most common response is in bold type.



### Question 17. How many people do you commercially fish with?

**Fish alone**    **With \_\_\_\_ # helpers (role(s): \_\_\_\_\_)**    **With \_\_\_\_ # licensed com. fishers**

In STT/STJ, 73.5% of fishers went fishing with helpers (Table 17a). Howard Forbes, Director of the Division of Environmental Enforcement, estimated that there were 130 registered helpers in the USVI. Fishers fished only with helpers (57.1%) or fished alone sometimes and with helpers other times (1.2%) or fished with commercial fishers and/or helpers (15.5%). In STX, 88.0% of fishers reported fishing with helpers. They fished alone or with helpers (1.8%), with helpers and/or other licensed fishers (58.7%) or helpers only (27.5%). Over twice as many fishers on STX fished with other commercial fishers (68.8%) as fishers on STT/STJ (30.1%). Fishers often fished with another licensed fisher if they did not own a boat or when their boat was under repair. Fishing alone was uncommon. Only ten fishers (16.2%) on STT/STJ and four fishers on STX (2.3%) fished alone at least some of the time. Most fishers fished with one or two helpers or commercial fishers (Tables 17c, d).

#### *Number of people fish with*

Table 17.a. (Q. 17). Frequency distribution of the number of crew that fishers fish with. Fishers responded that they fished alone and/or with helpers and/or other fishers.

| Categories  | STT/STJ      |              | STX          |              | USVI         |              |
|---|--------------|--------------|--------------|--------------|--------------|--------------|
|   | # of Fishers | Percent      | # of Fishers | Percent      | # of Fishers | Percent      |
| Fish alone only                                     | 9            | 10.7%        | 2            | 1.8%         | 11           | 5.7%         |
| Fish alone and with helpers                         | 1            | 1.2%         | 2            | 1.8%         | 3            | 1.6%         |
| Fish with helpers only                              | <b>48</b>    | <b>57.1%</b> | 30           | 27.5%        | <b>78</b>    | <b>40.4%</b> |
| Fish with other commercial fishers only             | 13           | 15.5%        | 11           | 10.1%        | 24           | 12.4%        |
| Fish with both helpers and other commercial fishers | 13           | 15.5%        | <b>64</b>    | <b>58.7%</b> | 77           | 39.9%        |
| # of fishers Responding                             | 84           | 100.0%       | 109          | 100.0%       | 193          | 100.0%       |

Note: The most common response is in bold type.

Fishers on STT/STJ fished with fewer crew than fishers on STX. STT/STJ fishers fished with 1 – 4 helpers or licensed fishers, fishing with an average of 1.58 crew (Table 17b). Fishers on STX fished with 1 – 7 helpers or fishers, an average of 2.16 crew. Net fishers used large numbers of crew, especially on STX.

Table 17.b. (Q. 17). The average number of crew (helpers and other licensed fishers) used by fishers who fished with a crew.

| Statistics              | STT/STJ    |                 |                       |   | STX        |                 |                       |                              |
|-------------------------|------------|-----------------|-----------------------|---|------------|-----------------|-----------------------|------------------------------|
|                         | Fish alone | # helpers       | # of licensed fishers | Total # helpers &/or fishers <sup>1</sup> | Fish alone | # helpers       | # of licensed fishers | Total # helpers &/or fishers |
| Mean                    | 0          | 1.60<br>(±0.71) | 1.31<br>(±0.68)       | 1.58<br>(±0.98)                           | 0          | 1.39<br>(±0.72) | 1.36<br>(±0.65)       | 2.16<br>(±1.09)              |
| Median                  | 0          | 1               | 1                     | 1   | 0          | 1               | 1                     | 2                            |
| Mode                    | 0          | 1               | 1                     | 1   | 0          | 1               | 1                     | 2                            |
| Range                   | 0          | 1-4             | 1-3                   | 1-4                                       | 0          | 1-6             | 1-4                   | 1-7                          |
| # of fishers responding | 10         | 62              | 26                    | 84  | 4          | 96              | 75                    | 109                          |

Table 17.c. (Q. 17). Breakdown of the number helpers employed per fisher.

| # of helpers            | STT/STJ   |              | STX       |              | USVI      |              |
|-------------------------|-----------|--------------|-----------|--------------|-----------|--------------|
|                         | N         | Percent      | N         | Percent      | N         | Percent      |
| 1                       | <b>32</b> | <b>51.6%</b> | <b>65</b> | <b>67.7%</b> | <b>97</b> | <b>61.4%</b> |
| 1.5                     | 0         | 0.0%         | 1         | 1.0%         | 1         | 0.6%         |
| 2                       | 24        | 38.7%        | 26        | 27.1%        | 50        | 31.7%        |
| 3                       | 5         | 8.1%         | 3         | 3.1%         | 8         | 5.1%         |
| 4                       | 1         | 1.6%         | 0         | 0.0%         | 1         | 0.6%         |
| 5                       | 0         | 0.0%         | 0         | 0.0%         | 0         | 0.0%         |
| 6                       | 0         | 0.0%         | 1         | 1.0%         | 1         | 0.6%         |
| # of fishers responding | 62        | 100.0%       | 96        | 100.0%       | 158       | 100.0%       |

Note: The most common response is in bold type.

Table 17.d. (Q. 17). Breakdown of the number licensed fishers a fisher fished with.

| # of licensed fishers   | STT/STJ   |              | STX       |              | USVI      |              |
|-------------------------|-----------|--------------|-----------|--------------|-----------|--------------|
|                         | N         | Percent      | N         | Percent      | N         | Percent      |
| 1                       | <b>21</b> | <b>80.8%</b> | <b>54</b> | <b>72.0%</b> | <b>75</b> | <b>74.3%</b> |
| 2                       | 2         | 7.7%         | 16        | 21.3%        | 18        | 17.8%        |
| 3                       | 3         | 11.5%        | 4         | 5.3%         | 7         | 6.9%         |
| 4                       | 0         | 0.0%         | 1         | 1.3%         | 1         | 1.0%         |
| # of fishers responding | 26        | 100.0%       | 75        | 100.0%       | 100       | 100.0%       |

Note: The most common response is in bold type.

### *Role of helpers*

Helpers participated in a wide variety of tasks (Table 17e). The most common role that fishers said helpers engaged in on STT/STJ was non-diving fisher (48.8%). Other common activities were cleaning and selling fish and an undefined “everything,” which one fisher said excluded boat driving. On STX the

fishers said that the most common helper role was boat captain or driver (53.0%) closely followed by fisher (43.9%). Diver was the next most common helper activity (19.7%). Helpers assisted diving operations by captaining the boat and in some cases diving. Only one fisher on STT/STJ said that his helper dived.

This question was asked in general terms, so while some fishers were specific, others just said helpers fished or were fishers. Thus, the response "fisher" or "fish" could have included trap pulling, net fishing or line fishing. Responses of "fisher," "fishing" or "line fishing" were incorporated under the category "Fisher." It is unlikely any of these responses included helpers who participated as diver fishers. On STT/STJ helpers also worked as 1st mate/deckhand, which likely included a myriad of tasks.

Table 17.e. (Q. 17). Function of helpers in STT/STJ and STX and frequency of helper participation in various functions.

| Roles of Helpers         | STT/STJ        |              | STX            |              | USVI           |              |
|--------------------------|----------------|--------------|----------------|--------------|----------------|--------------|
|                          | N <sup>1</sup> | Percent      | N <sup>1</sup> | Percent      | N <sup>1</sup> | Percent      |
| Fisher (excluding diver) | <b>20</b>      | <b>48.8%</b> | 29             | 43.9%        | <b>49</b>      | <b>45.8%</b> |
| Pull traps               | 3              | 7.3%         | 5              | 7.6%         | 8              | 7.5%         |
| Diver                    | 1              | 2.4%         | 13             | 19.7%        | 14             | 13.1%        |
| Net fisher               | 1              | 2.4%         | 1              | 1.5%         | 2              | 1.9%         |
| Catch bait               | 1              | 2.4%         | 2              | 3.0%         | 3              | 2.8%         |
| Bait traps               | 2              | 4.9%         | 0              | 0.0%         | 2              | 1.9%         |
| Help with tanks          | 0              | 0.0%         | 2              | 3.0%         | 2              | 1.9%         |
| Launch boat              | 0              | 0.0%         | 1              | 1.5%         | 1              | 0.9%         |
| Ice fish                 | 1              | 2.4%         | 0              | 0.0%         | 1              | 0.9%         |
| 1st mate/deckhand        | 4              | 9.8%         | 1              | 1.5%         | 5              | 4.7%         |
| Captain                  | 6              | 14.6%        | <b>35</b>      | <b>53.0%</b> | 41             | 38.3%        |
| Clean fish               | 10             | 24.4%        | 2              | 3.0%         | 12             | 11.2%        |
| Sell fish                | 11             | 26.8%        | 4              | 6.1%         | 15             | 14.0%        |
| Clean boat               | 2              | 4.9%         | 3              | 4.5%         | 5              | 4.7%         |
| Repair boat              | 1              | 2.4%         | 3              | 4.5%         | 4              | 3.7%         |
| Boat Maintenance         | 1              | 2.4%         | 5              | 7.6%         | 6              | 5.6%         |
| Everything               | 11             | 26.8%        | 10             | 15.2%        | 21             | 19.6%        |
| # of fishers responding  | 41             | -            | 66             | -            | 107            | -            |

<sup>1</sup>N = Number of fishers that provided responses in each category. A single fisher listed from 1 – 4 different roles.

Note: The most common response is in bold type.

Safety in diving is an important issue, which is a commonly ignored. Usually the fisher(s) was the diver and the helper was the boat captain, though helpers may also participate in diving. Dive fishers enter the water, often far out to sea, with a buoyed dive flag attached to them by a long line. It is the responsibility of the boat captain to follow the diver by following both the dive flag and the diver's bubbles in case the

dive flag comes detached from the diver. If more than one diver is in the water, this can be a real challenge, especially if the divers don't stay close together or they deliberately dive separately and each tows a flagged buoy. It is extremely important for a dive fisher to have a reliable boat captain. It is not unknown for a captain to lose a diver for short periods and there have been several reports on STX of divers having to swim several miles to shore when their boat captain couldn't find them (G. Martinez, pers. com.). We are unaware of any divers being lost at sea.

**Question 18: Who are your crew? Family Friends Acquaintances Others**

Most crew members were family or friends (Table 18) in both districts (92.3% on STT/STJ and 93.1% on STX). Helpers, who were relatives or friends, were generally considered as such, rather than as employees.

Table 18 (Q. 18). Number and percentages of categories of helpers.

| Categories                | STT/STJ      |              | STX          |              | USVI         |              |
|---------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                           | # of Fishers | Percent      | # of Fishers | Percent      | # of Fishers | Percent      |
| Family                    | 29           | 37.7%        | 28           | 27.5%        | 57           | 31.8%        |
| Friends                   | <b>30</b>    | <b>39.0%</b> | <b>44</b>    | <b>43.1%</b> | <b>74</b>    | <b>41.3%</b> |
| Acquaintances             | 3            | 3.9%         | 5            | 4.9%         | 8            | 4.5%         |
| Others                    | 1            | 1.3%         | 1            | 1.0%         | 2            | 1.1%         |
| Friends and Family        | 12           | 15.6%        | 23           | 22.5%        | 35           | 19.6%        |
| Friends and Acquaintances | 1            | 1.3%         | 0            | 0.0%         | 1            | 0.6%         |
| Family and Acquaintances  | 1            | 1.3%         | 1            | 1.0%         | 2            | 1.1%         |
| # of fishers responding   | 77           | 100.0%       | 102          | 100.0%       | 179          | 100.0%       |

Note: The most common response is in bold type.

**Question 19: Approximate age of crew members: \_\_\_\_#1 \_\_\_\_#2 \_\_\_\_#3 \_\_\_\_#4**

Most crew members in both districts were middle aged (Table 19a, 19b). There were few crew members over 70 and few under 25 years old.

Table 19.a. (Q 19). Age distribution of helpers for STT/STJ.

|         | Mean | Median | Range | SD   | Mode | N  |
|---------|------|--------|-------|------|------|----|
| Crew #1 | 47.8 | 50     | 14-83 | 16.8 | 30   | 73 |
| Crew #2 | 48.3 | 50     | 20-73 | 14.6 | 30   | 42 |
| Crew #3 | 47.0 | 40     | 30-72 | 15.4 | 30   | 15 |
| Crew#4  | 36.7 | 40     | 30-40 | 5.8  | 40   | 3  |

Table 19.b. (Q 19). Age distribution of helpers for STX.

|         | Mean | Median | Range | SD   | Mode | N   |
|---------|------|--------|-------|------|------|-----|
| Crew #1 | 51.9 | 52.0   | 14-78 | 16.4 | 50   | 105 |
| Crew #2 | 47.1 | 45.0   | 17-80 | 15.6 | 60   | 79  |
| Crew #3 | 44.9 | 46.0   | 19-76 | 18.1 | 25   | 32  |
| Crew#4  | 35.1 | 32     | 23-60 | 19.0 | -    | 7   |

**Question 20. How easy or hard is it to recruit crew?**

**Very hard      Hard      Easy      Very easy      Don't know      No answer**

Views on crew recruitment were mixed, but the plurality of respondents (47.6%) said that it was very easy or easy to find new (dependable) crew members, while 40.1% held that it was very hard or hard (Table 20). Another 6.4% did not know. Fishers were most concerned about recruiting crew who could handle the rigors of the sea and fishing and who were dependable. Several said that often young people found fishing too hard.

Table 20. (Q20). Effort required to recruit a helper for fishing activities.

| Categories              | STT/STJ      |              | STX          |              | USVI         |              |
|-------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                         | # of Fishers | Percent      | # of Fishers | Percent      | # of Fishers | Percent      |
| Very hard               | 11           | 13.6%        | 19           | 17.9%        | 30           | 16.0%        |
| Hard                    | 16           | 19.8%        | 29           | 27.4%        | 45           | 24.1%        |
| Easy                    | <b>23</b>    | <b>28.4%</b> | <b>48</b>    | <b>45.3%</b> | <b>71</b>    | <b>38.0%</b> |
| Very Easy               | 14           | 17.3%        | 4            | 3.8%         | 18           | 9.6%         |
| Don't Know              | 10           | 12.3%        | 2            | 1.9%         | 12           | 6.4%         |
| No Answer               | 7            | 8.6%         | 4            | 3.8%         | 11           | 5.9%         |
| # of fishers responding | 81           | 100.0%       | 106          | 100.0%       | 187          | 100.0%       |

Note: The most common response is in bold type.

**21. Landing sites: Main \_\_\_\_\_ Secondary \_\_\_\_\_**

STT fishers reported that they landed their fish at 18 different sites on the north, south and east end of the island and one site in the BVI, while STJ fishers reported using four sites (Table 21a). Frenchtown, Hull Bay, and the Benner Bay/Mangrove Lagoon complex, which includes Sea Side Marina, Sage Heaven, and Compass Pt. Marinas, were the three most commonly used sites.

Table 21.a. (Q. 21). The number and percentage of STT/STJ fishers using landing sites. Landing sites without a STJ are on STT, except one BVI site.

| <b>STT/ STJ Landing Sites<sup>1</sup></b> | <b>Number of Fishers<br/>Using Site<br/>Primary Site</b> | <b>Number of Fishers<br/>Using Site<br/>Secondary Site</b> | <b>Total</b> | <b>% Fishers<br/>Using Site</b> |
|---|--|--|--------------|---------------------------------|
| Frenchtown                                | 26   |  | 26           | 30.6%                           |
| Hull Bay                                  | 12   | 4  | 16           | 18.8%                           |
| Water Bay                                 | 8  |  | 8            | 9.4%                            |
| Mandahl Bay                               | 4  | 3  | 7            | 8.2%                            |
| Krum Bay                                  | 5  | 1  | 6            | 7.1%                            |
| Mangrove Lagoon                           | 4  | 2  | 6            | 7.1%                            |
| Sea Side Marina                           | 4  |  | 4            | 4.7%                            |
| Crown Bay                                 | 3  | 1  | 4            | 4.7%                            |
| Benner Bay                                | 3  |  | 3            | 3.5%                            |
| Sapphire Marina                           | 3  |  | 3            | 3.5%                            |
| American Yacht Harbor                     | 1  | 2  | 3            | 3.5%                            |
| Cruz Bay, STJ                             | 2  |  | 2            | 2.4%                            |
| Saga Haven                                | 2  |  | 2            | 2.4%                            |
| Subbase                                   | 2  |  | 2            | 2.4%                            |
| Coral Bay, STJ                            | 1  | 1  | 2            | 2.4%                            |
| Caneel Bay, STJ                           |  | 2  | 2            | 2.4%                            |
| Waterfront                                | 1  |  | 1            | 1.2%                            |
| Brewers Bay                               | 1  |  | 1            | 1.2%                            |
| Kettle Bay, STJ                           | 1  |  | 1            | 1.2%                            |
| Government Ramp at<br>Sandfill            | 1  |  | 1            | 1.2%                            |
| Vila Olga                                 | 1  |  | 1            | 1.2%                            |
| Compass Pt.                               |  | 1  | 1            | 1.2%                            |
| BVI                                       |  | 1  | 1            | 1.2%                            |
| # of fishers responding                   | 85   | 18   | 85           | -                               |

<sup>1</sup>Landing sites are on STT unless indicated by STJ or British Virgin Islands.

STX fishers reported landing their fish at 19 different locations on STX (Table 21b). The most important landing sites were: Altona Lagoon in Christiansted, the Molasses Dock adjacent to the container port on the south side of STX, and the Frederiksted fishermen's pier and boat ramps. These three sites have been developed (Altona Lagoon and Frederiksted) and/or are maintained by the DPNR DFW using US Department of Interior, Fish and Wildlife Service, Sport Fish Restoration grant funding. They were commonly used by both commercial and recreational fishers.

Table 21.b. (Q. 21). The number and percentage of STX fishers using landing sites.

| <b>St. Croix Landing Sites</b> | <b>Number of Fishers Using Site - Primary Site</b> | <b>Number of Fishers Using Site - Secondary Site</b> | <b>Total</b> | <b>Percent of Fishers using Site</b> |
|--------------------------------|--|--|--------------|--------------------------------------|
| Altona Lagoon                  | 24   | 26   | 50           | 45.87%                               |
| Molasses Dock                  | 25   | 21   | 46           | 42.20%                               |
| Frederiksted                   | 29   | 9  | 38           | 34.86%                               |
| Salt River                     | 5  | 5  | 10           | 9.17%                                |
| Gallows Bay                    | 9  |  | 9            | 8.26%                                |
| Christiansted                  | 3  | 3  | 6            | 5.50%                                |
| Castle Nugent                  | 4  | 1  | 5            | 4.59%                                |
| Teague Bay                     | 2  |  | 2            | 1.83%                                |
| St. Croix Marine               | 2  |  | 2            | 1.83%                                |
| Turners Hole                   | 1  |  | 1            | 0.92%                                |
| Water Gut                      | 1  |  | 1            | 0.92%                                |
| Williams Delight               | 1  |  | 1            | 0.92%                                |
| Bryan's Marine Ramp            | 1  |  | 1            | 0.92%                                |
| Airport                        | 1  |  | 1            | 0.92%                                |
| South Shore                    | 0  | 1  | 1            | 0.92%                                |
| Longford                       | 0  | 1  | 1            | 0.92%                                |
| Yacht Club                     | 0  | 1  | 1            | 0.92%                                |
| Chabert Beach                  | 1  |  | 1            | 0.92%                                |
| Croix Lagoon – East of HOVENSA |  | 1  | 1            | 0.92%                                |
| # of fishers responding        | 109  | 69   | 109          | -                                    |

Most (78.8%) STT/STJ fishers landed their fish at only one site (Table 21c). In contrast, 63.3% of STX fishers reported using two or more landing sites. Unlike STT/STJ, where fishers permanently moor their vessels, keep them at a slip, or haul them onshore at one location, most fishers on STX trailered their boats and used different landing sites depending on the prevailing wind conditions. The three most popular boat launching and landing sites on STX were on the north side (Altona Lagoon), south side (Molasses Dock) and west side (Frederiksted, adjacent to the Frederiksted Fish Market).

Table 21.c. (Q. 21). The number of landing sites used by fishers.

| Number of landing sites reported by fishers <sup>1</sup> | STT/STJ   |              | STX       |              | USVI       |              |
|--|-----------|--------------|-----------|--------------|------------|--------------|
|  | N         | Percent      | N         | Percent      | N          | Percent      |
| 1  | <b>67</b> | <b>78.8%</b> | 40        | 36.7%        | <b>107</b> | <b>55.2%</b> |
| 2  | 18        | 21.2%        | <b>69</b> | <b>63.3%</b> | 87         | 44.8%        |
| # of fishers responding                                  | 85        | 100.0%       | 109       | 100.0%       | 194        | 100.0%       |

<sup>1</sup>Note that fishers were asked for only their primary and secondary landing sites. Some provided a third site. On STX it is likely that fishers who trailer their boats use all three main boat ramp sites and sometimes other sites such as the undeveloped Salt River dirt ramp.

Note: The most common response is in bold type.

**Question 22. How much of your catch is iced (on board & during retail sale)?**

**All**   > ¾     ¾ - ½     ½ - ¼     **none**

Greater than 90% of fishers in both districts iced > 50% of their fish with >90% in STT/STJ and >85% in STX icing all their fish. Only a small proportion of fishers (6.8%) did not ice their catch (Table 22). Lobsters were marketed live to bring the best price.

Table 22 (Q. 22). Frequency distribution of the proportion of fish caught that is iced in both districts.

| Proportion of fish iced | STT/STJ   |                    | STX       |                    | USVI       |                    |
|-------------------------|-----------|--------------------|-----------|--------------------|------------|--------------------|
|                         | N         | Percent of fishers | N         | Percent of fishers | N          | Percent of fishers |
| All                     | <b>76</b> | <b>91.6%</b>       | <b>92</b> | <b>85.9%</b>       | <b>168</b> | <b>88.4%</b>       |
| >3/4                    | 1         | 1.2%               | 2         | 1.9%               | 3          | 1.6%               |
| 3/4 - 1/2               | 1         | 1.2%               | 3         | 2.8%               | 4          | 2.1%               |
| 1/4 - 1/2               | 0         | 0.0%               | 2         | 1.9%               | 2          | 1.1%               |
| 0                       | 5         | 6.0%               | 8         | 7.5%               | 13         | 6.8%               |
| # of fishers responding | 83        | 100.0%             | 107       | 100.0%             | 190        | 100.0%             |

Note: The most common response is in bold type.

**Question 23. Where do you sell your fish? Identify and rank according to sales value.**

\_\_\_\_\_ # [ ] Government market    \_\_\_\_\_ # [ ] Home    \_\_\_\_\_ # [ ] At landing site  
 \_\_\_\_\_ # [ ] Along road    \_\_\_\_\_ # [ ] Own fish store    \_\_\_\_\_ # [ ] Another fisher (buyer)  
 \_\_\_\_\_ # [ ] Retail store    \_\_\_\_\_ # [ ] Hotel    \_\_\_\_\_ # [ ] Restaurant  
 \_\_\_\_\_ # [ ] Private customer (type of customer \_\_\_\_\_)    \_\_\_\_\_ # [ ] Do not sell  
 \_\_\_\_\_ # [ ] other (specify): \_\_\_\_\_



In order to sell all their fish, individual fishers usually sell at a variety of locations including government markets, roadside sites, private customers and businesses such as restaurants, hotels, and retail markets (Table 23a). Figures 9 - 11 show the location of government and some of the roadside markets on each island. The majority of fishers in the USVI sell their fish in more than one location (61.1%, Table 23b). The percentage is higher on STX (65.7%) than on STT/STJ (54.9%).

On STT/STJ fishers sold their fish predominately (in order of importance) along the road, to private customers, to restaurants and at government markets (Table 23a). Fishers on STT/STJ who sold their fish along the road, sold them predominately adjacent to Fort Mylner Shopping Center and at the turn off to Coki Beach (Table 23c). They generally sold their fish from the back of their trucks. Iced/frozen fish were kept in coolers and fresh/thawing fish were displayed on ice on plastic sheets on the back of the truck.

In general, “private customers” consisted of neighbors, friends, co-workers, family, and acquaintances that contact fishers and order fish that are either delivered to customers or picked up at home of fisher.

The Gustave Quetel Fish House in Frenchtown is the most important government market on STT/STJ (Table 23c). This is because it is located on the shore and adjacent to a small dock, concrete break-front, large boat ramp and moorings for fishers’ boats. Frenchtown fishers dock along the break-front, moor their boats just offshore or haul their boats on shore for storage on the concrete ramp in front of the market. It also has the best facilities of any of the government markets. The Gustave Quetel Fish House provides fishers tables for cleaning and displaying fish and small rooms for rent. The rooms have a freshwater spigot and electricity. Fishers store their gear and keep freezers for freezing fish in the rooms. They pay a flat rate for use of water, electricity, and room rent. The Lionel Roberts Stadium market has freshwater and fish cleaning tables. Market Square is an historic open-air market. It was traditionally used by farmers and fishers to sell their produce and fish, respectively. Farmers sold their produce on the tables provided under a roof. Fishers sold their fish from the back of their trucks parked adjacent to the market. There were no facilities for cleaning or displaying fish. Market Square has been closed for several years for reconstruction. Farmers and fishers were relocated to the parking lot Emancipation Garden and now sell their produce and fish only on Saturdays at this location from the backs of their trucks. There is no government fish market on STJ.

On STX fishers sold their fish predominately (in order of importance) from home, at their landing site, along the road, to restaurants, to private customers and at government markets (Table 23a). Fishers on STX sell fish at a variety of locations on the island. Often, fish stands for displaying fish in coolers and

cleaning fish are set up roadside. Fishers may own or rent the land the stand is on. Other fishers are more mobile and sell fish roadside near shopping areas.

Government markets were less important on STX than on STT/STJ (Table 23a). In the past, there were two government markets with facilities for cleaning fish, including running water: Albert Edwards Fish Market in Frederiksted and the La Reine Fish Market. The latter was the most important, but it has been closed since at least 2010 because there was no financially sustainable way to maintain the fish house and dispose of the fish waste. No sewer line runs close to the market so all fish waste had to be hauled away. The Frederiksted market no longer has running water. However, it is adjacent to the sea and fishers can haul buckets of sea water to clean fish and clean the facility once they are finished. Of the two government markets, the LaReine site is still used the most because of its central location (Table 23d). However, the facilities are not used. Instead, fishers have constructed fish stands away from the fish house, closer to the road, and across from the farmer's market. There is also a separate fish cleaning area that customers can bring their fish for cleaning. The fish cleaners haul away the fish waste in buckets when they leave.

Table 23.a. (Q. 23). Number and percent of fishers selling their catch at various types of locations.

| Locations for selling catch   | STT/STJ   |              | STX       |              | USVI      |              |
|-------------------------------|-----------|--------------|-----------|--------------|-----------|--------------|
|                               | N         | Percent      | N         | Percent      | N         | Percent      |
| Gov't market                  | 30        | 36.6%        | 28        | 25.9%        | 58        | 30.5%        |
| Home                          | 5         | 6.1%         | <b>45</b> | <b>41.7%</b> | 50        | 26.3%        |
| Landing site <sup>1</sup>     | 6         | 7.3%         | 42        | 38.9%        | 48        | 25.3%        |
| Along road                    | <b>35</b> | <b>42.7%</b> | 42        | 38.9%        | <b>77</b> | <b>40.5%</b> |
| Own fish store                | 0         | 0.0%         | 0         | 0.0%         | 0         | 0.0%         |
| Another fisher (buyer)        | 0         | 0.0%         | 1         | 0.9%         | 1         | 0.5%         |
| Retail store                  | 0         | 0.0%         | 1         | 0.9%         | 1         | 0.5%         |
| Hotel                         | 6         | 7.3%         | 15        | 13.9%        | 21        | 11.1%        |
| Restaurant                    | 32        | 39.0%        | 41        | 38.0%        | 73        | 38.4%        |
| Supermarket                   | 4         | 4.9%         | 4         | 3.7%         | 8         | 4.2%         |
| Private customer <sup>2</sup> | 34        | 41.5%        | 38        | 35.2%        | 72        | 37.9%        |
| Do not sell                   | 1         | 1.2%         | 0         | 0.0%         | 1         | 0.5%         |
| Other                         | 4         | 4.9%         | 10        | 9.3%         | 14        | 7.4%         |
| # of fishers responding       | 82        | -            | 108       | -            | 190       | -            |

<sup>1</sup>Landing sites are listed in Tables 21a, b.

<sup>2</sup>Type of private customer were usually friends, family, or long-term customers who often fell under "friend".

Note: The most common response is in bold type.

Note: Fishers could respond with multiple answers. The total percentage divided by 100 is a measure of the mean number of locations that an individual fisher used to sell his catch.

Note: The most common response is in bold type.

A higher percentage of fishers on STT/STJ (45.1%) sell at only one location than on STX (34.5%) (Table 23b). However, more than half of all the fishers in both districts sell at more than one location with STX fishers selling fish at up to seven locations.

Table 23.b. (Q. 23). The number and percentage of different locations or entities that fishers utilized to sell their catch. This includes non-specific locations such as "restaurant, "roadside," etc.

| Number<br>Of Locations | STT/STJ   |              | STX       |              | USVI      |              |
|------------------------|-----------|--------------|-----------|--------------|-----------|--------------|
|                        | N         | Percent      | N         | Percent      | N         | Percent      |
| 1                      | <b>37</b> | <b>45.1%</b> | <b>37</b> | <b>34.3%</b> | <b>74</b> | <b>38.9%</b> |
| 2                      | 20        | 24.4%        | 26        | 24.1%        | 46        | 24.2%        |
| 3                      | 21        | 25.6%        | 19        | 17.6%        | 40        | 21.1%        |
| 4                      | 3         | 3.7%         | 13        | 12.0%        | 16        | 8.4%         |
| 5                      | 1         | 1.2%         | 7         | 6.5%         | 8         | 4.2%         |
| 6                      | 0         | 0.0%         | 4         | 3.7%         | 4         | 2.11%        |
| 7                      | 0         | 0.0%         | 2         | 1.9%         | 2         | 1.05%        |
| # fishers responding   | 82        | 100.0%       | 108       | 100.0%       | 190       | 100.0%       |

Note: The most common response is in bold type.

Table 23.c. (Q. 23). Fish market sites used by STT/STJ fishers. Other markets include traditional roadside markets and other non-government market sites.

| Market Site                                     | Gov't Markets |              | Along Road |              | Other Markets |              | Total     |              |
|---|---------------|--------------|------------|--------------|---------------|--------------|-----------|--------------|
|   | N             | Percent      | N          | Percent      | N             | Percent      | N         | Percent      |
| Gustave Quetel Fish House <sup>1</sup>          | <b>21</b>     | <b>77.8%</b> |            |              |               |              | <b>21</b> | <b>52.5%</b> |
| Market Square <sup>2</sup>                      | 5             | 18.5%        |            |              |               |              | 5         | 12.5%        |
| Lionel Roberts Stadium <sup>1</sup>             | 1             | 3.7%         |            |              |               |              | 1         | 2.5%         |
| Fort Mylner <sup>3</sup>                        |               |              | 3          | 33.3%        |               |              | 3         | 7.5%         |
| Smith Bay/Coki Point <sup>3</sup>               |               |              | <b>4</b>   | <b>44.4%</b> |               |              | 4         | 10.0%        |
| Along road by Eudora Kean High School           |               |              | 1          | 11.1%        |               |              | 1         | 2.5%         |
| By Lone Eagle Store                             |               |              | 1          | 11.1%        |               |              | 1         | 2.5%         |
| Charlotte Amalie Waterfront                     |               |              |            |              | <b>3</b>      | <b>75.0%</b> | 3         | 7.5%         |
| St. Thomas Airport                              |               |              |            |              | 1             | 25.0%        | 1         | 2.5%         |
| # of fishers who said they sold fish at markets | 27            | 100.0%       | 9          | 100.0%       | 4             | 100.0%       | 40        | 100.0%       |

<sup>1</sup>Government fish market sites with facilities for fish sales.

<sup>2</sup>Government market - primarily vegetable market – closed at the time of this survey.

<sup>3</sup>Traditional roadside market sites on the side of government roads.

Note: The most common response is in bold type.

About half (46.4%) of STX fishers that reported using a government market stated the market that they used (Table 23d). Only 8% of fishers used the Frederiksted market. The rest sold their fish on the

grounds of the now closed LaReine market. While almost 39% of fishers said they sell their fish along the road, few (7%) reported where they sold fish.

Table 23.d. (Q. 23). Fish market sites used by STX fishers.

| Market Site                 | Government Markets |              | Along the Road |              | Other |         | Total     |               |
|-----------------------------|--------------------|--------------|----------------|--------------|-------|---------|-----------|---------------|
|                             | N                  | Percent      | N              | Percent      | N     | Percent | N         | Percent       |
| La Reine <sup>1</sup>       | <b>12</b>          | <b>92.3%</b> |                |              |       |         | <b>12</b> | <b>57.14%</b> |
| Frederiksted <sup>1</sup>   | 1                  | 7.7%         |                |              |       |         | 1         | 4.76%         |
| Rented space along road     |                    |              | 1              | 33.3%        |       |         | 1         | 4.76%         |
| Adjacent to supermarket     |                    |              | <b>2</b>       | <b>66.7%</b> |       |         | 2         | 9.52%         |
| Warehouse near landing site |                    |              |                |              | 1     | 20.00%  | 1         | 4.76%         |
| South shore farmer's market |                    |              |                |              | 1     | 20.00%  | 1         | 4.76%         |
| Drives around               |                    |              |                |              | 1     | 20.00%  | 1         | 4.76%         |
| Bryan's Marine              |                    |              |                |              | 1     | 20.00%  | 1         | 4.76%         |
| Gallows Bay                 |                    |              |                |              | 1     | 20.00%  | 1         | 4.76%         |
| # of fishers responding     | 13                 | 100.00%      | 3              | 100.00%      | 5     | 100.00% | 21        | 100.00%       |

<sup>1</sup>Government fish markets – most fishers did not state the market they sold their fish at.

Note: The most common response is in bold type.

Note: No fisher responded saying they sold fish at more than one of the government markets.

#### Question 24: Where do you keep your boat? Home Other (specify \_\_\_\_\_)

STT/STJ fishers kept their boats at 23 different locations, 20 locations on STT, two on STJ and one in the BVI (Table 24a). The location of most of these sites are shown in Figures 9 and 10. The largest number of boats were moored, docked or hauled out and stored on the boat ramp in Frenchtown, STT. Twelve sites on STT/STJ were used by only one boat (Table 24a) and only eight fishers (9.8%) said they trailered their boats or kept them at home. In contrast, over 76.8% of the boats on STX were trailered and kept at home (Table 24b). Boats were also kept at 12 other sites on STX. The location of most coastal boat storage sites on STX are shown in Figure 11.

St. Croix has a large southern coastal plain extending from Frederiksted to Great Pond. Most homes are built on relatively flat land and the major roads run predominately east to west along the southern plain. It is easier to trailer a boat on STX. The major southern coast roads are built more like continental US roads than the roads on St. Thomas and St. John. They are wider with shoulders and low inclines. The three public boat ramps on STX (Frederiksted Fish Market, Gallows Bay, and Molasses Dock) have plenty of space to launch a boat and parking areas are allocated for vehicles and trailers. The three STX

ramps are positioned around the island to allow access to the mid-island northern and southern coasts and the west coast.

Table 24.a. (Q. 24). Percentage of STT/STJ fishers who used various locations to keep their boats. Ports in STJ are listed as such. All other ports are located in STT.

| <b>Port or Storage Site</b> | <b>Count of 1<sup>st</sup> Port</b> | <b>Count of 2<sup>nd</sup> Port</b> | <b>Total</b> | <b>Percent</b> |
|-----------------------------|-------------------------------------|-------------------------------------|--------------|----------------|
| Frenchtown                  | 22                                  |                                     | 22           | 26.8%          |
| Hull Bay                    | 12                                  |                                     | 12           | 14.6%          |
| Home                        | 7                                   | 1                                   | 8            | 9.8%           |
| Water Bay                   | 7                                   |                                     | 7            | 8.5%           |
| Krum Bay                    | 4                                   |                                     | 4            | 4.9%           |
| Crown Bay                   | 3                                   | 1                                   | 4            | 4.9%           |
| Sea Side Marina             | 4                                   |                                     | 4            | 4.9%           |
| Mandahl                     | 2                                   |                                     | 2            | 2.4%           |
| Sandfill                    | 2                                   |                                     | 2            | 2.4%           |
| Benner Bay                  | 2                                   |                                     | 2            | 2.4%           |
| Compass Point               | 1                                   | 1                                   | 2            | 2.4%           |
| Saga Haven                  | 2                                   |                                     | 2            | 2.4%           |
| American Yacht Harbor       | 1                                   |                                     | 1            | 1.2%           |
| Coral Bay, STJ              | 1                                   |                                     | 1            | 1.2%           |
| Cruz Bay, STJ               | 1                                   |                                     | 1            | 1.2%           |
| Magen's Bay                 | 1                                   |                                     | 1            | 1.2%           |
| Red Hook                    | 1                                   |                                     | 1            | 1.2%           |
| Sapphire Marina             | 1                                   |                                     | 1            | 1.2%           |
| Brewers Bay                 | 1                                   |                                     | 1            | 1.2%           |
| Coki Point                  | 1                                   |                                     | 1            | 1.2%           |
| Vila Olga                   | 1                                   |                                     | 1            | 1.2%           |
| Mangrove Lagoon             | 1                                   |                                     | 1            | 1.2%           |
| BVI                         | 1                                   |                                     | 1            | 1.2%           |
| # of fishers responding     | 79                                  | 3                                   | 82           | 100%           |

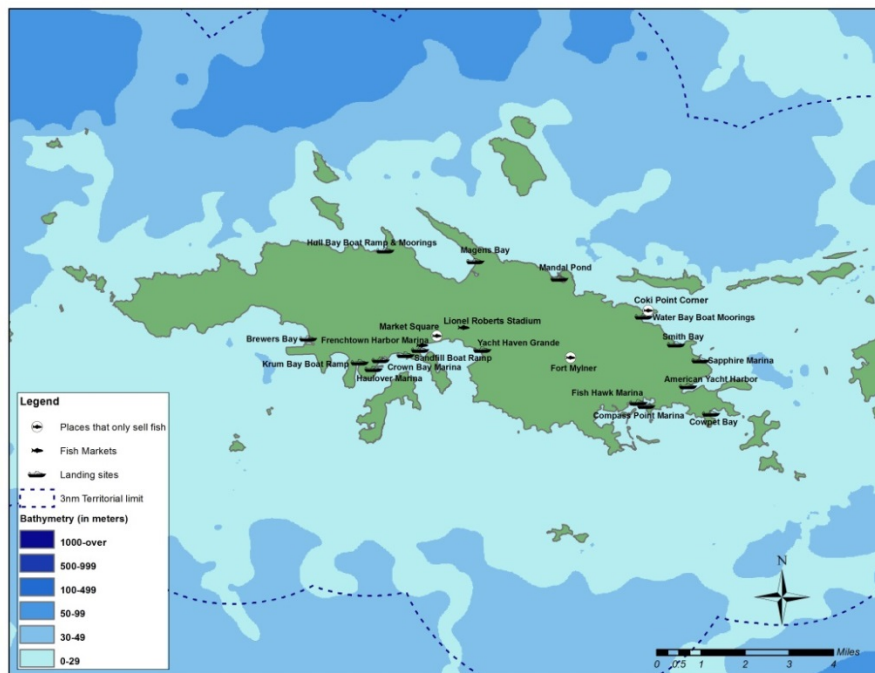


Figure 9. Location of landing sites and fish markets on St. Thomas.

