SEDAR 91 Trip Interview Program (TIP) Size Composition Analysis of Caribbean Spiny Lobster (*Panulirus argus*) in St. Croix, U.S. Caribbean, 1981-2023

Katherine Godwin[1], Adyan Rios[2]

SEDAR91-DW-06

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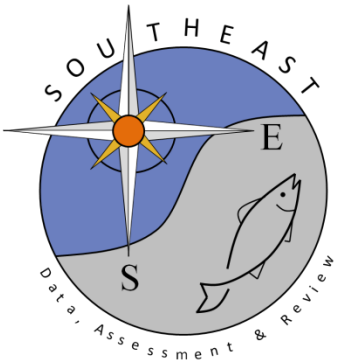

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Katherine Godwin[1], Adyan Rios[2]

November 08, 2024

[1]*Cooperative Institute for Marine & Atmospheric Studies, Rosenstiel School of Marine, Atmospheric, and Earth Science, University of Miami, 4600 Rickenbacker Causeway, Miami, FL 33149*

[2]*National Marine Fisheries Service, Southeast Fisheries Science Center Sustainable Fisheries Division, 75 Virginia Beach Drive, Miami, FL 33149*

Summary

In preparation for SouthEast Data, Assessment, and Review (SEDAR) 91 Benchmark assessment of Caribbean Spiny Lobster in St. Croix; 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 1981 to 2023.

The TIP data pertaining to Caribbean Spiny Lobster in St. Croix are comprised of 21,122 length observations across 1,642 unique port sampling interviews. There are 21,100 carapace length observations (99.9%). Two analyses are described in this document. First, gear groupings were established among gears based upon Caribbean Spiny Lobster size composition differences among gears. Gear groups were identified based on 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 no statistical differences in the size of measured lobster between gears.

Data Description

The Trip Interview Program (TIP) collects length and weight data from lobster landed by commercial fishing vessels. Data collection began in 1980's 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 in this document to analyze the year, region, species, interview ID, gear name, and length values. The data were filtered to Caribbean Spiny Lobster fork lengths in St. Croix recorded from 1981 to 2023.

Generalized Linear Mixed Model (GLMM) Analysis

The GLMM analysis of landed Caribbean Spiny Lobster size composition among commercial fishing gears was conducted on the time series as a whole from 1981-2023 (Figure 1). The analysis of the time series displays the statistical similarity of all available gears with respect to the mean size of lobster caught throughout the time series. The GLMM analysis of the full time series reported no statistical differences between the gears (Table 1).

