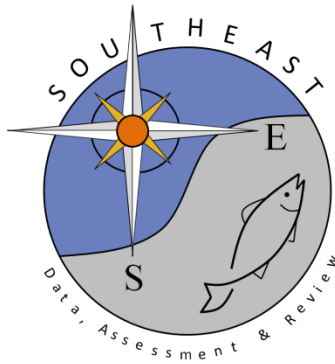


SEDAR 84 Trip Interview Program (TIP) Size Composition Analysis of
Stoplight Parrotfish (*Sparisoma viride*) in St. Croix, U.S. Caribbean, 1983-
2022

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SEDAR 84 Trip Interview Program (TIP) Size Composition Analysis of Stoplight Parrotfish (*Sparisoma viride*) in St. Croix, U.S. Caribbean, 1983-2022

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Summary

In preparation for SouthEast Data, Assessment, and Review (SEDAR) 84 Benchmark assessment of Caribbean Stoplight Parrotfish in St. Croix, U.S. Virgin Islands; the Southeast Fisheries Science Center, Sustainable Fisheries Division (SEFSC), Caribbean Fisheries Branch conducted a size composition analysis of the Trip Interview Program (TIP) data. This document summarizes data collected from 1983 to 2022.

The TIP data pertaining to Stoplight Parrotfish in St. Croix are comprised of 29,582 length observations across 1,028 unique port sampling interviews. Of the Stoplight Parrotfish measured, 29,048 are fork lengths (98.2%). Two analyses are described in this document. First, gear groupings were established among gears based upon Stoplight Parrotfish size composition differences among gears. Gear groups were identified based on the results of a generalized linear mixed model (GLMM) analysis using a gamma-distributed dependent variable and a covariate to account for changes in mean size over time. Random effects for interview ID and categorical year were included to account for non-independence of observations. Second, the aggregate density of the lengths was determined based on time series and gear representation within the data. The GLMM analysis of the full time series reported a statistical difference in the size of measured fish between the “SPEARS” and “POTS AND TRAPS;FISH” gears.

To understand the frequency with which trips are sampled, the number of interviews associated with main gears in the TIP data was compared to the number of trips reported in the Caribbean Commercial Landings logbook system. The 71 TIP interviews between 2012 and 2022 make up 0.97% of reported logbook trips. The SCUBA gear grouping represented the main gears reported (SPEARS; DIVING and BY HAND; DIVING GEAR). There were 67 SCUBA interviews (1% of SCUBA logbook trips).

Data Description

The Trip Interview Program (TIP) collects length and weight data from fish landed by commercial fishing vessels. Data collection began in 1983 with frequent updates in best practices; the latest being in 2017. Data are collected by trained shore-based samplers. The trained samplers interview fishermen to obtain morphometric data and biological samples from their catch. The TIP has five primary data tables: Interview, Effort, Landing, Sample, and Observation (Beggerly, Stevens, and Baertlein 2022). The Interview, Landing, and Sample tables were utilized to analyze the year, region, species, interview ID, gear name, and length values. The data were filtered to Stoplight Parrotfish fork lengths in St. Croix recorded from 1983 to 2022.

Generalized Linear Mixed Model (GLMM) Analysis

The purpose of this analysis was to establish gear groups among commercial fishing gears based upon Stoplight Parrotfish size composition differences among the gears. The GLMM analysis of landed Stoplight Parrotfish size composition among commercial fishing gears was first conducted on the time series as a whole from 1983-2022, and then on a truncated time series that coincides with the available species-specific commercial landings data from 2012-2022 (Figure 1). The analyses of the full and truncated time series display the statistical similarity of gears with respect to the mean size of fish caught throughout the time series. Gears with fewer than three interviews were excluded from the analysis.

The GLMM analysis of the full time series reported a statistical difference between the “SPEAR” and “POTS AND TRAPS;FISH” gears (Table 1). However, the truncated time series investigation showed no statistical significance between any of the available gears (Table 2). The recommendation based on these results is gears can be combined into one gear group if using data after 2012, or two groups corresponding to the GLMM groupings if using the full time series of TIP data.