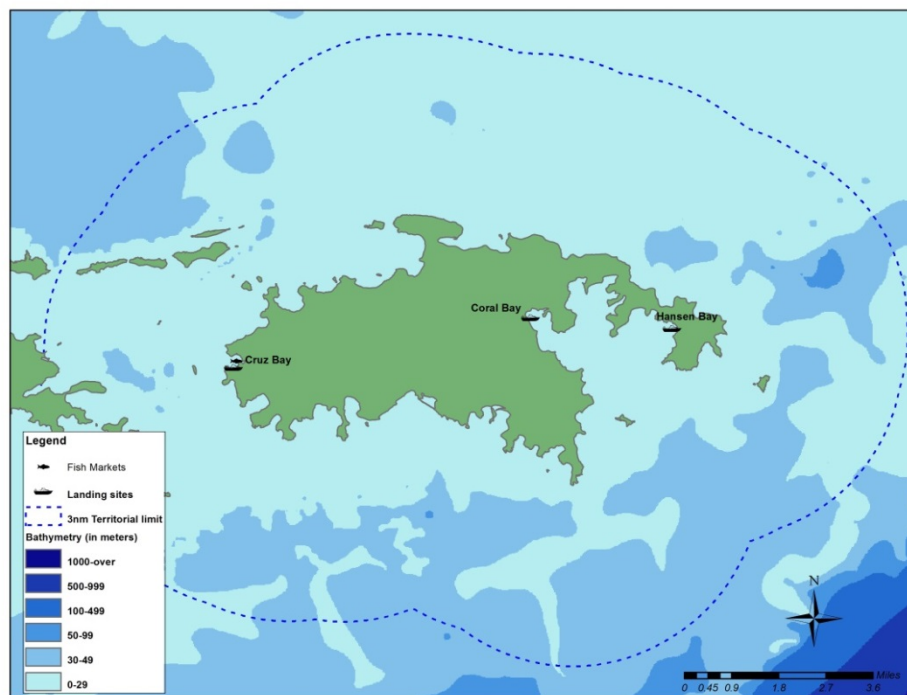


Figure 10. Location of landing sites and fish markets on St. John.

Table 24.b. (Q. 24). Boat storage locations on STX.

| Port or Storage Site         | Frequency | Percent |
|------------------------------|-----------|---------|
| Home                         | 83        | 76.8%   |
| Gallows Bay                  | 6         | 5.5%    |
| Christiansted dock           | 3         | 2.8%    |
| Private property             | 3         | 2.8%    |
| Chabert Beach, Christiansted | 2         | 1.9%    |
| Salt River Marina            | 2         | 1.9%    |
| Teague Bay                   | 2         | 1.9%    |
| Water Gut                    | 2         | 1.9%    |
| Bethlehem                    | 1         | 0.9%    |
| Bryan's Marine               | 1         | 0.9%    |
| Castle Nugent                | 1         | 0.9%    |
| St Croix Marine              | 1         | 0.9%    |
| White Lady                   | 1         | 0.9%    |
| # of fishers responding      | 108       | 100.0%  |

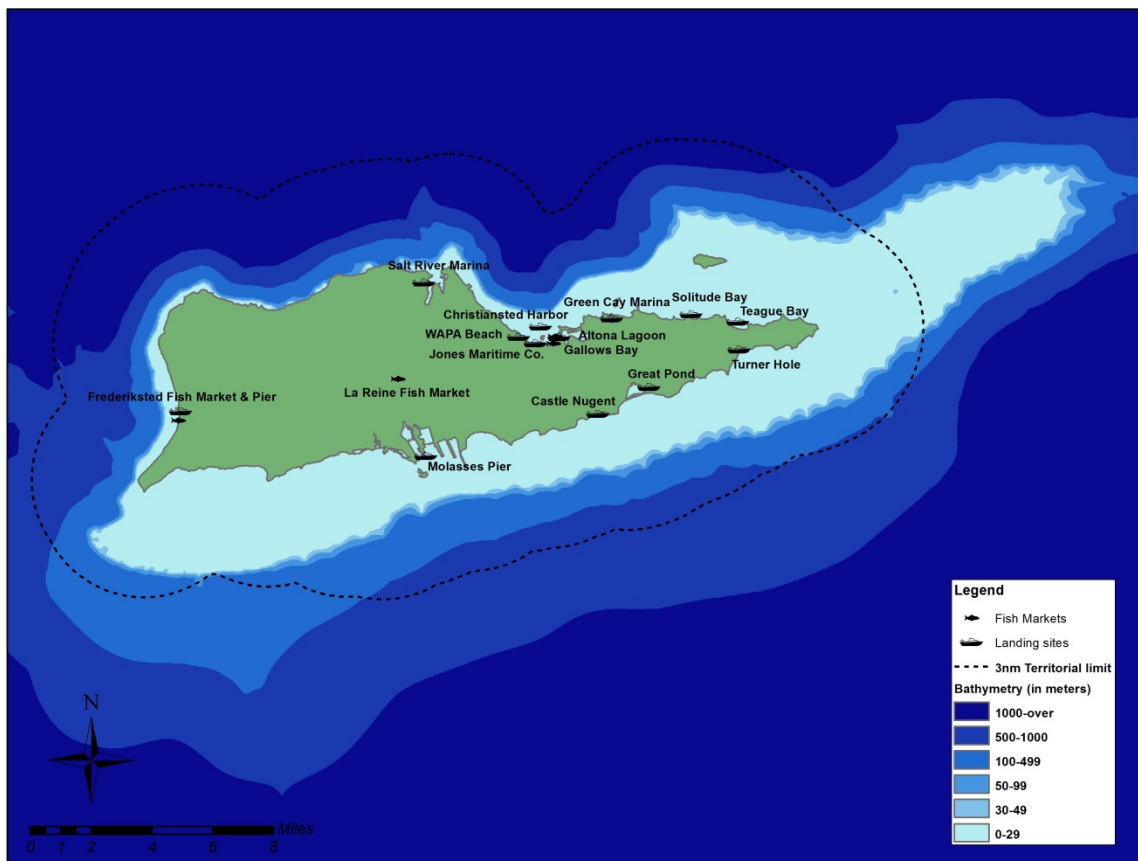


Figure 11. Location of landing sites and fish markets on St. Croix.

In contrast, STT/STJ is mountainous with steep narrow roads making it difficult to trailer a boat. There are five public boat ramps on STT: Benner Bay (Mangrove Lagoon), Frenchtown – Gustave Quetel Fish House, Sandfill, Krum Bay, and Hull Bay. Benner Bay, Frenchtown, and Hull Bay ramps are not easily accessed by vehicles with boat trailers because of cramped access, a steep road to the ramp, and/or a busy road adjacent to ramp. Only the Hull Bay ramp has parking for boats and trailers, but it is limited. Land along the coast on STT/STJ is very expensive and most is already in private use for homes, businesses, or marinas or in public use for ports, parks, public docks, cruise ship docking, or government department marinas. Hull Bay and Benner Bay ramps only accommodate very shallow draft boats. The Sandfill ramp is adjacent to the container port and is used sometimes by barges to off-load materials. Barges also use the Krum Bay ramp sometimes. The Krum Bay and Hull Bay ramps were developed by DFW with Sportfish Restoration funds.

### **Question 25 – Boat Information**

***Question 25a: Number of fishing boats \_\_\_\_ and \_\_\_\_ dinghies used for commercial fishing in the last 3 years?***

Most fishers owned only one fishing boat (Table 25a & b). Only 13 fishers who responded to this question did not own a boat (Table 25a). Fishers who did not own a boat generally fished with another fisher or were not fishing for a variety of reasons, but many because of illness. A slightly higher proportion of STT/STJ fishers owned more than one boat (27.4%) than STX fishers (18.0%).

The total number fishing boats (excluding dinghies) owned by fishers, was 129 on STX and 104 on STT/STJ (Table 25b). Most boats were actively used in the fishery in the past year. Fishers who own more than one fishing boat may do so to make sure they always have a boat available for fishing. They often were fixing one or more boats, while using another. Others had a larger boat that they used for most fishing and a smaller one for catching bait inshore. A few recently purchased new boats and may sell their old boat or have unrepaired boats that they may eventually sell.

On STX only one fisher reported owning a dinghy, while on STT/STJ nine fishers reported owning one dinghy and one fisher reported owning two dinghies. Some of the dinghies may be used by fishers in shallow, protected areas to harvest bait. For some fishers, a small dinghy-sized boat (generally  $\leq 12$  ft) was their only boat and they may use it for fishing close to shore, for seine net fishing, and when the weather is calm to access inshore fishing grounds. However, some fishers who only owned a boat  $\leq 12$  ft were not currently fishing and some had sold their main fishing boat and only retained their dinghy.



Table 25.a. (Q. 25a). Frequency distribution of the number of fishing boats (excluding dinghies) owned by fishers and used for commercial fishing within the last three years.

| Number of fishing boats | STT/STJ   |              | STX       |              | USVI       |              |
|-------------------------|-----------|--------------|-----------|--------------|------------|--------------|
|                         | N         | Percent      | N         | Percent      | N          | Percent      |
| 0                       | 8         | 9.5%         | 5         | 4.5%         | 13         | 6.7%         |
| 1                       | <b>53</b> | <b>63.1%</b> | <b>86</b> | <b>77.5%</b> | <b>139</b> | <b>71.3%</b> |
| 2                       | 18        | 21.4%        | 17        | 15.3%        | 35         | 17.9%        |
| 3                       | 5         | 6.0%         | 3         | 2.7%         | 8          | 4.1%         |
| # fishers responding    | 84        | 100.0%       | 111       | 100.0%       | 195        | 100.0%       |

<sup>1</sup>If fishers co-owned a boat or boats, the number of boats was divided among the fishers and rounded up to the next whole number.

Note: The most common response is in bold type.

Table 25.b. (Q. 25a). Descriptive statistics on the number of boats owned by fishers and used within the last 3 yrs. Dinghies excluded.

|                         | STT/STJ           | STX               | USVI              |
|-------------------------|-------------------|-------------------|-------------------|
| Mean (SD <sup>1</sup> ) | 1.3 ( $\pm 0.7$ ) | 1.2 ( $\pm 0.5$ ) | 1.2 ( $\pm 0.6$ ) |
| Range                   | 0 – 3             | 0 - 3             | 0 - 3             |
| Number of fishers       | 83                | 111               | 194               |
| # boats                 | 104               | 129               | 233               |

<sup>1</sup>SD = Standard Deviation

### ***Detailed Boat Specific Information***

Fishers were asked the following questions about their main fishing boats, any other boats that they had used for commercial fishing within the last three years, any dinghies that they owned, and any spare equipment boat equipment that they had.

#### ***Question 25b: Percent ownership of the boat (%).***

Eighty percent of fishers were sole owners of the primary boat that they used for fishing (Table 25c). More fishers were sole owners on STX compared to STT/STJ, while on STT/STJ a higher percentage did not own a boat or co-owned their boat than on STX. Often co-owners were family members, e.g. brothers or husband and wife.

Table 25.c. (Q. 25b). The ownership status of the primary fishing boat. Note: The most common response is in bold type.

| Boat ownership  | STT/STJ   |              | STX       |              | USVI       |         |
|-----------------|-----------|--------------|-----------|--------------|------------|---------|
|                 | N         | Percent      | N         | Percent      | N          | Percent |
| Sole owner      | <b>64</b> | <b>80.0%</b> | <b>96</b> | <b>92.3%</b> | <b>160</b> | 87.0%   |
| Co-owner        | 10        | 12.5%        | 6         | 5.8%         | 16         | 8.7%    |
| Do not own boat | 6         | 7.5%         | 2         | 1.9%         | 8          | 4.3%    |
| # of responses  | 80        | 100.0%       | 104       | 100.0%       | 184        | 100.0%  |

Note: The most common response is in bold type.

***Question 25c: Was the boat active last year (Y/N)? If no, why?***

Most fishers provided information about whether their boat(s) (fishing boats and dinghies) were in service or not. Almost three quarters of the boats were in service during the past year (Table 25d). The number in service was slightly higher (80.3%) on STT/STJ than on STX (70.2%).

Nearly half of fishers did not provide a reason for their boat not being in service during the past year (Table 25e). However, the main reason given by those who did respond was that their boat needed repair, the fisher was not fishing, or because the fisher or a family member was ill.

Table 25.d. (Q. 25c). Number of fishing boats and dinghies in service.

| Status of boats                | STT/STJ   |              | STX       |              | USVI       |              |
|--------------------------------|-----------|--------------|-----------|--------------|------------|--------------|
|                                | N         | Percent      | N         | Percent      | N          | Percent      |
| Number of boats in service     | <b>61</b> | <b>80.3%</b> | <b>73</b> | <b>70.2%</b> | <b>134</b> | <b>74.4%</b> |
| Number of boats not in service | 15        | 19.7%        | 31        | 29.8%        | 46         | 25.6%        |
| # of responses                 | 76        | 100.0%       | 104       | 100.0%       | 180        | 100.0%       |

Note: The most common response is in bold type.

Table 25.e. (Q. 25c). Reasons given for fishing boats and dinghies not being in service.

| Reasons not in Service      | STT/STJ  |               | STX      |              | USVI      |              |
|-----------------------------|----------|---------------|----------|--------------|-----------|--------------|
|                             | N        | Percent       | N        | Percent      | N         | Percent      |
| Under repair                | <b>4</b> | <b>100.0%</b> | <b>9</b> | <b>47.2%</b> | <b>13</b> | <b>56.6%</b> |
| Not fishing                 | 0        | 0.0%          | 3        | 15.8%        | 3         | 13.1%        |
| Illness                     | 0        | 0.0%          | 3        | 15.8%        | 3         | 13.1%        |
| Full time job               | 0        | 0.0%          | 1        | 5.3%         | 1         | 4.3%         |
| Need vehicle to tow boat    | 0        | 0.0%          | 1        | 5.3%         | 1         | 4.3%         |
| Using another boat          | 0        | 0.0%          | 1        | 5.3%         | 1         | 4.3%         |
| Recently purchased the boat | 0        | 0.0%          | 1        | 5.3%         | 1         | 4.3%         |
| # fishers responding        | 4        | 100.0%        | 19       | 100.0%       | 23        | 100.0%       |

Note: The most common response is in bold type.

***Question 25d: Year boat built***

The fishing fleet in the USVI was primarily comprised of vessels that are at least 25 years old (Table 25f). Nearly 37% of primary vessels used by fishers in STT/STJ were built before 1981 while 38.1% of the boats used by STX fishers were built before 1981. Only four boats were built since 2010.

Table 25.f. (Q. 25d). Age of primary boats used by fishers.

| Age of boat             | STT/STX   |              | STX       |              | USVI      |              |
|-------------------------|-----------|--------------|-----------|--------------|-----------|--------------|
|                         | N         | Percent      | N         | Percent      | N         | Percent      |
| ≤1960                   | 5         | 7.7%         | 0         | 0.0%         | 5         | 3.1%         |
| 1961-1970               | 5         | 7.7%         | 10        | 10.3%        | 15        | 9.3%         |
| 1971-1980               | 14        | 21.5%        | <b>27</b> | <b>27.8%</b> | <b>41</b> | <b>25.3%</b> |
| 1981-1990               | <b>19</b> | <b>29.2%</b> | 16        | 16.5%        | 35        | 21.6%        |
| 1991-2000               | 10        | 15.4%        | 23        | 23.7%        | 33        | 20.4%        |
| 2001-2010               | 10        | 15.4%        | 19        | 19.6%        | 29        | 17.9%        |
| 2010+                   | 2         | 3.0%         | 2         | 2.1%         | 4         | 2.5%         |
| # of fishers responding | 65        | 100.0%       | 97        | 100.0%       | 2         | 100.0%       |

Note: The most common response is in bold type.

***Question 25e: Registration numbers for each boat owned.***

Only about half the fishers knew their boat registration number. Given the length of the interview form and fishers' impatience, we did not spend time trying to obtain the boat registration number if the fisher did not know it off hand or have his boat registration immediately available. The boat registration

number was useful in confirming who co-owners of boats were. If the boat registration card was available, interviewers could check boat length. Otherwise the boat registration number was not useful.

**Question 25f: Boat length (ft)**

The mean size of the primary fishing boats owned by STT/STJ fishers was 24.6 ft compared with 21.9 ft in STX (Table 25g). Dinghies were not included in this analysis. The largest commercial fishing boat recorded in this study was a 47 ft vessel registered in STT/STJ. Nearly three-quarters of the boats in the fishery (72.0%) were 16 - 25 ft in length (Table 25h). This was a more common size range on STX (78.5% of boats) than on STT/STJ (62.7%). More boats in STT/STJ (34.7%) were >25 ft than in STX (15.0%) (Table 25h).

Table 25.g. (Q. 25f). Length of the primary boats (feet) used by fishers. Dinghies excluded.

|                         | STT/STJ     | STX         | USVI        |
|-------------------------|-------------|-------------|-------------|
| Mean (SD <sup>1</sup> ) | 24.6 (±7.8) | 21.9 (±5.6) | 23.0 (±6.7) |
| Median                  | 23          | 21          | 22          |
| Mode                    | 18          | 20          | 18          |
| Range                   | 14 – 47     | 12 – 45     | 12 – 47     |
| # of boats              | 75          | 107         | 182         |

<sup>1</sup>SD = Standard Deviation

Table 25.h. (Q. 25f). Frequency distribution of primary boat lengths used by fishers.

| Length of boats (ft) | STT/STJ   |         | STX       |         | USVI      |              |
|----------------------|-----------|---------|-----------|---------|-----------|--------------|
|                      | N         | Percent | N         | Percent | N         | Percent      |
| 0-15                 | 2         | 2.7%    | 7         | 6.5%    | 9         | 4.9%         |
| 16-20                | 27        | 36.0%   | <b>43</b> | 40.2%   | <b>70</b> | <b>38.5%</b> |
| 21-25                | <b>20</b> | 26.7%   | 41        | 38.3%   | 61        | 33.5%        |
| 26-30                | 11        | 14.7%   | 6         | 5.6%    | 17        | 9.3%         |
| 31-35                | 6         | 8.0%    | 6         | 5.6%    | 12        | 6.6%         |
| 35-40                | 6         | 8.0%    | 2         | 1.9%    | 8         | 4.4%         |
| >40                  | 3         | 4.0%    | 2         | 1.9%    | 5         | 2.7%         |
| # boats <sup>1</sup> | 75        | 100.0%  | 107       | 100.0%  | 182       | 99.9%        |

<sup>1</sup>Number of boats with length information.

Note: The most common response is in bold type.

Dinghies were only reported on STT/STJ and generally were about 10 – 12 ft in length (Table 25i). The paucity of dinghies in both districts is a function of where the boats are kept. Most fishers on STT/STJ dock their boats or moor them close to shore. On STX most fishers trailer their boats, while only a few dock or moor their boats.

Table 25.i. (Q. 25f): Length of dinghies (feet) used by fishers.

|                         | STT/STJ     | STX <sup>2</sup> | USVI        |
|-------------------------|-------------|------------------|-------------|
| Mean (SD <sup>1</sup> ) | 10.1 (±1.9) | -                | 10.1 (±1.9) |
| Median                  | 10.5        | -                | 10.5        |
| Mode                    | 12          | -                | 12          |
| Range                   | 7 – 12      | -                | 7 - 12      |
| # of boats <sup>3</sup> | 10          | 0                | 10          |

<sup>1</sup>SD = Standard Deviation

<sup>2</sup>Only one STX fisher said he owned a dinghy and he did not report the length of the dinghy.

<sup>3</sup>No fisher reported more than one boat length.

### ***Question 25g: Number and type of engines***

All of the 76 fishers on STT/STJ and the 104 on STX who reported owning at least one boat owned at least one engine (Table 25j). Boats on STT/STJ and STX were powered primarily by outboard engines (Table 25j). About 30% of the primary fishing boats on STT/STJ boats were powered by inboard engines compared to <10% on STX. One STT/STJ boat had inboard/outboard engines, while no fisher reported using an inboard/outboard engine on STX. If a fisher owned more than one boat, they sometimes used the same engines on all the boats that they owned. In essence, the other boats provided spare hulls that they could use when the primary boat hull was being repaired.

Table 25.j. (Q. 25g). Number and percentage of fishers who used inboard, outboard, or inboard/outboard engines on the primary commercial fishing boats.

| Engine Type             | STT/STJ   |              | STX       |              | USVI       |              |
|-------------------------|-----------|--------------|-----------|--------------|------------|--------------|
|                         | N         | Percent      | N         | Percent      | N          | Percent      |
| Outboard                | <b>51</b> | <b>67.1%</b> | <b>95</b> | <b>91.3%</b> | <b>146</b> | <b>81.1%</b> |
| Inboard                 | 24        | 31.6%        | 9         | 8.7%         | 33         | 18.3%        |
| Inboard/Outboard        | 1         | 1.3%         | 0         | 0.0%         | 1          | 0.6%         |
| # of fishers responding | 76        | 100.0%       | 104       | 100.0%       | 180        | 100.0%       |

Note: The most common response is in bold type.

A higher proportion of STT/STJ fishers used only one outboard engine (74.5%) or one inboard (87.5%) on their primary fishing boats compared to STX fishers where about half of fishers used two engines (Tables 25k, l). The single fisher that reported an inboard/outboard engine was on STT/STJ and he had only one engine on his boat. One fisher on STX reported not having any engines for his primary boat because he only used it to deploy his net.

Table 25.k. (Q. 25g). Number and percentage of fishers who used one or two outboard engines on their primary fishing boat.

| No. outboard engines per boat                    | STT/STJ   |              | STX             |              | USVI      |              |
|--|-----------|--------------|-----------------|--------------|-----------|--------------|
|  | N         | Percent      | N               | Percent      | N         | Percent      |
| 1  | <b>38</b> | <b>74.5%</b> | <b>52</b>       | <b>53.6%</b> | <b>90</b> | <b>60.8%</b> |
| 2  | 13        | 25.5%        | 45              | 46.4%        | 58        | 39.2%        |
| # of primary fishing boats with outboard engines | 51        | 100.00%      | 97 <sup>1</sup> | 100.00%      | 148       | 100.00%      |

<sup>1</sup>One fisher provided the number of engines on his boat but not the engine hp.

Note: The most common response is in bold type.

Table 25.l. (Q. 25g): Number and percentage of fishers who used one or two inboard engines on their primary fishing boat.

| No. inboard engines per boat            | STT/STJ   |              | STX      |              | USVI      |              |
|---|-----------|--------------|----------|--------------|-----------|--------------|
|   | N         | Percent      | N        | Percent      | N         | Percent      |
| 1                                       | <b>21</b> | <b>87.5%</b> | 4        | 44.4%        | <b>25</b> | <b>75.8%</b> |
| 2                                       | 3         | 12.5%        | <b>5</b> | <b>55.6%</b> | 8         | 24.2%        |
| # of fishing boats with inboard engines | 24        | 100.0%       | 9        | 100.0%       | 33        | 100.0%       |

Note: The most common response is in bold type.

#### ***Question 25h: Horsepower of engines.***

A wide range of engine sizes was used by fishers (Table 25m, n, o). Individual outboard and inboard engines ranged from 15 to 300 hp and 15 – 671 hp, respectively (Table 25m). Fishers predominantly used outboard engines ranging in size from 76 – 150 hp (Table 25n) and inboard engines ranging in size from 151 – 300 hp; Table 25o).

Average individual outboard engine size on STX was slightly smaller (91.2 hp) than STT/STJ (110.6 hp) (average engine size was counted only once per vessel since vessels when two engines had the same hp for each engine) (Table 25m). A higher percentage of boats on STX had two engines compared to STT/STJ (Tables 25k, l). The mean total hp of outboard engines were slightly larger on STX compared to STT/STJ (Table 25m), but there was a large amount of variability (standard deviation is nearly 50% of the mean on STT/STJ and greater than 50% of mean on STX) likely related to boat size and frequency of fishing. A couple STT/STJ fishers had one large and one small outboard engine which were likely spares or trolling engines. These were not included in the total hp or mean engine size.

The results were the reverse for the horsepower of inboard engines with STX fishers having smaller inboard engines on average (225.6 hp) than STT/STJ (290.8 hp). However, more STX fishers had two inboard engines on 44.4% of boats than STT/STJ fishers (12.5%) and, thus, the average total inboard

horsepower was larger on STX than STT/STJ. The only fisher reporting an inboard/outboard engine was on STT/STJ and it had a 310 hp engine.

Table 25.m. (Q. 25h). Average horsepower of individual engines (if a boat had two engines of the same size only one counted in calculations) and total horse power per boat (if two engines, total hp includes both engines) of outboard and inboard engines used by fishers on their primary vessel.

| Type of Engine             | STT/STJ              |                   | STX                  |                   | USVI                 |                   |
|----------------------------|----------------------|-------------------|----------------------|-------------------|----------------------|-------------------|
| <i>Outboard Engines hp</i> |                      |                   |                      |                   |                      |                   |
|                            | Individual Engine hp | Total Engine hp   | Individual Engine hp | Total Engine hp   | Individual Engine hp | Total Engine hp   |
| Mean (SD <sup>1</sup> )    | 110.6<br>(±72.5)     | 132.9<br>(±92.5)  | 91.2<br>(±58.3)      | 139.6<br>(+109.3) | 98.0<br>(+64.0)      | 137.1<br>(±103.6) |
| Median                     | 115                  | 120               | 85                   | 120               | 85                   | 120               |
| Mode                       | 40                   | 40                | 85                   | 170               | 85                   | 40                |
| Range                      | 20-300               | 20-450            | 3.5-300              | 3.5-600           | 3.5-300              | 3.5- 600          |
| N <sup>2</sup>             | 51                   | 51                | 95                   | 95                | 146                  | 146               |
|                            |                      |                   |                      |                   |                      |                   |
| <i>Inboard Engines hp</i>  |                      |                   |                      |                   |                      |                   |
| Mean (SD <sup>1</sup> )    | 290.8 (±210.1)       | 326.0<br>(±240.0) | 225.0 (±140.7)       | 366.1<br>(+285.1) | 272.4 (±193.2)       | 337.3<br>(±249.4) |
| Median                     | 210                  | 225               | 200                  | 350               | 205                  | 232.5             |
| Mode                       | 200                  | 200               | 200                  | 200               | 200                  | 200               |
| Range                      | 40-671               | 40-870            | 15-500               | 15-1000           | 15-671               | 15-1000           |
| N <sup>2</sup>             | 23                   | 23                | 9                    | 9                 | 32                   | 32                |

<sup>1</sup>SD = Standard Deviation

<sup>2</sup>Number of boats reporting the size and number of their engines.

Note: Spare or trolling engines were not included.

Table 25.n. (Q. 25h). The number and percentage of outboard engines in different horsepower (hp) classes used by fishers on their primary fishing boat.

| Engine hp  | STT/STJ   |              | STX       |              | USVI      |              |
|--|-----------|--------------|-----------|--------------|-----------|--------------|
|  | N         | Percent      | N         | Percent      | N         | Percent      |
| ≤25  | 3         | 5.9%         | 13        | 13.7%        | 16        | 11.0%        |
| 26-50  | 14        | 27.5%        | 10        | 10.5%        | 24        | 16.4%        |
| 51-75  | 5         | 9.8%         | 12        | 12.6%        | 17        | 11.6%        |
| 76-100   | 3         | 5.9%         | <b>34</b> | <b>35.8%</b> | <b>37</b> | <b>25.3%</b> |
| 101-150  | <b>15</b> | <b>29.4%</b> | 14        | 14.7%        | 29        | 19.9%        |
| 151-200  | 6         | 11.8%        | 9         | 9.5%         | 15        | 10.3%        |
| >200   | 5         | 9.8%         | 3         | 3.2%         | 8         | 5.5%         |
| # of primary fishing boats with outboard engines | 51        | 100.0%       | 95        | 100.0%       | 146       | 100.0%       |

Note: The most common response is in bold type.

Table 25.o. (Q. 25h). The number and percentage of inboard engines in different horsepower (hp) classes used by fishers on their primary fishing boat.

| Engine hp                                       | STT/STJ  |               | STX      |               | USVI     |               |
|---|----------|---------------|----------|---------------|----------|---------------|
|   | N        | Percent       | N        | Percent       | N        | Percent       |
| ≤100  | 4        | 17.39%        | 2        | 22.22%        | 6        | 18.75%        |
| 101-150   | 2        | 8.70%         | 0        | 0.00%         | 2        | 6.25%         |
| 151-200   | <b>5</b> | <b>21.74%</b> | <b>3</b> | <b>33.33%</b> | <b>8</b> | <b>25.00%</b> |
| 201-300   | <b>5</b> | <b>21.74%</b> | 2        | 22.22%        | 7        | 21.88%        |
| 301-400   | 0        | 0.00%         | 1        | 11.11%        | 1        | 3.13%         |
| 401-500   | 3        | 13.04%        | 1        | 11.11%        | 4        | 12.50%        |
| >500  | 4        | 17.39%        | 0        | 0.00%         | 4        | 12.50%        |
| # of primary fishing boats with inboard engines | 23       | 100.00%       | 9        | 100.00%       | 32       | 100.00%       |

Note: The most common response is in bold type.

#### **Question 25i: Type of fuel.**

Less than 15% of fishing boats use diesel fuel (Table 25p). Most boats in the fishery used gas and oil. Gasoline is used in four-stroke outboard motors and gas mixed with oil is used in two-stroke outboard motors. Inboard engines use diesel fuel. Four-stroke engines use less gas, have fewer emissions, and are quieter. However, the purchase price is greater than two-stroke engines. A higher percentage of STT/STJ fishers owned four-stroke engines (31.6%) compared with STX fishers (15.2%) (Table 25p). Also, a higher percentage of STT/STJ fishers used diesel because more owned inboard engines than STX fishers (Table 25l).

Table 25.p. (Q. 25i). The type of fuel used in engines of primary fishing boats.

| Fuel Type               | STT/STJ   |              | STX       |              | USVI       |               |
|-------------------------|-----------|--------------|-----------|--------------|------------|---------------|
|                         | N         | Percent      | N         | Percent      | N          | Percent       |
| Gas                     | 24        | 31.6%        | 15        | 15.2%        | 39         | 22.29%        |
| Gas & Oil               | <b>32</b> | <b>42.1%</b> | <b>78</b> | <b>78.8%</b> | <b>110</b> | <b>62.86%</b> |
| Diesel                  | 20        | 26.3%        | 6         | 6.1%         | 26         | 14.86%        |
| # of fishers responding | 76        | 100.0%       | 99        | 100.0%       | 175        | 100.00%       |

Note: The most common response is in bold type.

#### **Question 25j: Hull construction**

Most commercial fishing boats (97.1%) were constructed of fiberglass or fiberglass and wood (Table 25q). Few boats were made of only aluminum or wood.



Table 25.q. (Q. 25j). Frequency distribution of construction material of primary fishing boats.

| Construction material   | STT/STJ   |              | STX       |         | USVI       |         |
|-------------------------|-----------|--------------|-----------|---------|------------|---------|
|                         | N         | Percent      | N         | Percent | N          | Percent |
| Aluminum                | 1         | 1.4%         | 1         | 1.0%    | 2          | 1.2%    |
| Fiberglass              | <b>51</b> | <b>72.9%</b> | <b>83</b> | 81.4%   | <b>134</b> | 77.9%   |
| Fiberglass & wood       | 17        | 24.3%        | 16        | 15.7%   | 33         | 19.2%   |
| Wood                    | 1         | 1.4%         | 2         | 2.0%    | 3          | 1.7%    |
| # of fishers responding | 70        | 100.0%       | 102       | 100.1%  | 172        | 100.0%  |

Note: The most common response is in bold type.

### Question 25k: Boat electronic equipment.

Only 27.6% of commercial fishers on STT/STJ and 11.3% on STX carried an EPIRB on their primary fishing boats (Table 25r). Cell phones were more common than marine radios on boats in both districts. STT/STJ fishers had more marine radios than STX fishers. This reflects the differences between districts in distance from shore that fishers travel to fishing grounds and the distance to the edge of the shelf. The shelf edge on STT/STJ is 8 - 20 miles from shore, often too far for a cell phone connection, while on STX the shelf edge is predominantly <3 miles from shore and in some cases only a couple hundred meters from shore.

Depth finders / fish finders and GPS were more commonly installed by fishers on STT/STJ primary vessels than on STX (Table 25r). Radar was uncommon on fishing boats in the USVI, probably because of the small size of fishing boats.

Table 25.r. (Q. 25k). Breakdown of the number and percentage fishers who used various electronic equipment on their primary fishing boat.

| Electronic Equipment       | STT/STJ        |                      | STX       |              | USVI       |              |
|----------------------------|----------------|----------------------|-----------|--------------|------------|--------------|
|                            | N <sup>1</sup> | Percent <sup>2</sup> | N         | Percent      | N          | Percent      |
| Depth finder               | 59             | 77.6%                | 54        | 50.9%        | 103        | 56.6%        |
| Cell Phone                 | <b>70</b>      | <b>92.1%</b>         | <b>95</b> | <b>89.6%</b> | <b>165</b> | <b>90.7%</b> |
| Fish Finder                | 36             | 47.4%                | 42        | 39.6%        | 78         | 42.9%        |
| GPS                        | 51             | 67.1%                | 41        | 38.7%        | 92         | 50.5%        |
| EPIRB                      | 21             | 27.6%                | 12        | 11.3%        | 33         | 18.1%        |
| Radar                      | 5              | 6.6%                 | 3         | 2.8%         | 8          | 4.4%         |
| Marine Radio               | 47             | 61.8%                | 29        | 27.4%        | 76         | 41.8%        |
| # of primary fishing boats | 76             |                      | 106       |              | 182        |              |

<sup>1</sup>Only equipment reported for primary vessels were reported since some fishers, who owned more than one vessel, reported the same mobile equipment such as cell phones and marine radios (handheld ones) for each vessel they owned. In most cases it is likely that they used the same equipment on each vessel.

<sup>2</sup>Percentage is based on # of fishers reporting gear and total number of fishers who owned primary fishing boats in each district.

Note: The most common response is in bold type.

**Question 25l: Fishing equipment.**

Respondents indicated the type of fishing equipment they had installed on their vessels (Table 25s). In STT/STJ, the most common equipment onboard fishing vessels was a winch, reflecting the importance of trap fishing in the district. Electric reels used in deep-water snapper/grouper fishing were more common on STX, reflecting the higher importance of this fishery on STX.

Table 25.s. (Q. 25l). Percentage of primary fishing boats with various fishing gear.

| Fishing Equipment                            | STT/STJ        |                      | STX       |                      | USVI      |                      |
|--|----------------|----------------------|-----------|----------------------|-----------|----------------------|
|  | N              | Percent <sup>1</sup> | N         | Percent <sup>1</sup> | N         | Percent <sup>1</sup> |
| Winch  | <b>20</b>      | <b>26.3%</b>         | 11        | 10.4%                | <b>31</b> | <b>17.0%</b>         |
| Reel hydraulic                               | 6              | 7.9%                 | 3         | 2.8%                 | 9         | 4.9%                 |
| Reel electric                                | 2 <sup>2</sup> | 2.6%                 | <b>14</b> | <b>13.2%</b>         | 16        | 8.8%                 |
| Reel manual                                  | 3              | 3.9%                 | 5         | 4.7%                 | 8         | 4.4%                 |
| # primary fishing boats/fishers <sup>1</sup> | 76             |                      | 106       |                      | 182       |                      |

<sup>1</sup>Percentage is based on # of fishers reporting gear and total number of primary fishing boats owned in each district, excluding dinghies. Winches and reels are not used on very small boats.

<sup>2</sup>One of the two fishers who reported owning electric reels, owned two electric reels.

Note: The most common response is in bold type.

**Question 26: Approximate value in its present condition (used) of the vessel(s), engine(s) and fishing equipment/electronics/safety: \$ \_\_\_\_\_**

Nearly half of the fishers stated that their vessel and its associated equipment (not including fishing gear) was worth <\$20,000 (STT/STJ – 45.7%, STX – 51.5%) (Table 26a). A higher proportion of fishers on STT/STJ owned vessels worth >100,000 (24.3%) than on STX (6.9%). Also, the mean, median and mode of the value of vessels was higher on STT/STJ than on STX (Table 26b).

This difference was due, in part, to differences in fishing methods and the location of fishing grounds. On STT/STJ more fishers fished heavier traps (Table 27f - i) that had frames constructed of rebar vs wood for many STX fishers (Kojis and Quinn, 2011a). STT/STJ fishers, also, owned a larger number of traps per fisher (Table 27j). Both these factors require a larger vessel that can support a winch to haul traps. Also, the STT/STJ shelf is 8 miles wide to the south and 20 miles wide to the north, while the STX shelf is less than 2 miles wide except for Lang Bank on the east end of the island. Traps, especially the traps of major trap fishers, were usually set well off shore on STT/STJ and thus, vessels must be able to haul traps from relatively deep water and be able to handle traps in heavy seas. The most expensive boats in both districts, were charter vessels of which there were more on STT/STJ (Table 10b).

Table 26.a. (Q. 26). Breakdown of the percentage of fishers who estimated the value of their vessels and gear. Includes only gear attached to or associated with boat such as winches, hydraulic reels, electronics, and safety equipment (not including fishing gear such as lines, nets, traps, etc.).

| Value vessel and equipment used on vessel (US\$) | STT/STJ   |              | STX       |              | USVI      |              |
|--|-----------|--------------|-----------|--------------|-----------|--------------|
|  | N         | Percent      | N         | Percent      | N         | Percent      |
| <10,000  | 13        | 18.6%        | <b>31</b> | <b>30.1%</b> | <b>44</b> | <b>25.4%</b> |
| 10,000<20,000                                    | <b>19</b> | <b>27.1%</b> | 22        | 21.4%        | 41        | 23.7%        |
| 20,000<30,000                                    | 12        | 17.1%        | 12        | 11.7%        | 24        | 13.9%        |
| 30,000<40,000                                    | 3         | 4.3%         | 14        | 13.6%        | 17        | 9.8%         |
| 40,000<50,000                                    | 1         | 1.4%         | 3         | 2.9%         | 4         | 2.3%         |
| 50,000<100,000                                   | 5         | 7.1%         | 14        | 13.6%        | 19        | 11.0%        |
| 100,000 to <200,000                              | 6         | 8.6%         | 5         | 4.9%         | 11        | 6.4%         |
| 200,000 to <300,000                              | 7         | 10.0%        | 1         | 1.0%         | 8         | 4.6%         |
| >300,000   | 4         | 5.7%         | 1         | 1.0%         | 5         | 2.9%         |
| # of fishers responding                          | 70        | 100.0%       | 103       | 100.0%       | 173       | 100.0%       |

Note: The most common response is in bold type.

Table 26.b. (Q. 26). Summary statistics of the monetary value of all the boats and boat equipment (excluding fishing gear) owned by fishers.

|                         | STT/STJ                   | STX                | USVI               |
|-------------------------|---------------------------|--------------------|--------------------|
| Mean (SD <sup>1</sup> ) | \$75,681 ( $\pm$ 109,570) | \$34,216 (+58,811) | \$50,993 (+85,346) |
| Median                  | \$25,000                  | \$18,000           | \$20,000           |
| Mode                    | \$25,000                  | \$10,000           | \$25,000           |
| Range                   | \$1,500 – \$500,000       | \$900 - \$500,000  | \$900 - \$500,000  |
| # of fishers responding | 70                        | 103                | 173                |

<sup>1</sup>SD = Standard Deviation

### Question 27a: Fishing gear used by fishers.

Fishers were asked detailed questions about their fishing gear (see Kojis, 2004, Appendix II for a description of gears). Responses to this question are provided in Tables 27a - s.