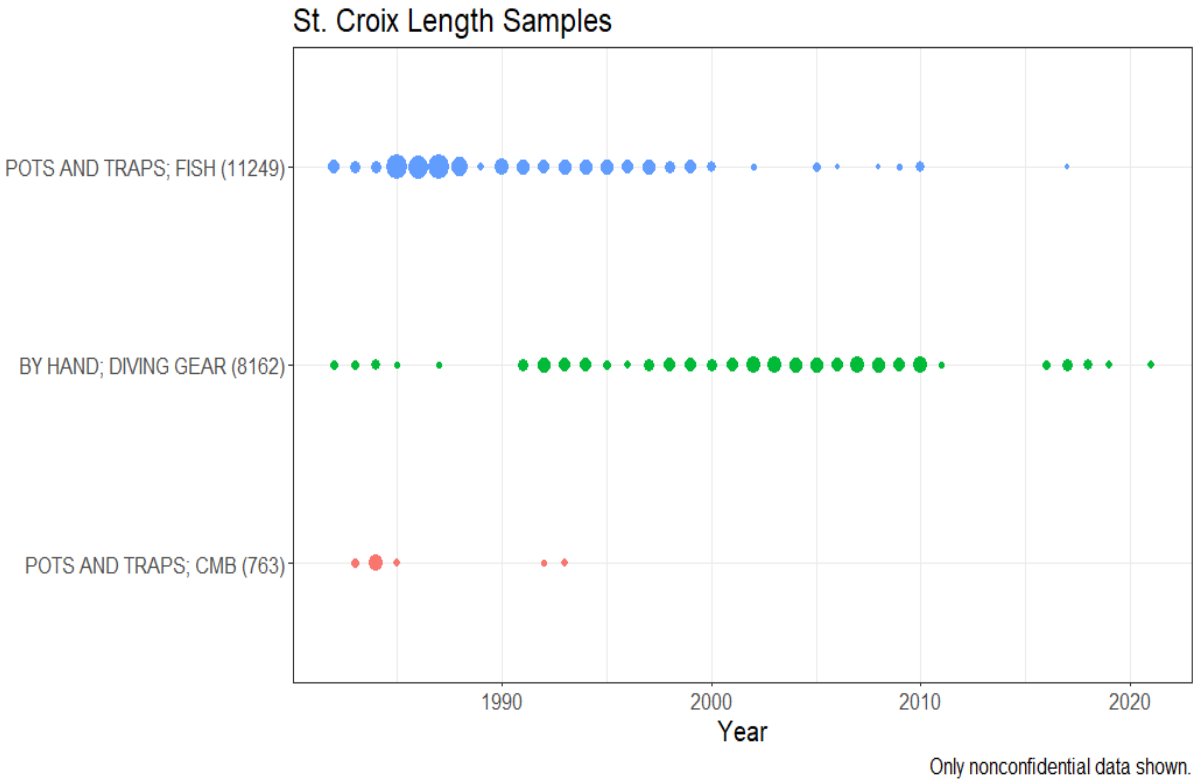

Figure 1: Plot showing relative number of Caribbean Spiny Lobster lengths in St. Croix across time collected. Each point is color specific to the gear it represents. Gears are arranged from most to least abundant.

Table 1: GLMM analysis summary results for St. Croix TIP Caribbean Spiny Lobster lengths(cm) from 1981 to 2023. 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	Lobster (n)	Interview (n)	Percentage
POTS AND TRAPS; FISH	10.61	2.37	2.36	2.37	1	11,249	824	54.20
BY HAND; DIVING GEAR	10.56	2.36	2.35	2.37	1	8,162	693	39.33
POTS AND TRAPS; CMB	10.62	2.33	2.30	2.37	1	763	33	3.68

*Only nonconfidential data shown.

Aggregated Gear Density

The aggregated densities of Caribbean Spiny Lobster lengths(cm) in St. Croix are plotted across the full time period and by gear, respectively (Figure 2 and Figure 3). Each plot includes a vertical line associated with the respective mean length. N equals the number of individuals displayed by category.

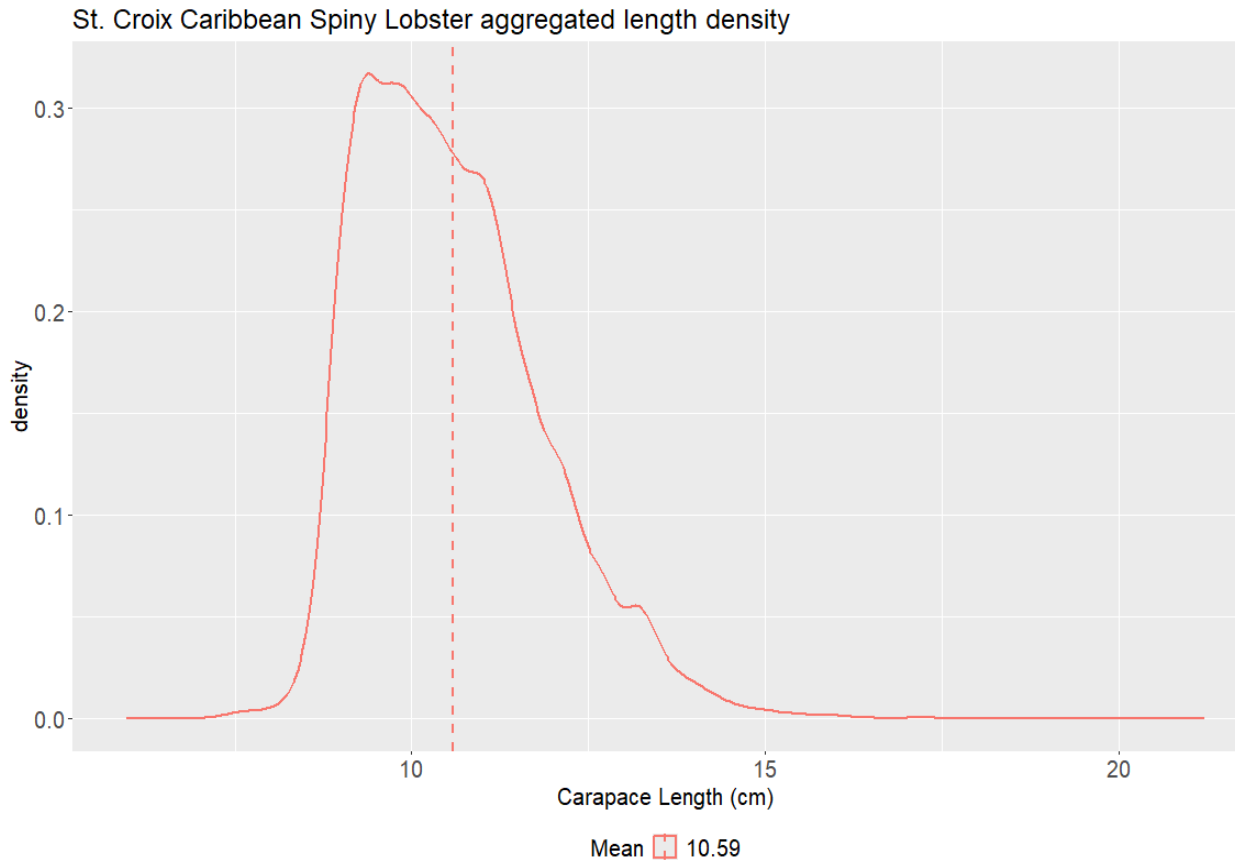

Figure 2: Aggregated density plot of lengths(cm) of Caribbean Spiny Lobster in St. Croix , all gears combined. Dotted line represents mean length.

