SEDAR 84 Trip Interview Program (TIP) Size Composition Analysis of Yellowtail Snapper (*Ocyurus chrysurus*) in St. Thomas/St. John, U.S. Caribbean, 1983-2022

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SEDAR 84 Trip Interview Program (TIP) Size Composition Analysis of Yellowtail Snapper (*Ocyurus chrysurus*) in St. Thomas/St. John, U.S. Caribbean, 1983-2022

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Summary

In preparation for SouthEast Data, Assessment, and Review (SEDAR) 84 Benchmark assessment of Caribbean Yellowtail Snapper in St. Thomas/St. John, 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 Yellowtail Snapper in St. Thomas/St. John are comprised of 20,064 length observations across 1,078 unique port sampling interviews. Of the Yellowtail Snapper measured, 19,927 are fork lengths (99.3%). Two analyses are described in this document. First, gear groupings were established among gears based upon Yellowtail Snapper 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 GLM analysis of the full time series reported a statistical difference in the size of measured fish between the “LINES HAND”, “POTS AND TRAPS; FISH”, AND “ROD AND REEL” gears.

To understand the frequency with which Yellowtail Snapper 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 398 TIP interviews between 2012 and 2022 make up 4.76% of reported logbook trips. The HANDLINE and FISH_TRAP_SEINE_NET gear groupings represented the main gears reported (LINES HAND and POTS AND TRAPS; FISH). There were 359 main gear interviews (4.92% of main gear 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 Yellowtail Snapper fork lengths in St. Thomas/St. John recorded from 1983 to 2022.

Generalized Linear Mixed Model (GLM) 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 GLM analysis of landed Yellowtail Snapper 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 all available 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 GLM analyses of the full time series (Table 1) and truncated time series(Table 2) reported a statistical difference between the “LINES HAND”, “POTS AND TRAPS; FISH”, AND “ROD AND REEL” gears. The recommendation based on these results is gears should be grouped corresponding to the GLMM groupings regardless of the time series of TIP data being utilized.

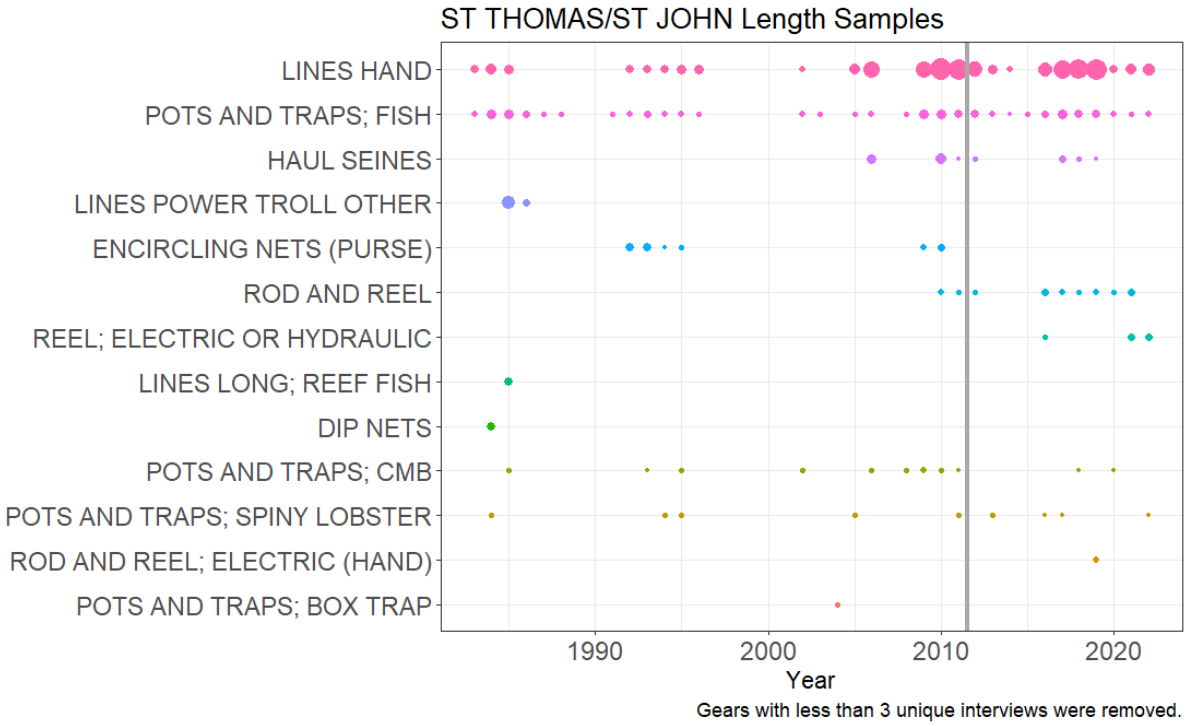

Figure 1: Plot showing relative number of Yellowtail Snapper in St. Thomas/St. John over time. Each point is color specific to the gear it represents. Gears are arranged from largest to smallest sample size of individual recorded lengths. Gray vertical line denotes the beginning of the truncated time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