Net gear, i.e. beach seines, haul seines, umbrella nets and gill nets, except for cast nets, was used by less than 15% of fishers in each district (Tables 27a – e). Umbrella nets were used only on STX by 6.4% of STX fishers (Table 27e). The exclusive use of umbrella nets on STX in 2016 is consistent with previous surveys (Kojis, 2004; Kojis and Quinn, 2011a). Beach seines (Table 27a) and haul seines (Table 27b) were used by a higher percentage of fishers on STT/STJ than STX. These nets are used primarily to target schooling yellowtail and blue runner on STT/STJ. Cast nets (Table 27d) were owned by >60% of fishers in each district and were used for gathering bait primarily for line fishing.

As in previous surveys (Kojis, 2004; Kojis and Quinn, 2011a), plastic lobster pots (Table 27f) were only recorded on STT/STJ. No one reported using deep-water shrimp pots in 2010 or 2016. Two STX fishers

reported using crab traps (Table 27i). Only one fisher on STX used wire lobster traps (Table 27g), while 10 did on STT/STJ. Wire lobster traps are similar to fish traps except for the shape of the funnel and the bait used (Kojis, 2004). Fish traps were used extensively by fishers in both districts though a higher percentage used them on STT/STJ (40.2%) than on STX (20.0%). STT/STJ fishers owned seven times more traps (all types of traps) than STX fishers (Table 27j). The mean number of traps per trap fisher on STT/STJ was 180 compared with only 33 on STX.

Line fishing was important in both districts. Fishers used a number of line fishing techniques, including bottom longlines, vertical set lines, anchor fishing, drift fishing, and trolling. The type of line fishing employed depended on the fish being targeted. Most fishers (>80% on STT/STJ and 90% on STX) owned a number of yo-yo reels (Table 27k) often with lines of different test on each of the reels (Kojis and Quinn, 2011a). More fishers on STT/STJ owned rods and reels (52.4%) than on STX (35.8%) (Table 27l). Fishers primarily used only 1 or 2 hooks when fishing these gears. No fisher reported using surface long lines in either district (Table 27m) and only one fisher in each district reported using bottom long lines (27n). Vertical setlines, multi-hook for catching deep-water snapper and grouper and vertical setlines – single hook, were more commonly used on STX (Table 27o). STX fishers used 3 – 40 hooks per line for deep-water snapper/grouper while on STT the one fisher who reported using this gear said he used 10 hooks. Also, more STX fishers used tuna buoys than on STT/STJ (Table 27q). They used 1 – 3 hooks per line. In fact, none of the fishers sampled on STT/STJ said they used tuna buoys though a few are known to do so (Kojis pers. obs.).

Skin diving was conducted by 32.9% of fishers on STT/STJ and 18.3% on STX (Table 27r). Scuba diving was predominately used for fishing in STX (54.1% of fishers) (Table 27s) compared to STT/STJ (14.6% of fishers). The mean dive time on STT/STJ was 2.2 hrs (range 0.5 – 5 hrs) while on STX the mean was 3.7 hrs (range 0.7 – 7 hrs). Most skin and scuba divers in both districts used snares for catching lobster and spears for spearing fish when diving (Tables 27r, s). Only one skin diver (4% of skin divers) on STT/STJ reported skin diving when using a net, while 95% of STX skin divers did so. The skin diver on STT/STJ that said he skin dived while net fishing, did so to clear net ropes from the reef. No fisher on STT/STJ used scuba when fishing with a net, while on STX 10% of fishers did so (Table 27s).

Gears used by <10 fishers included umbrella nets (Table 27e), plastic lobster traps (Table 27f), crab traps (Table 27i), surface long lines (Table 2n), bottom long lines (Table 27o), and vertical setline - single hook (Table 27p).

*Net gear*

Table 27.a. (Q. 27). Summary of information on beach seine nets owned by fishers.

| Location                            | N <sup>1</sup> | # Fishers sampled<br>owning gear | Percent of fishers<br>owning gear | Use<br><3<br>miles | Use<br>>3<br>miles |                | # beach seines<br>owned | Avg. # fished<br>per trip | Hrs<br>fished |
|-------------------------------------|----------------|----------------------------------|-----------------------------------|--------------------|--------------------|----------------|-------------------------|---------------------------|---------------|
| St. Thomas/<br>St. John<br>District | 82             | 6                                | 7.3%                              | 6                  | 0                  | Total          | 18                      |                           |               |
|                                     |                |                                  |                                   |                    |                    | Mean           | 3                       | 1                         | 1.7           |
|                                     |                |                                  |                                   |                    |                    | Range          | 1 - 6                   | 1                         | 0 – 4.5       |
|                                     |                |                                  |                                   |                    |                    | N <sup>2</sup> | 6                       | 6                         | 5             |
| St. Croix<br>District               | 109            | 4                                | 3.7%                              | 4                  | 0                  | Total          | 10                      |                           |               |
|                                     |                |                                  |                                   |                    |                    | Mean           | 2.5                     | 2.3                       | 4.8           |
|                                     |                |                                  |                                   |                    |                    | Range          | 1 - 4                   | 1 - 4                     | 0.5 - 8       |
|                                     |                |                                  |                                   |                    |                    | N <sup>2</sup> | 4                       | 4                         | 4             |

<sup>1</sup>N = total number of fishers responding to questions about any gear.

<sup>2</sup>N = number of fishers who said they owned beach seines.

Note: When fishers gave a range for ownership of gear, we recorded the mean in the appropriate cell and recorded the range in a comment.

Table 27.b. (Q. 27). Summary of information on haul nets (seine net) gear owned by fishers.

| Location                            | N <sup>1</sup> | # Fishers sampled<br>owning gear <sup>1</sup> | Percent of fishers<br>owning gear | Use<br><3<br>miles | Use<br>>3<br>miles |                | # haul nets<br>owned | Avg. # fished per<br>trip | Hrs<br>fished |
|-------------------------------------|----------------|---|-----------------------------------|--------------------|--------------------|----------------|----------------------|---------------------------|---------------|
| St. Thomas/<br>St. John<br>District | 82             | 12  | 14.6%                             | 12                 | 0                  | Total          | 24                   |                           |               |
|                                     |                |   |                                   |                    |                    | Mean           | 2                    | 1.6                       | 3.8           |
|                                     |                |   |                                   |                    |                    | Range          | 1 - 5                | 1 - 3                     | 0.75 –<br>6.5 |
|                                     |                |   |                                   |                    |                    | N <sup>2</sup> | 12                   | 11                        | 12            |
| St. Croix<br>District               | 109            | 5   | 4.6%                              | 5                  | 0                  | Total          | 8                    |                           |               |
|                                     |                |   |                                   |                    |                    | Mean           | 1.6                  | 1.0                       | 5.9           |
|                                     |                |   |                                   |                    |                    | Range          | 1 - 4                | 1                         | 3 - 8         |
|                                     |                |   |                                   |                    |                    | N <sup>2</sup> | 5                    | 5                         | 5             |

<sup>1</sup>N = total number of fishers responding to questions about any gear.

<sup>2</sup>N = number of fishers who said they owned haul nets.

Note: When fishers gave a range for ownership of gear, we recorded the mean in the appropriate cell and recorded the range in a comment.

Table 27.c. (Q. 27). Summary of information on gillnets (bait) owned by fishers.

| Location                         | N <sup>1</sup> | # Fishers<br>sampled<br>owning<br>gear <sup>1</sup> | Percent<br>of<br>fishers<br>owning<br>gear | Use<br><3 miles | Use<br>>3 miles | Use both<br><> 3 miles |                | # gillnets<br>owned | Avg. # fished<br>per trip | Hrs<br>fished |
|----------------------------------|----------------|---|--|-----------------|-----------------|------------------------|----------------|---------------------|---------------------------|---------------|
| St. Thomas/<br>St. John District | 82             | 2   | 2.4%                                       | 2               | 0               | 0                      | Total          | 2                   |                           |               |
|                                  |                |   |  |                 |                 |                        | Mean           | 1                   | 1                         | 5.5           |
|                                  |                |   |  |                 |                 |                        | Range          | 1                   | 1                         | 4 - 7         |
|                                  |                |   |  |                 |                 |                        | N <sup>2</sup> | 2                   | 2                         | 2             |
| St. Croix<br>District            | 109            | 12  | 11.0%                                      | 9               | 0               | 2                      | Total          | 24                  |                           |               |
|                                  |                |   |  |                 |                 |                        | Mean           | 2.0                 | 1.5                       | 3.2           |
|                                  |                |   |  |                 |                 |                        | Range          | 1 - 7               | 0 - 7                     | 5 - 8         |
|                                  |                |   |  |                 |                 |                        | N <sup>2</sup> | 12                  | 11                        | 10            |

<sup>1</sup>N = total number of fishers responding to questions about any gear.

<sup>2</sup>N = number of fishers who said they owned gillnets for catching bait.

Note: When fishers gave a range for ownership of gear, we recorded the mean in the appropriate cell and recorded the range in a comment.

Table 27.d. (Q. 27). Summary of information on cast nets owned by fishers.

| Location                         | N <sup>1</sup> | # Fishers sampled owning gear <sup>1</sup> | Percent of fishers owning gear | Use <3 miles | Use >3 miles |                | # cast nets owned | Avg. # fished per trip | Hrs fished |
|----------------------------------|----------------|--|--------------------------------|--------------|--------------|----------------|-------------------|------------------------|------------|
| St. Thomas/<br>St. John District | 82             | 55   | 67.1%                          | 53           | 0            | Total          | 144               |                        |            |
|                                  |                |  |                                |              |              | Mean           | 2.6               | 1.5                    | 1.6        |
|                                  |                |  |                                |              |              | Range          | 1 - 10            | 1.5                    | 0.1 - 6    |
|                                  |                |  |                                |              |              | N <sup>2</sup> | 55                | 50                     | 42         |
| St. Croix District               | 109            | 68   | 62.4%                          | 68           | 0            | Total          | 121               |                        |            |
|                                  |                |  |                                |              |              | Mean           | 1.8               | 1.3                    | 1.6        |
|                                  |                |  |                                |              |              | Range          | 1 - 5             | 1 - 2                  | 0.5 - 3    |
|                                  |                |  |                                |              |              | N <sup>2</sup> | 68                | 67                     | 62         |

<sup>1</sup>N = total number of fishers responding to questions about any gear.

<sup>2</sup>N = number of fishers who said they owned cast nets.

Note: When fishers gave a range for ownership of gear, we recorded the mean in the appropriate cell and recorded the range in a comment.



Table 27.e. (Q. 27). Summary of information on umbrella (lift) nets owned by fishers.

| Location                            | N <sup>1</sup> | # Fishers sampled owning gear <sup>1</sup> | Percent of fishers owning gear | Use <3 miles | Use >3 miles | Use both <> 3 miles |                | # umbrella nets owned | Avg. # fished per trip | Hrs fished |
|-------------------------------------|----------------|--|--------------------------------|--------------|--------------|---------------------|----------------|-----------------------|------------------------|------------|
| St. Thomas/<br>St. John<br>District | 82             | 0  | 0.0%                           |              |              |                     | Total          |                       |                        |            |
|                                     |                |  |                                |              |              |                     | Mean           |                       |                        |            |
|                                     |                |  |                                |              |              |                     | Range          |                       |                        |            |
|                                     |                |  |                                |              |              |                     | N <sup>2</sup> |                       |                        |            |
| St. Croix<br>District               | 109            | 7  | 6.4%                           | 6            | 0            | 1                   | Total          | 9                     |                        |            |
|                                     |                |  |                                |              |              |                     | Mean           | 1.3                   | 1.0                    | 2.1        |
|                                     |                |  |                                |              |              |                     | Range          | 1 - 2                 | 1                      | 2 – 2.5    |
|                                     |                |  |                                |              |              |                     | N <sup>2</sup> | 7                     | 7                      | 7          |

<sup>1</sup>N = total number of fishers responding to questions about any gear.

<sup>2</sup>N = number of fishers who said they owned umbrella nets.

Note: When fishers gave a range for ownership of gear, we recorded the mean in the appropriate cell and recorded the range in a comment.

***Trap (pot) gear***

Table 27.f. (Q. 27). Summary of information on plastic lobster traps owned by fishers.

| Location                                 | N <sup>1</sup> | # Fishers sampled owning gear <sup>1</sup> | Percent of fishers owning gear | Use <3 miles | Use >3 miles | Use both < 3 miles |                      | # traps owned | Soak time (days) | # Deployed | # hauled per trip | # arrow-head traps | # square traps | # round traps |
|--|----------------|--|--------------------------------|--------------|--------------|--------------------|----------------------|---------------|------------------|------------|-------------------|--------------------|----------------|---------------|
| <b>St. Thomas/<br/>St. John District</b> | 82             | 9  | 11.0%                          | 1            | 2            | 6                  | <b>Total</b>         | 2,068         |                  |            |                   |                    | 1968           | 100           |
|  |                |  |                                |              |              |                    | <b>Mean</b>          | 230           | 13.6             | 328.2      | 47.3              |                    | 246            |               |
|  |                |  |                                |              |              |                    | <b>Range</b>         | 7 - 600       | 6 - 28           | 100 - 600  | 7 - 75            |                    | 7 - 600        |               |
|  |                |  |                                |              |              |                    | <b>N<sup>2</sup></b> | 9             | 9                | 5          | 3                 |                    | 8              | 1             |
| <b>St. Croix District</b>                | 109            | 0  | 0.0%                           |              |              |                    | <b>Total</b>         |               |                  |            |                   |                    |                |               |
|  |                |  |                                |              |              |                    | <b>Mean</b>          |               |                  |            |                   |                    |                |               |
|  |                |  |                                |              |              |                    | <b>Range</b>         |               |                  |            |                   |                    |                |               |
|  |                |  |                                |              |              |                    | <b>N<sup>2</sup></b> |               |                  |            |                   |                    |                |               |

<sup>1</sup>N = total number of fishers responding to questions about any gear.

<sup>2</sup>N = number of fishers responding to questions about plastic lobster traps.

Note: When fishers gave a range for ownership of gear, we recorded the mean in the appropriate cell and recorded the range in a comment.

Table 27.g. (Q. 27). Summary of information on wire lobster traps owned by fishers.

| Location                         | N <sup>1</sup> | # Fishers sampled owning gear <sup>1</sup> | Percent of fishers owning gear | Use <3 miles | Use >3 miles | Use both <> 3 miles |                      | # traps owned | Soak time (days) | # Deployed | # hauled per trip | # arrow-head traps | # rectangular traps | # square traps | # round traps |
|----------------------------------|----------------|--|--------------------------------|--------------|--------------|---------------------|----------------------|---------------|------------------|------------|-------------------|--------------------|---------------------|----------------|---------------|
| St. Thomas/<br>St. John District | 82             | 10   | 12.2%                          | 5            | 1            | 4                   | <b>Total</b>         | 737           |                  |            |                   | 45                 | 50                  | 592            | 50            |
|                                  |                |  |                                |              |              |                     | <b>Mean</b>          | 73.7          | 10.6             | 85.8       | 16.0              | 22.5               | 50                  | 98.7           | 50            |
|                                  |                |  |                                |              |              |                     | <b>Range</b>         | 4 - 200       | 3 - 15           | 20 - 198   | 0 - 40            | 20 - 25            | 50                  | 4 - 109        | 50            |
|                                  |                |  |                                |              |              |                     | <b>N<sup>1</sup></b> | 10            | 9                | 4          | 4                 | 2                  | 1                   | 6              | 1             |
| St. Croix District               | 109            | 1  | 0.9%                           | 0            | 1            | 0                   | <b>Total</b>         | 20            |                  |            |                   |                    |                     | 20             |               |
|                                  |                |  |                                |              |              |                     | <b>Mean</b>          | 20.0          | 8.0              | No data    | No data           |                    |                     | 20             |               |
|                                  |                |  |                                |              |              |                     | <b>Range</b>         | 20            | 8                |            |                   |                    |                     | 20             |               |
|                                  |                |  |                                |              |              |                     | <b>N<sup>1</sup></b> | 1             | 1                |            |                   |                    |                     | 1              |               |

<sup>1</sup>N = total number of fishers responding to questions about any gear.

<sup>2</sup>N = number of fishers responding to questions about wire lobster traps.

Note: When fishers gave a range for ownership of gear, we recorded the mean in the appropriate cell and recorded the range in a comment.

Table 27.h. (Q. 27). Summary of information on fish traps owned by fishers.

| Location                         | N <sup>1</sup> | # Fishers sampled owning gear | Percent of fishers owning gear | Use <3 miles | Use >3 miles | Use both < 3 miles |                      | # of traps owned | Soak time (days) | # De-ployed | # haul-ed per trip | # arrow-head traps   | # rectangular traps | # square traps | # round traps | # S or Z traps |
|----------------------------------|----------------|-------------------------------|--------------------------------|--------------|--------------|--------------------|----------------------|------------------|------------------|-------------|--------------------|----------------------|---------------------|----------------|---------------|----------------|
| St. Thomas/<br>St. John District | 82             | 33                            | 40.2%                          | 14           | 3            | 14                 | <b>Total</b>         | 3,482            |                  |             |                    | 2,353.5 <sup>2</sup> | 100                 | 1,006.5        | 6             |                |
|                                  |                |                               |                                |              |              |                    | <b>Mean</b>          | 105.5            | 7.0              | 176.3       | 50.2               | 123.9                | 33.3                | 77.4           | 6             |                |
|                                  |                |                               |                                |              |              |                    | <b>Range</b>         | 4 - 430          | 3 - 14           | 48 - 430    | 0 - 200            | 5.5 - 430            | 12 - 58             | 4 - 290        | 6             |                |
|                                  |                |                               |                                |              |              |                    | <b>N<sup>3</sup></b> | 33               | 31               | 9           | 21                 | 19                   | 3                   | 13             | 1             |                |
| St. Croix District               | 109            | 24                            | 22.0%                          | 18           | 1            | 4                  | <b>Total</b>         | 822              |                  |             |                    | 456                  | 0                   | 238            |               | 113            |
|                                  |                |                               |                                |              |              |                    | <b>Mean</b>          | 34.3             | 8.3              | 120         | No data            | 29                   | 0                   | 24             | 0             | 22.6           |
|                                  |                |                               |                                |              |              |                    | <b>Range</b>         | 2 - 180          | 0.25 - 96        | 120         |                    | 1 - 120              |                     | 3 - 90         |               | 2 - 50         |
|                                  |                |                               |                                |              |              |                    | <b>N<sup>3</sup></b> | 24               | 24               | 1           |                    | 16                   |                     | 10             |               | 5              |

<sup>1</sup>N = total number of fishers responding to questions about any gear

<sup>2</sup>Some fishers indicated they had traps of different shapes but did not know or did not state how many traps of each shape that they had. If fishers stated that their traps had two shapes, the number of traps were divided equally between the shapes.

<sup>3</sup>N = number of fishers responding to questions about fish traps

Note: When fishers gave a range for ownership of gear, we recorded the mean in the appropriate cell and recorded the range in a comment.

Table 27.i. (Q. 27). Summary of information on other trap gear – crab traps owned by fishers.

| Location                         | N <sup>1</sup> | # Fishers<br>sampled owning<br>gear | Percent of<br>fishers<br>owning<br>gear | Use<br><3 miles | Use<br>>3 miles |                | # crab traps<br>owned | Avg. # fished per trip | Hrs fished |
|----------------------------------|----------------|-------------------------------------|---|-----------------|-----------------|----------------|-----------------------|------------------------|------------|
| St. Thomas/<br>St. John District | 82             | 0                                   | 0.0%                                    |                 |                 | Total          |                       |                        |            |
|                                  |                |                                     |   |                 |                 | Mean           |                       |                        |            |
|                                  |                |                                     |   |                 |                 | Range          |                       |                        |            |
|                                  |                |                                     |   |                 |                 | N <sup>2</sup> |                       |                        |            |
| St. Croix<br>District            | 109            | 2                                   | 1.8%                                    | 2               | 0               | Total          | 13                    |                        |            |
|                                  |                |                                     |   |                 |                 | Mean           | 6.5                   | 6.5                    | 22.5       |
|                                  |                |                                     |   |                 |                 | Range          | 5 - 8                 | 5 - 8                  | 9 - 36     |
|                                  |                |                                     |   |                 |                 | N <sup>2</sup> | 2                     | 2                      | 2          |

<sup>1</sup>N = total number of fishers responding to questions about any gear.

<sup>2</sup>N = number of fishers who said they owned crab traps.

Note: When fishers gave a range for ownership of gear, we recorded the mean in the appropriate cell and recorded the range in a comment.

Table 27.j. (Q. 27). Number of traps of all types owned by individual fishers in each district

| Location                     |                                     | # traps owned         |
|------------------------------|-------------------------------------|-----------------------|
| St. Thomas/St. John District | Total                               | 6,287                 |
|                              | Mean (SD <sup>1</sup> ) per fisher  | 179.6 ( $\pm 200.2$ ) |
|                              | Range of traps owned by each fisher | 4 - 720               |
|                              | N <sup>2</sup>                      | 35                    |
| St. Croix District           | Total                               | 855                   |
|                              | Mean (SD)                           | 32.9 ( $\pm 47.5$ )   |
|                              | Range                               | 2 - 200               |
|                              | N <sup>2</sup>                      | 26                    |

<sup>1</sup>SD = Standard Deviation.

<sup>2</sup>N = number of fishers who said they owned any type of trap.

### *Hook and line gear*

Table 27.k. (Q. 27). Summary of information on hand line gear (plastic reel also known as “yo-yo”) owned by fishers.

| Location                            | N <sup>1</sup> | # Fishers sampled<br>owning gear | Percent of fishers<br>owning gear | Use<br><3<br>miles | Use<br>>3<br>miles | Use<br>both<br><> 3<br>miles |                | # handlines<br>owned | #<br>hooks/line | Avg. #<br>fished per<br>trip | Hrs<br>fished |
|-------------------------------------|----------------|----------------------------------|-----------------------------------|--------------------|--------------------|------------------------------|----------------|----------------------|-----------------|------------------------------|---------------|
| St. Thomas/<br>St. John<br>District | 82             | 69                               | 84.1%                             | 35                 | 2                  | 30                           | Total          | 664                  |                 |                              |               |
|                                     |                |                                  |                                   |                    |                    |                              | Mean           | 9.6                  | 1.4             | 3.2                          | 6.2           |
|                                     |                |                                  |                                   |                    |                    |                              | Range          | 1 - 60               | 1 - 2           | 0 - 10                       | 1 - 12        |
|                                     |                |                                  |                                   |                    |                    |                              | N <sup>2</sup> | 69                   | 17              | 69                           | 65            |
| St. Croix<br>District               | 109            | 100                              | 91.7%                             | 42                 | 3                  | 51                           | Total          | 1,707.5              |                 |                              |               |
|                                     |                |                                  |                                   |                    |                    |                              | Mean           | 17.1                 | 1.8             | 3.9                          | 5.3           |
|                                     |                |                                  |                                   |                    |                    |                              | Range          | 1 - 600              | 1 - 7           | 0 - 20                       | 0.5 - 10      |
|                                     |                |                                  |                                   |                    |                    |                              | N <sup>2</sup> | 100                  | 67              | 100                          | 96            |

<sup>1</sup>N = total number of fishers responding to questions about any gear.

<sup>2</sup>N = number of fishers who said they owned hand line gear.

Note: When fishers gave a range for ownership of gear, we recorded the mean in the appropriate cell and recorded the range in a comment.

Table 27.1. (Q. 27). Summary of information on rod and reels owned by fishers.

| Location                            | N <sup>1</sup> | # Fishers sampled<br>owning gear | Percent of fishers<br>owning gear | Use<br><3<br>miles | Use<br>>3<br>miles | Use<br>both<br>< 3<br>miles |                | # rod &<br>reels owned | #<br>hooks/line | Avg. # fished<br>per trip | Hrs<br>fished |
|-------------------------------------|----------------|----------------------------------|-----------------------------------|--------------------|--------------------|-----------------------------|----------------|------------------------|-----------------|---------------------------|---------------|
| St. Thomas/<br>St. John<br>District | 82             | 43                               | 52.4%                             | 15                 | 2                  | 21                          | Total          | 296                    |                 |                           |               |
|                                     |                |                                  |                                   |                    |                    |                             | Mean           | 6.9                    | 1.1             | 3.3                       | 5.1           |
|                                     |                |                                  |                                   |                    |                    |                             | Range          | 1 - 30                 | 1 – 1.5         | 0 - 15                    | 1 - 12        |
|                                     |                |                                  |                                   |                    |                    |                             | N <sup>2</sup> | 43                     | 9               | 41                        | 38            |
| St. Croix<br>District               | 109            | 39                               | 35.8%                             | 12                 | 2                  | 25                          | Total          | 230                    |                 |                           |               |
|                                     |                |                                  |                                   |                    |                    |                             | Mean           | 5.9                    | 2.6             | 2.7                       | 4.3           |
|                                     |                |                                  |                                   |                    |                    |                             | Range          | 1 - 50                 | 1 - 20          | 1 - 6                     | 0.75 -<br>10  |
|                                     |                |                                  |                                   |                    |                    |                             | N <sup>2</sup> | 39                     | 22              | 38                        | 38            |

<sup>1</sup>N = total number of fishers responding to questions about any gear.

<sup>2</sup>N = number of fishers responding to questions about rods and reels.

Note: When fishers gave a range for ownership of gear, we recorded the mean in the appropriate cell and recorded the range in a comment.



Table 27.m. (Q. 27). Summary of information on surface longline gear owned by fishers.

| Location                         | N <sup>1</sup> | # Fishers sampled<br>owning gear | Use<br><3 miles | Use<br>>3 miles |       | # gears owned | # hooks/line | Avg. # fished per trip | Hrs fished |
|----------------------------------|----------------|----------------------------------|-----------------|-----------------|-------|---------------|--------------|------------------------|------------|
| St. Thomas/<br>St. John District | 82             | 0                                |                 |                 | Total |               |              |                        |            |
|                                  |                |                                  |                 |                 | Mean  |               |              |                        |            |
|                                  |                |                                  |                 |                 | Range |               |              |                        |            |
|                                  |                |                                  |                 |                 | N     |               |              |                        |            |
| St. Croix<br>District            | 109            | 0                                |                 |                 | Total |               |              |                        |            |
|                                  |                |                                  |                 |                 | Mean  |               |              |                        |            |
|                                  |                |                                  |                 |                 | Range |               |              |                        |            |
|                                  |                |                                  |                 |                 | N     |               |              |                        |            |

<sup>1</sup>N = number of fishers responding to questions about any gear.

Table 27.n. (Q. 27). Summary of information on bottom longline gear owned by fishers.

| Location                            | N <sup>1</sup> | # Fishers sampled<br>owning gear | Percent of fishers<br>owning gear | Use<br><3<br>miles | Use<br>>3<br>miles | Use<br>both<br><> 3<br>miles |                | # gears<br>owned | Avg. # fishing<br>per trip | Hrs<br>fished | # hooks /<br>line |
|-------------------------------------|----------------|----------------------------------|-----------------------------------|--------------------|--------------------|------------------------------|----------------|------------------|----------------------------|---------------|-------------------|
| St. Thomas/<br>St. John<br>District | 82             | 1                                | 1.2%                              | 0                  | 0                  | 1                            | Total          | 1                |                            | 4.5           |                   |
|                                     |                |                                  |                                   |                    |                    |                              | Mean           | 1                | 1                          | 4.5           | No data           |
|                                     |                |                                  |                                   |                    |                    |                              | Range          | 1                | 1                          | 4.5           |                   |
|                                     |                |                                  |                                   |                    |                    |                              | N <sup>2</sup> | 1                | 1                          | 1             |                   |
| St. Croix<br>District               | 109            | 1                                | 0.9%                              | 1                  | 0                  | 0                            | Total          | 1                |                            |               |                   |
|                                     |                |                                  |                                   |                    |                    |                              | Mean           | 1.0              | 1.0                        | 5.0           | No data           |
|                                     |                |                                  |                                   |                    |                    |                              | Range          | 1                | 1                          | 5             |                   |
|                                     |                |                                  |                                   |                    |                    |                              | N <sup>2</sup> | 1                | 1                          | 1             |                   |

<sup>1</sup>N = total number of fishers responding to questions about any gear.

<sup>2</sup>N = number of fishers who said they owned bottom longline gear.

Note: When fishers gave a range for ownership of gear, we recorded the mean in the appropriate cell and recorded the range in a comment.

Table 27.o. (Q. 27). Summary of information on vertical set line (multi-hook deep-water snapper-grouper) owned by fishers.

| Location                            | N <sup>1</sup> | # Fishers sampled<br>owning gear <sup>1</sup> | Percent of fishers<br>owning gear | Use<br><3<br>miles | Use<br>>3<br>miles | Use<br>both<br><> 3<br>miles |                      | # gears<br>owned | #<br>hooks/line | Avg. # fished<br>per trip | Hrs<br>fished |
|-------------------------------------|----------------|---|-----------------------------------|--------------------|--------------------|------------------------------|----------------------|------------------|-----------------|---------------------------|---------------|
| St. Thomas/<br>St. John<br>District | 82             | 3   | 3.7%                              | 1                  | 1                  | 1                            | <b>Total</b>         | 8                |                 |                           |               |
|                                     |                |   |                                   |                    |                    |                              | <b>Mean</b>          | 2.7              | 10.0            | 2.7                       | 4.0           |
|                                     |                |   |                                   |                    |                    |                              | <b>Range</b>         | 2 - 3            | 10              | 2 - 3                     | 1 - 6         |
|                                     |                |   |                                   |                    |                    |                              | <b>N<sup>1</sup></b> | 3                | 2               | 3                         | 3             |
| St. Croix<br>District               | 109            | 42  | 38.5%                             | 6                  | 0                  | 33                           | <b>Total</b>         | 181              |                 |                           |               |
|                                     |                |   |                                   |                    |                    |                              | <b>Mean</b>          | 4.3              | 12.2            | 2.9                       | 6.5           |
|                                     |                |   |                                   |                    |                    |                              | <b>Range</b>         | 1 - 12           | 3 - 40          | 0 - 10                    | 0 - 12        |
|                                     |                |   |                                   |                    |                    |                              | <b>N<sup>2</sup></b> | 42               | 41              | 42                        | 42            |

<sup>1</sup>N = total number of fishers responding to questions about any gear.

<sup>2</sup>N = number of fishers who said they owned vertical set line gear.

Note: When fishers gave a range for ownership of gear, we recorded the mean in the appropriate cell and recorded the range in a comment.

Table 27.p. (Q. 27). Summary of information on vertical set line (single hook pelagic fish) owned by fishers.

| Location                               | N <sup>1</sup> | # Fishers<br>sampled owning<br>gear | Percent of<br>fishers owning<br>gear | Use<br><3<br>miles | Use<br>>3<br>miles | Use both<br>< 3<br>miles |                | # gears<br>owned | #<br>hooks/line | Avg. #<br>fished per<br>trip | Hrs<br>fished |
|--|----------------|-------------------------------------|--------------------------------------|--------------------|--------------------|--------------------------|----------------|------------------|-----------------|------------------------------|---------------|
| St.<br>Thomas/<br>St. John<br>District | 82             | 1                                   | 1.2%                                 | 0                  | 0                  | 1                        | Total          | 1                |                 |                              |               |
|  |                |                                     |                                      |                    |                    |                          | Mean           | 1.0              | No data         | 1.0                          | 3.0           |
|  |                |                                     |                                      |                    |                    |                          | Range          | 1                |                 | 1                            | 3             |
|  |                |                                     |                                      |                    |                    |                          | N <sup>1</sup> | 1                |                 | 1                            | 1             |
| St. Croix<br>District                  | 109            | 6                                   | 5.5%                                 | 2                  | 0                  | 4                        | Total          | 34.5             |                 |                              |               |
|  |                |                                     |                                      |                    |                    |                          | Mean           | 5.8              | 4.5             | 3.3                          | 7.8           |
|  |                |                                     |                                      |                    |                    |                          | Range          | 1 – 17.5         | 1 - 8           | 1 - 8                        | 5 - 10        |
|  |                |                                     |                                      |                    |                    |                          | N <sup>1</sup> | 6                | 2               | 6                            | 5             |

<sup>1</sup>N = total number of fishers responding to questions about any gear.

<sup>2</sup>N = number of fishers who said they owned vertical set line gear.

Note: When fishers gave a range for ownership of gear, we recorded the mean in the appropriate cell and recorded the range in a comment.

Table 27.q. (Q. 27). Summary of information on tuna buoy or reel buoy fishing owned by fishers.

| Location                         | N <sup>1</sup> | # Fishers sampled owning gear | Percent of fishers owning gear | Use <3 miles | Use >3 miles | Use both <> 3 miles |                | # gears owned | # hooks/line | Avg. # fished per trip | Hrs fished |
|----------------------------------|----------------|-------------------------------|--------------------------------|--------------|--------------|---------------------|----------------|---------------|--------------|------------------------|------------|
| St. Thomas/<br>St. John District | 82             | 0                             | 0.0%                           | 0            | 0            | 1                   | Total          | 1             |              |                        |            |
|                                  |                |                               |                                |              |              |                     | Mean           | 1.0           | No data      | 1.0                    | 2.0        |
|                                  |                |                               |                                |              |              |                     | Range          | 1             |              | 1                      | 2          |
|                                  |                |                               |                                |              |              |                     | N <sup>1</sup> | 1             |              | 1                      | 1          |
| St. Croix District               | 109            | 17                            | 15.6%                          | 0            | 2            | 13                  | Total          | 58            |              |                        |            |
|                                  |                |                               |                                |              |              |                     | Mean           | 3.4           | 1.3          | 3.0                    | 6.0        |
|                                  |                |                               |                                |              |              |                     | Range          | 1 - 8         | 1 - 2        | 1 - 8                  | 2 - 10     |
|                                  |                |                               |                                |              |              |                     | N <sup>1</sup> | 17            | 12           | 17                     | 17         |

<sup>1</sup>N = total number of fishers responding to questions about any gear.

<sup>2</sup>N = number of fishers who said they owned tuna buoy or reel buoy gear.

Note: When fishers gave a range for ownership of gear, we recorded the mean in the appropriate cell and recorded the range in a comment.

## Skin and scuba gear

Table 27.r. (Q. 27). Summary of information of skin diving gear owned by fishers.

| Location                         | N <sup>1</sup> | # Fishers who owned gear <sup>2</sup> | Percent of fishers owning gear | # of skin divers using fishing gear |       |       | # of fishers fishing in territorial (<3 mi) or federal (>3 mi) waters |               |                 | # of each gear type owned by skin diving fishers |       |       | Total # of people on boat (crew and fisher) | Average # of divers per trip | Diving time |
|----------------------------------|----------------|---------------------------------------|--------------------------------|-------------------------------------|-------|-------|---|---------------|-----------------|--|-------|-------|---|------------------------------|-------------|
|                                  |                |                                       |                                | Net                                 | Snare | Spear | Use <3 miles  | Use > 3 miles | Both < >3 miles |  | Snare | Spear |   |                              |             |
| St. Thomas/<br>St. John District | 82             | 27                                    | 32.9%                          | 1 <sup>3</sup>                      | 26    | 26    | 20  | 0             | 4               | Total <sup>4</sup>                               | 80    | 47    |   |                              |             |
|                                  |                |                                       |                                |                                     |       |       |   |               |                 | Mean   | 3.1   | 1.8   | 2.4   | 2.2                          | 4.4         |
|                                  |                |                                       |                                |                                     |       |       |   |               |                 | Range <sup>5</sup>                               | 0-10  | 0-7   | 0-4   | 1-4                          | 1-12        |
|                                  |                |                                       |                                |                                     |       |       |   |               |                 | N <sup>6</sup>                                   | 26    | 26    | 27  | 25                           | 26          |
| St. Croix District               | 109            | 20                                    | 18.3%                          | 19                                  | 16    | 17    | 20  | 0             | 0               | Total  | 43.5  |       |   |                              |             |
|                                  |                |                                       |                                |                                     |       |       |   |               |                 | Mean   | 2.6   | 2.0   | 2.3   | 1.9                          | 3.2         |
|                                  |                |                                       |                                |                                     |       |       |   |               |                 | Range  | 0-10  | 0-5   | 1-3   | 1-3                          | 0.5 - 8     |
|                                  |                |                                       |                                |                                     |       |       |   |               |                 | N <sup>6</sup>                                   | 17    | 10    | 20  | 20                           | 20          |

<sup>1</sup>Total number of fishers who reported owning any gear.

<sup>2</sup>One fisher skin dived to collect conch on occasion but provided no other information.

<sup>3</sup>One fisher reported diving to clear ropes on net from reef.

<sup>4</sup>Total number of gears reported by fishers.

<sup>5</sup>When fishers gave a range for ownership of gear, we recorded the mean.

<sup>6</sup>Number of fishers who said they had they owned skin diving gear.

Note: Snares are used to capture lobster and are often made as needed. Simple snares can be made from a stick and string.

Table 27.s. (Q. 27). Summary of information of scuba diving gear owned by fishers.

| Location                | N <sup>1</sup> | # Fishers owning gear | Percent of fishers owning gear | # of scuba divers using fishing gear |       |       | # of fishers fishing in territorial (<3 mi) or federal (>3 mi) waters |                    |                 | # of each gear type owned by scuba fishers |       |       |                      | Total # of people on boat (crew and fisher) | Average # of divers per trip | Diving time (hrs) |
|-------------------------|----------------|-----------------------|--------------------------------|--------------------------------------|-------|-------|---|--------------------|-----------------|--|-------|-------|----------------------|---|------------------------------|-------------------|
|                         |                |                       |                                | Net                                  | Snare | Spear | Use <3 miles only   | Use > 3 miles only | Both < >3 miles |  | Tanks | Snare | Spear                |   |                              |                   |
| St. Thomas/<br>St. John | 82             | 12 <sup>2</sup>       | 14.6%                          | 0                                    | 10    | 9     | 10  | 0                  | 2               | Total <sup>3</sup>                         | 26    | 32.5  | 20.5                 |   |                              |                   |
|                         |                |                       |                                |                                      |       |       |   |                    |                 | Mean                                       | 2.4   | 2.7   | 1.7                  | 2.5   | 2.0                          | 2.2               |
|                         |                |                       |                                |                                      |       |       |   |                    |                 | Range                                      | 1-6   | 0-8   | 0 – 5.5 <sup>3</sup> | 2-5   | 1-3                          | 0.5-5             |
|                         |                |                       |                                |                                      |       |       |   |                    |                 | N <sup>4</sup>                             | 11    | 12    | 12                   | 11  | 11                           | 12                |
| St. Croix               | 109            | 59                    | 54.1%                          | 6                                    | 57    | 55    | 28  | 0                  | 22              | Total                                      | 214   | 138   | 111                  |   |                              |                   |
|                         |                |                       |                                |                                      |       |       |   |                    |                 | Mean                                       | 3.8   | 3.8   | 2.0                  | 2.6   | 1.8                          | 3.7               |
|                         |                |                       |                                |                                      |       |       |   |                    |                 | Range                                      | 1-6   | 0-10  | 0-5                  | 1-6   | 1-4                          | 0.7-7             |
|                         |                |                       |                                |                                      |       |       |   |                    |                 | N <sup>4</sup>                             | 57    | 47    | 55                   | 59  | 58                           | 58                |

<sup>1</sup>Total number of fishers who reported any gear.

<sup>2</sup>One charter fisher did not use scuba for fishing only to take clients diving.

<sup>3</sup>Total number of gears reported by fishers.

<sup>4</sup>Number of fishers who said they owned scuba diving gear.

Note: Snares are used to capture lobster.

