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

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SEDAR84-DW-09

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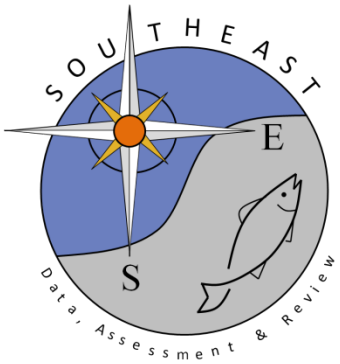

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SEDAR 84 Trip Interview Program (TIP) Size Composition Analysis of Yellowtail Snapper (*Ocyurus chrysurus*) in Puerto Rico, U.S. Caribbean, 1983-2022

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Summary

In preparation for SouthEast Data, Assessment, and Review (SEDAR) 84 Benchmark assessment of Caribbean Yellowtail Snapper in Puerto Rico; 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 Puerto Rico are comprised of 103,730 length observations across 5,159 unique port sampling interviews. Of the Yellowtail Snapper measured, 103,520 are fork length observations (99.8%). 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 GLMM analysis of the full time series reported a statistical difference in the size of measured fish between “LINES HAND”/“BOTTOM LINE”, “HAUL SEINES”, and “TRAMMEL NETS”.

To understand the frequency with which trips are sampled, the number of interviews associated with main gears in the TIP data would have been compared to the number of trips reported in the Caribbean Commercial Landings logbook system. Due to the idiosyncrasies of the Puerto Rico trip frequency recordings in the commercial landings logbook, the percent of trips sampled by TIP requires further investigation.

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 Puerto Rico 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 Yellowtail Snapper size composition among commercial fishing gears was conducted on the time series as a whole from 1983-2022 (Figure 1). The analyses of the time series displays the statistical similarity of all available gears with respect to the mean size of fish caught throughout the time series. The GLMM analysis of the full time series reported a statistical difference between the “LINES HAND”/“BOTTOM LINE”, “HAUL SEINES”, and “TRAMMEL NETS” gears (Table 1). The recommendation based on these results is gears should be grouped corresponding to the GLMM groupings identified in Table 1.