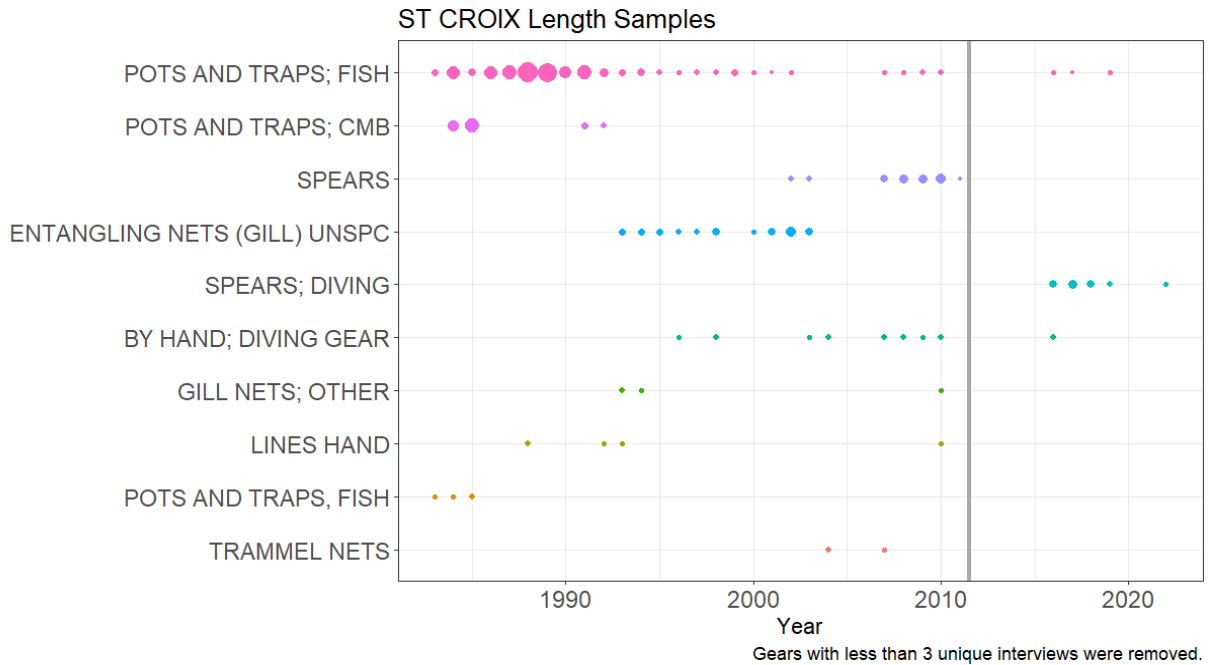


Figure 1: Plot showing relative number of Stoplight Parrotfish lengths collected in St. Croix over time. Each point is color specific to the gear it represents. Gears are arranged from largest to smallest sample size of individual recorded lengths. Gray vertical line denotes the beginning of the truncated time series in 2012.

Table 1: GLMM analysis summary results for St. Croix TIP Stoplight Parrotfish fork lengths(cm) from 1983 to 2022. The column titled “group” indicates the group(s) where mean lengths are not statistically different from other gears with matching group number(s). The “n” column indicates the number of unique lengths recorded for each gear. The “Percentage” column indicates the percent of the total recorded lengths for each gear. Gears that make up less than 2% are shaded in gray.

Gear	Mean	Estimated Marginal Mean	LCL	UCL	Group	Fish (n)	Interview (n)	Percentage	Gear Group
POTS AND TRAPS; FISH	27.71	3.35	3.32	3.37	1	19,910	614	68.60	Fish Traps
POTS AND TRAPS; CMB	28.22	3.38	3.35	3.41	1,2	2,922	113	10.07	Spears or Fish Traps
SPEARS	28.27	3.40	3.36	3.44	2	2,133	107	7.35	Spears
ENTANGLING NETS (GILL) UNSPC	28.72	3.34	3.31	3.38	1,2	2,131	56	7.34	Spears or Fish Traps
SPEARS; DIVING	27.69	3.37	3.31	3.43	1,2	984	63	3.39	Spears or Fish Traps
BY HAND; DIVING GEAR	28.47	3.38	3.33	3.43	1,2	521	20	1.80	Spears or Fish Traps
GILL NETS; OTHER	30.00	3.35	3.27	3.43	1,2	121	5	0.42	Spears or Fish Traps
LINES HAND	30.73	3.42	3.32	3.51	1,2	113	4	0.39	Spears or Fish Traps
NOT CODED	27.15	3.33	3.27	3.39	1,2	105	8	0.36	Spears or Fish Traps
TRAMMEL NETS	30.43	3.44	3.33	3.55	1,2	69	3	0.24	Spears or Fish Traps