**Question 27b: Approximate value in its present condition (used) of all net, trap, line and dive gears described above: \$ \_\_\_\_\_**

Most fishers valued all their fishing equipment (nets, traps, line and dive gear) at \$10,000 or less (Table 27u) (STT/STJ – 55.1%, STX – 88.6%). Only on STT/STJ did fishers own equipment that they valued over \$50,000 (20.2%) (Table 27t). Fishers that had higher values for their gear were either trap fishers or charter boat fishers. Wire traps made of rebar and wire mesh were valued by fishers at \$250 - \$350 new, while plastic lobster traps, used exclusively on STT/STJ, were valued at \$110. Charter boat operators often owned considerable numbers of very expensive rods and reels as well as ancillary gear for fishing large pelagic fish such as marlin. About 20% of fishers in both districts owned fishing equipment valued at less than \$1,000 (Table 27t).

Table 27.t. (Q. 27b). Percentage of fishers who provided values of all fishing gear owned in each value category.

| Value of fishing gear   | STT/STJ   |              | STX       |              | USVI      |              |
|-------------------------|-----------|--------------|-----------|--------------|-----------|--------------|
|                         | N         | Percent      | N         | Percent      | N         | Percent      |
| \$0-\$1,000             | 14        | 20.3%        | 22        | 20.8%        | 36        | 20.6%        |
| >\$1,000 - \$10,000     | <b>24</b> | <b>34.8%</b> | <b>72</b> | <b>67.8%</b> | <b>96</b> | <b>54.8%</b> |
| >\$10,000-\$20,000      | 5         | 7.2%         | 6         | 5.7%         | 11        | 6.3%         |
| >\$20,000-50,000        | 12        | 17.4%        | 6         | 5.7%         | 18        | 10.3%        |
| >\$50,000-\$100,000     | 9         | 13.0%        | 0         | 0.0%         | 9         | 5.1%         |
| >\$100,000              | 5         | 7.2%         | 0         | 0.0%         | 5         | 2.9%         |
| # of fishers responding | 69        | 100.0%       | 106       | 100.0%       | 175       | 100.0%       |

Note: The most common response is in bold type.

The mean value of fishing gear owned by fishers on STT/STJ was about five times that of fishers on STX. This difference can largely be attributed to the type of fishing done in each district. Trap fishing was commonly conducted on STT/STJ. STT/STJ fishers that fished with rebar framed wire traps expended considerable amounts of money and/or time on supplies and labor to construct traps and many owned over 200 traps. While some fishers on STX use rebar and wire traps, many others construct traps more cheaply using local wood for the frame and chicken wire.

Table 27.u. (Q. 27b). Summary statistics of the monetary value of all the fishing gear owned by fishers.

|                         | STT/STJ                        | STX              | USVI              |
|-------------------------|--------------------------------|------------------|-------------------|
| Mean (SD <sup>1</sup> ) | \$26,497 (+4,695) <sup>2</sup> | \$5,301 (+7,765) | \$13,731 (+2,068) |
| Median                  | \$10,000                       | \$3,000          | \$4,000           |
| Mode                    | \$1,000                        | \$2,000          | \$2,000           |
| Range                   | \$50 - \$200,000               | \$75 - \$50,000  | \$50 - \$500,000  |
| # of fishers responding | 70                             | 106              | 176               |

<sup>1</sup>SD = Standard Deviation <sup>2</sup>A single data point was omitted because it was an extreme outlier without supporting evidence based on the gear listed by the fisher.



**Question 28: How many times you or your crew had the bends in the last 12 months?**

**Yes/No    Self #\_\_\_\_times    Crew #\_\_\_\_times**

**Question 29: How many times you or your crew have been in a hyperbaric chamber in the last 12 months? Yes/No    Self #\_\_\_\_times    Crew #\_\_\_\_times**

Decompression sickness (the bends) is a serious issue for fishers that use scuba gear to catch fish and shellfish. Nearly half (48.3%) of STX fishers who said they fished using scuba gear said that they or their crew had experienced the bends in the last 12 months (Table 28a). Thirty-five percent of fishers said that they had experienced the bends in the last 12 months (Table 28b). Since the crew that they used varied in number and composition over time, it is not known what proportion of crew experienced the bends.

Most (86.8%) of STX divers said that if they or their crew had decompression sickness, they were treated in a hyperbaric chamber (Tables 29a). Fishers with the bends were treated in a hyperbaric chamber 90.5% of the time (Table 29b) and crew 82.4% of the time (Table 29c). Most crew, according to fishers, only experienced the bends once in the last year (58.8%) and were treated in a hyperbaric only once or twice (Table 29c). However, 57.1% of fishers who had the bends in the last 12 months experienced them multiple times and 61.9% of them used the chamber multiple times (Table 29b).

The number of times STX fishers and crew were treated in a hyperbaric chamber varied irrespective of the number of times they had the bends (Table 29b, c). Some reported the bends but did not get treated while others got treated more frequently than they reported they had the bends. For example, one fisher reported experiencing the bends once but was treated four times. This difference in the number of hyperbaric treatments is likely due to differences in the severity of the bends. A severe case of decompression sickness might require multiple treatments.

No fishers on STT/STJ who said that they fished using scuba reported experiencing decompression sickness (Table 28) and none used a hyperbaric chamber in the last 12 months.

Table 28.a. (Q. 28). Number of fishers who used scuba equipment to fish who said they or their crew experienced decompression sickness in the last 12 months.

| Had decompression sickness           | STT/STJ         |               | STX       |              | USVI      |              |
|--------------------------------------|-----------------|---------------|-----------|--------------|-----------|--------------|
|                                      | N               | Percent       | N         | Percent      | N         | Percent      |
| Yes <sup>1</sup>                     | 0               | 0.0%          | 29        | 48.3%        | 29        | 38.7%        |
| No                                   | <b>15</b>       | <b>100.0%</b> | <b>31</b> | <b>51.7%</b> | <b>46</b> | <b>61.3%</b> |
| # of fishers responding <sup>2</sup> | 15 <sup>1</sup> | 100.0         | 60        | 100.0%       | 75        | 100.0%       |

<sup>1</sup>Sixteen fishers said that they used scuba to fish. One provided no information on whether he had decompression sickness in the last 12 months. Note: The most common response is in bold type.

Table 28.b. (Q. 28 & 29). Frequency of occurrence of fishers who used scuba equipment who said that they experienced decompression sickness in the last 12 months.

| Had decompression sickness           | STT/STJ         |               | STX       |              | USVI      |              |
|--------------------------------------|-----------------|---------------|-----------|--------------|-----------|--------------|
|                                      | N               | Percent       | N         | Percent      | N         | Percent      |
| Yes <sup>1</sup>                     | 0               | 0.0%          | 21        | 35.0%        | 21        | 28.0%        |
| No                                   | <b>15</b>       | <b>100.0%</b> | <b>39</b> | <b>65.0%</b> | <b>39</b> | <b>72.0%</b> |
| # of fishers responding <sup>2</sup> | 15 <sup>1</sup> | 100.0         | 60        | 100.00       | 75        | 100.0%       |

<sup>1</sup>Sixteen fishers said that they used scuba to fish. One provided no information on whether he had decompression sickness in the last 12 months.

Note: The most common response is in bold type.

Table 29.a. (Q. 29). Frequency of occurrence of fishers and crew on STX who used scuba equipment while fishing and who experienced decompression sickness who were treated in a hyperbaric chamber.

| Treated in hyperbaric chamber      | STX       |              |
|------------------------------------|-----------|--------------|
|                                    | N         | Percent      |
| Yes                                | <b>33</b> | <b>86.8%</b> |
| No                                 | 5         | 13.2%        |
| # of fishers & crew with the bends | 38        | 100.0%       |

Note: The most common response is in bold type.

Table 29.b. (Q. 29). Breakdown of the number of times fishers on STX had the decompression sickness (DCS) in the last 12 months and the frequency with which they were treated in a hyperbaric chamber based on the number of times they had DCS.

| # of times with DCS     | Number of fishers | %            | Number of times used hyperbaric chamber |          |          |   |          |   |
|-------------------------|-------------------|--------------|---|----------|----------|---|----------|---|
|                         |                   |              | 0                                       | 1        | 2        | 3 | 4        | 5 |
| 1                       | <b>9</b>          | <b>42.9%</b> | <b>1</b>                                | <b>5</b> | <b>2</b> |   | <b>1</b> |   |
| 2                       | 3                 | 14.3%        |   |          | 3        |   |          |   |
| 3                       | 4                 | 19.0%        | 1                                       |          | 1        | 2 |          |   |
| 4                       | 2                 | 9.5%         |   | 1        |          |   |          | 1 |
| 5                       | 2                 | 9.5%         |   |          |          |   | 1        | 1 |
| 6                       | 0                 | 0.0%         |   |          |          |   |          |   |
| 7                       | 1                 | 4.8%         |   |          |          | 3 |          |   |
| # of fishers responding | 21                | 100.0%       |   |          |          |   |          |   |

Note: The most common response is in bold type.

Table 29.c. (Q. 29). Breakdown of the number of times crew on STX had decompression sickness (DCS) in the last 12 months and the frequency with which they were treated in the hyperbaric chamber based on the number of times they had DCS.

| # of times with DCS     | Number of crew | %            | Number of times used hyperbaric chamber |          |   |   |    |
|-------------------------|----------------|--------------|---|----------|---|---|----|
|                         |                |              | 0                                       | 1        | 2 | 3 | 19 |
| 1                       | <b>10</b>      | <b>58.8%</b> | <b>2</b>                                | <b>8</b> |   |   |    |
| 2                       | 3              | 17.6%        |   |          | 3 |   |    |
| 3                       | 2              | 11.8%        |   | 1        | 1 |   |    |
| 4                       | 1              | 5.9%         | 1                                       |          |   |   |    |
| 5                       | 0              | 0.0%         |   |          |   |   |    |
| 6                       | 0              | 0.0%         |   |          |   |   |    |
| 7                       | 0              | 0.0%         |   |          |   |   |    |
| 19                      | 1              | 5.9%         |   |          |   |   | 1  |
| # of fishers responding | 17             |              |   |          |   |   |    |

Note: The most common response is in bold type.

**Question 30: Compared with 5 years ago is fishing:**

**better    about the same    worse    don't know    No answer**

**Why?** \_\_\_\_\_

A plurality of fishers on STT/STJ (42.3%) said that fishing was the same as five years ago, while on STX a plurality said it was worse (43.9%) (Table 30a). Only 16.7% of STT/STJ fishers and 11.2% of STX fishers said it was better.

Table 30.a. (Q. 30). Fishers' opinions on the condition of fishing today versus five years ago.

| Fisher Opinions         | STT/STJ   |              | STX       |              | USVI      |              |
|-------------------------|-----------|--------------|-----------|--------------|-----------|--------------|
|                         | N         | Percent      | N         | Percent      | N         | Percent      |
| Better                  | 13        | 16.7%        | 12        | 11.2%        | 25        | 13.5%        |
| Same                    | <b>33</b> | <b>42.3%</b> | 40        | 37.4%        | 73        | 39.5%        |
| Worse                   | 27        | 34.6%        | <b>47</b> | <b>43.9%</b> | <b>74</b> | <b>40.0%</b> |
| Did Not Know            | 5         | 6.4%         | 8         | 7.5%         | 13        | 7.0%         |
| # of fishers responding | 78        | 100.0%       | 107       | 100.0%       | 185       | 100.0%       |

Note: The most common response is in bold type.

Some, but not all, fishers who provided the opinion “better,” “worse,” etc., gave reasons for their opinion (Table 30b). While only 13.5% of fishers in the USVI said fishing was “better”, they did provide a variety of reasons for saying fishing this. The number one reason in both districts was that there was more fish, lobster, and conch. Only in STT/STJ did fishers attribute the improvement in fishing to management measures. Fishers in both districts said fishing was better because they were catching more fish and there were fewer fishers. One fisher in each district said that resources were depleted despite saying fishing was better.

Almost 40% of fishers in the USVI said fishing was “about the same”. Most said that this was because fishing was the same or the catch was the same (Table 30b). STX fishers complained about regulations, especially closures, while STT/STJ fishers said that there were more fish because of the 2” mesh requirement for traps and while there were too many restrictions, there were more fishers fishing – implying that the restrictions might be needed. Also, some fishers in both districts said there were more fishers and others said fewer.

Forty percent of fishers in the USVI said fishing was “worse”. Almost 36% of fishers who said fishing was “worse” said this was because of less fish. Fishers on STT/STJ blamed this on an increase in non-marketable fish, i.e. poisonous fish such as barracuda, overfishing, and the catching of live bait by charter fishers. STX fishers said that besides there being less fish, fish were harder to spear and catch with a line. In contrast to STX where 11 fishers complained about regulations, only one STT/STJ fisher complained about regulations. For STX fishers, fishing was “worse” because of area closures, especially on the east end (St. Croix East End Marine Park) and with the BIRNM expansion. They also felt fishing was adversely impacted by the change in the conch quotas from 150 per licensed fisher to 200 per boat. This was because some boats fish with more than one licensed commercial fisher and this reduces the number of conch they can harvest in a trip. Fishers also complained about too many fishers, including recreational fishers and unlicensed fishers who illegally sell fish. STX fishers were concerned about the lack of surface FADs that attract pelagic fish.

Table 30.b. (Q. 30). Reasons for fishers’ opinions on the condition of fishing today versus five years ago.

|  | STT/STJ |       | STX |       | USVI |       |
|--|---------|-------|-----|-------|------|-------|
|  | N       | %     | N   | %     | N    | %     |
| <b>Better</b>  |         |       |     |       |      |       |
| More fish, conch & lobster                                       | 6       | 40.0% | 6   | 54.5% | 12   | 46.2% |
| • STT/STJ - more white sea urchins <sup>1</sup>                  |         |       |     |       |      |       |
| • STT/STJ – trap funnel design allows you to catch more fish     |         |       |     |       |      |       |
| • STT/STJ – CPUE higher  |         |       |     |       |      |       |
| • STT/STJ – lobster great, fish the same                         |         |       |     |       |      |       |
| • STT/STJ – more hardnose than before, rest of the fish the same |         |       |     |       |      |       |
| Catching more  | 2       | 13.3% | 4   | 36.4% | 6    | 23.1% |

|  | STT/STJ         |        | STX |        | USVI |        |
|--|-----------------|--------|-----|--------|------|--------|
|  | N               | %      | N   | %      | N    | %      |
| • <i>STT/STJ – Though selling a problem</i>                                    |                 |        |     |        |      |        |
| • <i>STX – Fished more</i>   |                 |        |     |        |      |        |
| Fewer fishermen  | 2               | 13.3%  | 2   | 18.2%  | 4    | 15.4%  |
| • <i>STT/STJ – Number of fishers targeting yellowtail has declined</i>         |                 |        |     |        |      |        |
| • <i>STX – fishermen dying out/less active</i>                                 |                 |        |     |        |      |        |
| • <i>STX – Fewer skin divers</i>   |                 |        |     |        |      |        |
| Protection of resources have improved fishery                                  | 4               | 26.7%  | 0   | 0.0%   | 4    | 15.4%  |
| • <i>STT/STJ – fisher/younger fishers respect the ocean</i>                    |                 |        |     |        |      |        |
| • <i>STT/STJ – protection of spawning aggregations</i>                         |                 |        |     |        |      |        |
| • <i>STT/STJ– area closure means more fish</i>                                 |                 |        |     |        |      |        |
| Resources depleted   | 1               | 6.7%   | 1   | 9.1%   | 2    | 7.7%   |
| • <i>STT/STJ – less big fish</i>   |                 |        |     |        |      |        |
| Conditions are good  | 0               | 0.0%   | 1   | 6.7%   | 1    | 3.8%   |
| Higher population, thus greater demand for fish                                | 1               | 6.7%   | 0   | 0.0%   | 1    | 3.8%   |
| Fishing depends on currents and moon, type of fishing varies                   | 1               | 6.7%   | 0   | 0.0%   | 1    | 3.8%   |
| # of fishers who said “better” and providing reasons                           | 15 <sup>2</sup> | 113.3% | 11  | 127.3% | 26   | 119.2% |
|  |                 |        |     |        |      |        |
| <b><i>About the Same</i></b>   |                 |        |     |        |      |        |
| Catch is the same  | 18              | 75.0%  | 15  | 48.4%  | 33   | 60.0%  |
| • <i>STT/STJ – market driven fishery</i>                                       |                 |        |     |        |      |        |
| • <i>STT/STJ – net fishing slow, no bait last few years, trap fishing same</i> |                 |        |     |        |      |        |
| Fishing same though variable among years – weather, El Nino, currents          | 5               | 20.8%  | 2   | 6.5%   | 7    | 12.7%  |
| No change generally  | 0               | 0.0%   | 5   | 16.1%  | 5    | 9.1%   |
| Problems   | 1               | 4.2%   | 4   | 12.9%  | 5    | 9.1%   |
| • <i>STX – bad weather, global warming, area closure</i>                       |                 |        |     |        |      |        |
| • <i>STX – people steal your pots</i>  |                 |        |     |        |      |        |
| • <i>STX – sales are bad</i>   |                 |        |     |        |      |        |
| • <i>STX – no fish market available</i>  |                 |        |     |        |      |        |
| • <i>STT/STJ – more fishermen</i>  |                 |        |     |        |      |        |

|   | STT/STJ |        | STX |        | USVI |        |
|---|---------|--------|-----|--------|------|--------|
|   | N       | %      | N   | %      | N    | %      |
| Sales are the same  | 0       | 0.0%   | 3   | 9.7%   | 3    | 5.5%   |
| Fishing affected by closures & restrictions   | 1       | 4.2%   | 2   | 6.5%   | 3    | 5.5%   |
| • STX – little space for fish traps   |         |        |     |        |      |        |
| • STX – lots of closed areas  |         |        |     |        |      |        |
| • STT/STJ – too many restrictions to keep fish for the future, but there are more fishers fishing |         |        |     |        |      |        |
| More fish because of 2" mesh  | 1       | 4.2%   | 0   | 0.0%   | 1    | 1.8%   |
| Fewer fishers   | 1       | 4.2%   | 0   | 0.0%   | 1    | 1.8%   |
| Total # fishers responding, “About the Same” and providing reasons                                | 24      | 112.5% | 31  | 100.0% | 55   | 105.5% |
| <b>Worse</b>  |         |        |     |        |      |        |
| Less fish   | 9       | 40.9%  | 15  | 33.3%  | 24   | 35.8%  |
| • STX - Fish smarter - harder to spear & catch with line  |         |        |     |        |      |        |
| • STT/STJ - more non-marketable fish and poisonous fish like barracuda                            |         |        |     |        |      |        |
| • STT/STJ - harder to catch fish  |         |        |     |        |      |        |
| • STT/SJ - overfishing  |         |        |     |        |      |        |
| • STT/STJ - live baiting by charters  |         |        |     |        |      |        |
| Area closures & regulations   | 1       | 4.5%   | 11  | 24.4%  | 12   | 17.9%  |
| • STX Too many closed areas on the east end of the island   |         |        |     |        |      |        |
| • STX Change in conch restrictions - 150 per fisher to 200 per boat                               |         |        |     |        |      |        |
| • STX - BIRNM expansion   |         |        |     |        |      |        |
| Climate   | 1       | 4.5%   | 8   | 17.8%  | 9    | 13.4%  |
| • STX climate change, water temperature   |         |        |     |        |      |        |
| • STX unusually bad weather   |         |        |     |        |      |        |
| No FADs - especially no surface FADs  | 1       | 4.5%   | 5   | 11.1%  | 6    | 9.0%   |
| Too many fishers - including recreational fisheries   | 5       | 22.7%  | 0   | 0.0%   | 5    | 7.5%   |
| Nets still fishing  | 0       | 0.0%   | 3   | 6.7%   | 3    | 4.5%   |
| Too little enforcement  | 3       | 13.6%  | 0   | 0.0%   | 3    | 4.5%   |
| Illegal fishing and fishers, especially Santo Domingo fishers                                     | 3       | 13.6%  | 0   | 0.0%   | 3    | 4.5%   |
| Lionfish eating commercial fish   | 0       | 0.0%   | 3   | 6.7%   | 3    | 4.5%   |
| Too many traps - lost traps kill fish   | 2       | 9.1%   | 1   | 2.2%   | 3    | 4.5%   |
| Pollution   | 2       | 9.1%   | 1   | 2.2%   | 3    | 4.5%   |
| Economy bad - lack of customers   | 1       | 4.5%   | 1   | 2.2%   | 2    | 3.0%   |

|  | STT/STJ |        | STX |        | USVI |        |
|--|---------|--------|-----|--------|------|--------|
|  | N       | %      | N   | %      | N    | %      |
| Foreign longliners                                 | 1       | 4.5%   | 1   | 2.2%   | 2    | 3.0%   |
| Fish poisoning                                     | 0       | 0.0%   | 1   | 2.2%   | 1    | 1.5%   |
| Expenses too high - trailer stolen                 | 0       | 0.0%   | 1   | 2.2%   | 1    | 1.5%   |
| Lack of respect for the sea                        | 1       | 4.5%   | 0   | 0.0%   | 1    | 1.5%   |
| Overpopulation                                     | 1       | 4.5%   | 0   | 0.0%   | 1    | 1.5%   |
| No longer have boat or equipment                   | 0       | 0.0%   | 1   | 2.2%   | 1    | 1.5%   |
| # fishers responding "Worse" and providing reasons | 22      | 140.9% | 45  | 115.6% | 67   | 123.9% |
| <i>Don't know</i>                                  | 4       |        | 8   |        | 12   |        |

Note: N = number of fishers who responded "better," "same," etc. and provided reasons for their opinion. Individual fishers often gave two or three reasons why they felt fishing was better, the same or worse.

<sup>1</sup>White sea urchins are harvested by some fishers, especially down islanders who traditionally harvest urchins in their "home" island.

<sup>2</sup>Number of fishers who responded "better" and gave a reason. This includes 12 who only responded better, two who responded "better" and the "same", and one who responded "better" and "worse".

### Question 31: How easy is it to find employment outside fishing (circle one)?

very hard      hard      easy      very easy      Don't know      No answer

Which jobs you seek (if any) \_\_\_\_\_

A higher proportion of fishers on STX (51.3%) indicated that it was very hard or hard to find other employment compared to STT/STJ (18.1%; Table 31a). Over half the fishers on STT/STJ either didn't know how difficult it was to find employment or the question wasn't applicable to them (50.6%). Fewer fishers on STX responded that they don't know (31.6%). Fishers who responded, "Don't know" were often ones that had not looked for employment for many years. They had steady full-time jobs, had been full time fishers for a long time, or were retired.

Over 35% of fishers in the USVI felt it was very hard or hard to find employment (Table 31b). Over 70% of fishers on STT/STJ aged 31 – 40, who responded "very hard," "hard," "easy," or "very easy," felt that it was very hard or hard to find employment (Table 31c). In contrast 66.7% of fishers aged 21-30, 83.3% of fishers aged 41-50 and 77% of fishers aged 61-70, who responded "very hard," "hard," "easy," or "very easy," felt it was easy or very easy to find employment. Over 30% of fishers in all age groups on STT/STJ did not know how difficult it was to find work. In general, the percentage responding "do not know" increased with age.

Greater than 50% of fishers on STX, who responded "very hard," "hard," "easy," or "very easy," felt that finding a job was very hard or hard (Table 31a, d). Only fishers aged 31 - 40 were split 50/50 on how hard it was to find a job with 37.5% saying it was very easy (Table 31d). Of

fishers aged 41 – 80, 75 – 80% reported that it was very hard or hard to find a job. Older fishers (>60 years old) responded “don’t know” more frequently than younger fishers.

The economy on STX was depressed compared to STT/STJ. In 2012, HOVENSA, a large refinery, closed on St Croix resulting the loss of almost 2,000 well-paying jobs. The most recent unemployment statistics provided by the USVI Department of Labor website (2016), showed an unemployment rate of 7.1% on STT/STJ and 10.4% unemployment on STX for February 2016.

Table 31.a. (Q. 31). Frequency distribution of fishers' opinions of the effort required to find other employment.

| Effort required      | STT/STJ   |              | STX       |              | USVI      |              |
|----------------------|-----------|--------------|-----------|--------------|-----------|--------------|
|                      | N         | Percent      | N         | Percent      | N         | Percent      |
| Very hard            | 4         | 4.8%         | 30        | 27.0%        | 34        | 17.5%        |
| Hard                 | 11        | 13.3%        | 27        | 24.3%        | 38        | 19.6%        |
| Easy                 | 13        | 15.7%        | 11        | 9.9%         | 24        | 12.4%        |
| Very easy            | 9         | 10.8%        | 4         | 3.6%         | 13        | 6.7%         |
| Don't know           | <b>42</b> | <b>50.6%</b> | <b>35</b> | <b>31.6%</b> | <b>77</b> | <b>39.7%</b> |
| No answer            | 4         | 4.8%         | 4         | 3.6%         | 8         | 4.1%         |
| # fishers responding | 83        | 100.0%       | 111       | 100.0%       | 194       | 100.0%       |

Note: The most common response is in bold type.

Table 31.b. (Q. 31). Age distribution of fisher's opinions of the effort required to find other employment for USVI.

| Difficulty in finding employment | Age      |          |           |           |           |           |          | Total     | Percent      |
|----------------------------------|----------|----------|-----------|-----------|-----------|-----------|----------|-----------|--------------|
|                                  | 21-30    | 31-40    | 41-50     | 51-60     | 61-70     | 71-80     | 81+      |           |              |
| Very hard                        | 2        | 3        | 10        | 11        | 4         | 3         | 0        | 33        | 17.2%        |
| Hard                             | 1        | 6        | 9         | 11        | 7         | 4         | 0        | 38        | 19.3%        |
| Easy                             | 3        | 3        | 6         | 6         | 4         | 2         | 0        | 24        | 12.5%        |
| Very Easy                        | 0        | 3        | 3         | 6         | 0         | 1         | 0        | 13        | 6.8%         |
| Don't know                       | <b>3</b> | <b>5</b> | <b>10</b> | <b>17</b> | <b>22</b> | <b>18</b> | <b>2</b> | <b>77</b> | <b>40.1%</b> |
| No answer                        | 1        | 0        | 1         | 1         | 3         | 1         | 1        | 8         | 4.2%         |
| # of fishers responding          | 10       | 20       | 39        | 52        | 40        | 29        | 3        | 193       | 100.0%       |

Note: The most common response is in bold type.



Table 31.c. (Q. 31). Age distribution of fisher's opinions of the effort required to find other employment for STT/STJ.

| Difficulty in finding employment | Age      |          |          |           |           |          |          | Total     | Percent      |
|----------------------------------|----------|----------|----------|-----------|-----------|----------|----------|-----------|--------------|
|                                  | 21-30    | 31-40    | 41-50    | 51-60     | 61-70     | 71-80    | 81+      |           |              |
| Very hard                        | 0        | 1        | 1        | 2         | 0         | 0        | 0        | 4         | 4.9%         |
| Hard                             | 1        | 4        | 1        | 1         | 2         | 2        | 0        | 11        | 12.2%        |
| Easy                             | 2        | 2        | 3        | 4         | 1         | 1        | 0        | 13        | 15.9%        |
| Very Easy                        | 0        | 0        | 2        | 6         | 0         | 1        | 0        | 9         | 11.0%        |
| Don't know                       | <b>2</b> | <b>5</b> | <b>6</b> | <b>11</b> | <b>12</b> | <b>5</b> | <b>1</b> | <b>42</b> | <b>51.2%</b> |
| No answer                        | 0        | 0        | 0        | 1         | 1         | 1        | 1        | 4         | 4.9%         |
| # of fishers responding          | 5        | 12       | 13       | 25        | 16        | 10       | 2        | 83        | 100.0%       |

Note: The most common response is in bold type.

Table 31.d. (Q. 31). Age distribution of fisher's opinions of the effort required to find other employment for STX.

| Difficulty in finding employment | Age      |          |          |          |           |           |          | Total     | Percent      |
|----------------------------------|----------|----------|----------|----------|-----------|-----------|----------|-----------|--------------|
|                                  | 21-30    | 31-40    | 41-50    | 51-60    | 61-70     | 71-80     | 81+      |           |              |
| Very hard                        | 2        | 2        | 9        | 9        | 4         | 3         | 0        | 29        | 26.4%        |
| Hard                             | 0        | 2        | 8        | 10       | 5         | 2         | 0        | 27        | 24.6%        |
| Easy                             | 1        | 1        | 3        | 2        | 3         | 1         | 0        | 11        | 10.0%        |
| Very Easy                        | 0        | 3        | 1        | 0        | 0         | 0         | 0        | 4         | 3.6%         |
| Don't know                       | <b>1</b> | <b>0</b> | <b>4</b> | <b>6</b> | <b>10</b> | <b>13</b> | <b>1</b> | <b>35</b> | <b>31.8%</b> |
| No answer                        | 1        | 0        | 1        | 0        | 2         | 0         | 0        | 4         | 3.6%         |
| # of fishers responding          | 5        | 8        | 26       | 27       | 24        | 19        | 1        | 110       | 100.0%       |

Note: The most common response is in bold type.

Fishers were asked what types of jobs they sought (Table 31e). The most common responses to this question on STX were there were “no jobs available” (40.0% of fishers responding), “retired” (15.7%) and “haven’t looked for work” (11.4%). On STT/STJ, the most common response was “construction” (25.7%), primarily carpentry and masonry with “no jobs available” being the second most common response (17.1%). The poor economy on STX since the closure of HOVENSA is reflected in the high percentage of fishers on STX responding that there were “no jobs available.” More fishers on STX (15.7%) said they were retired than on STT/STJ (5.7%). Fishers sought work in a wide variety of jobs.

Table 31.e. (Q. 31). Types of jobs sought by fishers.

| Job sought                    | STT/STJ  |              | STX |              | USVI      |              |
|-------------------------------|----------|--------------|-----|--------------|-----------|--------------|
|                               | N        | %            | N   | %            | N         | %            |
| No jobs available             | 6        | 17.1%        | 28  | <b>40.0%</b> | <b>34</b> | <b>32.4%</b> |
| Construction                  | <b>9</b> | <b>25.7%</b> | 5   | 7.1%         | 14        | 13.3%        |
| Retired                       | 2        | 5.7%         | 11  | 15.7%        | 13        | 12.4%        |
| Haven't looked for work       | 4        | 11.4%        | 8   | 11.4%        | 12        | 11.4%        |
| Tradesman                     | 1        | 2.9%         | 7   | 10.0%        | 8         | 7.6%         |
| Government                    | 3        | 8.6%         | 2   | 2.9%         | 5         | 4.8%         |
| Tourist boat captain/coxswain | 2        | 5.7%         | 3   | 4.3%         | 5         | 4.8%         |
| Other tourism                 | 2        | 5.7%         |     | 0.0%         | 2         | 1.9%         |
| Aviation                      | 2        | 5.7%         |     | 0.0%         | 2         | 1.9%         |
| Surveying                     | 1        | 2.9%         | 1   | 1.4%         | 2         | 1.9%         |
| Architecture                  | 1        | 2.9%         |     | 0.0%         | 1         | 1.0%         |
| Medical                       | 1        | 2.9%         |     | 0.0%         | 1         | 1.0%         |
| Security                      | 1        | 2.9%         |     | 0.0%         | 1         | 1.0%         |
| Banking                       |          | 0.0%         | 1   | 1.4%         | 1         | 1.0%         |
| Truck driving                 |          | 0.0%         | 1   | 1.4%         | 1         | 1.0%         |
| Property management           |          | 0.0%         | 1   | 1.4%         | 1         | 1.0%         |
| Housekeeping                  |          | 0.0%         | 1   | 1.4%         | 1         | 1.0%         |
| Consultancy                   |          | 0.0%         | 1   | 1.4%         | 1         | 1.0%         |
| # of fishers responding       | 35       | 100.0%       | 70  |              | 105       | 100.0%       |

Note: The most common response is in bold type.

**Question 32: Compared to 5 years ago, how is household financial well-being (circle one)?**

**better      about the same      worse      Don't know      No answer      Why?\_\_\_\_\_**

According to fishers on STT/STJ, the financial condition of 71.1% of their households was the "same" or "better," while only 20.5% said it was worse (Table 32a). In contrast, only 49.5% of fishers on STX said their financial condition was "the same" or "better," while 45% said it was "worse".

Fishers who said that their financial condition was better were generally making more money because they had a better job, were finally debt free, were catching and selling more fish, their children had left home and therefore were no longer an expense or their wife's business was going well or she had got a job (Table 32b).

Table 32.a. (Q. 32). Frequency distribution of fishers' opinions of the financial condition of their household compared to five years ago.

| Financial condition     | STT/STJ   |              | STX       |              | USVI      |              |
|-------------------------|-----------|--------------|-----------|--------------|-----------|--------------|
|                         | N         | Percent      | N         | Percent      | N         | Percent      |
| Better                  | 16        | 19.3%        | 11        | 9.9%         | 27        | 13.9%        |
| Same                    | <b>43</b> | <b>51.8%</b> | 44        | 39.6%        | <b>87</b> | <b>44.9%</b> |
| Worse                   | 17        | 20.5%        | <b>50</b> | <b>45.0%</b> | 67        | 34.5%        |
| Don't Know              | 1         | 1.2%         | 5         | 4.6%         | 6         | 3.1%         |
| N/A                     | 6         | 7.2%         | 1         | 0.9%         | 7         | 3.6%         |
| # of fishers responding | 83        | 100.0%       | 111       | 100.0%       | 194       | 100.0%       |

Note: The most common response is in bold type.

Table 32.b. (Q. 32). The reasons fishers said that their financial well-being was “better” compared with five years ago.

| Reasons for “better” opinion                  | STT/STJ  |                     | STX      |              | USVI     |              |
|---|----------|---------------------|----------|--------------|----------|--------------|
|   | N        | %                   | N        | %            | N        | %            |
| Making more money                             | <b>3</b> | <b>25.0%</b>        |          |              | <b>3</b> | <b>13.6%</b> |
| • now close to landing site so less expenses  |          |                     |          |              |          |              |
| • increase in salary with college degree      |          |                     |          |              |          |              |
| Working harder                                | 1        | 8.3%                |          |              | 1        | 4.5%         |
| More lobster                                  | 1        | 8.3%                |          |              | 1        | 4.5%         |
| Better economy                                | 2        | 16.7%               |          |              | 2        | 9.1%         |
| • more jobs                                   |          |                     |          |              |          |              |
| Debt free                                     | 2        | 16.7%               | 1        | 10.0%        | <b>3</b> | <b>13.6%</b> |
| • bills paid off                              |          |                     |          |              |          |              |
| • no longer other financial obligations       |          |                     |          |              |          |              |
| • house paid for                              |          |                     |          |              |          |              |
| Wife making more money                        | 2        | 16.7%               |          |              | 2        | 9.1%         |
| • wife's business                             |          |                     |          |              |          |              |
| • wife recently got job                       |          |                     |          |              |          |              |
| Children have left home                       | 2        | 16.7%               | 1        | 10.0%        | <b>3</b> | <b>13.6%</b> |
| Price of fish higher                          |          |                     | 1        | 10.0%        | 1        | 4.5%         |
| Catching and selling more fish                |          |                     | <b>2</b> | <b>20.0%</b> | 2        | 9.1%         |
| Diving brings in more money                   |          |                     | 1        | 10.0%        | 1        | 4.5%         |
| Living by himself                             |          |                     | 1        | 10.0%        | 1        | 4.5%         |
| Conditions are good                           |          |                     | 1        | 10.0%        | 1        | 4.5%         |
| Fishing helps (probably to supplement income) |          |                     | 1        | 10.0%        | 1        | 4.5%         |
| Better Job                                    |          |                     | 1        | 10.0%        | 1        | 4.5%         |
| Total # of fishers responding with reason     | 12       | 108.3% <sup>1</sup> | 10       | 100.0%       | 22       | 104.5%       |

<sup>1</sup>Some fishers provided more than one reason.

Note: The most common response is in bold type.

Fishers who said that their financial condition was about the same gave a variety of reasons including that they were catching the same amount of fish and making the same amount of

money, bills and income were the same, they were retired, and they were now getting social security (Table 32c). Some, who said “about the same” said the economy was bad, they were struggling, they were working harder, and their financial condition went up and down. Some were not working or fishing.

Table 32.c. (Q. 32). The reasons fishers said that their financial well-being was “about the same” compared with five years ago.

| Reasons for “About the same” opinion                    | STT/STJ  |              | STX       |              | USVI      |              |
|---|----------|--------------|-----------|--------------|-----------|--------------|
|   | N        | %            | N         | %            | N         | %            |
| No change in circumstances                              | <b>8</b> | <b>50.0%</b> | <b>19</b> | <b>76.0%</b> | <b>27</b> | <b>65.9%</b> |
| • STT/STJ - make enough to pay bills                    |          |              |           |              |           |              |
| • STT/STJ - you make more money but expenses are higher |          |              |           |              |           |              |
| • fishing steady with steady budget                     |          |              |           |              |           |              |
| • STX – same amount of fishing                          |          |              |           |              |           |              |
| • BOTH - catching and selling same amount of fish       |          |              |           |              |           |              |
| • STX – only target certain amount of fish              |          |              |           |              |           |              |
| • STT/STJ - same bills, same cash                       |          |              |           |              |           |              |
| Maintenance is expensive                                | 2        | 12.5%        |           |              | 2         | 4.9%         |
| Not working and/or fishing                              | 1        | 6.3%         |           |              | 1         | 2.4%         |
| Not fishing   | 2        | 12.5%        |           |              | 2         | 4.9%         |
| Bad economy   | 2        | 12.5%        |           |              | 2         | 4.9%         |
| • still struggling                                      |          | 0.0%         |           |              |           |              |
| Financial condition goes up and down                    | 1        | 6.3%         |           |              | 1         | 2.4%         |
| Depends on how many days I go fishing                   |          |              | 1         | 4.0%         | 1         | 2.4%         |
| Fishing is bad  |          |              | 1         | 4.0%         | 1         | 2.4%         |
| Retired   |          |              | 1         | 4.0%         | 1         | 2.4%         |
| We all work   |          |              | 1         | 4.0%         | 1         | 2.4%         |
| Working harder  |          |              | 1         | 4.0%         | 1         | 2.4%         |
| Getting social security                                 |          |              | 1         | 4.0%         | 1         | 2.4%         |
| # of fishers responding with reason                     | 16       | 100.0%       | 25        | 100.0%       | 41        | 100.0%       |

Note: The most common response is in bold type.

Fishers who said their financial condition was worse also gave a wide variety of reasons (Table 32d) primarily related to the opinion that the cost of living had gone up and the economy was bad. Crucian fishers said that they were especially affected by the closure of HOVENSA and the loss of nearly 2,000 well-paying jobs. The result was that there were few available jobs on STX, fewer customers for their fish, and fewer charter customers. STX fishers also complained about regulations, especially the closed areas and seasons. A few fishers felt there was too much competition among fishers because of closed seasons when they have to fish other species or because there were too many unlicensed fishers selling fish. Fishers also gave environmental reasons for a down turn in their financial condition. This ranged from the weather affecting fishing, to lionfish eating the fish, to drought affecting crops. Clearly STX fishers were feeling

the effect of the HOVENSA closure on the economy and the lack of alternative jobs to supplement fishing or the lack of full time jobs that fishing only supplemented.