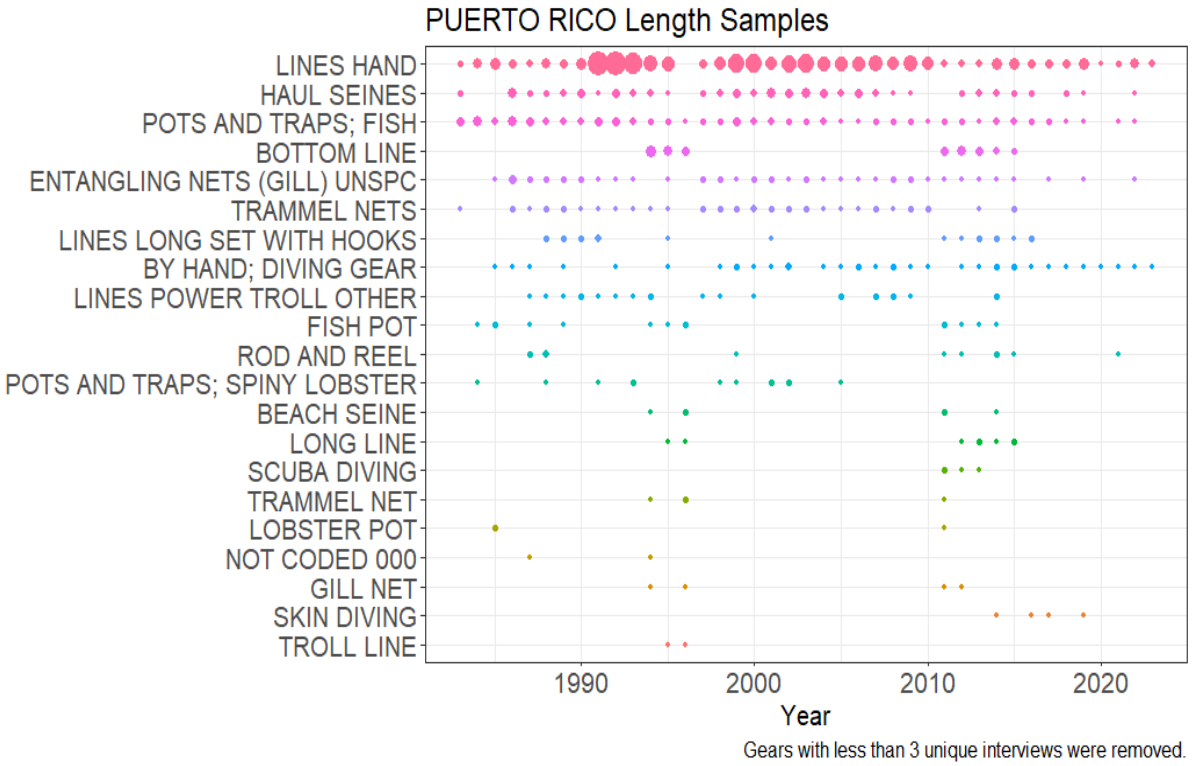

Figure 1: Plot showing relative number of Yellowtail Snapper lengths in Puerto Rico across time collected. Each point is color specific to the gear it represents. Gears are arranged from largest to smallest sample size of individual recorded lengths.

Table 1: GLMM analysis summary results for Puerto Rico 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.

Gear	Mean	Estimated Marginal Mean	LCL	UCL	Group	Fish (n)	Interview (n)	Percentage	Gear Group
LINES HAND	30.03	3.38	3.37	3.40	5	79,750	2,644	76.50	Hand Line
HAUL SEINES	25.13	3.18	3.14	3.21	1	7,214	212	6.92	Haul Seine
POTS AND TRAPS; FISH	25.05	3.22	3.21	3.24	1,2	6,995	1,282	6.71	Haul Seine or Trap
BOTTOM LINE	29.70	3.38	3.35	3.42	5	4,776	204	4.58	Hand Line
ENTANGLING NETS (GILL) UNSPC	26.28	3.28	3.24	3.31	2,3,4	1,338	123	1.28	Trap, Net, or Diving
TRAMMEL NETS	27.55	3.31	3.28	3.33	3,4	1,005	224	0.96	Net or Diving
LINES LONG SET WITH HOOKS	27.59	3.35	3.30	3.40	3,4,5	634	61	0.61	Net, Diving, or Hand Line
BY HAND; DIVING GEAR	30.18	3.36	3.32	3.39	4,5	557	117	0.53	Diving or Hand Line
LINES POWER TROLL OTHER	30.29	3.39	3.32	3.45	3,4,5	419	36	0.40	Net, Diving, or Hand Line
FISH POT	25.09	3.25	3.21	3.29	1,2,3	369	99	0.35	Haul Seine, Trap, or Net
ROD AND REEL	27.61	3.35	3.28	3.42	2,3,4,5	366	32	0.35	Trap, Net, Diving, or Hand Line
POTS AND TRAPS; SPINY LOBSTER	28.56	3.31	3.20	3.42	1,2,3,4,5	235	14	0.23	Haul Seine, Trap, Net, Diving, or Hand Line
BEACH SEINE	27.96	3.24	3.09	3.39	1,2,3,4,5	177	7	0.17	Haul Seine, Trap, Net, Diving, or Hand Line
LONG LINE	31.30	3.34	3.23	3.46	1,2,3,4,5	78	10	0.07	Haul Seine, Trap, Net, Diving, or Hand Line
SCUBA DIVING	29.52	3.32	3.25	3.39	1,2,3,4,5	48	29	0.05	Haul Seine, Trap, Net, Diving, or Hand Line

Table 1 continued:

Gear	Mean	Estimated Marginal Mean	LCL	UCL	Group	Fish (n)	Interview (n)	Percentage	Gear Group
TRAMMEL NET	27.50	3.35	3.24	3.46	1,2,3,4,5	45	11	0.04	Haul Seine, Trap, Net, Diving, or Hand Line
LOBSTER POT	23.34	3.19	3.07	3.31	1,2,3,4,5	28	10	0.03	Haul Seine, Trap, Net, Diving, or Hand Line
GILL NET	27.57	3.31	3.15	3.47	1,2,3,4,5	22	5	0.02	Haul Seine, Trap, Net, Diving, or Hand Line
NOT CODED 000	24.20	3.21	3.05	3.38	1,2,3,4,5	23	4	0.02	Haul Seine, Trap, Net, Diving, or Hand Line
SKIN DIVING	31.04	3.40	3.20	3.59	1,2,3,4,5	18	4	0.02	Haul Seine, Trap, Net, Diving, or Hand Line
TROLL LINE	24.86	3.29	3.10	3.48	1,2,3,4,5	16	3	0.02	Haul Seine, Trap, Net, Diving, or Hand Line