Table 2: GLMM analysis summary results for the TIP data of Stoplight Parrotfish fork lengths in St. Croix from 2012 to 2022. The column titled “group” indicates the group(s) where mean lengths are not statistically different from other gears with matching group number(s). The “n” column indicates the number of unique lengths recorded for each gear. The “Percentage” column indicates the percent of the total recorded lengths for each gear. Gears that make up less than 2% are shaded in gray.

Gear	Mean	Estimated Marginal Mean	LCL	UCL	Group	Fish (n)	Interview (n)	Percentage	Gear Group
SPEARS; DIVING	27.69	3.33	3.29	3.38	1	984	63	93.54	Spears or Fish Traps
BY HAND; DIVING GEAR	26.76	3.29	3.05	3.52	1	49	3	4.66	Spears or Fish Traps
POTS AND TRAPS; FISH	30.26	3.30	3.15	3.46	1	19	4	1.81	Spears or Fish Traps

Aggregated Gear Density

The aggregated densities of Stoplight Parrotfish lengths(cm) in St. Croix supplied in the TIP dataset are plotted across the full time period (Figure 2) and by gear, respectively (Figure 3 and Figure 4). Each plot includes a vertical line associated with the respective mean length. N equals the number of measured fish by gear category. Gears with fewer than three interviews were excluded from the analysis.