Table 32.d. (Q. 32). The reasons fishers said that their financial well-being was “worse” compared with five years ago.

| Reasons for “worse” opinion   | STT/STJ |       | STX |       | USVI |       |
|---|---------|-------|-----|-------|------|-------|
|   | N       | %     | N   | %     | N    | %     |
| Cost of living has gone up  | 7       | 50.0% | 3   | 6.1%  | 10   | 15.9% |
| • STX - higher expenses for gas and air fills                           |         |       |     |       |      |       |
| • STX - cost of boat maintenance has gone up                            |         |       |     |       |      |       |
| Bad economy   | 4       | 28.6% | 11  | 22.4% | 15   | 23.8% |
| • STT/STJ - no raise or actual pay cut                                  |         |       |     |       |      |       |
| • STX - everything slow in economy                                      |         |       |     |       |      |       |
| • STX - no jobs   |         |       |     |       |      |       |
| • STX - HOVENSA closed – customers left                                 |         |       |     |       |      |       |
| • STX - people not buying fish  |         |       |     |       |      |       |
| • STX - only veterans and National Guard has money to buy fish          |         |       |     |       |      |       |
| Expense of boat repairs   | 3       | 21.4% |     |       | 3    | 4.8%  |
| Divorce   | 1       | 7.1%  |     |       | 1    | 1.6%  |
| Pension has decreased   | 1       | 7.1%  |     |       | 1    | 1.6%  |
| Son was crew and he left  | 1       | 7.1%  |     |       | 1    | 1.6%  |
| Too many expenses related to boat maintenance                           |         |       | 2   | 4.1%  | 2    | 3.2%  |
| • in debt from boat maintenance   |         |       |     |       |      |       |
| Too many fishers without licenses selling fish and lowering fish prices |         |       | 1   | 2.0%  | 1    | 1.6%  |
| Lower income - not making the same as before                            |         |       | 2   | 4.1%  | 2    | 3.2%  |
| No work - only fishing  |         |       | 3   | 6.1%  | 3    | 4.8%  |
| Fewer charters with HOVENSA closed                                      |         |       | 1   | 2.0%  | 1    | 1.6%  |
| Not fishing right now   |         |       | 3   | 6.1%  | 3    | 4.8%  |
| • boat under repair   |         |       |     |       |      |       |
| Sick for long period for variety of reasons including getting bends     |         |       | 3   | 6.1%  | 3    | 4.8%  |
| Fishing less  |         |       | 3   | 6.1%  | 3    | 4.8%  |
| • older and slower, not pushing yourself as much so catching less fish  |         |       |     |       |      |       |
| Regulations impact fishing  |         |       | 5   | 10.2% | 5    | 7.9%  |
| • more regulations than before  |         |       |     |       |      |       |
| • closed areas, closed seasons  |         |       |     |       |      |       |
| • because of closed seasons have to compete with other fishers          |         |       |     |       |      |       |
| More competition with other fishers                                     |         |       | 1   | 2.0%  | 1    | 1.6%  |
| Catching fewer fish   |         |       | 3   | 6.1%  | 3    | 4.8%  |
| • can't catch as many fish  |         |       |     |       |      |       |
| Fewer fish  |         |       | 3   | 6.1%  | 3    | 4.8%  |
| • fewer lobster   |         |       |     |       |      |       |

| Reasons for “worse” opinion                     | STT/STJ |   | STX |      | USVI |      |
|---|---------|---|-----|------|------|------|
|   | N       | % | N   | %    | N    | %    |
| • fewer fish and thus earning less from fishing |         |   |     |      |      |      |
| Environmental reasons                           |         |   | 3   | 6.1% | 3    | 4.8% |
| • climate change                                |         |   |     |      |      |      |
| • too many lionfish                             |         |   |     |      |      |      |
| • bad weather                                   |         |   |     |      |      |      |
| • polluted water                                |         |   |     |      |      |      |
| Changed jobs                                    |         |   | 1   | 2.0% | 1    | 1.6% |
| Retired   |         |   | 2   | 4.1% | 2    | 3.2% |
| Bad farming year - drought                      |         |   | 2   | 4.1% | 2    | 3.2% |
| Deceased relative                               |         |   | 2   | 4.1% | 2    | 3.2% |
| • spouse died                                   |         |   |     |      |      |      |
| # of fishers responding with reason             | 14      | - | 49  | -    | 63   | -    |

<sup>1</sup>Some fishers provided more than one reason.

Note: The most common response is in bold type.

**Question 33: What are the main socio-economic problems affecting your fishery? (If regulations, please specify).**

The main socio-economic problem for fishers in both districts was regulation with 37.8% mentioning an issue with regulation (Table 33). In general, fishers thought that there were too many regulations and restrictions. This was especially true on STX where 45.5% of the STX fishers said that the regulations were restricting their fishing in some way. Only one STX fisher had anything positive to say about the regulations indicating he understood the need for closures but they still restricted fishing. In contrast, only 27.5% of STT/STJ fishers commented on regulations and several supported or understood the need for certain regulations, especially the closed areas that protected spawning aggregations.

Several fishers said that closed areas caused conflict among fishers by making the area available for fishing smaller. While some fishers in both districts objected to closed seasons, only fishers on STT/STJ gave reasons. Specifically, some STT/STJ fishers thought the practice was wasteful. One fisher said that fish caught and released were eaten by sharks and another who fished in very deep water (>150 ft), said the fish died even if their air bladder was punctured.

The second most common problem was related to environmental issues (USVI – 18.6% of fishers). Fishers in both districts mentioned that climate change (including global warming) and bad weather impacted the fishery. STT/STJ fishers were more concerned about pollution from live-aboard boats and development than STX fishers.

Fishers also complained about competition among fishers. There were a variety of reasons given for this ranging from the number of fishers and boats fishing, including recreational “weekend” fishers,” to the number of traps. The number of closed areas was considered a problem because it reduced the fishing area, increasing competition among fishers. Fishers stated that unlicensed/illegal fishers that sold fish competed with licensed fishers and recommended better enforcement. Foreign fishers, such as Japanese long liners, were also thought to deplete pelagic fish and bait stocks.

STT/STJ fishers had more issues related to traps than STX fishers. A couple STT/STJ fishers felt that the number of traps had increased, though others were concerned about (proposed) trap reductions, e.g. that the reductions weren’t fair and that because of the reductions trap fishers were fishing harder. Other STT/STJ fishers complained that traps damaged the benthos from rope entanglement and that fishers were using wire, not the required biodegradable twine to fasten the trap doors, and, therefore, lost traps continued fishing. STX fishers were concerned about large vessels cutting their trap lines on the south shore where vessels come over the shelf to access HOVENSA and the container port.

Few USVI fishers sell lionfish. They are generally a nuisance when caught in traps with one fisher on STT/STJ reporting that they had been stung by a lionfish and another saying that when lionfish were caught in traps other fish would not enter the trap. Other fishers were concerned about lionfish depleting reef fish. Fishers on STX said that closed areas were a haven for lionfish since no one caught them there. There was a recommendation on STX that a special commercial permit for harvesting and selling lionfish be issued, especially to dive shops.

Fishers in both districts were concerned about dishonest reporting of catch because of the unknown impact on ACLs and fish stocks. Catch reporting is required and monthly reports by species must be submitted to DFW.

The cost of living in the USVI is high. Fishers said they were impacted by the high price of fishing gear, e.g. rope and wire for trap construction and boat/engine maintenance and repair. While the gas price is lower than in the past, it is considerably higher than in the continental US and is a major expense for fishers and several complained about how much they spent on gas.

STT/STJ fishers reported that fishers targeting pelagic species were using a new (last couple of years) live bait fishing technique and that bait stocks were being depleted.

Fishers in both districts wanted more FADs deployed and they preferred surface FADs to the submerged FADs currently installed. Fishers did not think that the submerged FADs attracted fish.

More STX fishers (8.1%) referred to the effect of the bad economy on their income than STT/STJ fishers (2.7%). A fisher on STT/STJ said he sold his fish at the same price as 10 years ago because people lacked disposable income. In a study of fish prices in the USVI, Kojis (2014) found that fishers on STT sold their fish at set price with little variation among fishers. Fish price was only lowered if a fisher still had fish for sale in the late morning/afternoon. STX fishers stated that people just did not have the money to buy fish because of the down turn in the economy with the closure of HOVENSA and the lack of tourism on the island. STX fishers complained of no jobs. Fishers on both islands often supplemented their income with construction jobs, etc. or fished to supplement their employment income. This is harder to do today on STX.

Some fishers on STT/STJ (8.2%) complained of the difficulty of selling fish, attributing it to low the prices of farm raised fish (probably frozen supermarket fish) and changes in preference among generations. Older people still bought fresh, local fish, while younger people were less inclined to do so. On STX, one fisher (1.0%) said that fishers that did not ice their fish were giving a bad reputation to other fishers, which likely reduced fish sales.

Table 33. (Q. 33). The main socio-economic problems that fishers said affected their fishery. District specific comments are indicated for emphasis. Those comments without a STT/STJ or STX preceding it apply to both districts. N = number of fishers providing similar socio-economic problems.

| Socio-economic problems  | STT/STJ |       | STX |       | USVI |       |
|--|---------|-------|-----|-------|------|-------|
|  | N       | %     | N   | %     | N    | %     |
| Regulations  | 20      | 27.4% | 45  | 45.5% | 65   | 37.8% |
| • Too many regulations and restrictions  |         |       |     |       |      |       |
| • Too many areas closed, less area to fish   |         |       |     |       |      |       |
| • STT/STJ - CFMC regulations impinge on fishery  |         |       |     |       |      |       |
| • STT/STJ - We help the CFMC screw us  |         |       |     |       |      |       |
| • STT/STJ - CFMC restricted in developing regulations and guidelines                                 |         |       |     |       |      |       |
| • STT/STJ - ACL's too low – need stock assessments   |         |       |     |       |      |       |
| • STT/STJ – Closures work – Hind Bank proof of this  |         |       |     |       |      |       |
| • STT/STJ - Yellowfin grouper closure is ok  |         |       |     |       |      |       |
| • STT/STJ – Year-round Hind Bank closure is an injustice – used to fish for yellowtail snapper there |         |       |     |       |      |       |
| • STT/STJ - Closed areas cause competition among fishers – STJ monument is good example of this.     |         |       |     |       |      |       |



| Socio-economic problems   | STT/STJ |       | STX |       | USVI |       |
|---|---------|-------|-----|-------|------|-------|
|   | N       | %     | N   | %     | N    | %     |
| • STT/STJ - To protect coral species on STJ fishing grounds limited and can't drop anchor   |         |       |     |       |      |       |
| • STT/STJ – Limited entry is important  |         |       |     |       |      |       |
| • STT/STJ - Closing for spawning seas is necessary – helpful in preserving fish stocks  |         |       |     |       |      |       |
| • STT/STJ – Doesn't like closed seasons for fish – toss over and sharks eat them  |         |       |     |       |      |       |
| • STT/STJ – Wasteful when catch fish during closed season. Fish caught in deep water (>150 ft) on north side can't survive even if puncture bladder |         |       |     |       |      |       |
| • STT/STJ – Need research on Nassau grouper so can catch again  |         |       |     |       |      |       |
| • STT/STJ – Fishing grounds smaller – not really a complaint  |         |       |     |       |      |       |
| • STT/STJ - Targeting limited number species, reducing number economic fish and increasing non-economic poisonous (ciguatera) fish                  |         |       |     |       |      |       |
| • STX – Need to be careful about restricting fishers regarding closed areas and bag limits  |         |       |     |       |      |       |
| • STX – Closed areas are a haven for lionfish   |         |       |     |       |      |       |
| • STX – Need to open at least some of the closed areas  |         |       |     |       |      |       |
| • STX – Need closed areas but restricted fishing  |         |       |     |       |      |       |
| • STX – Objected to BIRNM expansion prohibition on take in territorial waters around Buck Island  |         |       |     |       |      |       |
| Environmental Issues that Impact Fishery  | 20      | 27.4% | 12  | 12.1% | 32   | 18.6% |
| • Climate Change  |         |       |     |       |      |       |
| • Bad weather that impacts fishing  |         |       |     |       |      |       |
| • STT/STJ - Disturbance to mangroves in the Mangrove Lagoon - tying boats to mangroves,   |         |       |     |       |      |       |
| • STT/STJ - Pollution from detergents, cleaning supplies by boat users (probably referring to primarily liveaboards).                               |         |       |     |       |      |       |
| • STT/STJ - Pollution, runoff, car oil, plastic, dirt, dump   |         |       |     |       |      |       |
| • STT/STJ - Little St. James is destroyed, heavy equipment is on site now   |         |       |     |       |      |       |
| • STT/STJ – Sewage pollution, especially from live-aboards  |         |       |     |       |      |       |
| • STX – hurricanes and green water  |         |       |     |       |      |       |
| Competition Among Fishers   | 7       | 9.6%  | 5   | 5.1%  | 12   | 7.0%  |
| • STT/STJ – More boats, more people fishing   |         |       |     |       |      |       |
| • STT/STJ – Recreational fishers/weekend warriors   |         |       |     |       |      |       |
| • STT/STJ – Too many traps  |         |       |     |       |      |       |
| • STT/STJ – Too many young fishers fishing the same area  |         |       |     |       |      |       |
| • STX – More people fishing than before   |         |       |     |       |      |       |
| • STX – Too many fishers  |         |       |     |       |      |       |
| Illegal Fishers   | 5       | 6.8%  | 2   | 2.0%  | 7    | 4.1%  |
| • STT/STJ – Dominican Republic people catching fish   |         |       |     |       |      |       |
| • STT/STJ – Too many unlicensed fishers catching  |         |       |     |       |      |       |

| Socio-economic problems   | STT/STJ |       | STX |      | USVI |      |
|---|---------|-------|-----|------|------|------|
|   | N       | %     | N   | %    | N    | %    |
| lobster   |         |       |     |      |      |      |
| • STX – Lots of phantom fisherman that don't have a license but sell their catch  |         |       |     |      |      |      |
| • STX – Too many divers without fishing license   |         |       |     |      |      |      |
| Issues with traps   | 9       | 12.3% | 3   | 3.0% | 12   | 7.0% |
| • STT/STJ – Too many traps  |         |       |     |      |      |      |
| • STT/STJ – More boats, more gear, number of traps up dramatically  |         |       |     |      |      |      |
| • STT/STJ – Trap theft is a problem   |         |       |     |      |      |      |
| • STT/STJ – Unfair that fisher is permitted fewer traps than others   |         |       |     |      |      |      |
| • STT/STJ - Biodegradable trap doors supposed to be tied with hemp cord, instead use copper wire - lose traps become ghost traps                            |         |       |     |      |      |      |
| • STT/STJ - Fish traps causing the most destruction to the fishery resources: habitat by entanglement among the benthos and death of fish species           |         |       |     |      |      |      |
| • STT/STJ - Trap reductions causing trap fishing harder, fishers think they are going to be shut down so they fish harder                                   |         |       |     |      |      |      |
| • STX – Fish pot lines are cut by big vessels (problem on the south side of STX as cargo and fuel vessels head toward HOVENSA docks and the container port) |         |       |     |      |      |      |
| Lionfish  | 6       | 8.2%  | 7   | 7.1% | 13   | 7.6% |
| • STT/STJ - If lion fish in traps then other fish will not go in traps  |         |       |     |      |      |      |
| • STT/STJ – Increase in lionfish  |         |       |     |      |      |      |
| • STT/STJ – Catches lionfish in pots but doesn't sell them. He has been stung a few times.  |         |       |     |      |      |      |
| • STX – Closed areas provide a haven for lionfish   |         |       |     |      |      |      |
| • STX – Lionfish depleting reef fish  |         |       |     |      |      |      |
| • STX – Need to provide commercial license to harvest lionfish – especially for dive shops  |         |       |     |      |      |      |
| Boat Maintenance Expensive  | 4       | 5.5%  | 1   | 1.0% | 5    | 2.9% |
| • Problems with engine breakdown and repair   |         |       |     |      |      |      |
| • STT/STJ - Engine parts/repair expensive, as is fiberglass resin paint, etc.   |         |       |     |      |      |      |
| Poaching  | 4       | 5.5%  | 0   | 0.0% | 4    | 2.3% |
| • STT/STJ – Other fishermen mess with gear  |         |       |     |      |      |      |
| • STT/STJ - Theft   |         |       |     |      |      |      |
| • STT/STJ - People take fish in his net, people spear fish in his net   |         |       |     |      |      |      |
| Health Problems – fisher sick or blind and can't fish   | 4       | 5.5%  | 1   | 1.0% | 5    | 2.9% |
| Live Bait Fishing Depleting Bait Fish   | 3       | 4.1%  | 0   | 0.0% | 3    | 1.7% |
| • STT/STJ – Japanese boats catching all the bait  |         |       |     |      |      |      |
| • STT/STJ – Live bait fishing to catch pelagic fish is depleting the bait fish  |         |       |     |      |      |      |
| • STT/STJ – Bait fishing collapsing   |         |       |     |      |      |      |
| Not Enough Enforcement  | 3       | 4.1%  | 3   | 3.0% | 6    | 3.5% |
| • STX – Fishers still net fishing - lack of enforcement   |         |       |     |      |      |      |

| Socio-economic problems   | STT/STJ |      | STX |       | USVI |      |
|---|---------|------|-----|-------|------|------|
|   | N       | %    | N   | %     | N    | %    |
| <ul style="list-style-type: none"> <li>STX - Shells of conch are being left on the bottom by scuba divers and conch are found dead around area where conch were cleaned at the bottom (conch meats must be removed on shore so that it can be determined if the conch is of legal size by measuring the shell)</li> </ul> |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>STX – Recreational fishers selling fish</li> </ul>   |         |      |     |       |      |      |
| Foreign Fishers Taking VI Fish  | 3       | 4.1% | 2   | 2.0%  | 5    | 2.9% |
| <ul style="list-style-type: none"> <li>STT/STJ – Fishers from the Dominican Republic catching (and presumably selling) fish</li> </ul>  |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>STT/STJ – Lack of regulation of take of HMS species in other countries</li> </ul>  |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>STX – Japanese long liners catching all the pelagics moving our way / fishermen forced to catch reef fish</li> </ul>   |         |      |     |       |      |      |
| Fish Catch Reporting  | 3       | 4.1% | 1   | 1.0%  | 4    | 2.3% |
| <ul style="list-style-type: none"> <li>STT/STJ - Dishonest reporting from fishers on catch report</li> </ul>  |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>STT/STJ – Under reporting of fish catch and income</li> </ul>  |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>STT/STJ – Too much paperwork reporting catch</li> </ul>  |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>STX - Need proper reporting - if report too few fish may be penalized</li> </ul>   |         |      |     |       |      |      |
| Economy bad   | 2       | 2.7% | 8   | 8.1%  | 10   | 5.8% |
| <ul style="list-style-type: none"> <li>STT/STJ - People don't have the money to spend on fresh catch - lack of disposable income – sells catch at the same price as 10 years ago</li> </ul>   |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>STX – No jobs, people are out of work</li> </ul>   |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>STX – HOVENSA closing, market sales depressed</li> </ul>   |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>STX – Lack of tourism</li> </ul>   |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>STX – No money circulating, people aren't buying as much fish and more people fishing</li> </ul>   |         |      |     |       |      |      |
| Hard to sell fish   | 6       | 8.2% | 1   | 1.0%  | 7    | 4.1% |
| <ul style="list-style-type: none"> <li>STT/STJ – Selling fish is difficult, younger generation eats less fish</li> </ul>  |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>STT/STJ – Sales of fish more difficult, farm raised fish too cheap, new generation not buying fish – primarily older generation</li> </ul>   |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>STT/STJ – Spend more time selling fish than catching fish</li> </ul>   |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>STX – Certain fishers not icing fish which gives bad reputation for other fishers</li> </ul>   |         |      |     |       |      |      |
| Increasing Cost of Living and High Expenses   | 6       | 8.2% | 4   | 4.0%  | 10   | 5.8% |
| <ul style="list-style-type: none"> <li>Cost of fuel</li> </ul>  |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>High cost of living</li> </ul>   |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>STT/STJ – Cost of fishing supplies has increased, e.g. ropes and wire for pots</li> </ul>  |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>STT/STJ – Small business loan has a high interest rate</li> </ul>  |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>STT/STJ – Inflation, cost of fishing gear</li> </ul>   |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>STX – Cost of fishing supplies and bait</li> </ul>   |         |      |     |       |      |      |
| <ul style="list-style-type: none"> <li>STX - Spend \$200 in gas to catch too few fish.</li> </ul>   |         |      |     |       |      |      |
| Need for More FADs  | 1       | 1.4% | 9   | 12.3% | 10   | 5.8% |

| Socio-economic problems  | STT/STJ |      | STX |      | USVI |      |
|--|---------|------|-----|------|------|------|
|  | N       | %    | N   | %    | N    | %    |
| • Limited number of FADs   |         |      |     |      |      |      |
| • STX – Lack of support for replacing FADs   |         |      |     |      |      |      |
| • STX – Need surface FADs, waste of money putting in underwater FADs   |         |      |     |      |      |      |
| • STX - Need to find another job to make enough money to support family when FADs gone.  |         |      |     |      |      |      |
| • STX – FAD at Sandy Point gone, needs to be replaced and have light,  |         |      |     |      |      |      |
| Fish Market Improvements   | 2       | 2.7% | 2   | 2.0% | 4    | 2.3% |
| • STT/STJ – No market to sell fish in the “country”, especially in Fort Mylner Area  |         |      |     |      |      |      |
| • STT/STJ – Need more fish markets with sufficient parking and running water   |         |      |     |      |      |      |
| • STX – Need a fish market for selling fish  |         |      |     |      |      |      |
| • STX – Frederiksted fish market needs lights at night   |         |      |     |      |      |      |
| Less fish  | 3       | 4.1% | 2   | 2.0% | 5    | 2.9% |
| • STT/STJ – Not much engagement for younger generation to fish sustainability  |         |      |     |      |      |      |
| • STT/STJ – Big time fishers take away everything  |         |      |     |      |      |      |
| • STT/STJ – Overfishing down island  |         |      |     |      |      |      |
| • STX – Less fish, don’t know why  |         |      |     |      |      |      |
| Personal Issues Impinging on fishing   | 2       | 2.7% | 0   | 0.0% | 2    | 1.2% |
| • STT/STJ – Dinghies are being removed from Hull Bay beach   |         |      |     |      |      |      |
| • STT/STJ – Limited fishing area because afraid to go offshore because can’t swim  |         |      |     |      |      |      |
| STT/STJ – Previously got boat insurance for \$185/mo but it is available right now   | 1       | 1.4% | 0   | 0.0% | 1    | 0.6% |
| STT/STJ – Long liners  | 1       | 1.4% | 0   | 0.0% | 1    | 0.6% |
| STT/STJ – Fishing being phased out as fishers retire   | 1       | 1.4% | 0   | 0.0% | 1    | 0.6% |
| STT/STJ – Charter fishing is not as attractive as before and it is difficult to get permits to fish in the BVI                                   | 2       | 2.7% | 0   | 0.0% | 2    | 1.2% |
| STT/STJ – Fewer marketable fish, more unmarketable fish  | 1       | 1.4% | 0   | 0.0% | 1    | 0.6% |
| STT/STJ – Waves from ferries cause problems  | 1       | 1.4% | 0   | 0.0% | 1    | 0.6% |
| STT/STJ – Demanding job – little time to go fishing  | 1       | 1.4% | 0   | 0.0% | 1    | 0.6% |
| STT/STJ – Have no boat   | 1       | 1.4% | 0   | 0.0% | 1    | 0.6% |
| STX – Altona Lagoon  | 0       | 0.0% | 2   | 2.0% | 2    | 1.2% |
| • STX – Prevent fishing in Altona Lagoon for at least 5 years  |         |      |     |      |      |      |
| • STX – Altona Lagoon needs to be closed to fishing at least 2 days a week, leave as a nursery – there are nets blocking the entrance 24 hrs/day |         |      |     |      |      |      |
| STX - Sandy Point Pond is blocked. Fish can't get in and out, especially sprat. Need to open so fish can move in and out.                        | 0       | 0.0% | 1   | 1.0% | 1    | 0.6% |
| STX – Consider making artificial reefs   | 0       | 0.0% | 1   | 1.0% | 1    | 0.6% |
| STX – No help from the government with grants, etc.  | 0       | 0.0% | 1   | 1.0% | 1    | 0.6% |
| Boat Ramp Issues   | 0       | 0.0% | 2   | 2.0% | 2    | 1.2% |
| • STX – Ramps not safe, no lights or bumper guards   |         |      |     |      |      |      |
| • STX – Launching boat - too many kids around - afraid he will hurt them.  |         |      |     |      |      |      |
| STX – East End Marine Park needs to remove buoys,  | 0       | 0.0% | 1   | 1.0% | 1    | 0.6% |

| Socio-economic problems   | STT/STJ |      | STX |       | USVI |       |
|---|---------|------|-----|-------|------|-------|
|   | N       | %    | N   | %     | N    | %     |
| dangerous for small boats when weather is bad and they need to fish close to shore  |         |      |     |       |      |       |
| STX – Continuing Net Problems   | 0       | 0.0% | 1   | 1.0%  | 1    | 0.6%  |
| <ul style="list-style-type: none"> <li>STX - need to completely stop nets, 9 fishers left over catching same amount</li> </ul>  |         |      |     |       |      |       |
| <ul style="list-style-type: none"> <li>STX – Net ban not law. Gill netters catch 400 - 500 lbs of fish, flooding the market, can't sell fish when price is down.</li> </ul> |         |      |     |       |      |       |
| STX – Fishers need to get organized   | 0       | 0.0% | 1   | 1.0%  | 1    | 0.6%  |
| STX – Not enough money for DPNR   | 0       | 0.0% | 1   | 1.0%  | 1    | 0.6%  |
| STX – Everything is ok  | 0       | 0.0% | 1   | 1.0%  | 1    | 0.6%  |
| Nothing affecting fisher  | 3       | 4.1% | 18  | 18.2% | 21   | 12.2% |
| # of fishers responding <sup>1</sup>  | 73      |      | 99  |       | 172  |       |

<sup>1</sup>Fishers often provided more than one socio-economic problem

Note: The most common response is in bold type.

#### Question 34: What percentage of your household income comes from fishing? \_\_\_\_%

Approximately half of fishers in both districts (STT/STJ – 48.8%, STX – 53.8%) relied on fishing for more than half their income (Table 34). On STX, 38.9% of fishers relied on fishing for 100% of their income in contrast to STT/STJ where only 27.5% did. About 30% of fishers derived a quarter or less of their income from commercial fishing (STT/STJ – 27.8%, STX – 32.4%).

Table 34.a.(Q. 34). Proportion of fishers' household income derived from fishing.

| Proportion of income    | STT/STJ   |              | STX       |              | USVI      |              |
|-------------------------|-----------|--------------|-----------|--------------|-----------|--------------|
|                         | N         | Percent      | N         | Percent      | N         | Percent      |
| 100%                    | <b>22</b> | <b>27.5%</b> | <b>42</b> | <b>38.9%</b> | <b>64</b> | <b>34.0%</b> |
| >75% - <100%            | 10        | 12.5%        | 6         | 5.6%         | 16        | 8.5%         |
| >50% - 75%              | 7         | 8.8%         | 10        | 9.3%         | 17        | 9.0%         |
| >25% - 50%              | 18        | 22.5%        | 15        | 13.9%        | 33        | 17.6%        |
| >0% - 25%               | 19        | 23.8%        | 24        | 22.2%        | 43        | 22.9%        |
| 0%                      | 4         | 5.0%         | 11        | 10.2%        | 15        | 8.0%         |
| # of fishers responding | 80        | 100.00%      | 108       | 100.00%      | 188       | 100.0%       |

Note: The most common response is in bold type.

Fishers in both districts derived an average of over half their household income from fishing (Table 34b). However, there is a large range of dependency on fishing for income (0 – 100%) in both districts and the dependency varied depending on whether the fisher had other employment or was retired (Table 34c). Some fishers who said they had other employment, especially STX fishers, did not have full time jobs. Many of these fishers, who worked in the construction trades, said they were employed full time or nearly full time when construction was booming, but only

worked seasonally (or on part-time basis) when the economy was faltering and construction was weak. These fishers reported that fishing was an important backup source of income. Retirees often fished to make a little extra income to supplement their pension and/or social security. This income was also used to pay for fuel and boat maintenance allowing them to continue fishing even if most of their income came from elsewhere.

Table 34.b. (Q. 26). Descriptive statistics of the percentage of household income fishers derive from fishing.

|                         | <b>STT/STJ</b> | <b>STX</b>   | <b>USVI</b>  |
|-------------------------|----------------|--------------|--------------|
| Mean (SD) <sup>1</sup>  | 56.4 (+37.8)   | 58.0 (+39.9) | 57.3 (+38.9) |
| Median                  | 50             | 60           | 60           |
| Mode                    | 100            | 100          | 100          |
| Range                   | 0 - 100        | 0 - 100      | 0 - 100      |
| # of fishers responding | 80             | 108          | 188          |

<sup>1</sup>SD = Standard Deviation

Table 34.c. (Q. 26). Descriptive statistics of the percentage of household income fishers derived from fishing. Note: fishers who are listed as retirees in this table said they were not employed.

| <b>Percentage of household income</b> | <b>STT/STJ</b>   |                     |                  | <b>STX</b>      |                     |                  |
|---------------------------------------|------------------|---------------------|------------------|-----------------|---------------------|------------------|
|                                       | <b>Employed</b>  | <b>Not employed</b> | <b>Retirees</b>  | <b>Employed</b> | <b>Not employed</b> | <b>Retirees</b>  |
| Mean (SD) <sup>1</sup>                | 10.2%<br>(±15.4) | 77.9%<br>(±30.7)    | 38.2%<br>(±32.1) | 35.7%<br>(±5.6) | 80.4%<br>(±31.5)    | 26.5%<br>(±20.0) |
| Median                                | 0.5              | 95%                 | 30%              | 20%             | 100%                | 22.5%            |
| Mode                                  | 0                | 100%                | 5%               | 60%             | 100%                | 30%              |
| Range                                 | 0-30%            | 5-100%              | 0-100%           | 0-100%          | 0-100%              | 0 -60%           |
| # of fishers responding               | 35               | 40                  | 6                | 42              | 56                  | 10               |

<sup>1</sup>SD = Standard Deviation

**Question 35: Do you belong to a fishing organization? Yes No Which? \_\_\_\_\_**

Most fishers on STT/STJ (67.5%) and STX (92.9%) did not belong to any fishing organization (Table 35). Participation in a fishing organization increased from less than 3% in 2003 to 25% in 2010 to 32.5% in 2016 on STT/STJ. This was largely due to the establishment of the St. Thomas Fisher Association in 2005 and fishers' increasing willingness to participate in management organizations, e.g. the local Fisheries Advisory Committees and the CFMC. There is no local commercial fisher organization on STX, as a result only 7.1% of the fishers in STX belonged to fishing organizations in 2016 (Table 35), primarily state and federal organizations. One STX fisher belonged to two game fishing clubs, one on STX and one on STT.

Table 35. (Q. 35). Number and percentage of fishers belonging to a fishing organization.

| Participation in Organizations                       | STT/STJ   |              | STX        |              | USVI       |              |
|--|-----------|--------------|------------|--------------|------------|--------------|
|  | N         | Percent      | N          | Percent      | N          | Percent      |
| # fishers who belong to <u>no</u> organization       | <b>60</b> | <b>67.5%</b> | <b>105</b> | <b>92.9%</b> | <b>165</b> | <b>81.7%</b> |
| # fishers who belong to an organization <sup>1</sup> | 22        | 32.5%        | 7          | 7.1%         | 29         | 14.4%        |
| Total # of fishers responding                        | 82        | 100%         | 120        | 100%         | 202        | 100%         |
| <i>Organizations fishers belong to</i>               |           |              |            |              |            |              |
| St. Thomas Fishermen's Association                   | <b>14</b> | <b>15.7%</b> | 0          | 0.0%         | <b>14</b>  | <b>6.9%</b>  |
| District Fishery Advisory Committee                  | 5         | 5.6%         | <b>4</b>   | <b>3.5%</b>  | 9          | 4.5%         |
| Golden Hook Fishing Club - STX                       | 0         | 0.0%         | 1          | 0.9%         | 1          | 0.5%         |
| VI Game Fishing Club - STT                           | 5         | 5.6%         | 1          | 0.9%         | 6          | 3.0%         |
| CFMC – Advisory Panel                                | 5         | 5.6%         | 2          | 1.8%         | 7          | 3.5%         |

<sup>1</sup>Individual fishers can belong to more than one organization.

Note: The most common response is in bold type.

#### 4. Discussion

The number of fishers as a proportion of the population continued to decline since the initial 1930's survey (Table 36a). The total number of fishers in 2016 is based on fishers on the 2015-16 and 2016-17 fisher lists maintained by DPNR, DFW. The 2016-17 list was up to date as of August 3 – 4, 2016. An updated list, provided in November 2016, gave the total number of registered fishers for the 2016-17 fishing year for STT/STJ of 107 and STX of 126 (USVI total 233). Thus, it is anticipated that the 260 number is higher than the actual number of fishers registering in 2016-17 and, therefore, the decline in fishers is more pronounced.

While the USVI population has declined 4.3% since its peak in 2000, the licensed commercial fishing population declined by 32.1% or 28.6% as a proportion of population (Table 36a). There were 123 fewer licensed commercial fishers in 2015-17, compared to 2003-04 (Kojis, 2004) and 37 fewer than 2010-11 (Kojis and Quinn, 2011a). The percentage of full time fishers declined from 2003-4 to 2010-11 but was slightly higher in 2016.

Table 36.a. Comparison of the number of fishers in the USVI between 1930 and 2016.

| Survey year                 | # and percent of fishers who are full time (FT) or part time (PT) |                    |                                      |                    | Total # of Fishers | USVI Pop-ulation      | # of males >15 years old | % of population commercially fishing |
|-----------------------------|---|--------------------|--------------------------------------|--------------------|--------------------|-----------------------|--------------------------|--------------------------------------|
|                             | FT  | %                  | PT                                   | %                  |                    |                       |                          |                                      |
| <b>1930</b> <sup>1</sup>    | n/a   |                    | n/a                                  |                    | 405                | 22,012                |                          | 1.8%                                 |
| <b>1968</b> <sup>2</sup>    | 120   | 30%                | 280                                  | 70%                | 400                | 55,000                |                          | 0.73%                                |
| <b>2003-4</b> <sup>3</sup>  | 215   | 67%                | 108                                  | 33%                | 383                | 108,612 <sup>4</sup>  |                          | 0.35%                                |
| <b>2010-11</b> <sup>5</sup> | 92 <sup>6</sup> /119.8 <sup>7</sup>                               | 40.4% <sup>8</sup> | 136 <sup>6</sup> /177.2 <sup>7</sup> | 59.6% <sup>8</sup> | 297 <sup>9</sup>   | 106,405 <sup>10</sup> | 39,575 <sup>10</sup>     | 0.28%                                |
| <b>2014</b>                 |   |                    |                                      |                    |                    | 103,961 <sup>10</sup> |                          |                                      |
| <b>2016</b>                 | 81 <sup>6</sup> /109.1 <sup>7</sup>                               | 42.0% <sup>8</sup> | 112 <sup>6</sup> /150.9 <sup>7</sup> | 58.0% <sup>8</sup> | 260 <sup>11</sup>  |                       |                          | 0.25% <sup>12</sup>                  |

<sup>1</sup>Fiedler and Jarvis, 1932

<sup>2</sup>Swingle et al., 1970

<sup>3</sup>Kojis, 2004

<sup>4</sup>2000 US Census – [www.census.gov/prod/cen2000/island/viprofile.pdf](http://www.census.gov/prod/cen2000/island/viprofile.pdf) - July 17, 2004.

<sup>5</sup>Kojis and Quinn, 2011a

<sup>6</sup>Number of licensed fishers responding that they fished >36 hrs per week (FT) or <36 hrs per week (PT). Excludes fishers who said they were not fishing. See Table 5 (Kojis and Quinn, 2011a), and Table 15c (this report).

<sup>7</sup>Proportional number of full time or part time fishers based on total number of fishers

<sup>8</sup>Percentage of full time or part time fishers based on proportional number of full time or part time fishers.

<sup>9</sup>Total number of licensed fishers on STT/STJ and STX Districts as of 18 March and 15 March 2011, respectively (fishing license year runs from 1 July to 30 June), including ones who stated they were not fishing.

<sup>10</sup>US Census 2010 Press Release dated 24 Aug 2011. Website: <http://2010.census.gov/news/releases/operations/cb11-cn180.html>. Accessed 26 Mar 12.

<sup>10</sup><https://www.usviber.org/pdfs/ECON14.pdf>

<sup>11</sup>Total number of fishers in combined 2015-16 list and the 2016-17 list as of August 2017.

<sup>12</sup>Percentage based on USVI 2014 population and 2016 fisher statistics.

Fisher numbers declined 25.0% on STT/STJ between 2003-04 and 2010-11 and 0.6% between 2010-11 and 2016 (Table 36b). However, the total licensed fishers in 2016 was based on 2015-16 and 2016-17 fisher lists and as of November 2016 only 107 fishers had registered for the 2016-17 fishing year, though more may register before June 30<sup>th</sup>, 2017, which is the end of the 2016-17 fishing year. The number of fishers has declined steadily on STX (Table 36b). From 2003-04 to 2010-11, the number of fishers declined 20.6% and between 2010-11 – 2016, the number declined 16.2%. Again, the number of licensed fishers in 2016 is based on fishers registering in two years and as of November 2016 only 126 fishers had registered on STX, which may mean a more precipitous decline than we detected in this survey.

In total, there was a 22.5% decline in number of licensed commercial fishers in the USVI between the first and second survey and a 9.6% decline between the second and third survey (Table 36b). The decline between 2003-04 and 2016 was larger on STX (36.8%) than on STT/STJ (25.6%).



Table 36.b. Comparison of the number of fishers between 2004 and 2016, including the percentage change in the USVI fisher population relative to 2004 levels.

| Year | STT/STJ | % change since 2004 | STX | % change since 2004 | USVI | % change since 2004 |
|------|---------|---------------------|-----|---------------------|------|---------------------|
| 2004 | 160     | 0.00%               | 223 | 0.00%               | 383  | 0.00%               |
| 2011 | 120     | -25.0%              | 177 | -20.6%              | 297  | -22.5%              |
| 2016 | 119     | -25.6%              | 141 | -36.8%              | 260  | -32.1%              |

A moratorium on the issuance of commercial licenses to fishers has been in effect since 2001. As of 2001, fishing licenses were only issued to fishers who had held a commercial fishing license for at least one year within three years of June 2001 and had complied with catch reporting requirements (DPNR DFW 2016). Transfers of licenses were initially done on a limited basis primarily to family members. Most requests for license transfers were submitted by the Commissioner to the appropriate district Fisheries Advisory Committee (FAC) for recommendations. Not all fishers transferred their licenses when they were no longer fishing. Some allowed their licenses to lapse. This appears to have happened more frequently between the first and second surveys given the more precipitous decline in the number of fishers. License transfers now are officially sanctioned according to DPNR DFW (2016):

Commercial fishing licenses are transferable. V.I.C., Title 12, Chapter 9A, §312(c) as amended by Bill number 29-0329, allows the transferability of fishing licenses to family members and fishers' helpers. License transfer requests are submitted to the Director of the Division of Fish and Wildlife, are reviewed by the Fisheries Advisory Committee (FAC), and are approved or denied by the Commissioner of the Department of Planning and Natural Resources.

The closure of HOVENSA in 2012 on STX may have contributed to the decline in the number of fishers on STX. Since nearly 2,000 well-paying jobs were lost, fishers lost customers because people left the island and because those that remained had less money to pay for expensive fresh fish. In some cases, because of the decline in the economy, fishers and their families have left the island for jobs on the mainland (G. Martinez, pers. com.).

#### **4.1. Description of Commercial Fishers**

##### ***Ethnicity and Race***

Fishers have been asked about their ethnicity since the 2004 survey, but about their race only since the 2011 survey. Therefore, the racial composition of fishers in 2004 was determined based on the responses to the question on ethnicity (see footnotes in Tables 37a, b for details on determining race).