Table 1: GLMM analysis summary results for St. Thomas/St. John TIP Yellowtail Snapper 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
LINES HAND	32.80	3.46	3.44	3.48	2	14,752	433	77.38	Hand Line
POTS AND TRAPS; FISH	30.30	3.39	3.38	3.41	1	2,033	435	10.66	Traps
HAUL SEINES	31.56	3.42	3.36	3.49	1,2	556	26	2.92	Hand Line or Traps
LINES POWER TROLL OTHER	35.12	3.50	3.42	3.59	1,2,3	544	20	2.85	Hand Line, Traps, or Rod and Reel
ENCIRCLING NETS (PURSE)	31.59	3.45	3.37	3.52	1,2,3	363	20	1.90	Hand Line, Traps, or Rod and Reel
ROD AND REEL	34.49	3.61	3.54	3.68	3	205	21	1.08	Rod and Reel
REEL; ELECTRIC OR HYDRAULIC	31.23	3.52	3.36	3.68	1,2,3	139	5	0.73	Hand Line, Traps, or Rod and Reel
DIP NETS	35.54	3.55	3.34	3.76	1,2,3	109	3	0.57	Hand Line, Traps, or Rod and Reel
LINES LONG; REEF FISH	35.27	3.48	3.29	3.67	1,2,3	109	4	0.57	Hand Line, Traps, or Rod and Reel
POTS AND TRAPS; CMB	29.58	3.38	3.32	3.44	1,2	78	26	0.41	Hand Line or Traps
POTS AND TRAPS; SPINY LOBSTER	28.72	3.36	3.27	3.45	1,2	43	10	0.23	Hand Line, Traps, or Rod and Reel
ROD AND REEL; ELECTRIC (HAND)	33.15	3.46	3.31	3.60	1,2,3	20	4	0.10	Hand Line, Traps, or Rod and Reel
POTS AND TRAPS; BOX TRAP	32.13	3.45	3.30	3.60	1,2,3	6	4	0.03	Hand Line, Traps, or Rod and Reel

Table 2: GLMM analysis summary results for the TIP data of Yellowtail Snapper fork lengths in St. Thomas/St. John 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
LINES HAND	32.14	3.44	3.42	3.47	2	7,353	210	85.93	Hand Line
POTS AND TRAPS; FISH	30.24	3.38	3.36	3.41	1	778	149	9.09	Traps
ROD AND REEL	34.43	3.58	3.51	3.64	3	174	15	2.03	Rod and Reel
REEL; ELECTRIC OR HYDRAULIC	31.23	3.51	3.39	3.64	1,2,3	139	5	1.62	Hand Line, Traps, or Rod and Reel
HAUL SEINES	30.05	3.44	3.34	3.54	1,2,3	81	8	0.95	Hand Line or Traps
ROD AND REEL; ELECTRIC (HAND)	33.15	3.44	3.32	3.57	1,2,3	20	4	0.23	Hand Line, Traps, or Rod and Reel
POTS AND TRAPS; SPINY LOBSTER	30.53	3.41	3.28	3.54	1,2,3	8	4	0.09	Hand Line, Traps, or Rod and Reel

Aggregated Gear Density

The aggregated densities of Yellowtail Snapper lengths(cm) in St. Thomas/St. John supplied in the TIP dataset are plotted across the full and truncated time periods (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 category.