Aggregated Gear Density

The aggregated densities of Yellowtail Snapper lengths(cm) in Puerto Rico supplied in the TIP dataset are plotted across the full time period (Figure 2) and by gear, respectively (Figure 3). Each plot includes a vertical line associated with the respective mean length. N equals the number of measured fish by category.

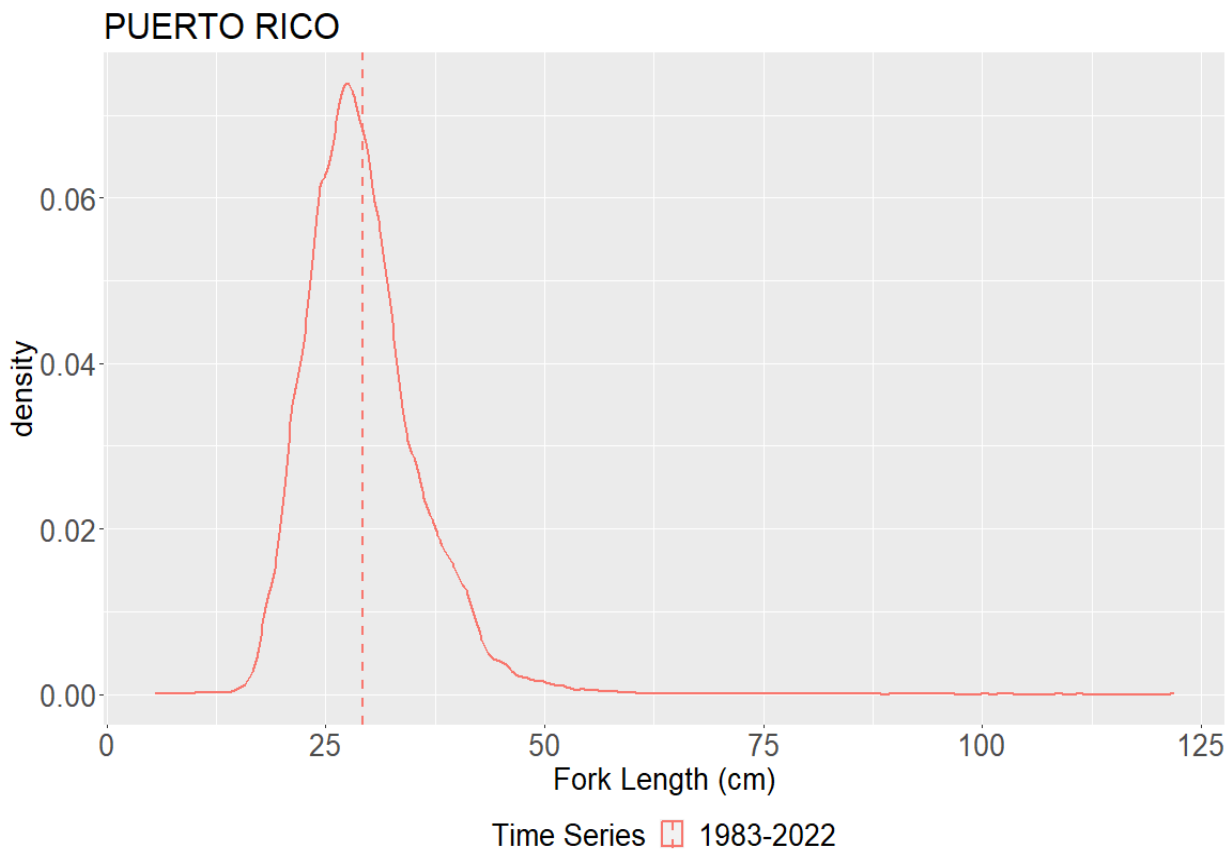

Figure 2: Aggregated density plot of lengths(cm) of Yellowtail Snapper in Puerto Rico, all gears combined. Dotted line represents mean length (29.22cm).