The racial and ethnic composition of fishers in the two districts has remained substantially unchanged over the three surveys. However, race and ethnicity differed appreciably between the districts. The majority of fishers on STT/STJ identified as white and of French descent in the three studies conducted since 2003-4 (Kojis, 2004; Kojis and Quinn, 2011a; this study; Tables 37a, 38a). Black was the second most common race though the percentage of fishers identifying as black declined in 2016. It is unclear if this was because there are fewer black fishers or because black fishers were more difficult to contact and more reluctant to be interviewed. The second most common ethnicity on STT/STJ was West Indian (Table 38a). All other ethnicities were uncommon, comprising  $\leq 3.6\%$  of fishers responding.

In 2003-4, nearly half of fishers on STX identified their ethnicity as Hispanic (Table 38b). Hispanic fishers can be any race, which makes it impossible to determine race from this response. Fishers who identified as Hispanic in 2003-4 were listed as “Other” in Table 37b. In 2010-11 (Kojis and Quinn, 2011a) and 2016, black was the predominant race that STX fishers identified with, while the second most common race was mixed race. The proportion of fishers on STX identifying as mixed race increased by almost 10% between 2010-11 and 2016, while the proportion identifying as white declined by about 50%.

STX fishers predominantly identified their ethnicity as Hispanic in all three surveys (Table 38b). In fact, the proportion of fishers who identified as Hispanic on STX has been increasing over the 12 years of these studies. A summary of the history of Hispanic migration to STX is provided in Valdes-Pizzini et al. (2010) and Kojis and Quinn (2011a). West Indian was consistently the second most common fisher identified ethnicity. In contrast to STT/STJ, no STX fisher identified themselves as French in any of the three surveys.

Variations in proportion of fishers who identify as a particular race or ethnicity between studies may, at least in part, be a function of the way a fisher wants to identify at a particular time. The Caribbean has a long history of providing a home to myriad of races and ethnicities with extensive inter-marriage. Many fishers are mixed race and can choose to identify as mixed race or to emphasize one race or another depending on current political climate and their disposition at the time.

Table 37.a. Racial composition of STT/STJ fishers in 2004, 2011 and 2016.

| Race                    | 2004 <sup>1</sup>     |              | 2011 <sup>2</sup> |              | 2016      |              |
|-------------------------|-----------------------|--------------|-------------------|--------------|-----------|--------------|
|                         | N                     | %            | N                 | %            | N         | %            |
| Black                   | 37                    | 32.5%        | 41                | 39.8%        | 28        | 26.2%        |
| Mixed                   | 7 <sup>3</sup>        | 6.1%         | 2                 | 1.9%         | 15        | 14.0%        |
| White                   | <b>66<sup>4</sup></b> | <b>57.9%</b> | <b>59</b>         | <b>57.3%</b> | <b>62</b> | <b>57.9%</b> |
| Other                   | 4 <sup>5</sup>        | 3.5%         | 1                 | 1.0%         | 2         | 1.9%         |
| # of fishers responding | 114                   | 100.0%       | 103               | 100.0%       | 107       | 100.0%       |

<sup>1</sup>Kojis(2004) <sup>2</sup>Kojis and Quinn (2011a)

<sup>3</sup>Includes fishers who identified as black French. <sup>4</sup>Includes fishers who identified as French or white.

<sup>5</sup>Fishers identifying as Hispanic.

Note: The most common response is in bold type.

Table 37.b. Racial composition of STX fishers in 2004, 2011 and 2016.

| Race                    | 2004 <sup>1</sup>      |              | 2011 <sup>2</sup> |              | 2016            |              |
|-------------------------|------------------------|--------------|-------------------|--------------|-----------------|--------------|
|                         | N                      | %            | N                 | %            | N               | %            |
| Black                   | 92 <sup>3</sup>        | 41.6%        | <b>58</b>         | <b>65.2%</b> | <b>47</b>       | <b>40.9%</b> |
| White                   | 17                     | 7.7%         | 14                | 15.7%        | 9               | 7.8%         |
| Other                   | <b>108<sup>5</sup></b> | <b>48.9%</b> | 2                 | 2.2%         | 29 <sup>6</sup> | 25.2%        |
| # of fishers responding | 221                    | 100.0%       | 89                | 100.0%       | 115             | 100.0%       |

<sup>1</sup>Kojis (2004) <sup>2</sup>Kojis and Quinn (2011a)

<sup>3</sup>Included fishers who identified as black and West Indian.

<sup>4</sup>Includes fishers who identified as black Hispanic.

<sup>5</sup>Includes an East Indian and 107 fishers who identified as Hispanic. Given the option, many Hispanic fishers may have identified themselves as mixed race.

<sup>6</sup>Includes fishers who said they were Latin or Hispanic when asked their race. Note: The most common response is in bold type.

Table 38.a. Ethnic composition of STT/STJ fishers in 2004, 2011 and 2016.

| Ethnicity               | 2004 <sup>1</sup> |              | 2011 <sup>2</sup> |              | 2016      |              |
|-------------------------|-------------------|--------------|-------------------|--------------|-----------|--------------|
|                         | N                 | %            | N                 | %            | N         | %            |
| Continental             | 10                | 8.8%         | 1                 | 1.2%         | 5         | 4.8%         |
| Crucian                 | 0                 | 0.0%         | 1                 | 1.2%         | 0         | 0.0%         |
| French descent          | <b>56</b>         | <b>49.1%</b> | <b>58</b>         | <b>69.9%</b> | <b>63</b> | <b>60.6%</b> |
| French West Indian      | 7                 | 6.1%         | 1                 | 1.2%         | 3         | 2.9%         |
| French Hispanic         | 0                 | 0.0%         | 0                 | 0.0%         | 1         | 1.0%         |
| Hispanic                | 4                 | 3.5%         | 3                 | 3.6%         | 0         | 0.0%         |
| Mixed                   | 0                 | 0.0%         | 0                 | 0.0%         | 2         | 1.9%         |
| West Indian             | 37                | 32.5%        | 18                | 21.7%        | 30        | 28.8%        |
| East Indian             | 0                 | 0.0%         | 0                 | 0.0%         | 0         | 0.0%         |
| Other                   | 0                 | 0.0%         | 1                 | 1.2%         | 0         | 0.0%         |
| # of fishers responding | 114               | 100.0%       | 83                | 100.0%       | 104       | 100.0%       |

<sup>1</sup>Kojis (2004)

<sup>2</sup>Kojis and Quinn (2011a)

Note: The most common response is in bold type.

Table 38.b. Ethnic composition of STX fishers in three surveys conducted in 2004, 2011 and 2016.

| Ethnicity               | 2004 <sup>1</sup> |              | 2011 <sup>2</sup> |                    | 2016      |              |
|-------------------------|-------------------|--------------|-------------------|--------------------|-----------|--------------|
|                         | N                 | %            | N                 | %                  | N         | %            |
| Continental             | 17 <sup>3</sup>   | 7.7%         | 4                 | 2.7% <sup>4</sup>  | 6         | 5.1%         |
| Crucian                 | 0                 | 0.0%         | 22                | 14.9% <sup>5</sup> | 1         | 0.8%         |
| French descent          | 0                 | 0.0%         | 0                 | 0.0%               | 0         | 0.0%         |
| French West Indian      | 0                 | 0.0%         | 0                 | 0.0%               | 1         | 0.8%         |
| French Hispanic         | 0                 | 0.0%         | 0                 | 0.0%               | 0         | 0.0%         |
| Hispanic                | <b>107</b>        | <b>48.4%</b> | <b>77</b>         | <b>52.0%</b>       | <b>69</b> | <b>58.0%</b> |
| Mixed                   | 4 <sup>6</sup>    | 1.8%         | 0                 | 0.0%               | 0         | 0.0%         |
| West Indian             | 92                | 41.6%        | 30                | 20.3%              | 42        | 35.3%        |
| East Indian             | 1                 | 0.5%         | 0                 | 0.0%               | 0         | 0.0%         |
| Other                   | 0                 | 0.0%         | 15 <sup>7</sup>   | 10.2%              | 0         | 0.0%         |
| # of fishers responding | 221               | 100.0%       | 148               | 100.0%             | 119       | 100.0%       |

<sup>1</sup>Kojis (2004)

<sup>2</sup>Kojis and Quinn (2011a)

<sup>3</sup>Includes fishers who identified as white.

<sup>4</sup>Includes fishers who identified as Continental and African American.

<sup>5</sup>Includes fishers who identified as Crucian and Virgin Islander

<sup>6</sup>Includes fishers who identified as black Hispanic.

<sup>7</sup>Includes fishers who identified as of British descent, European (not French), and other.

Note: The most common response is in bold type.

### *Age, Gender, and Years Fishing*

Most fishers were middle aged and older and their average age steadily increased over the three surveys. The median age for fishers in 2016 was 57 years - 24 years older than the territorial median age of 33 years in 2010 (Wikipedia – US Virgin Islands, 2017) and 13.9 yrs older than the median age for USVI males in 2016 of 45.9 yrs (CIA World Factbook, 2017). Also, the average age of fishers has been increasing. In 2003, the average age of USVI fishers was 50.5 yrs (Kojis, 2004). In 2011 (Kojis and Quinn, 2011a), it increased 2.7 yrs to 53.2 yrs and in 2016 it further increased to 56.0 years. The mean age of fishers increased 3.0 and 2.9 years for STT/STJ and STX fishers, respectively, since 2011 (Kojis and Quinn, 2011a).

Commensurate with the increasing age of fishers, the average number of years fishers have been fishing has been increasing. In 1968, fishers had been fishing for an average of 19 yrs (Swingle et al., 1970). In 2004, the average was 22.8 years, increasing to 24.8 yrs in 2011 and declining slightly to 24.1 years in 2016.

Swingle et al. (1970) commented that commercial fishing was attracting fewer young people because of better paying jobs in tourism and government. Full time fishing attracts people of a certain temperament and skill set, which is not necessarily correlated with good performance in

the formal education system. In recent years, fewer males than females have graduated from high school and university (DeGannes et al., 2012), consequently diminishing male prospects for employment at higher pay levels in the tourism industry, government and professional occupations. Probably because of the moratorium on fishing licenses that was implemented in 2001, fewer males have entered the fishing profession in recent years. Less than 10% of the fishers are less than 30 years old. Should fish stocks remain at least at their present levels for the next decade, fishing is likely to become increasingly lucrative for the relatively small number of younger fishers as the largest fisher cohort exerts less fishing pressure because of mortality and fatigue associated with aging.

Women are less involved in the industry in the 21<sup>st</sup> century than they were 80 years ago. In the 1930s, women “retailed” fish for some fishermen and earned a 15% commission on the sale (Fiedler and Jarvis, 1932). Male fishers have largely assumed responsibility for selling fish. Also, in 2016, only four women had fishing licenses and did not generally engage in fishing activities. They either recently obtained a fishing license and had not yet commenced fishing, had “sleeper” licenses because they had primarily been involved in management of the family fish business and their husbands had retired, or had not fished in years but were hanging on to their license in case they could sell it.

### ***Education***

In general, STT/STJ fishers achieved a higher level of education than STX fishers (Table 39). In all three surveys, less than half of STX fishers had completed high school compared with more than half of STT/STJ fishers. However, fisher formal education levels are increasing in both districts (Table 39). Fishers with at least a high school education level was higher in 2016 (STX – 46.4%, STT/STJ – 63.1%) than in previous surveys (STX 2004 – 36.0%, 2011 – 38.6%; STT/STJ 2004 – 51.9%, 2011 – 59.7%). This is likely the result of younger, better educated fishers, replacing older, less educated fishers who have retired or died.

Table 39. Comparison of formal education levels of STT/STJ and STX fishers between 2004 and 2016.

| Education Level      | STT/STJ   |              |           |              |           |              | STX       |              |           |              |           |              |
|----------------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|-----------|--------------|
|                      | 2004      |              | 2011      |              | 2016      |              | 2004      |              | 2011      |              | 2016      |              |
|                      | N         | %            | N         | %            | N         | %            | N         | %            | N         | %            | N         | %            |
| None                 |           |              | 2         | 2.0%         | 1         | 1.1%         |           |              | 2         | 1.3%         | 2         | 1.8%         |
| Elementary school    | 10        | 9.6%         | 9         | 8.8%         | 11        | 12.6%        | 55        | 25.7%        | 26        | 16.8%        | 20        | 17.9%        |
| Junior high school   | 11        | 10.6%        | 12        | 11.8%        | 6         | 6.9%         | <b>61</b> | <b>28.5%</b> | 38        | 24.5%        | 27        | 24.1%        |
| Some high school     | 29        | 27.9%        | 18        | 17.6%        | 14        | 16.1%        | 21        | 9.8%         | 29        | 18.7%        | 11        | 9.9%         |
| High school diploma  | <b>43</b> | <b>41.3%</b> | <b>54</b> | <b>52.9%</b> | <b>34</b> | <b>39.1%</b> | 54        | 25.2%        | <b>43</b> | <b>27.7%</b> | <b>36</b> | <b>32.1%</b> |
| Some college         | 5         | 4.8%         | 3         | 2.9%         | 5         | 5.7%         | 13        | 6.1%         | 12        | 7.7%         | 1         | 0.9%         |
| College degree       | 6         | 5.8%         | 4         | 3.9%         | 9         | 10.3%        | 10        | 4.7%         | 5         | 3.2%         | 4         | 3.6%         |
| Post graduate degree |           |              |           |              | 7         | 8.0%         |           |              |           |              | 8         | 7.1%         |
| Trade School         |           |              |           |              | 0         | 0.0%         |           |              |           |              | 3         | 2.7%         |
| # fishers responding | 104       | 100%         | 102       | 100%         | 87        | 100%         | 214       | 100%         | 155       | 100%         | 112       | 100.0%       |

Note: The most common response is in bold type.

As the formal education level of the fishers increases, it should become easier to communicate science based management principles. A sustainable, well managed profitable fishing industry does not exist without concerned informed participants and consumers. Because of tax concessions given the fishing industry there is only a minimal amount of revenue from the industry, which goes primarily to support the DPNR Division of Enforcement, primarily to provide the match for the federal boating safety grant. With little revenue coming in from the fishing industry, there has been no political interest to fund DPNR DFW to provide local fisher education and improve management. Limited funding is provided by the CFMC to DFW to participate in Council activities, support the local Fisheries Advisory Committees, and for commercial fisher education related to local and Council management issues, but the funding is insufficient.

The science behind fisheries management strategies is often sophisticated and complex, even for highly trained professionals. It is not unexpected that fishers attending public meetings, held by

federal and territorial agencies to consider management strategies, are commonly antagonistic, frequently making vitriolic statements, rather than contributing to thoughtful discussion of the difficult fisheries management choices that are intended to maximize the livelihood potential of fishers, while maintaining biological diversity and ecological complexity. Not only are many fishers not high school graduates, but even those who have completed high school have not likely encountered the basic concepts of fisheries biology and management in school. There is no fisheries curriculum either in the territorial high schools and no fisheries management / science undergraduate degree at the University of the Virgin Islands, nor are there specific scholarships for local students to study fisheries management on the mainland.

### ***Full-time/Part-time Fishers***

In 2016, most fishers were part time fishers (54.6%) defined as carrying out fishing related activities for <36 hrs per week) or were not fishing (5.7%). Only 39.5% of fishers fished full time. A commercial fishing license was required for a fisher to catch fish for sale and/or use such gear as traps and nets (Title 12 of the VI Code). The license and identification card with photograph cost \$25.00 (H. Forbes, Director, DPNR Division of Enforcement, pers. comm.). To sell fish, a fisher must also obtain a \$1.00 business license from the VI Department of Licensing and Consumer Affairs. Also, licensed commercial fishers are exempt from fees such as boat registration and mooring fees and get special tax dispensation. In order to get these exemptions, they must be engaged in fishing (H. Forbes, pers. comm.). Fishers who are no longer fishing owing to illness or other temporary reason may obtain “sleeper” status from DFW. This status means that they do not have to submit monthly catch reports. However, if they register a boat or mooring they must pay the fees.

The low fees for a commercial license result in some fishers retaining their license in order to use gears such as traps not permitted without a license to catch fish for personal use and/or to avoid fees and obtain tax exemptions (Downs and Petterson, 1987). In 2016, fishers were also retaining licenses in anticipation that they may be able to sell their license since DPNR is not issuing new licenses. The only way to obtain a commercial fishing license is if a currently licensed fisher wishes to transfer his license and, even then, transfers are legally restricted to helpers or family members. V.I.C., Title 12, Chapter 9A, §312(c) as amended by Bill number 29-0329, allows the transferability of fishing licenses to family members and fishers’ helpers (DPNR DFW, 2016). Helpers are recorded by the Division of Enforcement where they annually pay \$20.00 for a helper’s permit (DPNR DFW, 2016). The ability to sell a license allows fishers to monetize the

license to a value substantially greater than the current \$25.00 annual fee. Licenses have been rumored to sell for \$1,500 - \$2,000 (H. Forbes, pers. comm.).

It is difficult to compare the proportion of fishers who are full time vs part time over time because of the way this question was asked in different surveys. In 2004, fishers were asked if they were full time fishers working >36 hrs per week, part-time fishers  $\leq$ 36 hrs per week, opportunistic fishers, or charter fishers (Kojis, 2004). While in 2011, fishers were asked about their participation in fishing activities and given the option of >36 hrs per week, >15 – 36 hrs per week and <15 hrs per week (Kojis and Quinn, 2011a). The words "full time" and "part time" were removed from the questionnaire in 2011 because of contention between full time and part time fishers on STT/STJ. This question was not asked in this survey.

In all three surveys, fishers were asked about the number of trips they took per week, the average duration of those trips and the time they spent in a variety of other fishing activities. In 2004, fishers were asked how many hours per week they spent "repairing fishing gear/preparations, while in 2011 and 2016 this question was broken down into two separate questions related to repairing and maintaining fishing gear and preparing for fishing.

The percentage of STT/STJ fishers who said they were full time fishers and/or said that they fished >36 hrs per week declined 43.5% between 2004 and 2011 (Table 40a – non-shaded columns). However, when fishers were asked to breakdown their participation by specific activity (shaded columns), the percentage of fishers who participated in fishing activities >36 hrs per week declined by only 2% in between 2004 and 2011 and increased 9.3% between 2011 and 2016. Between 2004 and 2016, there was a decline in the number of fishers fishing 15 – 36 hrs a week (shaded columns), and an increase in the number fishing <15 hrs per week.



Table 40.a. Comparison of fishing effort in STT/STJ in 2004, 2011 and 2016. Shaded columns show fisher effort when broken down by various fishing activities. Non-shaded columns show the effort that fishers said they expended when asked if full time, part time, or opportunistic (Kojis, 2004) or what their participation level was in all fishing activities when provided an option of >36 hrs, 15 - <36 hrs, <15 hrs, or 0 (Kojis and Quinn, 2011a, this study).

| Hrs per week fishing                 | 2004 <sup>1</sup> |              | 2004      |              | 2011 <sup>2</sup> |              | 2011      |              | 2016      |              |
|--------------------------------------|-------------------|--------------|-----------|--------------|-------------------|--------------|-----------|--------------|-----------|--------------|
|                                      | N                 | %            | N         | %            | N                 | %            | N         | %            | N         | %            |
| >36                                  | <b>85</b>         | <b>78.0%</b> | 39        | 34.5%        | <b>29</b>         | <b>34.5%</b> | 26        | 32.5%        | <b>38</b> | <b>41.8%</b> |
| 15 - 36                              | 21                | 19.3%        | <b>49</b> | <b>43.4%</b> | 26                | 31.0%        | <b>31</b> | <b>38.8%</b> | 26        | 28.6%        |
| <15                                  | 3 <sup>3</sup>    | 2.8%         | 17        | 15.0%        | <b>29</b>         | <b>34.5%</b> | 23        | 28.7%        | 27        | 29.7%        |
| # of fishers responding <sup>4</sup> | 109               | 100.0%       | 105       | 7.1%         | 84                | 100.0%       | 80        | 100.0%       | 38        | 100.0%       |

<sup>1</sup>Kojis (2004)

<sup>2</sup>Kojis and Quinn (2011a)

<sup>3</sup>Includes opportunistic fishers, charter not included.

<sup>4</sup>Total # of fishers does not include fishers who said they were not fishing because this data not available for 2012 breakdown.

Note: The most common response is in bold type.

The percentage of fishers on STX who said they were “full time (>36 hrs per week)” or “fished >36 hrs per week” declined 17.2% between 2004 and 2011 (Table 40b - non-shaded columns). When fishing activities were broken down by activity (shaded columns), fishers who carried out fishing activities >36 hrs per week increased 1.8% between 2004 and 2011 but declined 12.7% between 2011 and 2016 (Table 40b). The number of fishers who carried out fishing activities <15 hrs a week steadily increased over the years on STX.

Table 40.b. Comparison of fishing effort in STX in 2004, 2011 and 2016. Shaded columns show fisher effort when broken down by various fishing activities. Non-shaded columns show the effort that fishers said they expended when asked if full time, part time, or opportunistic (Kojis, 2004) or what their participation level was in all fishing activities when provided an option of >36 hrs, 15 - <36 hrs, <15 hrs, or 0 in 2011 and 2016. Zero response is incorporated in “<15.”

| Hrs per week fishing                 | 2004 <sup>1</sup> |              | 2004       |              | 2011 <sup>2</sup> |              | 2011 <sup>3</sup> |              | 2016 <sup>4</sup> |              |
|--------------------------------------|-------------------|--------------|------------|--------------|-------------------|--------------|-------------------|--------------|-------------------|--------------|
|                                      | N                 | %            | N          | %            | N                 | %            | N                 | %            | N                 | %            |
| >36                                  | <b>130</b>        | <b>61.0%</b> | <b>103</b> | <b>48.6%</b> | <b>63</b>         | <b>43.8%</b> | <b>69</b>         | <b>50.4%</b> | <b>43</b>         | <b>37.7%</b> |
| 15 - 36                              | 67                | 31.5%        | 78         | 36.8%        | 38                | 26.4%        | 47                | 34.3%        | 39                | 34.2%        |
| <15                                  | 16 <sup>3</sup>   | 7.5%         | 31         | 14.6%        | 43                | 29.9%        | 21                | 15.3%        | 32                | 28.1%        |
| # of fishers responding <sup>4</sup> | 213               | 100.0%       | 212        | 100.0%       | 144               | 100.0%       | 137               | 100.0%       | 114               | 100.0%       |

<sup>1</sup>Kojis (2004)

<sup>2</sup>Kojis and Quinn (2011a)

<sup>3</sup>Includes opportunistic fishers, charter not included.

<sup>4</sup>Total # of fishers does not include fishers who said they were not fishing because this data available for 2011 breakdown.

Note: The most common response is in bold type.

The proportion of fishers fishing full time or >36 hrs per week on STT/STJ was 17.0% higher than STX on in 2004, but 9.3% lower in 2011 (general question: Tables 40a, b - non-shaded columns). In the activities breakdown question (shaded columns), the proportion of STX fishers fishing full time (>36 hrs/week) was higher in 2004 and 2011 by 14.1% and 17.9%, respectively, than STT/STJ, but 3.6% lower in 2016 (Tables 40a, b). The decline in fishing effort on STX from 2011 to 2016 may be in part to fewer customers and people having less money because of the close of HOVENSA and an aging fisher population.

The high percentage of fishers on both STT/STJ and STX who said they were full time fishers in 2004 (unshaded columns – Tables 40a, b), was likely related to the contentious discussion among fishers, local Fisheries Advisory Committees, and management agencies, especially on STT/STJ, about whether part-time fishers should be able to obtain a commercial fishing license. This was an ongoing issue since 1987 (USVI Government, 1987). Fishers who had a full-time job but relied on fishing for a substantial portion of supplemental income and for whom fishing was a family tradition, claimed to be full time even if they fished only a few days a month. Some fishers who relied on fishing for all their income, felt these fishers were part-time and should be denied a license because they already had a full-time job, often with benefits. The concern revolved mostly around trap fishers who felt that part-time fishers were not pulling their traps frequently enough and fish were dying the traps and/or that trap loss for part-time fishers was high. Full time fishers were concerned about fish wastage and ghost fishing. This concern likely influenced fishers to say that they were full time in 2004 when given this option even if they actually fished <36 hrs. The topic was not as prominent among fishers and management agencies in 2011 or 2016 for a number of reasons: 1) the moratorium was reducing the fisher population, 2) more fishers were using GPS which made it easier to locate traps, even if a fisher had not fished in several weeks reducing the number of ghost traps, and 3) the CFMC and local government were implementing a wide array of management measures which were more of a concern to fishers.

### ***Proportion of Income from Fishing***

The proportion of fishers deriving > 50% their income from fishing declined on STT/STJ (Table 41a), but stayed nearly the same over the years on STX (Table 41b). In 2004, 73.8% of fishers on STT/STJ derived >50% of their income from fishing, while only 50.6% did so in 2011 and 48.8% in 2016 -- a decline of 25.0% over 13 yrs. On STX, the proportion of fishers deriving >50% of

their income from fishing in 2003 and 2011 increased from 51.1% to 54.1% and remained about the same in 2016 (53.8%).

A comparison of the percentage of fishers that derived 100% of their income from fishing between districts shows major changes over the years. In 2004, 22.3% more STT/STJ fishers derived 100% of their income than on STX. In 2011, the percentage between districts was similar while in 2016 the proportion of STX fishers who derived 100% of their income from fishing was 11.4% higher than STT/STJ. Although the proportion of fishers deriving 100% of the income from fishing has declined in both districts over the years, the percentage has remained higher on STX, reflecting the lack of jobs on STX because of the bad economy.

Table 41.a. Proportion of fishers' income on STT/STJ derived from fishing.

| Proportion of income    | 2004 <sup>1</sup> |              | 2011 <sup>2</sup> |              | 2016      |              |
|-------------------------|-------------------|--------------|-------------------|--------------|-----------|--------------|
|                         | N                 | %            | N                 | %            | N         | %            |
| 100%                    | <b>64</b>         | <b>67.4%</b> | <b>35</b>         | <b>43.2%</b> | <b>22</b> | <b>27.5%</b> |
| >75% - <100%            | 3                 | 3.2%         | 1                 | 1.2%         | 10        | 12.5%        |
| >50% - 75%              | 3                 | 3.2%         | 5                 | 6.2%         | 7         | 8.8%         |
| >25% - 50%              | 6                 | 6.3%         | 7                 | 8.6%         | 18        | 22.5%        |
| >0% - 25%               | 13                | 13.7%        | 23                | 28.4%        | 19        | 23.8%        |
| 0%                      | 6                 | 6.3%         | 10                | 12.3%        | 4         | 5.0%         |
| # of fishers responding | 95                | 100.0%       | 81                | 100.0%       | 80        | 100.0%       |

<sup>1</sup>Kojis (2004)

<sup>2</sup>Kojis and Quinn (2011a).

Note: The most common response is in bold type.

Table 41.b. Proportion of fishers' income on STX derived from fishing.

| Proportion of income         | 2004 <sup>1</sup> |              | 2011 <sup>2</sup> |              | 2016      |              |
|------------------------------|-------------------|--------------|-------------------|--------------|-----------|--------------|
|                              | N                 | %            | N                 | %            | N         | %            |
| 100%                         | <b>96</b>         | <b>45.1%</b> | <b>60</b>         | <b>40.5%</b> | <b>42</b> | <b>38.9%</b> |
| >75% - <100%                 | 7                 | 3.3%         | 14                | 9.5%         | 6         | 5.6%         |
| >50% - 75%                   | 6                 | 2.8%         | 6                 | 4.1%         | 10        | 9.3%         |
| >25% - 50%                   | 29                | 13.6%        | 21                | 14.2%        | 15        | 13.9%        |
| >0% - 25%                    | 62                | 29.1%        | 23                | 15.5%        | 24        | 22.2%        |
| 0%                           | 13                | 6.1%         | 24                | 16.2%        | 11        | 10.2%        |
| Number of fishers responding | 213               | 100.0%       | 148               | 100.0%       | 108       | 100.00%      |

<sup>1</sup>Kojis (2004)

<sup>2</sup>Kojis and Quinn (2011a).

Note: The most common response is in bold type.

## 4.2. Description of the Fish Targeted, Boat Statistics, and Fishing Equipment used by Fishers

The fisheries of STT/STJ and STX differed in the percentage of fishers targeting the various categories of fish, in the percentage of fishers using various types of gear, and even in some of the gears used. Differences in the size and depth of the insular shelf surrounding each district (Fig. 12) and exposure to Atlantic Ocean wave regimes and currents influence the nature of the fisheries. St. Croix has a shelf area of  $120\text{nm}^2$  with most of the shelf  $<80$  ft deep while St. Thomas has a  $510\text{nm}^2$  shelf area with most of the shelf  $>80$  ft. St. Thomas also lies on the Puerto Rico Bank which means the shelf is contiguous with the shelf surrounding Puerto Rico and the British Virgin Islands (Fig. 12). St. Thomas's north coast is exposed to Atlantic Ocean swells and currents, while the shelf to the south of STT and STJ is protected to some extent from easterly and, especially northeasterly waves and the storm Atlantic swells. The shelf to the north of the northern USVI gradually deepens to  $>200$  ft depth extending 20 nm before rapidly dropping off into the abyss. The southern shelf similarly deepens to depths of 200 ft and then rises as shallow as 120 ft along the shelf edge before dropping off steeply. The southern shelf extends about 8 nm from shore.

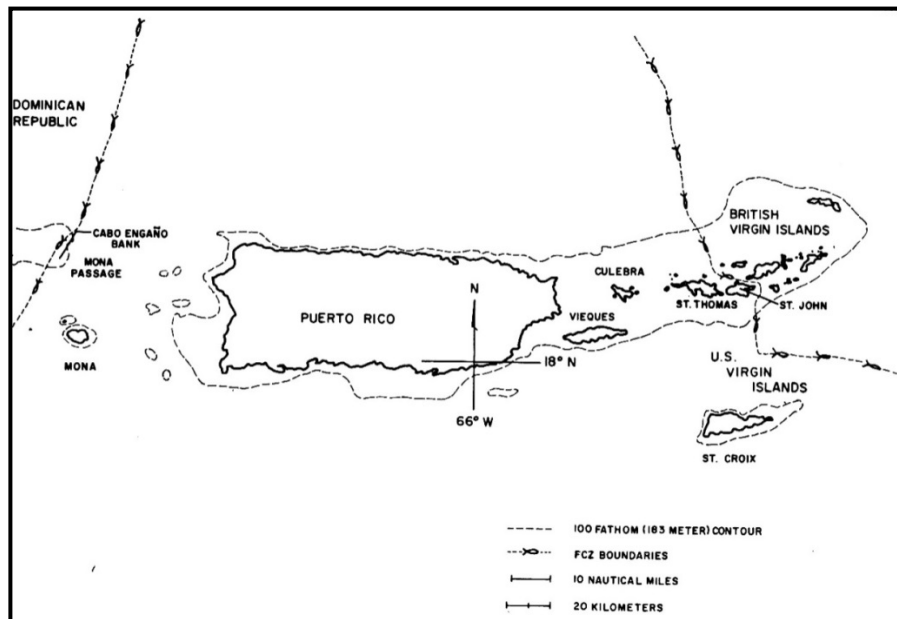


Figure 12. Map of Puerto Rico and the US Virgin Islands (after Jacobsen and Browder, 1987) showing the extent of the insular shelves ( $\leq 200\text{m}$  depth) of the Puerto Rico Bank (Puerto Rico and the northern Virgin Islands), and the insular shelf surrounding STX. The line with fish symbols represents the EEZ.

## Categories of Fish Targeted

Fishers were asked “What do you commercially fish for?” in 2004 and provided with options, e.g. reef fish, coastal pelagic fish, etc. They were ranked based on the number of fishers fishing for category. In 2011, the same question was asked, but fishers were also asked to rank the categories based on revenue generated. In 2016, fishers were asked “What species do you commercially fish for?” and then asked to rank the species based revenue generated. The change from the number of fishers fishing for a category of fish or shellfish to ranking fish by the amount of revenue generated may have changed the results because some species/categories had a higher price per pound, i.e. spiny lobster vs. reef fish. Despite the change in this question, reef fish was the most important category in the territory in all three surveys (Table 11c, Table 42).

On STX, the spiny lobster (primarily *Panulirus argus*) was the second most important category in 2011 and 2016, but the third most important in 2004 (Table 42). Coastal pelagic fish declined in importance on STX from 2004 to 2016. They were the second most commonly fished species in 2004, the third most important in 2011, and the fourth most important in 2016. Dolphin/wahoo was the third most important in 2016. This category was not listed in the 2004 and 2011 surveys. It is likely that fishers would have considered these species deep-water pelagics and, thus, deep-water pelagics would have retained their 2011 ranking of 3<sup>rd</sup> if these dolphin/wahoo had not been put in a separate category in 2016. Deep-water snapper was the second most important category in 2004, and the fifth in 2011 and 2016. The lower ranking in 2011 and 2016 may indicate a decrease in the catch of deep-water snapper and, thus, the vulnerability of these species to fishing. Queen conch was the fourth most important category in all three years.

Table 42. Comparison of the rank of fish and shellfish among years and between districts.

| Categories of fish and shellfish | Rank              |                   |          |      |      |      |
|----------------------------------|-------------------|-------------------|----------|------|------|------|
|                                  | STT/STJ           |                   |          | STX  |      |      |
|                                  | 2004 <sup>1</sup> | 2011 <sup>2</sup> | 2016     | 2004 | 2011 | 2016 |
| Reef fish                        | 1                 | 1                 | 1        | 1    | 1    | 1    |
| Spiny lobster                    | 3                 | 3                 | 2 - tied | 3    | 2    | 2    |
| Dolphin & wahoo                  | n/a               | n/a               | 4        | n/a  | n/a  | 3    |
| Coastal pelagic                  | 2                 | 2                 | 2 - tied | 5    | 6    | 7    |
| Deepwater Snapper                | 8                 | 7                 | 5 - tied | 2    | 5    | 5    |
| Queen conch                      | 7                 | 6                 | 8        | 4    | 4    | 4    |
| Deepwater pelagic                | 6                 | 4 - tied          | 7        | 6    | 3    | 6    |
| Whelk                            | 5                 | 4 - tied          | 5 - tied | 8    | 7    | 9    |
| Baitfish                         | 4                 | 8                 | 9        | 7    | 8    | 8    |

<sup>1</sup>Kojis (2004). <sup>2</sup>Kojis and Quinn (2011a).

On STT/STJ, bait fish outranked queen conch, whelk and deep-water snapper in 2004 (Table 42). While it was the least targeted category in 2011 and 2016. Few fishers generate revenue from bait fish in either district. The high ranking in 2004 was probably because most fishers fish for bait but do not sell it. Ballyhoo, which are purchased by charter fishers to catch billfish, was the only baitfish observed being sold by fishers (Kojis, pers. obs.).

There were distinct differences in the ranks of categories between the districts (Table 42). While reef fish were of prime importance in both districts in all three surveys, spiny lobster ranked second on STT/STJ only in 2016 when fishers were asked to rank the categories by revenue generated. In 2004 and 2011 it ranked third and in both those years coastal pelagic fish ranked second. On STX spiny lobster ranked third in 2004, but second in 2011 and 2016. The lower ranking of lobster in 2004 on STX may be a function of the way the question was asked.

Queen conch was a much more important resource on STX where it ranked 4<sup>th</sup> in all three years (Table 42). Queen conch ranked only 6<sup>th</sup> to 8<sup>th</sup> on STT/STJ. Conch are fished by skin diving, and more commonly scuba diving. The shallower STX shelf allows easier access by both skin and scuba divers, the latter are constrained by decompression limits.

Deep-water snapper was more important on STX compared to STT/STJ (Table 42). This was primarily a function two factors: 1) the proximity of deep water habitat on STX because of the narrower shelf and 2) the area of shelf per fisher. STT/STJ fishers have 6.3 times more shelf area to fish than STX fishers (Kojis and Quinn, 2011) so they could focus their fishing on the shelf.

### **Boats and Engines**

Boat ownership has changed dramatically in the 86 years since the first survey in 1930 (Table 43). In 1930, there were nearly the same number of fishing boats on STT and STJ and a higher percentage ownership of boats. However, by 1967 the number and percentage of fishers owning boats on STT was much higher than STJ. There were a number of reasons for this change. After emancipation, the population on STJ decreased dramatically and those persons remaining became subsistence farmers and fishers. STT, on the other hand, had a deep-water harbor, had more commerce and, since 1871, was the capital of the USVI. In the 1930's, STT inhabitants had more job choices while STJ remained rural. Also, in 1959, President Eisenhower signed the bill creating the Virgin Islands National Park (VINP) on STJ. The park encompassed approximately 50% of the island. While the population on STT had grown to nearly 30,000 by 1970 and development on STT was burgeoning, STJ was still a sleepy place with only about 1,700

inhabitants (Crossett, Clement, and Rohmann, 2008). Thus by 1967, boat ownership was higher on STT than on STJ.

The percentage of fishers owning boats increased dramatically between 1967 and 2003 and there has been a steady increase in the following years (Table 43). In 2016, fishers owned an average of 1.35 boats including dinghies with STT/STJ having a higher percentage of boat ownership than STJ.

Table 43. Changes in the number of boats (including dinghies) and percentage of boat ownership from 1930 to 2016.

| Survey year                | # of fishers interviewed |     |     |      | # of boats and percentage boat ownership |                   |                   |      |     |      |      |      |
|----------------------------|--------------------------|-----|-----|------|--|-------------------|-------------------|------|-----|------|------|------|
|                            | STT                      | STJ | STX | USVI | STT                                      |                   | STJ               |      | STX |      | USVI |      |
|                            |                          |     |     |      | N  | %                 | N                 | %    | N   | %    | N    | %    |
| <b>1930<sup>1</sup></b>    | 127                      | 78  | 200 | 405  | 58                                       | 46%               | 53                | 68%  | 87  | 44%  | 186  | 50%  |
| <b>1967<sup>2</sup></b>    | 60                       | 72  | 153 | 285  | 36                                       | 60%               | 16                | 22%  | 37  | 24%  | 89   | 31%  |
|                            |                          |     |     |      | <b>STT/STJ</b>                           |                   |                   |      |     |      |      |      |
|                            |                          |     |     |      | <i>N</i>                                 |                   | <i>%</i>          |      |     |      |      |      |
| <b>2003-4<sup>3</sup></b>  | 103                      | 13  | 217 | 333  | 143                                      |                   | 123% <sup>5</sup> |      | 251 | 116% | 333  | 118% |
| <b>2010-11<sup>4</sup></b> | 93                       | 9   | 157 | 259  | 132                                      |                   | 129% <sup>5</sup> |      | 187 | 119% | 319  | 123% |
| <b>2016<sup>6</sup></b>    | 81                       | 3   | 111 | 195  | 125                                      |                   | 149% <sup>5</sup> |      | 130 | 117% | 255  | 135% |
| <b>2016<sup>7</sup></b>    |                          |     |     |      | 122                                      | 151% <sup>5</sup> | 3                 | 100% |     |      |      |      |

<sup>1</sup>Fiedler and Jarvis (1932)

<sup>2</sup>Swingle et al. (1970). Only 69% of full time fishers and 25% of part time fishers were interviewed.

<sup>3</sup>Kojis (2004)

<sup>4</sup>Kojis and Quinn (2011a; includes dinghies).

<sup>5</sup>Percent is >100 because some fishers interviewed had more than one boat.

<sup>6</sup>This study (includes dinghies).

<sup>7</sup>Breakdown of boat ownership by island for STT/STJ District.