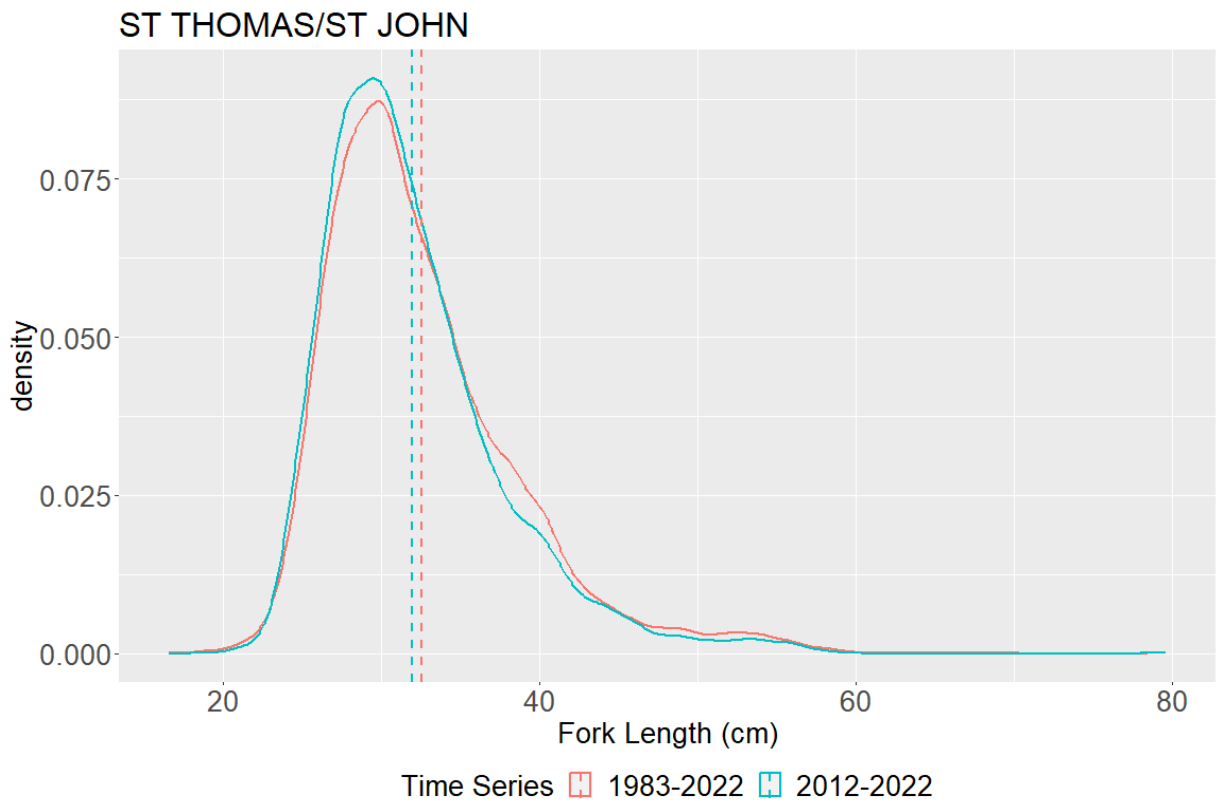

Figure 2: Aggregated density plot of lengths(cm) of Yellowtail Snapper in St. Thomas/St. John, all gears combined. Dotted line represents mean length. The means of 1983-2022 and 2012-2022 time series are 32.55cm and 31.98cm respectively.