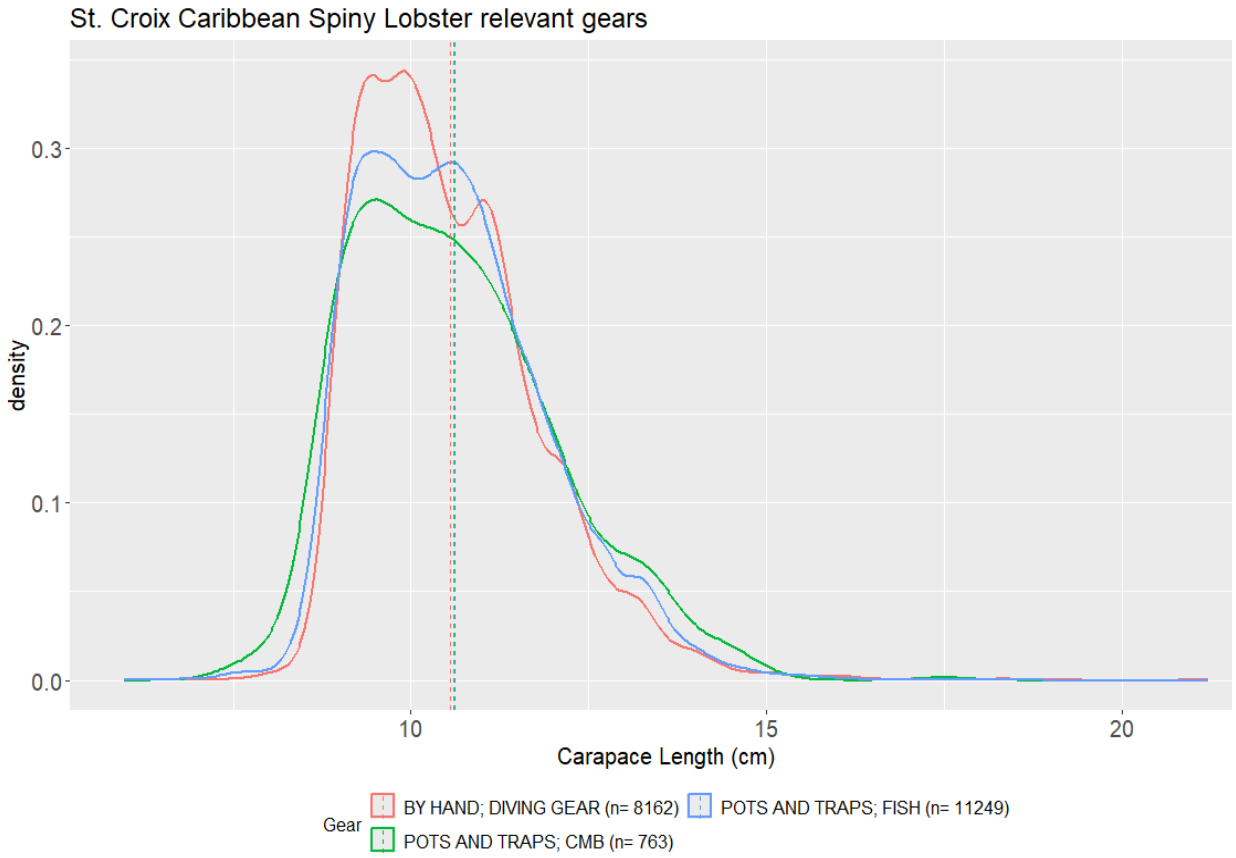

Figure 3: Aggregated density plot of lengths(cm) of nonconfidential gears recorded for Caribbean Spiny Lobster in St. Croix from 1981 to 2023. Dotted line represents mean length. Mean lengths can be found in Table 1.

Literature Cited

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

Godwin, Katherine, Adyan Rios, and Kyle Dettloff. 2024. SEDAR 84 Trip Interview Program (TIP) Size Composition Analysis of Stoplight Parrotfish (Sparisoma viride) in St. Croix, US Caribbean, 1983-2022. SEDAR-84-DW-11. 7pp.