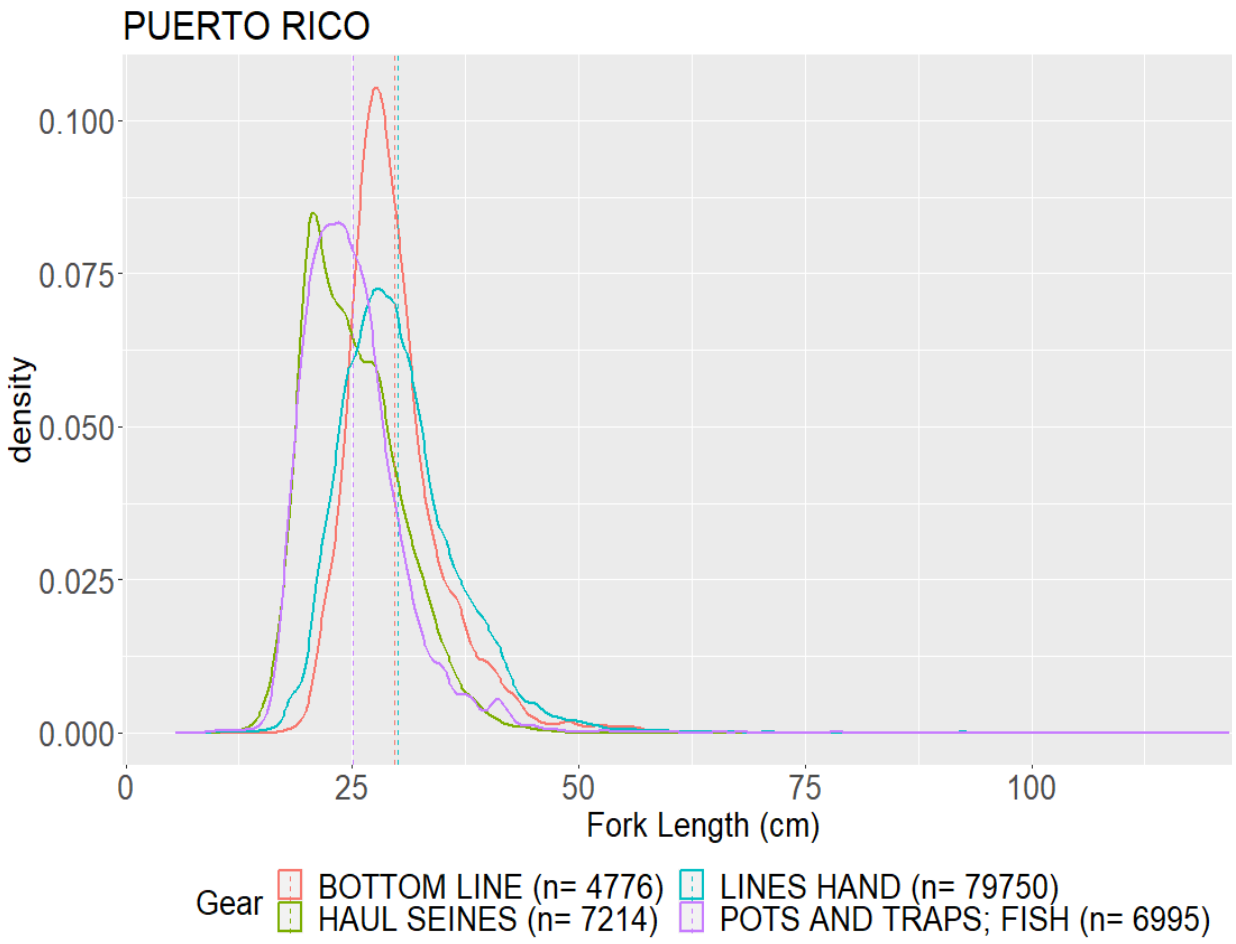

Figure 3: Aggregated density plot of lengths(cm) of gears with greater than 2% representation for Yellowtail Snapper in Puerto Rico from 1983 to 2022. Dotted line represents mean length. Mean lengths can be found in Table 1.

Literature Cited

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