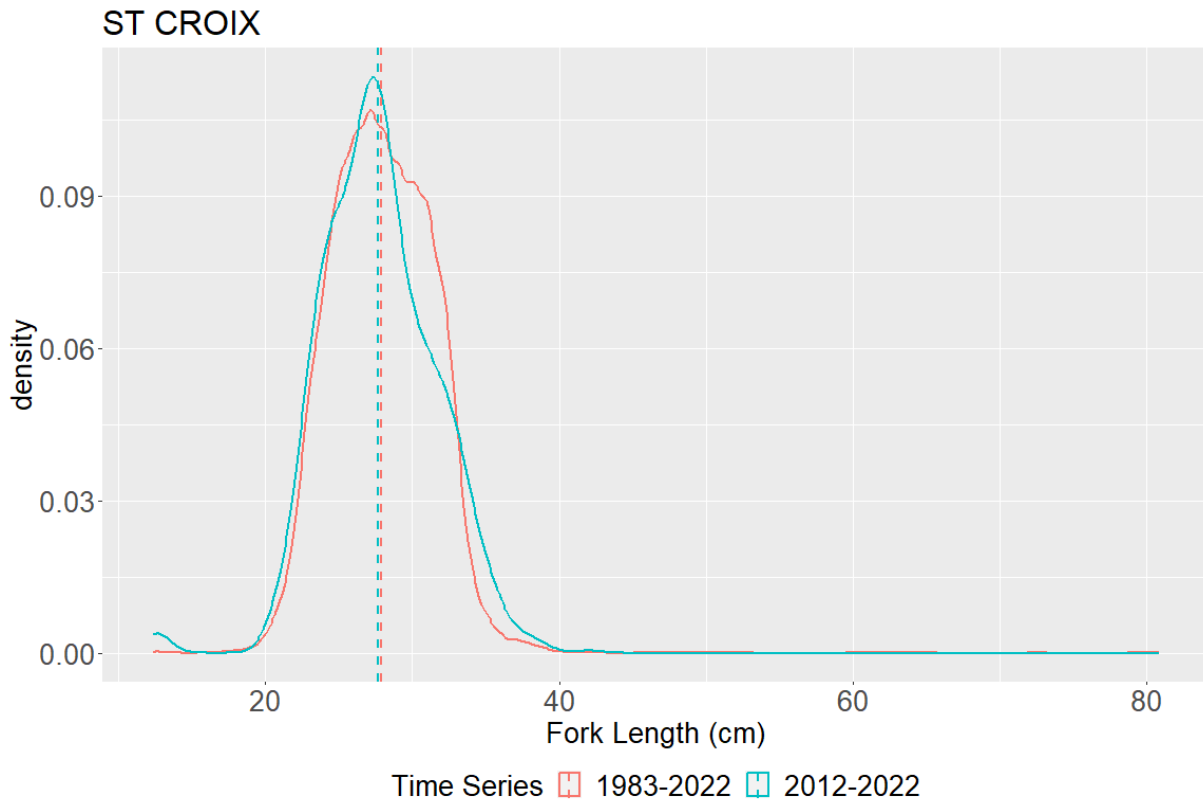


Figure 2: Aggregated density plot of lengths(cm) of Stoplight Parrotfish in St. Croix, all gears combined. Dotted line represents mean length. The means of 1983-2022 and 2012-2022 time series are 27.92cm and 27.69cm respectively.

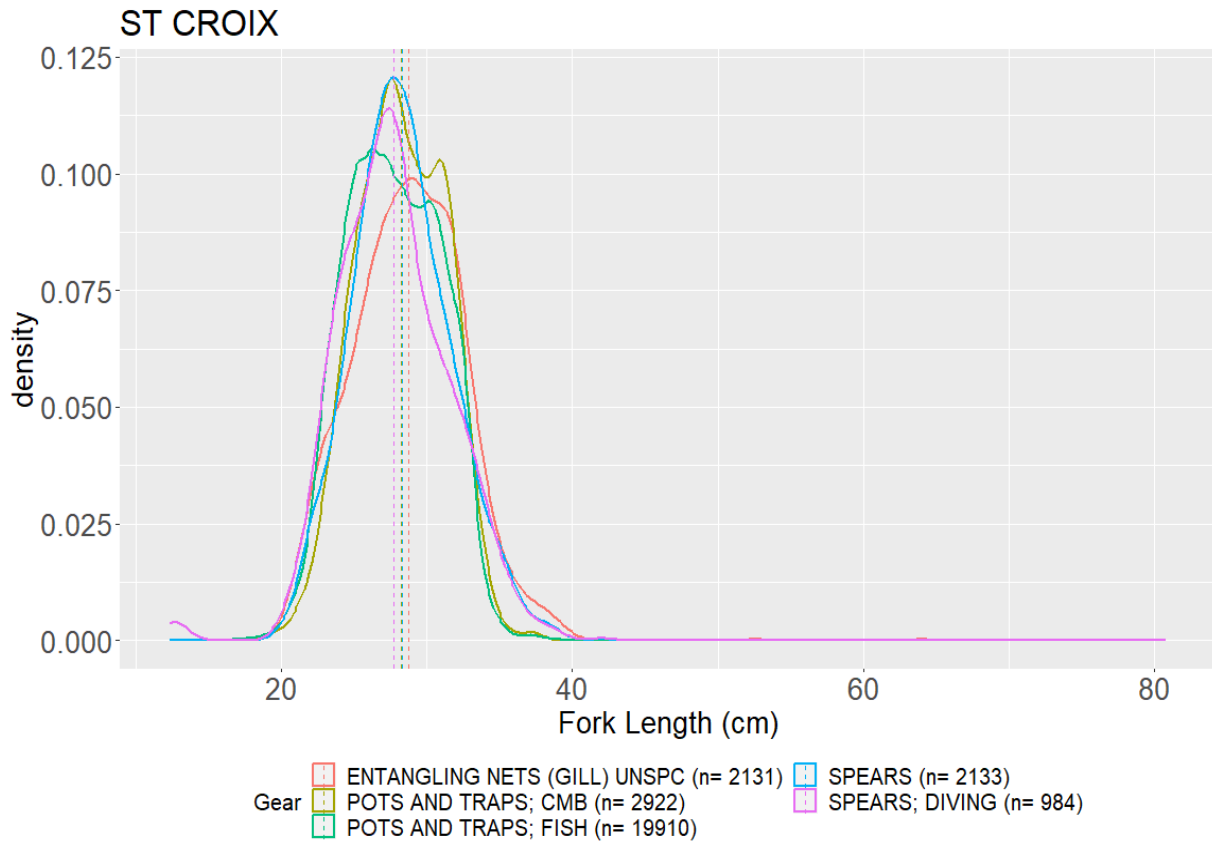


Figure 3: Aggregated density plot of lengths(cm) of gears with greater than 2% representation for Stoplight Parrotfish in St. Croix from 1983 to 2022. Dotted line represents mean length. Mean lengths can be found in [Table 1](#).