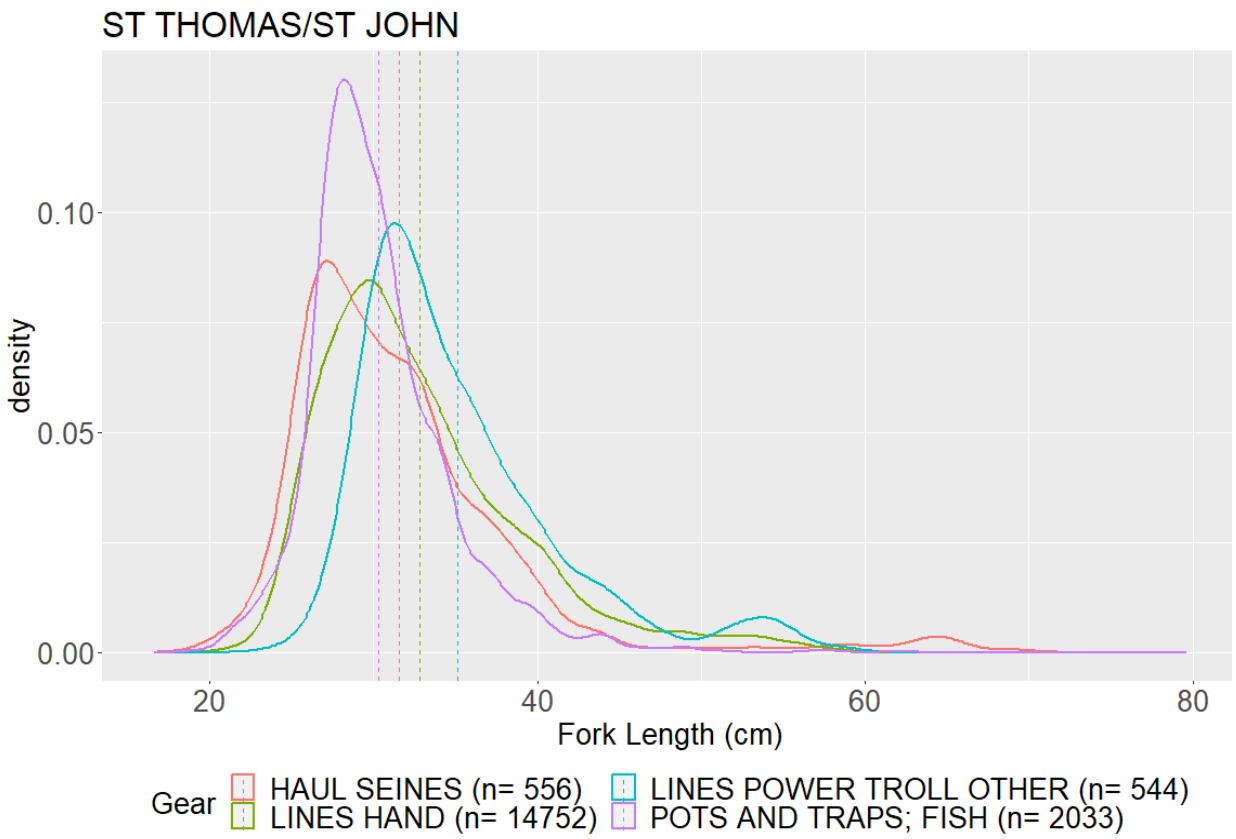

Figure 3: Aggregated density plot of lengths(cm) of gears with greater than 2% representation for Yellowtail Snapper in St. Thomas/St. John from 1983 to 2022. Dotted line represents mean length. Mean lengths can be found in Table 1.

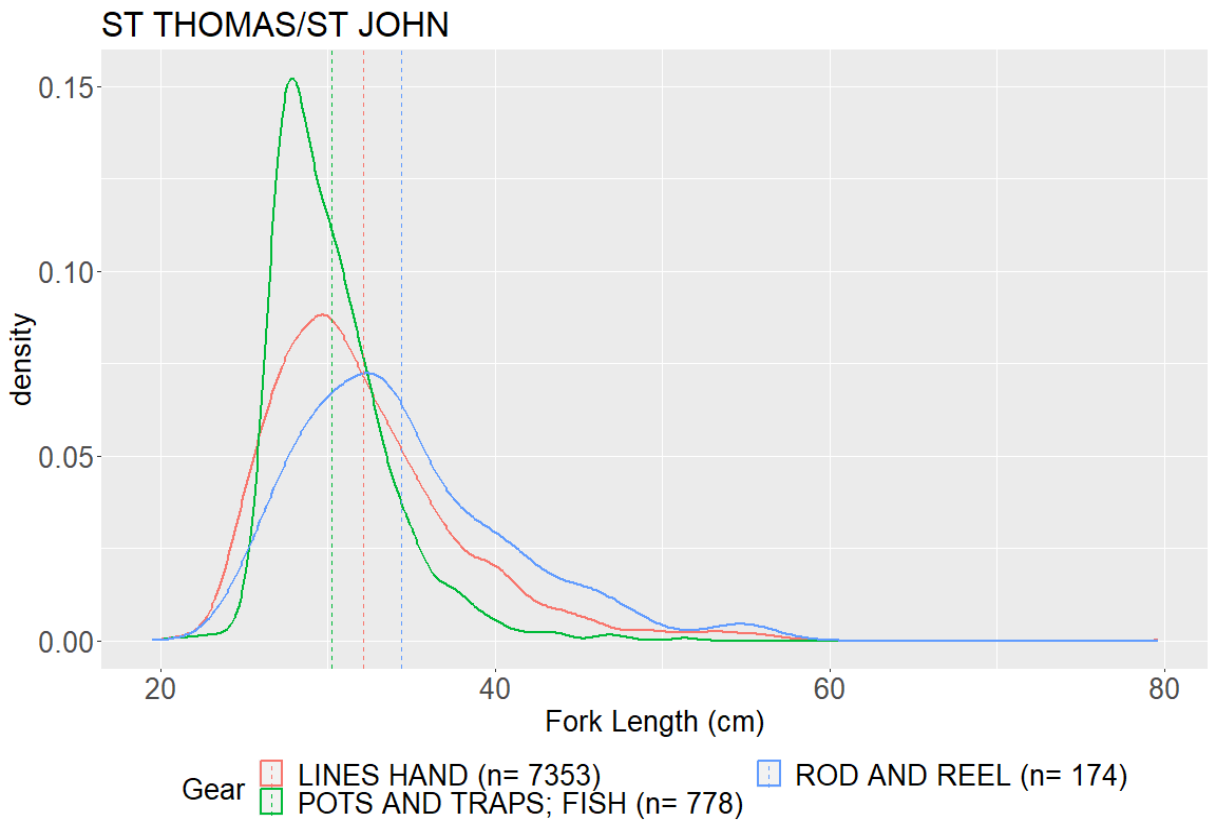

Figure 4: Aggregated density plot of lengths(cm) of gears with greater than 2% representation for Stoplight Parrotfish in St. Croix from 2012 to 2022. Dotted line represents mean length. Mean lengths can be found in Table 2.

Literature Cited

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