There have been major technological advances made in the construction of boats, engines, and boat equipment over the years. In the 1930's most fishers used rowboats or sail boats (Table 44). By 1968, 100% of fishers had a boat with a gas or diesel powered engine. The use of powerful engines and the increasing adoption among fishers of sophisticated electronic fishing and safety gear (Table 45) has resulted in fishers being able to access the EEZ more readily and safely. This is especially true on STT/STJ with its much larger, wider shelf. Prior to the use of powerful engines and depth/fish finders (echo sounders) and GPS, Lang Bank on STX and the outer shelf on STT/STJ served as informal marine reserves because of limited access and the difficulty accurately finding fishing grounds using distant landmarks.

Table 44. Percentage of boats with engines from 1930 to 2016.

| Survey year              | # of fishers interviewed |     |                  | % of boats with engines |      |      |
|--------------------------|--------------------------|-----|------------------|-------------------------|------|------|
|                          | STT                      | STJ | STX              | STT                     | STJ  | STX  |
| <b>1930</b> <sup>1</sup> | 127                      | 78  | 200              | 0%                      | 0%   | 1.1% |
| <b>1968</b> <sup>2</sup> | 60                       | 72  | 153 <sup>3</sup> | 100%                    | 100% | 100% |
| <b>2004</b> <sup>3</sup> | 103                      | 13  | 217              | 100%                    |      | 99%  |
| <b>2011</b> <sup>4</sup> | 93                       | 9   | 157              | 100%                    |      | 100% |
| <b>2016</b> <sup>5</sup> | 73                       | 3   | 106              | 100%                    |      | 100% |

<sup>1</sup>Fiedler and Jarvis (1932)

<sup>2</sup>Swingle et al. (1970). Only 69% of full time fishers and 25% of part time fishers were interviewed.

<sup>3</sup>Kojis (2004)

<sup>4</sup>Kojis and Quinn (2011a)

<sup>5</sup>This study.

Table 45. Number and percentage of various types of electronic equipment used on fishing boats in the USVI from 2004 to 2016.

| Electronic Equipment | 2004 <sup>1</sup> |                      | 2011 <sup>2</sup> |                      | 2016       |                      |
|----------------------|-------------------|----------------------|-------------------|----------------------|------------|----------------------|
|                      | N                 | Percent <sup>3</sup> | N                 | Percent <sup>3</sup> | N          | Percent <sup>3</sup> |
| Echo sounder         | 144               | 37.2%                | 144               | 44.3%                | 143        | 60.6%                |
| Cell Phone           | <b>232</b>        | <b>59.9%</b>         | <b>196</b>        | <b>60.3%</b>         | <b>203</b> | <b>86.0%</b>         |
| GPS                  | 95                | 24.5%                | 126               | 38.8%                | 117        | 49.6%                |
| EPIRB                | 35                | 9.0%                 | 15                | 4.6%                 | 40         | 16.9%                |
| Radar                | 6                 | 1.6%                 | 5                 | 1.5%                 | 13         | 5.5%                 |
| Marine Radio         | 117               | 30.2%                | 88                | 27.1%                | 93         | 39.4%                |
| # boats              | 387               |                      | 325               |                      | 236        |                      |

<sup>1</sup>Kojis (2004)

<sup>2</sup>Kojis and Quinn (2011a)

<sup>3</sup>Percentage is based on total number of boats owned in each district, including dinghies. Some fishers, who owned more than one vessel and reported the same mobile equipment such as cell phones and marine radios (handheld ones) for each vessel they owned. In most cases it is likely that they used the same equipment on each vessel. However, it was reported as fishers reported during the interview.

Note: The most common response is in bold type.

Fishing boats in 2016 are typically made of fiberglass or fiberglass and wood and powered by powerful outboard engines (Tables 25q, 25n). The use of lighter, more fuel efficient aluminum boats has yet to penetrate the fishery in part because of concerns about corrosion (L. Aubain, pers. com.). Outboard engines are energy intensive, consuming gallons of fuel on each trip. The decline in oil prices in 2016 encouraged the continued use of high speed two-stroke gasoline engines in preference to more expensive 4-stroke outboard engines, which are quieter and more fuel efficient, and slower more fuel efficient diesel engines. If gas prices increase again and stay high, it is likely that fishers will spend the extra money to purchase 4-stroke outboards since a number of them are doing this already (Table 46a, b) or move to larger, diesel powered vessels,



especially on STT/STJ. STT/STJ fishers may then go out for longer periods to haul more pots on each trip and take fewer trips. They may also more frequently target shelf edge and outer shelf species that are of higher value (e.g. deep-water pelagic fish) that they can sell to the restaurants catering to tourists. This of course depends on the availability of these higher value fish, which in turn will depend on the ability of Caribbean nations to manage these fish for all Caribbean fishers. It may also depend on the consistent installation and maintenance of deep water surface FADs, which attract deep-water pelagic fish and are fished by both recreational and commercial fishers. Funding for the permitting, construction and maintenance of FADs was made available to DFW by the federal government (Sport Fish Restoration funding).

Table 46.a. The type of fuel used in engines of fishing boats including dinghies on STT/STJ and STX.

| Fuel Type              | STT/STJ           |              |                   |              |           |              | STX        |              |            |              |           |              |
|------------------------|-------------------|--------------|-------------------|--------------|-----------|--------------|------------|--------------|------------|--------------|-----------|--------------|
|                        | 2004 <sup>1</sup> |              | 2011 <sup>2</sup> |              | 2016      |              | 2004       |              | 2011       |              | 2016      |              |
|                        | N                 | %            | N                 | %            | N         | %            | N          | %            | N          | %            | N         | %            |
| Gas <sup>3</sup>       | <b>74</b>         | <b>60.7%</b> | 14                | 12.2%        | 24        | 31.6%        | <b>149</b> | <b>63.7%</b> | 15         | 9.0%         | 15        | 15.2%        |
| Gas & Oil <sup>4</sup> | 16                | 13.1%        | <b>69</b>         | <b>60.0%</b> | <b>32</b> | <b>42.1%</b> | 73         | 31.2%        | <b>140</b> | <b>84.3%</b> | <b>78</b> | <b>78.8%</b> |
| Diesel                 | 32                | 26.2%        | 32                | 27.8%        | 20        | 26.3%        | 12         | 5.1%         | 11         | 6.6%         | 6         | 6.1%         |
| # of boats             | 122               | 100.0%       | 115               | 100.0%       | 76        | 100.0%       | 234        | 100.0%       | 166        | 100.0%       | 99        | 100.0%       |

<sup>1</sup>Kojis (2004)

<sup>2</sup>Kojis and Quinn (2011a)

<sup>3</sup>Gas engines were described to fishers as 4-stroke engines in 2011 and 2016 but not in 2004.

<sup>4</sup>Gas & oil engines were described to fishers as 2-stroke engines in 2011 and 2016 but not in 2004.

Note: The most common response is in bold type.

Table 46.b. The type of fuel used in engines of fishing boats including dinghies.

| Fuel Type  | USVI              |              |                   |              |            |              |
|------------|-------------------|--------------|-------------------|--------------|------------|--------------|
|            | 2004 <sup>1</sup> |              | 2011 <sup>2</sup> |              | 2016       |              |
|            | N                 | %            | N                 | %            | N          | %            |
| Gas        | <b>223</b>        | <b>62.6%</b> | 29                | 10.3%        | 39         | 22.3%        |
| Gas & Oil  | 89                | 25.0%        | <b>209</b>        | <b>74.4%</b> | <b>110</b> | <b>62.9%</b> |
| Diesel     | 44                | 12.4%        | 43                | 15.3%        | 26         | 14.9%        |
| # of boats | 356               | 100.0%       | 281               | 100.0%       | 175        | 100.0%       |
|            |                   |              |                   |              |            |              |

<sup>1</sup>Kojis (2004)

<sup>2</sup>Kojis and Quinn (2011a)

Note: The most common response is in bold type.

In 2016, most fishers owned boat at least one boat (Table 25a) and most (>80%) were sole owners of their primary fishing boat. Some fishers owned more than one boat with a few owning

up to 3 boats, excluding dinghies (Table 25b). Every fisher on STX and STT/STJ that owned a boat reported having at least one engine for their boat. It was more common for STX fishers to have two motors per boat (Tables 25k, l) of less horse power (Tables 25m). Very few fishers traveled long distances to fishing grounds or spent continuous days at sea fishing. They liked to drive fast to the fishing site, often (especially on STX), so they could get back to port and market their fish fresh by mid-day or so they could fill orders quickly. As a result, slower and larger diesel powered boats were uncommon and generally owned by charter fishers. The greater number of diesel engines in STT/STJ was due to the presence of an economically significant charter boat population which often fished the northern shelf edge, particularly the North Drop, when permitted by the BVI government, to catch billfish and other deep-water pelagic species. The northern shelf edge is about 20 miles from St. Thomas. This fleet caters to wealthy recreational fishers and most augment the income of their crew by selling charter catches. A number of resident charter vessels also have commercial licenses and commercially fish when not chartered. In 2012, HOVENSA closed and many STX residents who chartered game fishing vessels left the island.

The average size of boats has changed little since 2003-4 in both districts (Table 47a, b). The mean boat size on STT/STJ has remained 2.7 to 2.8 ft larger than on STX. The mean length of the primary boat on STT/STJ and STX increased from 2004 to 2011 and declined slightly in 2016 (Table 47a).

Table 47.a. Comparison over time of the length of the primary fishing boats used by fishers.

| Statistics                 | STT/STJ           |                   |                | STX            |                |                | USVI           |                |                |
|----------------------------|-------------------|-------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                            | 2004 <sup>1</sup> | 2011 <sup>2</sup> | 2016           | 2004           | 2011           | 2016           | 2004           | 2011           | 2016           |
| Mean (SD) <sup>1</sup>     | 23.5<br>(+7.0)    | 24.9<br>(+7.2)    | 24.6<br>(+7.8) | 20.8<br>(+5.6) | 22.1<br>(+5.5) | 21.9<br>(+5.6) | 21.7<br>(+6.2) | 23.2<br>(+6.3) | 23.0<br>(+6.7) |
| Range                      | 9 - 48            | 13 -<br>47        | 14 -<br>47     | 10 -<br>54     | 13 -<br>42     | 12 -<br>45     | 9 - 54         | 13 -<br>47     | 12 -<br>47     |
| # of primary fishing boats | 102               | 89                | 75             | 208            | 137            | 107            | 310            | 226            | 182            |

<sup>1</sup>Kojis (2004)

<sup>2</sup>Kojis and Quinn (2011a)

About 70% of the primary fishing boats owned by USVI fishers in all three surveys ranged between 16 and 25 ft in length (Table 47b). The highest percentage of fishing boats in a single category was between 16 and 20 ft in length. The proportion of boats >26 ft increased from 17.2% in 2004 to 26.1.0% in 2011, but declined slightly to 23.0% in 2016.

Table 47.b. Frequency distribution of primary boat lengths used by fishers in the USVI.

| Length of boats (ft)                    | 2004 <sup>1</sup> |              | 2011 <sup>2</sup> |              | 2016      |              |
|---|-------------------|--------------|-------------------|--------------|-----------|--------------|
|   | N                 | Percent      | N                 | Percent      | N         | Percent      |
| 0-15                                    | 28                | 9.0%         | 11                | 4.5%         | 9         | 4.9%         |
| 16-20                                   | <b>131</b>        | <b>42.3%</b> | <b>88</b>         | <b>35.9%</b> | <b>70</b> | <b>38.5%</b> |
| 21-25                                   | 98                | 31.6%        | 82                | 33.5%        | 61        | 33.5%        |
| 26-30                                   | 23                | 7.4%         | 27                | 11.0%        | 17        | 9.3%         |
| 31-35                                   | 20                | 6.5%         | 21                | 8.6%         | 12        | 6.6%         |
| 35-40                                   | 7                 | 2.3%         | 11                | 4.5%         | 8         | 4.4%         |
| >40                                     | 3                 | 1.0%         | 5                 | 2.0%         | 5         | 2.7%         |
| # of primary fishing boats <sup>3</sup> | 310               | 100.0%       | 245               | 100.0%       | 182       | 99.9%        |

<sup>1</sup>Kojis (2004)

<sup>2</sup>Kojis and Quinn (2011a)

<sup>3</sup>Number of boats with length information.

Note: The most common response is in bold type.

### ***Electronic Gear used on Boats***

In the 21<sup>st</sup> century technological advancement in electronics has altered the fishery, increasing safety and fishing efficiency. As fishers ventured further from port, the need for and ownership safety equipment increased (Table 48). Following the general trend in society, the cell phone was the most common electronic communication and safety device carried on board fishing vessels in the USVI. Cell phone ownership by USVI fishers increased by 30.8% from 2004 to 2016, with 90.7% of fishers owning cell phones in 2016. Boats on STT/STJ fish further off shore than on STX and often there is no cell phone reception on their fishing ground. On STX, cell phone reception is available at most fishing grounds. As a result, more fishers on STT/STJ own marine radios than on STX. In 2016, 61.8% of fishers owned marine radios on STT/STJ compared with only 27.4% on STX.

Another important safety equipment piece is the EPIRB (Emergency Position Indicating Radio Beacon). The percentage ownership in the USVI increased 9.1% since 2004 (Table 48). While fewer than 20% of fishers in the USVI owned an EPIRB in 2016, ownership was higher on STT/STJ (27.6%) than STX (11.3%). The percentage ownership increased in each district; more so on STT/STJ, where fishers fished further off shore and boats were larger. The cost and size of EPIRB's has come down over the years making them more affordable for fishers. In addition to electronic safety devices, 21.1% of the STT/STJ boats and 46.2% of STX boats had two engines. Seldom do two engines fail at the same time, unless a fisher runs into a reef.

GPS has steadily become more common on boats in both districts since the first census, allowing fishers to place traps without surface lines and to accurately mark prime fishing sites. GPS usage increased 25.4% between 2003-04 and 2016 on STT/STJ and 23.8% on STX (Table 48). GPS has been consistently more common on boats in STT/STJ than in STX. In 2016, the percentage of fishers owning GPS was 28.4% higher than on STX. Fishers on STT/STJ use GPS not only to locate fishing grounds, but also to locate traps set “blind” (without a surface buoy attached) in deep water (60 to 170 feet) or when trap buoys were lost. In STX, while GPS is used to locate fishing grounds, trap fishers generally set traps in shallow water on the shelf and individually buoy them (Kojis, 2004). This reduces the need for purchasing a GPS for locating traps.

The use of depth finders / echo sounders has increased steadily in both districts since 2004. They were more commonly used by fishers on STT/STJ vessels in all three surveys than STX. In 2016, 26.7% more fishers on STT/STJ used a depth finder compared to STX. Waters fished were generally deeper on STT/STJ and, unlike most areas of the shelf on STX, it is often impossible to detect habitat type by looking down from the surface.

Table 48. Comparison over time of the percentage of fishers who used various electronic equipment on their primary fishing boats.

|                            | STT/STJ           |                   |              | STX          |              |              | USVI         |              |              |
|----------------------------|-------------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                            | 2004 <sup>1</sup> | 2011 <sup>2</sup> | 2016         | 2004         | 2011         | 2016         | 2004         | 2011         | 2016         |
| Cell Phone                 | <b>53.2%</b>      | 45.5%             | <b>92.1%</b> | <b>63.7%</b> | <b>70.7%</b> | <b>89.6%</b> | <b>59.9%</b> | <b>60.3%</b> | <b>90.7%</b> |
| GPS                        | 41.7%             | 54.5%             | 67.1%        | 14.9%        | 27.7%        | 38.7%        | 24.5%        | 38.8%        | 50.5%        |
| EPIRB                      | 13.7%             | 6.7%              | 27.6%        | 6.5%         | 3.1%         | 11.3%        | 9.0%         | 4.6%         | 18.1%        |
| Marine Radio               | 46.0%             | 36.6%             | 61.8%        | 21.4%        | 20.4%        | 27.4%        | 30.2%        | 27.1%        | 41.8%        |
| Depth finder               | 52.5%             | <b>61.9%</b>      | 77.6%        | 28.6%        | 31.9%        | 50.9%        | 37.2%        | 44.3%        | 56.6%        |
| Radar                      | 1.4%              | 2.2%              | 6.6%         | 1.6%         | 1.0%         | 2.8%         | 1.6%         | 1.5%         | 4.4%         |
| # of primary fishing boats | 139               | 134               | 76           | 248          | 191          | 106          | 387          | 325          | 182          |

<sup>1</sup>Kojis (2004)

<sup>2</sup>Kojis and Quinn (2011a)

Note: The most common response is in bold type.

### ***Mechanical Equipment on Boats***

Winches, commonly used to pull traps, were more common in STT/STJ where most of the trap fishing is conducted. STX fishing boats were generally smaller and fewer had winches. Fishers on STX still sometimes framed their traps with wood which was lighter than rebar and thus easier to pull by hand. The percentage of boats on STT/STJ with a winch remained about the same over

the three censuses (2004 - 26.6%, 2011 - 25.4%, 2016 – 26.3%), but increased slightly on STX (2004 -7.3%, 2011 - 9.8%, 2016 – 10.4%) (Kojis, 2004, Kojis and Quinn 2011, Table 25s).

Manual, electric and hydraulic reels, used to catch deep-water snapper and grouper, were more commonly used in fishing on STX than STT/STJ (Table 11e). The percentage of fishers on STX owning reels has been consistently higher than on STT/STJ in each of the three surveys. However, a higher percentage of STT/STJ fishers owned hydraulic reels than STX fishers while STX fishers owned more electric and manual reels than STT/STJ fishers (Table 25s).

### ***Fishing Gear***

Multi-species and multi-gear fisheries are common throughout the Caribbean (Munro and Smith 1983). Not only do fishers target a variety of fish species, they also target a wide range of shellfish (e.g. spiny lobsters, queen conch, and whelk) and habitats requiring different types of gear. Table 49 illustrates the types and numbers of each gear used from 1930 to 2016.

Table 49. Comparison of total number of each type of gear owned by fishers in 1930, 1968, 2004, 2011 and 2016.

| Survey<br>year    | Number of Fishers  |                    |       | # of Gears         |                    |                       |           |                                    |                  |                      | Scuba<br>(total #<br>scuba<br>fishers/total<br># tanks) |
|-------------------|--------------------|--------------------|-------|--------------------|--------------------|-----------------------|-----------|------------------------------------|------------------|----------------------|---|
|                   |                    |                    |       | Fish pots          | Lobster Pots       | Beach/<br>Haul seines | Cast nets | Vertical Set<br>lines <sup>1</sup> | Hand lines       | Rod and<br>Reel gear |   |
|                   | Total #<br>Fishers | Fishers<br>Sampled |       |                    |                    |                       |           |                                    |                  |                      |   |
|                   |                    | #                  | %     |                    |                    |                       |           |                                    |                  |                      |   |
| 1930 <sup>2</sup> | 405                |                    | 85%   | 1,600              | 0                  | 40                    | 113       | 25                                 | 204              | n/a                  |   |
| 1968 <sup>3</sup> | 400                | 153                | 38.3% | 838                | 425                | n/a                   | n/a       | n/a                                | n/a              | n/a                  |   |
| 2004 <sup>4</sup> | 383                | 339                | 88.5% | 6,606 <sup>6</sup> | 2036 <sup>7</sup>  | 18                    | 147       | 351                                | 192              | 118                  | 83/502  |
| 2011 <sup>5</sup> | 297                | 259                | 87.2% | 4,211 <sup>6</sup> | 2,259 <sup>7</sup> | 10 <sup>8</sup>       | 294       | 153                                | 569 <sup>9</sup> | 121 <sup>9</sup>     | 71/340  |
| 2016              | 260                | 213                | 81.9% | 5,511 <sup>6</sup> | 2,068 <sup>7</sup> | 60 <sup>10</sup>      | 265       | 225                                | 2,372            | 526                  | 71/440  |

<sup>1</sup> Fiedler and Jarvis (1932) called these trawl lines but the description was the same as for vertical set lines – multi-hook in this study.

<sup>2</sup> Fiedler and Jarvis (1932).

<sup>3</sup> Swingle et al. (1970; Table 1, p. 115)

<sup>4</sup> Kojis (2004).

<sup>5</sup> Kojis and Quinn (2011a)

<sup>6</sup> Includes fish pots as well as modified fish pots/wire lobster pots.

<sup>7</sup> Plastic lobster pots - only used on STT/STJ.

<sup>8</sup> Number of beach and haul seines, not including gill nets used for catching flying fish and ballyhoo.

<sup>9</sup> Based on the number of hand lines and troll lines used by anchor fishers in 2010. However, in 2010 STX fishers owned another 621 hand lines and 61 rods and reels that they used interchangeably for anchor, troll, and drift fishing.

<sup>10</sup> Includes both beach (28) and haul seines (32).

Note: In 1930 and 1968 there was no commercial fishing license. The Total # of Fishers included all fishers fishing and selling fish. Total # of Fishers in 2004, 2011, 2016, included only licensed fishers.

Note: Numbers of gear reflect only what was reported, i.e. gears were not standardized by percent of fishers interviewed or any other measure.

Differences in fisheries habitat, fish and shellfish abundance, shelf size, and proximity to deep water drives the differences in fishing gear used in the two districts. STX has a narrow, relatively shallow shelf around most of the island compared with STT/STJ. As described in detail below, fishers predominantly utilize gears that best fit their fishery. Kojis (2004) provided a brief summary of the changes that have occurred in the construction of various fishing gears.

#### *Gear – Traps or Pots*

In 2016, the number of fish traps and modified fish traps (funnel modified to target lobster, but also catch fish) increased substantially compared to previous years. However, fishers reported owning fewer plastic lobster traps (Table 49). Plastic lobster pots were used only on STT/STJ. STX fishers primarily caught lobster using snares while skin or scuba diving and with wire fish traps.

GPS has become a common device used by fishers on STT/STJ to locate both fishing grounds and gear with 67.1% of fishers who owned a fishing boat owning a GPS in 2016 (Table 48). GPS was owned by fewer STX fishers (38.7%), probably because fewer traps are set (Tables 33-35), but also because traps on STX are usually individually buoyed (Kojis, 2004), and are often set in shallow water where they are often visible from the surface. Traps on STT/STJ are frequently set blind owing to trap theft if buoyed. Trap theft was also an issue on STX. However, in both districts, fishers also complained of loss of trap contents, often without theft of traps. Fishers may haul traps they do not own, remove the contents, and return the traps to the sea bed. In STX, divers sometimes open other fishers' traps and remove the lobster and fish. Stealing the traps themselves is harder. Many fishing boats are not large, even trap boats, and most boats can fit only a few traps on the deck.

Assuming that fishers were randomly interviewed in the 1930, 1968, 2004, 2011 and 2016 surveys, an estimate of the total numbers of traps (fish and lobster) in the fishery can be calculated based on the percentage of fishers interviewed. Based on the expanded data (Table 50), the number of fish and lobster traps owned by fishers in the USVI declined by 2,850 from 2004 to 2011, and increased by 1,633 from 2011 to 2016. The total number of traps owned by USVI fishers in 2016 is still 1,217 less than in 2004. The number of traps owned by fishers on STX has steadily declined, possibly owing to trap theft and/or fish and lobster theft out of traps (G. Martinez). Since many traps are deployed in shallow water on STX, it is easy for divers to open the door on traps and remove the fish and lobster in the traps. The number of traps on STT/STJ declined almost 2,477 in 2011, but increased 1,771 from 2011 to 2016.

Table 50. Comparison of the number of pots (fish, modified fish, and lobster pots) owned by fishers between 1930 and 2016.

| Year of survey       | Location | % of fishers interviewed | # of traps reported in each district | Total # of traps reported in both districts | Expanded data <sup>1</sup> |
|----------------------|----------|--------------------------|--------------------------------------|---|----------------------------|
| 1930 <sup>2</sup>    | USVI     | 85%                      |                                      | 1600  | 1,882                      |
| 1968 <sup>3</sup>    | USVI     | 38.3%                    |                                      | 838   | 3,296                      |
| 2002/03 <sup>4</sup> | USVI     |                          |                                      | 8,815                                       |                            |
| 2004 <sup>5</sup>    | STT/STJ  | 83.0% <sup>6</sup>       | 7,407                                |   | 8,924                      |
|                      | STX      | 82.6% <sup>7</sup>       | 1,235                                |   | 1,495                      |
|                      | USVI     |                          |                                      | 8,642                                       | 10,409                     |
| 2011 <sup>8</sup>    | STT/STJ  | 85% <sup>9</sup>         | 5,480                                |   | 6,447                      |
|                      | STX      | 89% <sup>9</sup>         | 990                                  |   | 1,112                      |
|                      | USVI     |                          |                                      | 6,470                                       | 7,559                      |
| 2016                 | STT/STJ  | 76.5% <sup>10</sup>      | 6,287                                |   | 8,218                      |
|                      | STX      | 86.5% <sup>10</sup>      | 842                                  |   | 973                        |
|                      | USVI     |                          |                                      | 7,129                                       | 9,192                      |

<sup>1</sup>Expanded data were calculated by dividing the number of traps reported by the percentage of fishers interviewed.

<sup>2</sup>Fiedler and Jarvis (1932).

<sup>3</sup>Swingle et al. (1970)

<sup>4</sup>USVI catch report data from the FY2002-03 fishing year.

<sup>5</sup>Kojis, 2004.

<sup>6</sup>Percentage based on 54 fishers reporting that they fished traps in the 2002-03 catch reports and only 44 respondents reporting owning traps (Kojis, 2004).

<sup>7</sup>Percentage based on 69 fishers stating that they owned traps but only 57 fishers reporting the number they owned (Kojis, 2004).

<sup>8</sup>Kojis and Quinn (2011a).

<sup>9</sup>Based on percentage of licensed fishers interviewed (Kojis and Quinn, 2011a).

<sup>10</sup>Based on percentage of licensed fishers interviewed (Table 1, this study).

Fish trap reduction has been a major resource management initiative in the territory since at least 2011. Fishers and management agencies have expressed concern about the number of traps being deployed, especially on STT/STJ, and wanted to ensure that trap numbers at least remained static on STX, which has a much smaller shelf area. A summary of progress on trap reduction measures to 2011 is provided in Kojis and Quinn (2011a). DPNR and the CFMC had not finalized or implemented any fish trap reduction plan as of April 2017. However, it is still under consideration (H. Forbes, pers. comm.).

#### *Gear – Nets*

The only types of nets permitted in the US Virgin Islands are cast nets, seine nets (beach and haul seines), umbrella nets, and small mesh gill nets for catching bait (specifically ballyhoo) and flying fish. Trammel nets and gill nets for other than bait fish were prohibited in 2008 (VIC T12 Ch9a, Section 321-1). A brief summary of the history of this prohibition is found in Kojis and Quinn

(2011a). Cast nets were the most commonly owned net and were used in both districts for catching bait primarily for personal fishing (Table 27d). A description of the different types of cast nets can be found in Kojis (2004). As in 2004 and 2011, umbrella nets were only used by a few STX fishers (6.4%) and were not reported to be used on STT/STJ (Table 27e). Umbrella nets were primarily for catching the bait fish locally known as “round robin” (*Decapterus punctatus*), a scad. Beach seines and haul seines were more commonly used on STT/STJ (7.3% and 14.6% of fishers, respectively) than on STX (3.7% and 4.6%) (Tables 27a, b, respectively). Haul seines were used to catch jacks in both districts and yellowtail snapper (*Ocyurus chrysurus*) on STT/STJ, while on STX they were sometimes used with scuba to catch reef fish.

*Gear – Vertical Set lines, Tuna/Reel Buoys, Surface and Bottom Long Lines.*

Background on the use of vertical set lines since 1930 is found in Kojis (2004) and Kojis and Quinn (2011a). Two types of vertical set lines were used by fishers in the USVI: single hook for pelagics and multi-hook for deep-water snapper and grouper. Both of these gears were predominately owned by fishers on STX (single hook pelagic: STX – 5.5%, STT/STJ 1.2%, Table 27p; multi-hook: STX - 38.5%, STT/STJ - 3.7%, Table 27o). These gears were used to fish in deep water, off the shelf edge.

Between 2004 (Kojis, 2004) and 2011 (Kojis and Quinn, 2011a) the ownership of vertical set lines declined in the USVI, but increased in 2016 (Table 49). This change in ownership occurred on STX since only one fisher reported owning vertical set line for pelagics gear on STT/STJ in all three surveys. In contrast, nine fishers on STX owned this gear in 2004, eight in 2011 and six in 2016. A question regarding ownership of tuna buoy gear was only asked in the last two surveys. Ten fishers on STX owned the gear in 2011 and 17 in 2016. No STT/STJ fishers reported owning this gear. However, it is known that at least one fisher uses this gear on STT/STJ (Kojis, pers. obs.). Fishers using this gear deploy up to six buoys with attached reels, hauling them either when a reel starts spinning indicating a fish on the line or after all are deployed, in the order that they were deployed. In 2016, surface long lines (Table 27m) were not owned by any fishers while bottom long-lines (Table 27n) were owned by only one fisher in each district.

*Gear – Skin and Scuba*

Skin and scuba diving remain important fishing techniques for harvesting lobster by hand or snare, queen conch by hand and fish using a spear. Skin and scuba diving was also used to adjust net ropes and detach net ropes from the bottom when nets were being hauled in. Skin diving was



conducted more widely on STT/STJ than scuba (Table 51). Fishers on STT/STJ skin dived primarily to catch queen conch and lobster for personal use. Scuba is used by only a few fishers on STT/STJ because of the depth of most of the fishing grounds and the few fishers who fish queen conch. Most fishers on STT/STJ think that it is not economically viable to fish queen conch. The primary reason given was because cleaning conch took too much time. It is also likely because harvesting conch was too difficult because they are less abundant than in STX.

On STX, scuba was an important fishing technique with over half of STX fishers using scuba to fish (Tables 10b, 27s, 50). It has increased in importance over time on STX (Table 51). STX has an important queen conch fishery. Although, there is an annual catch limit of 50,000 lbs for each district, it is likely that STX fishers harvest more than this and do not report it because of the economic importance of the fishery and limited active enforcement of fisheries regulations. Also, because only limited port sampling is being conducted by DFW, there is no way to verify fisher catch reports, which are the basis for determining when the annual catch limit is reached. Spearfishing was also common on STX, allowing fishers to target specific species desired by their customers. The spiny lobster is a high value species and while fishers on STX sometimes used traps to catch lobster, most have intimate knowledge of lobster “holes” and harvest lobster with scuba and a snare. Several fishers reported that scuba was still be used on STX in conjunction with seine nets to herd fish into nets.

Table 51. Comparison over time of the percentage of fishers who owned and used scuba and skin diving gear.

|                         | STT/STJ           |                   |                   | STX   |       |       | USVI  |       |       |
|-------------------------|-------------------|-------------------|-------------------|-------|-------|-------|-------|-------|-------|
|                         | 2004 <sup>1</sup> | 2011 <sup>2</sup> | 2016 <sup>3</sup> | 2004  | 2011  | 2016  | 2004  | 2011  | 2016  |
| Scuba diving            | 10.7%             | 8.0%              | 14.6%             | 39.0% | 39.2% | 54.1% | 29.7% | 26.2% | 37.2% |
| Skin diving             | 14.6%             | 8.0%              | 32.9%             | 18.8% | 20.8% | 18.3% | 17.4% | 15.5% | 24.6% |
| # of fishers responding | 103               | 113               | 82                | 213   | 158   | 109   | 316   | 271   | 191   |

<sup>1</sup>Recalculation of data from first fisher census survey database (Kojis, 2004).

<sup>2</sup>Recalculation of data from second fisher census survey database (Kojis and Quinn, 2011a).

<sup>3</sup>This study.

### *Gear – Other Gears*

Line fishing was conducted by 83.5% of USVI fishers in 2011 (Kojis and Quinn, 2011a) and 85.2% in 2016 (Table 10b). It was the most important revenue generating fishing method in 2011 and 2016 (Table 10c). Line fishing includes a wide variety of gear from simple yo-yo gear to surface long lines. The majority of fishers used “yo-yos” (monofilament line on plastic reels), but

a few, especially those targeting pelagic fish, used rods and reels. Hand lines have remained a staple gear throughout the years (Fiedler and Jarvis, 1932; Swingle et al., 1970). Bottom and surface long line gear have been used by only a few fishers since 2004. In 2004, one fisher on STT/STJ and two on STX reported owning surface long lines. In 2011, only two fishers on STX reported owning this gear. No fishers reported owning surface long line gear in 2016. Bottom long line gear was owned by three fishers on STX and one STT/STJ fisher in 2004. Only one fisher in each district reported owning bottom long line gear in 2011 and 2016.

Vertical setline – multi-hook gear was owned by more fishers on STX than on STT/STJ, but ownership increased slightly on STT/STJ. This gear is used for catching deep-water snapper and grouper, which are much more commonly fished on STX than on STT/STJ. In 2004, only one STT/STJ fisher reported owning this gear while 45 STX fishers owned the gear. In 2010-11 and 2016, three fishers on STT/STJ, while on STX 26 fishers reported owning this gear in 2010-11 and 42 in 2016.

### **4.3. Observations of the Fishing Industry**

#### *Location of Fisher Residences*

Fishers were scattered throughout the islands. Fishers on STX lived in 50 estates, but only three estates, Whim (8.8% of fishers), Frederiksted (8.0%), and Clifton Hill (5.8%), had more than 5% of fishers surveyed (Table 2c). Fishers on STT/STJ lived in 37 estates. However, a fairly high percentage of fishers (40.3%) lived in the two traditional ethnically French fishing villages on STT/STJ, Frenchtown (13.5%) and Northside (26.8%). Northside includes Hull Bay - 6.7%, Lerkenlund - 9.2%, and St. Peter -10.9%. The three Northside estates border Hull Bay, where fishers moor their boats. These four estates had the highest percentage of fishers.

The USVI fishing industry is small scale with 56.3% of fishers fishing primarily in territorial waters, less than 3 miles from shore (Table 12). Fishers not only catch fish, but also construct and repair their gear, repair their boats, and market their fish. The Average licensed commercial fisher on STT/STJ and STX spent an average of 34.6 and 33.8 hrs per week, respectively, carrying out all fishing activities. Active Fishers spent an average of 1.2 hrs more than the Average Fisher on STT/STJ and 0.5 hrs more on STX on all fishing related activities. However, there was a large range in the hours spent carrying out fishing activities in both districts by both Average Fishers and Active Fishers. For example, some fishers seldom participated in fishing related activities and others spent >90 hrs.

There is no central fishing port on any island. Fishers who lived on STJ were most likely to land their catch in Cruz Bay, Coral Bay, or Caneel Bay (Table 21a). Fishers who lived on STT usually landed their fish at one of 19 different sites (Table 21a). However, whichever site STT fishers chose was likely the site they used every time since only 18 of 85 (21.1%) provided a secondary landing site. The three most commonly used landing sites were Frenchtown, Hull Bay, and Benner Bay/Mangrove Lagoon (including Mangrove Lagoon, Sea Side Marina, Benner Bay, Saga Haven). If they lived on STX, they might land their fish at one of 18 sites (Table 51). However, they were most likely to land their fish at Altona Lagoon, Christiansted; Molasses Pier; or Frederiksted Fisherman's Pier (Table 21b). Many STX fishers drove their boats to a launch site on a trailer. As a result, a substantial portion (63.3%) of fishers on STX landed their fish at more than one site.

### *Icing fish*

Only 22% of fishers iced their fish in 2004, but by 2011, 90% did. The results were similar to 2011 in 2016 with 88.4% of fishers indicating that they iced their fish. The slightly lower percentage may be because the question provided more detail than in the past by asking if they iced their fish both "on board and during retail sale." Some fishers do not ice their fish on board their vessel – only icing it once it is landed. If fishers on STT/STJ know they will be back after markets close, they often freeze their fish when they return. On STX fishers may fish for several hours early in the morning and then ice their fish upon return. Observations of fishers selling fish in 2015 and 2016 confirmed that icing of fish during retail sale was almost universal in both districts today (Kojis, pers. obs.). STX fishers usually sold their fish directly from their coolers, which were filled with ice and fish, while STT/STJ fishers stored their fish in coolers and displayed a portion of their fish on a bed of ice on the back of their truck or on the tables provided at one of the fish houses. Sometimes they pulled frozen fish from their coolers and laid it on the bed of ice where it thawed.

### *Marketing*

As in 2004 and 2011, fishers in both districts sold their catch to a wide variety of customers, often selling at several different locations (23c, d) and/or to several different entities (Table 23a). The locations of the formal and informal fish markets on STT/STJ remained the same as in previous surveys. In STX, fishers commonly brought their fish home for sale to local residents, while STT/STJ fishers seldom did. Fishers in both districts commonly sold fish to private customers, restaurants and along the road. Government markets were used by over a third of fishers on

STT/STJ, but were not as commonly used on STX since the La Reine Fish Market, the main government market, closed down.

#### *Financial condition of fishers*

Despite the decline of some fish stocks (CFMC, 2005) and the increasing costs of boat and engine maintenance and safety and electronic gear, the fishing community was not impoverished. However, STX fishers felt they were economically worse off compared to STT/STJ fishers. Consistent with this, 71.1% of fishers on STT/STJ said their financial condition was the same or better (Table 32a) and only 20.5% said it was worse. This was similar to 2011 when 79.8% of fishers on STT/STJ said fishing was the same, better, or much better and 20.3% said it was worse or much worse. However, on STX, 45.0% of fishers in 2016 said their financial condition was worse, while in 2011 only 36.0% said their financial condition was worse or much worse (Kojis and Quinn, 2011a). This is probably due to the economic tightening associated with the closure of the oil refining operations of HOVENSA in 2012. This was an increase of 9% for STX since 2011. This question was not asked in 2004 (Kojis, 2004).

In 2016, 25% of STT/STJ fishers said the reason their financial well-being was better was because they were making more money while for 20% of STX fishers it was because they were catching and selling more fish (and presumably making more money). Other reasons given in both districts were because they were debt free and children had left home. Fishers in both districts who said their financial well-being was worse complained of a bad economy. On STT/STJ, 50% of fishers said the cost of living had gone up and 21.4% blamed the expense of boat repairs. STX fishers gave wide ranging reasons for being in worse financial shape, including regulations impacting fishing (10.2%), cost of living, no work, fishing less, catching fewer fish, less fish, and environmental reasons (each of these six opinions was provided by 6.1% of STX fishers). Fishers were not asked to provide reasons for the change in their financial well-being in 2011 and the question wasn't asked in 2004.