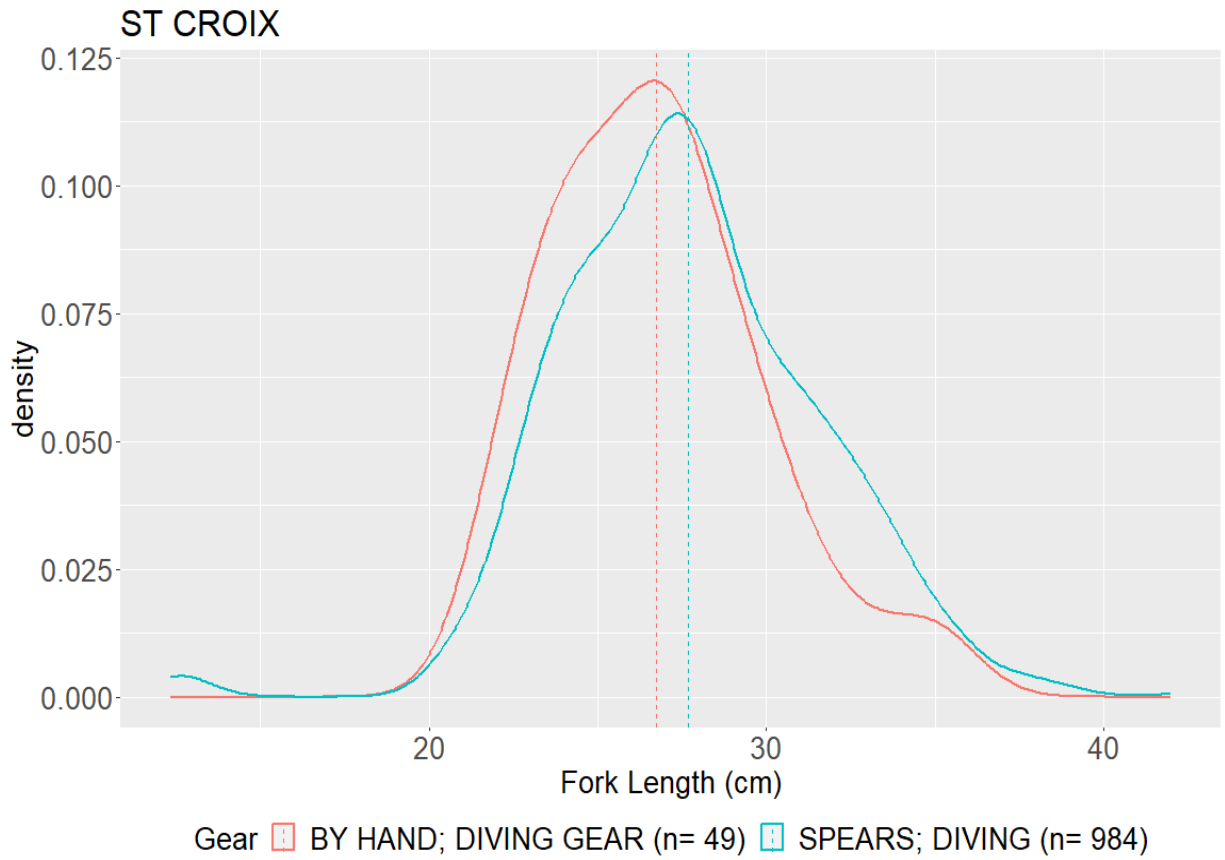


Figure 4: Aggregated density plot of lengths(cm) of gears with greater than 2% representation for Stoplight Parrotfish in St. Croix from 2012 to 2022. Dotted line represents mean length. Mean lengths can be found in [Table 2](#).

Literature Cited

Beggerly, Sara, Molly Stevens, and Heather Baertlein. 2022. "Trip Interview Program Metadata." North Charleston, SC.