In both districts, the percentage of fishers who reported 100% of their household income from fishing decreased from 2004 – 2016 (Table 52). This was especially true on STT/STJ. From 2004 to 2016, 40.3% fewer fishers earned 100% of their income from fishing. On STX there was only a decline of 6.6%. This trend is similar for STT/STJ. When the percentage of fishers earning >50% of their income from fishing is calculated, there is a decline from 74.4% in 2004 to 48.8% in 2016. On STX the percentage of fishers earning >50% of their income from fishing is similar over the three censuses ranging from 51.6% in 2004 to 53.8% in 2016. The trends and

differences between districts may be a function of the availability of other reasonable paying jobs. However, in 2016, approximately 50% of fishers in each district said they did not engage in other employment activities (Table 16). On STT/STJ, 27.5% of fishers generated 100% of their income from fishing in 2016 (Table 52) and 49.4% (Table 16a) did not have any other employment, which meant that 21.9% had other household income, e.g. another family member worked, such as their wife or they received social security or a pension. The percentage of fishers who had other household income was lower on STX (12.9%) . This was because a higher proportion of fishers generated 100% of their income from fishing (38.9% - Table 52) and about the same percentage as STT/STJ said they did not have another job (51.8%, Table 16a)

Table 52. Comparison over time of the percentage of household income fishers earned from fishing.

| Proportion of income    | STT/STJ           |                   |                   | STX          |              |              | USVI         |              |              |
|-------------------------|-------------------|-------------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                         | 2004 <sup>1</sup> | 2011 <sup>2</sup> | 2016 <sup>3</sup> | 2004         | 2011         | 2016         | 2004         | 2011         | 2016         |
| 100%                    | <b>67.8%</b>      | <b>43.2%</b>      | <b>27.5%</b>      | <b>45.5%</b> | <b>40.5%</b> | <b>38.9%</b> | <b>52.1%</b> | <b>41.5%</b> | <b>34.0%</b> |
| >75% - <100%            | 3.3%              | 1.2%              | 12.5%             | 3.3%         | 9.5%         | 5.6%         | 3.3%         | 6.6%         | 8.5%         |
| >50% - 75%              | 3.3%              | 6.2%              | 8.8%              | 2.8%         | 4.1%         | 9.3%         | 3.0%         | 4.8%         | 9.0%         |
| >25% - 50%              | 6.7%              | 8.6%              | 22.5%             | 13.6%        | 14.2%        | 13.9%        | 11.6%        | 12.2%        | 17.6%        |
| >0% - 25%               | 14.4%             | 28.4%             | 23.8%             | 28.6%        | 15.5%        | 22.2%        | 24.4%        | 20.1%        | 22.9%        |
| 0%                      | 4.4%              | 12.3%             | 5.0%              | 6.1%         | 16.2%        | 10.2%        | 5.6%         | 14.8%        | 8.0%         |
| # of fishers responding | 90                | 81                | 80                | 213          | 148          | 108          | 303          | 229          | 188          |

<sup>1</sup>Recalculation of data from first fisher census survey database (Kojis, 2004).

<sup>2</sup>Kojis and Quinn (2011a)

In both the 2011 and 2016 surveys, STX fishers said that they found it considerably harder to find other employment than fishers did on STT/STJ (Table 53). This question was not asked on the 2004 survey. While the percentage of STT/STJ fishers who found it “very hard” or “hard” to find other employment increased 8.3% between 2011 and 2016, the percentage decreased 6.9% on STX. However, the percentage of fishers who said it was “easy” or “very easy” to find a job on STT/STJ also increased between 2011 and 2016, while declining slightly on STX. The percentage of STT/STJ and STX fishers who responded, “Don’t know” increased about 20% on STT/STJ and 10% on STX between 2011 and 2016. “Don’t know” usually meant that they had not looked for a job for years because they fished full time, stayed in the same job for years, and/or were retired.

Table 53. Comparison over time of fishers' opinions on the effort required to find other employment.

|                            | STT/STJ           |              | STX          |              | USVI         |       |
|----------------------------|-------------------|--------------|--------------|--------------|--------------|-------|
|                            | 2011 <sup>1</sup> | 2016         | 2011         | 2016         | 2011         | 2016  |
| Very hard                  | 3.7%              | 4.8%         | 24.2%        | 27.0%        | 17.0%        | 17.5% |
| Hard                       | 6.1%              | 13.3%        | <b>34.0%</b> | 24.3%        | 24.3%        | 19.6% |
| Easy                       | 12.2%             | 15.7%        | 9.8%         | 9.9%         | 10.6%        | 12.4% |
| Very easy                  | 6.1%              | 10.8%        | 3.9%         | 3.6%         | 4.7%         | 6.7%  |
| Don't know                 | 31.7%             | <b>50.6%</b> | 21.6%        | <b>31.6%</b> | <b>25.1%</b> | 39.7% |
| No answer                  | <b>40.2%</b>      | 4.8%         | 6.5%         | 3.6%         | 18.3%        | 4.1%  |
| Total # fishers responding | 82                | 83           | 153          | 111          | 235          | 194   |

<sup>1</sup>Kojis and Quinn (2011a)

Note: The most common response is in bold type.

### *Fisher concerns*

Extensive management efforts have been undertaken by federal and territorial agencies in the past 13 years. To determine fishers' opinions on the condition of fishing, which is related, in part, to the effectiveness of management measures, fishers were asked in all three censuses if fishing was "improved" ("better" was used in 2003 and 2016), the "same," or "worse" than five or ten years ago (Kojis, 2004; Kojis and Quinn, 2011a). Fishers in both districts increasingly thought that the condition of fishing today was better than in 2004 and 2011 and fewer thought that fishing was worse (Table 54). These changes in fishers' perceptions of fishing may indicate that fishers are starting to see the results of the regulations that have been imposed over the last 13 years. Also, they may have a better understanding of the reasons for the regulations.

Table 54. Comparison over time of fisher opinions on the condition of fishing in the USVI.

| Fisher Opinions         | STT/STJ           |                   |              | STX          |              |              | USVI         |              |              |
|-------------------------|-------------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                         | 2004 <sup>1</sup> | 2011 <sup>2</sup> | 2016         | 2004         | 2011         | 2016         | 2004         | 2011         | 2016         |
| Better                  | 11%               | 9.4%              | 16.7%        | 1.9%         | 9.7%         | 11.2%        | 4.9%         | 9.6%         | 13.5%        |
| Same                    | <b>53%</b>        | 44.7%             | <b>42.3%</b> | 30.3%        | 37.0%        | 37.4%        | 37.7%        | 39.7%        | 39.5%        |
| Worse                   | 36%               | <b>45.9%</b>      | 34.6%        | <b>67.8%</b> | <b>51.3%</b> | <b>43.9%</b> | <b>57.4%</b> | <b>49.4%</b> | <b>40.0%</b> |
| Did Not Know            | -                 | 0.0%              | 6.4%         | -            | 1.9%         | 7.5%         | -            | 1.3%         | 7.0%         |
| # of fishers responding | 100               | 85                | 78           | 208          | 154          | 107          | 308          | 239          | 185          |

<sup>1</sup>Kojis (2004)

<sup>2</sup>Kojis and Quinn (2011a).

Note: The most common response is in bold type.

In 2011 (Kojis and Quinn, 2011a) and 2016, fishers were asked why they felt the way they did about the condition of fishing. In 2004, fishers were only asked "why" if they said fishing was worse. Fishers who responded that fishing had "improved" gave similar responses in both 2011 and 2016 (Table 30b), stating that there were more fish, conch, and lobster; that they were catching more; and that selling was a problem (too much fish in the market in 2011). In 2016, fishers on STT/STJ and STX said that there were fewer fishers. On STX this was because fishers were dying out and less active and there were fewer skin divers. Fishers on STT/STJ said that protection of resources had improved the fishery, especially protection of spawning aggregations and area closures, though one fisher said there were fewer big fish. Unlike 2011, when the net ban had been in effect for a few years, STX fishers who stated fishing was better did not mention that this was because of the net ban. Also, in 2011, one fisher who said fishing had improved and one who said it was the same said it was because prices were higher. No fishers in either district mentioned that prices were higher in 2016. Kojis (2014) found that fishers on STX were sometimes lowering their prices or giving away more fish to encourage sales because sales were bad on the island after the closure of HOVENSA. Fishers on STT were maintaining their prices, but finding it harder to market fish as the older generation died out and the younger generation bought cheaper fish in supermarkets imported from outside the territory. Fishers on STT often discounted fish that they had not sold in the morning. However, it was unclear if the amount of fish being discounted was increasing.

The primary reason fishers in both districts gave for saying fishing was the same in both this survey and the last, was because catches were about the same though they may fluctuate throughout the year (Table 30b). Fishers in both districts gave more reasons if they thought fishing was worse in both 2011 and 2016. Less fish/overfishing was the primary reason fishers thought fishing was worse in all three surveys. Regulations, especially area closures, have been a major issue affecting STX fishers since 2004. The percentage of STX fishers who complained about area closures and regulations increased in 2016, while only one STT/STJ fisher complained about regulations. Fishers specifically mentioned the change in the conch daily quota from 150/person to 200/boat and the number of closed areas on STX. STX fishers also complained about the lack of surface FADs in 2016. The number of traps per fisher was a major issue for STT/STJ fishers in both 2004 and 2011, but less of an issue in 2016. This is likely because there have been many years of discussion among fishers and attempts to limit the number of traps in the USVI, but no final agreement and implementation. STX fishers complained that fishers were still fishing with nets and scuba making fishing worse (less fish). The second most common

reason for fishing being worse in 2004 and 2011 on STX was “too many fishers.” No STX fishers gave this as a reason 2016. In contrast, only 8.3% and 5.1% of fishers said that too many fishers contributed to fishing being worse on STT/STJ in 2004 and 2011, respectively, while, in 2016, it was the second most important reason with 22.7% of fishers giving this as a reason. Fishers on STT/STJ specifically mentioned that there were too many recreational and illegal fishers (i.e. unlicensed fishers). There was no specific mention of too many licensed commercial fishers, probably because a fishing license moratorium has been in place for almost 16 years and the number of licensed commercial fishers had declined.

Fishers in the two districts differed considerably on their opinions of the management measures in place today. For STX fishers, area closures and regulations were the second most important reason that fishing was worse. The shelf around STX is much smaller than the one around STT/STJ. Therefore, STX fishers felt that area closures reduced their fishing grounds considerably and negatively impacted their fishing. This was less true on STT/STJ. While a few STT/STJ fishers complained about area closures they seemed to understand their importance, especially in protecting spawning aggregations. The Red Hind Bank year-round closure, has been particularly successful in protecting the red hind. STT/STJ fishers acknowledged the increase in catches of red hind (*Epinephelus guttatus*). Lack of enforcement and illegal fishing was a concern of fishers on STT/STJ, but not STX.

#### *Socio-economic problems*

In 2011 and 2016 similar questions were asked in order to solicit fishers’ opinions about the problems affecting their fishery. In 2011, fishers were asked “What are the problems affecting the fishery?” and in 2016 fishers were asked “What are the main socio-economic problems affecting your fishery?” This question was not in the 2004 survey. In both 2011 and 2016, fishers were most concerned about regulations negatively impacting their fishery (2011 – 43.4% STT/STJ, 55.0% STX; 2016 – 27.4% STT/STJ, 45.5% STX), though the specific concerns about regulations changed somewhat between surveys, in part, because of changes in the regulations. During both surveys, fishers complained about too many regulations, specifically too many closed areas which reduced the fishing area and caused more competition among fishers. On STT/STJ, fishers in both surveys objected to the closed areas. However, in 2016, several fishers said specific closures worked. The STJ monument was criticized the most for limiting fishing grounds, while the Red Hind Bank closure was supported by several fishers, especially in protecting the red hind spawning aggregation. Similar findings have been reported by Karras and



Agar (2009). Fishers on STT/STJ have seen increased catches of red hind over the years. This is seen in the market where red hind was sometimes the most common reef fish displayed (Kojis, pers. obs.). One fisher also expressed support for the Grammanik Bank closure, which not only protects spawning aggregations of the yellowfin grouper, but also of other grouper species, including an incipient Nassau grouper aggregation (Nemeth et al., 2006). No fishers on STX had any positive comments on area and seasonal closures in 2011 or 2016.

Fishers on STT/STJ in 2016 complained about fish wastage because of seasonal closures and species harvest prohibitions. They complained that fish released either were eaten by sharks or, if pulled from deep water, especially on the north side of STX, they couldn't survive even if their bladder was punctured. One fisher concerned about Nassau grouper mortality on release recommended research on this species, presumably so that fishers could retain and sell Nassau grouper.

In 2011, the trammel and gill net ban (VIRR T12 Ch9A Sec 321) had been newly implemented. This ban primarily impacted a group of STX fishers who caught many hundreds of pounds of fish on a single fishing trip by deploying gill nets attached to the bottom and using scuba to chase fish into the net. In 2011, 11.3% of STX fishers supported the ban and only 1.3% were against the ban. In 2016, only one fisher commented on nets saying that the nine major net fishers were still fishing using nets and flooding the market with fish. It is well known that some fishers continued to fish with nets and scuba, but most say that the fishers now use seine nets instead of gill nets. Seine nets are not prohibited.

In 2011, pollution was the number one concern of fishers on STT/STJ. In 2016, environmental issues tied with regulations for the issue of most concern. Fishers in both surveys were concerned about sewage pollution, runoff, and habitat loss. During heavy rains, the seas around STT/STJ turn brown from runoff of soil, sewage from septic tanks, and pollutants. Fishers on STT/STJ were also concerned about pollution from the sewage, detergents, and boat cleaners used on liveaboard boats. STT/STJ attracts a large number of seasonal boats, especially sail boats, as well as a significant number of long-term liveaboard boats. Boats with people living aboard are supposed to either have an approved sewage treatment system or holding tanks for their sewage. Boats with holding tanks are expected either to have their tanks pumped periodically or to go off shore and discharge their sewage. DPNR/DFW supported a sewage pump-out boat, but few liveaboard boaters wanted to use it even at reduced rates in part because they were likely bypassing the holding tank.

The proportion of fishers on STX that were concerned about environmental issues was about a fifth that of STT/STJ in 2011 and less than half in 2016. Fishers on STX were most concerned about pollution from the Cruzan rum factory, sewage, and HOVENSA in 2011. In 2016, their concerns had more to do with climate change, the weather (heavy seas prevent fishers from fishing), hurricanes, and green water (probably from an incursion of the Orinoco River plume).

In both surveys fishers were concerned about competition from non-commercial fishers selling fish. These include charter fishers who do not have a commercial fishing license who sell their excess catch to restaurants and other recreational fishers, specifically new immigrants from other Caribbean Islands, who catch fish and sell in the local market at lower prices.

In 2011, there was little concern/awareness among fishers regarding the impact of lionfish on the fishery. In 2016, 8.2% of fishers on STT/STJ and 7.1% on STX, expressed concerns about lionfish. On STT/STJ, fishers were seeing increasing numbers. A couple fishers said they caught them in their traps with one saying that when lionfish were in their traps other fish did not enter the traps. Fishers on STX were aware that lionfish could potentially deplete commercial fish species and thought that closed areas were a haven for lionfish because no one was fishing them. Few fishers in both districts retain and sell lionfish. There is evidence that some individuals can be ciguatoxic (Kilgo, 2014; Robertson et al., 2014).

### *Fisher Organizations*

STT/STJ and STX have had different patterns of fisher participation in fisher organizations over the last three censuses (Table 55). In 2004 and 2011, STT/STJ fishers were reluctant to participate in government advisory committees. Fishers who were involved in advisory committees often were harangued and/or threatened by other fishers if they did not like the regulations being proposed. However, with the establishment of the St. Thomas Fishermen's Association in 2005 (Magras and Olsen, 2013) this began to change. Dr. David Olsen helped establish this association and encouraged fishers to speak up and participate in fisheries management and research (Olsen et al., 2007). However, most of the members of the organization were from the French community on the island, few West Indians joined. Dr. Olsen has left the USVI, and the STFA is no longer as active as it was. However, he left a positive legacy, since fishers are now more willing to participate in local and federal advisory and management agencies and have a better understanding of the issues and the role they can play in managing local fisheries.

The pattern is different on STX. In 2004, 20.3% of STX fishers belonged to a local fisher organization, the Fishermen's United Services Cooperative. This organization was established by Robert McAuliffe, a longline pelagic fisher on STX who spoke out about fisheries management issues and encouraged others to do so as well. When he died, the organization lapsed. Other fishers tried to establish new local fisher organizations, but none were successful in getting more than a few members. STX fishers are individualists and, unlike STT/STJ where the French community gets together for fishing activities such as the Mother and Father's Day Fishing Tournaments and the Bastille Day Tournament, STX fishers do not. However, STX fishers have increased their participation in government advisory bodies over the years though periodically fishers who do participate get threatened by other fishers who object to the position a fisher is taking or assumes the participating fisher has more control over outcomes than he does.

Table 55. Comparison over time of fisher participation in various fisher organizations.

| Types of organizations         | STT/STJ           |                   |       | STX   |      |      | USVI  |       |      |
|--------------------------------|-------------------|-------------------|-------|-------|------|------|-------|-------|------|
|                                | 2004 <sup>1</sup> | 2011 <sup>2</sup> | 2016  | 2004  | 2011 | 2016 | 2004  | 2011  | 2016 |
| Local Fishermen's Associations | 0.0%              | 25%               | 15.7% | 20.3% | 2.6% | 0.0% | 13.3% | 11.4% | 6.9% |
| Government Advisory Committees | 1.8%              | 0.0%              | 5.6%  | 1.9%  | 2.0% | 5.3% | 1.8%  | 1.2%  | 8.0% |
| Sport Fishing Clubs            | 0.9%              | 0.0%              | 5.6%  | 0.9%  | 0.7% | 0.9% | 0.9%  | 0.4%  | 3.0% |
| Unknown                        | 0.0%              | 2.0%              | 0.0%  | 1.8%  | 3.3% | 0.0% | 1.2%  | 2.9%  | 0.0% |
| # of fishers responding        | 114               | 92                | 82    | 219   | 151  | 120  | 333   | 243   | 202  |

<sup>1</sup>Kojis (2004)

<sup>2</sup>Kojis and Quinn (2011a)

#### 4.4. Occupational Hazards and Health / Safety Considerations

Socio economic studies have focused on the demographics, economics and the technological aspects of the Virgin Islands fishery, but there has been only a single published study (Quinn and Kojis, 2012) that reported on the human health and safety issues associated with being a fisher. This survey added questions about decompression sickness (the bends) and treatment of the bends. The most notable addition is the information about the occurrence of decompression sickness (DCS) on fishers who dive.

No scuba fishers reported the bends on STT/STJ. However, DCS was a serious problem among fishers on STX (Table 28a). Fishers using scuba tend to push depth and time limits. They often have a predetermined amount of fish they must catch, either because they have customer orders or

need to make a certain minimum amount of money to pay for the trip, crew, and their own bills. It was unlikely that any scuba fisher used a dive computer, in part, because dive computers do not work if a fisher exceeds recreational decompression limits, which they commonly do (G. Martinez). Also, many fishers are not certified by any dive agency.

DCS occurs when divers remain underwater for extended periods and do not ascend slowly enough so that gases dissolved in tissues can be released and not form bubbles, which can cause blockage in the blood system. Most fishers and crew who had the bends were treated in a hyperbaric chamber (86.8%, Table 29a), often multiple times (Table 29c, d). Fishers have access to hyperbaric chambers and medical officers who can treat DCS on STT and Puerto Rico. There has never been a hyperbaric chamber on STX as far as is known (Kojis pers. obs.).

Treatment in a hyperbaric chamber for a STX fisher is expensive because it includes transportation to either STT or Puerto Rico and occurs in a hospital. The cost of an overnight stay at Schneider Hospital, STT (stay of 24 – 30 hrs) and three 1.5 hr chamber treatments was \$10,500 in 2017. Agar and Shivilani (2017) report similar treatment costs for Puerto Rico. They report that the first treatment in a hyperbaric chamber (with helicopter transportation) can cost up to \$10,000. Schneider Hospital on STT charges \$296.00 per session for use of the hyperbaric chamber. This does not include the cost of medical staff and any overnight hospital stays. It is unlikely that fishers could pay the full cost of treatment because they are not eligible for reasonably priced insurance, such as DAN, a recreational diving insurance that includes transportation to and treatment in a hyperbaric chamber. It is likely that most fishers or crew were required to pay an amount each month to the hospital where they were treated. It is unlikely that the monthly payment was large because most fishers do not make or report a large profit in their business. This means that the local hospitals and tax payers are subsidizing the cost of the hospital treatment of fishers and crew.

It was unclear from this survey if fishers felt that DCS was just a cost of doing business or if they were simply unaware of the constraints related to scuba diving. Hyperbaric staff from Puerto Rico have visited STX and talked to fishers who commercially scuba dive about the importance of not getting dehydrated, etc. when diving (Kojis, pers.com.) It is unknown how many fishers and crew they have talked to and what other information they have passed on to fishers and crew.

## 5. Recommendations

We would like to offer recommendations for the next fisher census. Ideally these fisher censuses would be conducted on a regular basis. The last three surveys have been conducted at 6 - 7 yr intervals. There have not been profound changes in the fishery over the period of the censuses, but clearly there are trends that need to be followed in the demographics of the fishery; use of gear, especially trap numbers; and changes in fishers' opinions about the condition of their fishery and their households. Trends in the demographics of the fishery are especially important to follow because it appears that fishers are aging out of the fishery and few young people are entering the fishery. Because of the relatively small changes in the fishery thus far, a ten-year interval between surveys may be warranted, especially if there are not profound changes in the USVI economy or fisheries regulations.

Gathering information about boats, engines and gear is tedious and changes are few. The wide range of information about boats and gear is not really that useful. The important information relates to the length of the primary fishing vessel since that has been increasing and maybe the number of and types of engine used. GPS and cell phone use is now fairly ubiquitous. Few boats have radar. If the surveys are only conducted every ten years, then it may be useful to include questions on electronic equipment. If conducted, more frequently, this question could be eliminated and only asked every other survey, unless, of course, new types of equipment become available. Survey questions about boats and gear should be determined by detailed preliminary surveys of about five full time fishers in each district. These should be fishers who are willing to supply information about changes in their respective fishery\ies, especially changes in boats and gear, that may need to be included in the final survey.

The gear questions that are useful are the ones about the number of each type of traps owned and deployed and, maybe the number of surface and bottom long lines owned, their length and the number of hooks per long line, if they start being used with any frequency. Questions about handlines (yo yo gear) could be omitted since all fishers own plenty of these. There needs to be clarification about gear for catching deep water snapper (and grouper). Fishers may own electric rods and reels or an electric/hydraulic reel attached to a boat. This likely differs from the winch used for hauling traps. Queries should be made and photos taken of the various types of reels prior to the next survey with detailed information on the use of each of the gears and the cost of the gear. Also, ownership (and use) of a dive computer could be added to the scuba gear question.

While it is likely to be considered an imposition, the tracking of willing fishers using GPS would allow for more accurate determination of many parameters associated with the fishery.

No need to ask about icing fish unless something drastically changes – virtually everyone does this now in both districts.

A list of the predominant roles that helpers provide is needed in the next survey based on what fishers provided this time, e.g. drive boat, assist divers, help maintain boat, help maintain engine, etc. Also, instead of just stating that the helper works as a “fisher,” be more specific, e.g. line fisher, trap puller, diver, net fisher, etc. Also, boat maintenance should be defined, e.g. it could include cleaning the boat, as well as changing the oil, running freshwater through the engine, or actually making fiberglass repairs or repairing an engine, etc. This will depend upon what is considered important to the socio-economist and fisheries managers.

Information about all aspects of occupational health / accidents, e.g. being lost/rescued at sea, harmed during fishing, damage to boats, etc. should be standard on all social economic surveys, especially for those professions, such as fishing, that include many hazards. Additional questions about mechanical failure at sea would be useful as the severity and duration could pose a health and safety concern. Future surveys should minimally include questions identical to the ones in this survey regarding decompression sickness (DCS) and treatment. However, it is recommended that a separate survey be conducted detailing the occurrence of DCS, whether divers are officially certified and by which organization, the frequency of treatment, the costs of treatment to hospitals and fishers, and the reasons why fishers flaunt gas laws and get bent frequently. This survey should be conducted to determine how to reduce DCS in commercial fishers and crew. It should also include other fishing hazards, such as physical harm associated with fishing that impaired a fisher’s ability to fish, and if fishers were ever lost at sea and if and how they were rescued.

## 6. Acknowledgments

We would like to thank Ruth Gomez, Director of Fish and Wildlife, for giving staff of the Division of Fish and Wildlife permission to participate in this survey outside of normal working hours and asking her staff to periodically provide updated lists of registered fishers for both STX and STT/STJ District. We would also like to thank Director Gomez for providing a location and chairs for interviewing fishers during fisher registration at DPNR headquarters on STT. Thanks to Mekisha George and Juan Cruz, DFW staff, who updated the lists and emailed them to Dr. Barbara Kojis. Also, thanks to Mekisha George, Juan Cruz and Johnathan Brown (DFW STT) and Lia Hibbert (Earth Resources Technology) for reviewing and commenting on the USVI commercial census form.

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Howard Forbes, Director of Enforcement, kindly made space for interviewers during fisher registration at Enforcement offices in STX and supported our efforts to interview as many fishers as possible. We also very much appreciated his willingness to provide information about fisher registration and other matters.

Of course, this census could not have been accomplished without the cooperation of many fishers on STT/STJ and STX who willingly took time from their busy schedules to answer questions and help us understand their fishery and livelihood. We wish to express our sincere appreciation for their assistance. Also, we would like to acknowledge the review assistance provided by Scott Crosson, Matthew McPherson, and Alex Chester.

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## Appendix I

OMB Control No. 0648-0716

Expiration date June 30, 2018

### FISHERMEN CENSUS 2016-2017



United States Virgin Islands  
Department of Planning and Natural Resources  
NOAA Fisheries Service



**Thank you for taking the time to respond to this voluntary survey.** Public reporting burden for this collection of information is estimated to average about 30 minutes per response including the time for reviewing the instructions, searching the existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspects of this burden to Mr. Juan Agar, National Marine Fisheries Service, 75 Virginia Beach Drive, Miami, Florida 33149. This reporting is required under and is authorized under 50 CFR 622.5(a) (1) (v). NOAA Administrative Order 216-100 states that the information provided shall be treated as confidential. Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the Paperwork Reduction Act (PRA), unless that collection displays a currently valid OMB Control Number. NMFS and the Department of Planning and Natural Resources of the U.S. Virgin Islands need this information to improve the conservation and management of marine fishery resources in the U.S. Virgin Islands. Participation in this survey is voluntary, and you do not need to answer any questions you do not wish to answer.

Everything we discuss will be confidential. When we complete our interviews and other work, we will write a report that summarizes everything we have learned. We will not use people's names in our reports, or write about anything that is sensitive.

*For no contact, specify date, time and method of contact (6 attempts):*

|          |          |
|----------|----------|
| 1. _____ | 2. _____ |
| 3. _____ | 4. _____ |
| 5. _____ | 6. _____ |

*For no contact, refusal or partial interviews, why?* \_\_\_\_\_  
\_\_\_\_\_

*Contact method (in-person, phone, etc.):*      ☐ *In-person*      ☐ *Phone* ☐ *Other*  
*(specify):* \_\_\_\_\_

*Survey number:* \_\_\_\_\_ *Fisher Name:* \_\_\_\_\_ *Interviewer:* \_\_\_\_\_ *Date:* \_\_\_\_\_

*Interview (tick one)*    ☐ *no contact*      ☐ *refusal*      ☐ *partial*      ☐ *complete*

Contact person in USVI: Barbara Kojis.  
Email: [bkojis@hotmail.com](mailto:bkojis@hotmail.com)  
2855 W. Crestview Drive  
Prescott, AZ 86305  
Phone: 520 831 3057

Mail completed questionnaires to: Barbara Kojis

## USVI COMMERCIAL FISHERMEN CENSUS FORM (2016-2017)

1. Name: \_\_\_\_\_ Permit No.: \_\_\_\_\_
2. Estate and Island where you live \_\_\_\_\_ Zip code: \_\_\_\_\_
3. Age: \_\_\_\_\_
4. How many years have commercially fished? As Commercial Fisher \_\_\_\_\_ + Helper \_\_\_\_\_ = Total \_\_\_\_\_ years.
5. Fishing frequency: ☐ Fish year round ☐ Seasonal (month): \_\_\_\_\_ species: \_\_\_\_\_)
6. Race: ☐ White ☐ Black/African American ☐ Mixed ☐ Other: \_\_\_\_\_
7. Ethnicity/descent: ☐ Hispanic [origin]: \_\_\_\_\_ ☐ French descent  
☐ West Indian [origin]: \_\_\_\_\_ ☐ Other: \_\_\_\_\_
8. Household size \_\_\_\_\_ (include yourself)
9. Level of education completed:  
☐ Elementary school ☐ Junior high ☐ Some high school ☐ High school diploma  
☐ Trade school ☐ Some college ☐ College degree ☐ Post-graduate
10. Type of commercial fishermen. After identifying gear(s), **rank them based on revenue generated.**  
☐ #\_\_ Trap fisher ☐ #\_\_ Line fisher ☐ #\_\_ Net fisher ☐ #\_\_ Diver (☐ tank ☐ skin)  
☐ #\_\_ Charter ☐ #\_\_ Subsistence ☐ #\_\_ Other: \_\_\_\_\_
11. What species do you commercially fish for? After identifying species, **rank them based on revenue generated.**  
☐ #\_\_ Reef fish ☐ #\_\_ Deep-water snapper ☐ #\_\_ Lobster ☐ #\_\_ Conch  
☐ #\_\_ Coastal pelagics (jacks, mackerels) ☐ #\_\_ Dolphin/wahoo  
☐ #\_\_ Deep-water pelagics (tunas)  
☐ #\_\_ Whelk ☐ #\_\_ Bait sold ☐ #\_\_ Other (specify): \_\_\_\_\_
12. Where do most of your landings come from?  
☐ USVI waters ☐ federal waters ☐ About equal
13. How often do you fish? \_\_\_\_\_ trips per (month)
14. On average, how long are your fishing trips? \_\_\_\_\_ hours/trip (dock to dock)  
On average, how many hours per week do you spend:  
a) Repairing and maintaining boat and engine \_\_\_\_\_ hours/week  
b) Repairing and maintaining fishing gear: \_\_\_\_\_ hours/week  
c) Preparing for fishing (filling boat, filling tanks, driving to the dock/boat ramp) \_\_\_\_\_ hours/week  
d) Fish sales \_\_\_\_\_ hours/week
15. Besides fishing, do you engage in other employment activities? Yes No  
If YES, specify: \_\_\_\_\_
16. How many people do you commercially fish with?  
☐ Fish alone ☐ With \_\_\_\_ # helpers (role(s): \_\_\_\_\_) ☐ With \_\_\_\_ # licensed comm. Fishers
17. Who are your crew?  
☐ Family ☐ Friends ☐ Acquaintances ☐ Others \_\_\_\_\_
18. Approximate age of crew members? \_\_\_\_ #1 \_\_\_\_ #2 \_\_\_\_ #3 \_\_\_\_ #4

19. How easy or hard is to recruit crew?

☐ very hard    ☐ hard    ☐ easy    ☐ very easy    ☐ Don't know    ☐ No answer

20. Landing sites: Main: \_\_\_\_\_ Secondary: \_\_\_\_\_

21. How much of your catch is iced (on board & during retail sale)?

☐ All    ☐ >3/4    ☐ 3/4-1/2    ☐ 1/2-1/4    ☐ <1/4    ☐ none

22. Where do you sell your fish? Identify and rank according to sales value.

# \_\_\_\_\_ ☐ Government market (which fish market?: \_\_\_\_\_ )

# \_\_\_\_\_ ☐ Home                      # \_\_\_\_\_ ☐ At landing site                      # \_\_\_\_\_ ☐ Along the road

# \_\_\_\_\_ ☐ Own fish store                      # \_\_\_\_\_ ☐ Another fisher (buyer)                      # \_\_\_\_\_ ☐ Retail store

# \_\_\_\_\_ ☐ Hotel                      # \_\_\_\_\_ ☐ Restaurant                      # \_\_\_\_\_ ☐ Supermarket

# \_\_\_\_\_ ☐ Private customer (type of customer \_\_\_\_\_)

# \_\_\_\_\_ ☐ Do not sell                      # \_\_\_\_\_ ☐ Other (specify): \_\_\_\_\_

23. Where do you keep your boat? ☐ Home ☐ Other (specify: \_\_\_\_\_)

### Boat information

24. Number of fishing boats \_\_\_\_\_ and \_\_\_\_\_ dinghies used for commercial fishing within the last 3 years?

|  | Boat 1<br>(main<br>boat)                                 | Boat 2   | Boat 3   | Boat 4   | Dinghy   | Spare<br>Equipment                 |
|--|--|--|--|--|--|------------------------------------|
| <b>Percent ownership of the boat? (%)</b>                  | %  | %  | %  | %  | %  | <b>X</b>                           |
| <b>Was the boat active last year (Y/N)?<br/>If no why?</b> | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> Yes <input type="checkbox"/> No | <b>X</b>                           |
| <b>Year built</b>  |  |  |  |  |  | <b>X</b>                           |
| <b>Boat Registration No.</b>                               |  |  |  |  |  |                                    |
| <b>Boat length (ft.)</b>                                   |  |  |  |  |  | <b>X</b>                           |
| <b>Number of engines</b>                                   |  |  |  |  |  |                                    |
| Outboard   | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__       |
| Inboard  | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__       |
| In/Out-board   | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__       |
| <b>Engine power (HP)</b>                                   |  |  |  |  |  |                                    |
| Engine 1 HP  |  |  |  |  |  |                                    |
| Engine 2 HP  |  |  |  |  |  |                                    |
| Engine 3 HP  |  |  |  |  |  |                                    |
| <b>Fuel type</b>   |  |  |  |  |  |                                    |
| Gas (4-stroke)   | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>           |
| Gas & oil (2-stroke)                                       | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>           |
| Diesel   | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>           |
| <b>Hull construction</b>                                   |  |  |  |  |  |                                    |
| Wood   | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <b>X</b>                           |
| Wood/Fiberglass  | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <b>X</b>                           |
| Fiberglass   | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <b>X</b>                           |
| Aluminum   | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <b>X</b>                           |
| Steel  | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <b>X</b>                           |
| Other<br>(specify):_____                                   | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <input type="checkbox"/>                                 | <b>X</b>                           |
| <b>Boat equipment/electronics</b>                          |  |  |  |  |  |                                    |
| GPS  | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__       |
| Depth finder   | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__       |
| Fish finder  | <input type="checkbox"/> #__ (E,H)                       | <input type="checkbox"/> #__ (E,H)                       | <input type="checkbox"/> #__ (E,H)                       | <input type="checkbox"/> #__ (E,H)                       | <input type="checkbox"/> #__ (E,H)                       | <input type="checkbox"/> #__ (E,H) |
| Marine radio   | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__       |
| EPIRB  | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__       |
| Cell phone   | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__       |
| Radar  | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__       |
| Other<br>(specify):_____                                   | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__       |
| <b>Number Fishing equipment</b>                            | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__       |
| Winch  | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__       |
| Reel Manual  | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__       |
| Reel Hydraulic   | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__       |
| Reel Electric  | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__       |
| Other<br>(specify):_____                                   | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__                             | <input type="checkbox"/> #__       |

25. Approximate value in its present condition (used) of the vessel(s), engine(s) and fishing equipment/electronics/safety: \$\_\_\_\_\_

**Gear information**

| <b>Nets</b>          | Num. owned | Avg. Num. fished per trip | Soak time (hrs) | Main fishing area  |
|----------------------|------------|---------------------------|-----------------|--|
| Beach seine          |            |                           |                 | <input type="checkbox"/> Terr <input type="checkbox"/> Fed <input type="checkbox"/> Both |
| Haul net (seine net) |            |                           |                 | <input type="checkbox"/> Terr <input type="checkbox"/> Fed <input type="checkbox"/> Both |
| Gill nets (bait)     |            |                           |                 | <input type="checkbox"/> Terr <input type="checkbox"/> Fed <input type="checkbox"/> Both |
| Cast net             |            |                           |                 | <input type="checkbox"/> Terr <input type="checkbox"/> Fed <input type="checkbox"/> Both |
| Umbrella (lift) net  |            |                           |                 | <input type="checkbox"/> Terr <input type="checkbox"/> Fed <input type="checkbox"/> Both |
| Other: _____         |            |                           |                 | <input type="checkbox"/> Terr <input type="checkbox"/> Fed <input type="checkbox"/> Both |

| <b>Pots</b>  | Num. owned                    | Avg. Num. fished on trip      | Soak time (days) | Shape and # (Arrowhead, square, etc.) | Main fishing area  |
|--------------|-------------------------------|-------------------------------|------------------|---------------------------------------|--|
| Lobster      | # ____ Wire<br># ____ Plastic | # ____ Wire<br># ____ Plastic |                  |                                       | <input type="checkbox"/> Terr <input type="checkbox"/> Fed <input type="checkbox"/> Both |
| Fish         |                               |                               |                  |                                       | <input type="checkbox"/> Terr <input type="checkbox"/> Fed <input type="checkbox"/> Both |
| Other: _____ |                               |                               |                  |                                       | <input type="checkbox"/> Terr <input type="checkbox"/> Fed <input type="checkbox"/> Both |

| <b>Hook and line</b>                                      |                                       | Num. owned              | Avg. Num. fished on trip | Hrs fished  | Main fishing area   |   |           |   |
|---|---------------------------------------|-------------------------|--------------------------|-------------|---|---|-----------|---|
| Handline (Yo Yo Reel)                                     |                                       |                         |                          |             | <input type="checkbox"/> Terr <input type="checkbox"/> Fed<br><input type="checkbox"/> Both |   |           |   |
| Rod and reel  |                                       |                         |                          |             | <input type="checkbox"/> Terr <input type="checkbox"/> Fed<br><input type="checkbox"/> Both |   |           |   |
| Surface longline  |                                       |                         |                          |             | <input type="checkbox"/> Terr <input type="checkbox"/> Fed<br><input type="checkbox"/> Both |   |           |   |
| Bottom longline   |                                       |                         |                          |             | <input type="checkbox"/> Terr <input type="checkbox"/> Fed<br><input type="checkbox"/> Both |   |           |   |
| Vertical set line (multi-hook deep-water snapper-grouper) |                                       |                         |                          |             | <input type="checkbox"/> Terr <input type="checkbox"/> Fed<br><input type="checkbox"/> Both |   |           |   |
| Vertical set line (single hook pelagics)                  |                                       |                         |                          |             | <input type="checkbox"/> Terr <input type="checkbox"/> Fed<br><input type="checkbox"/> Both |   |           |   |
| Tuna buoy or reel buoy fishing                            |                                       |                         |                          |             | <input type="checkbox"/> Terr <input type="checkbox"/> Fed<br><input type="checkbox"/> Both |   |           |   |
| <b>Skin and SCUBA</b>                                     | Total no. crew per trip (inc. divers) | Num. of divers per trip | Num. tanks per diver     | Num. snares | Num. spearguns  | Avg. diving time per diver per trip (hrs/diver) | With net? | Main fishing area   |
| Skin (free) diving  |                                       |                         | X                        |             |   |   | Y/N       | <input type="checkbox"/> Terr <input type="checkbox"/> Fed<br><input type="checkbox"/> Both |
| SCUBA diving  |                                       |                         |                          |             |   |   | Y/N       | <input type="checkbox"/> Terr <input type="checkbox"/> Fed<br><input type="checkbox"/> Both |

26. Approximate value in its present condition (used) of all net, trap, line, and dive gears described above:  
\$ \_\_\_\_\_



27. How many times you or your crew had the bends in the last 12 months? Yes/No  
Self #\_\_\_times      Crew #\_\_\_times

28. How many times have you or your crew been in a hyperbaric chamber in the last 12 months? Yes/No  
Self #\_\_\_times      Crew #\_\_\_times

29. Compared with 5 years ago, is fishing:

☐ better   ☐ about the same   ☐ worse      ☐ Don't know      ☐ No answer

Why? \_\_\_\_\_

30. How easy is it to find employment outside fishing (circle one)?

☐ very hard   ☐ hard   ☐ easy   ☐ very easy   ☐ Don' know   ☐ No answer

Which jobs you seek (if any)\_\_\_\_\_

31. Compared with 5 years ago, how is your household financial well-being (circle one)?

☐ better      ☐ about the same      ☐ worse      ☐ Don' know      ☐ No answer

Why? \_\_\_\_\_

32. What are the main socio-economic problems affecting your fishery? (If regulations please specify)

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

33. What percentage of your household income comes from fishing?\_\_\_ %

34. Do you belong to a fishing organization? ☐ Yes ☐ No Which? \_\_\_\_\_

If you are interested in access to the report, please provide your email address: \_\_\_\_\_