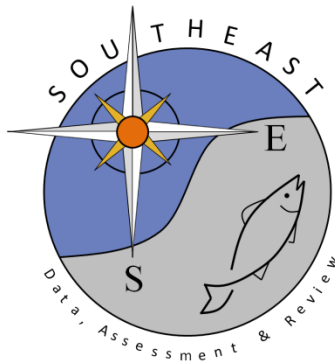


Cooperative Research Program Puerto Rico Life History Project

Stephanie Martínez Rivera¹

SEDAR103-DW-05

3 August 2026



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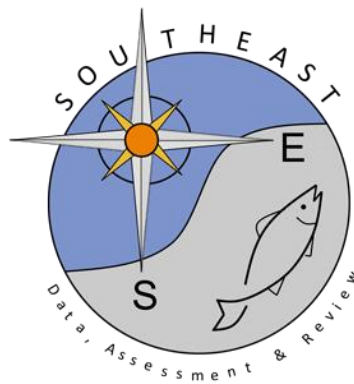
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Cooperative Research Program Puerto Rico Life History Project

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SEDAR 103: US Caribbean Application of Alternate Assessment Methods

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Collaborators

1. HJR Reefscaping, environmental consulting group
2. Commercial fishers
3. Noemí Peña Alvarado, Puerto Rico Department of Natural and Environmental Resources (PR DRNA)
4. Katherine Overly, NOAA Fisheries, Panama City Lab

Introduction

In September 2021, the Southeast Fisheries Science Center (SEFSC) Cooperative Research Program implemented a collaborative project with commercial fishers to gather life history data on commercially important species in Puerto Rico. The project, which continued through December 2025, aimed to fill critical data gaps for snappers, groupers, and other federally managed reef fish. By collecting data on length, weight, reproduction, age, and growth, including biological samples such as gonads, otoliths, eyes, and DNA, the resulting dataset provides vital life history information to directly support stock assessments.

Sampling Method

Commercial fishers deployed standard fishing gear to target commercially important reef fishes, including snappers, groupers, grunts, and wrasses, in the waters surrounding Puerto Rico (Figure 1). On-board observers recorded spatial data and collected length measurements and biological samples to assess species-specific maturity, age, and growth. Gonad tissues were processed using histology at the PR DRNA laboratory to assign sex and maturity stages. Otolith and eye samples were shipped to the NOAA SEFSC Panama City Laboratory, where they were stored pending further processing.

Target species for this project were selected by identifying data gaps within the PR DRNA maturity database and consulting with subject matter experts. The majority of these species required samples primarily from the smallest and/or largest size classes, with only a select few requiring sampling across all size bins. Furthermore, because the standard fishing gear was not modified, the resulting samples possess an inherent gear selectivity bias.

Results

A total of 1,936 fish representing 53 species were measured (Figure 2), 1,301 of which were also weighed (Table 1). To assess maturity, 891 samples from 19 species were sexed and staged using histology (Table 2). Additionally, otolith and eye samples were collected from 1,272 fish (Table 3). These data provide size composition information, which can be further stratified by gear type

and sex for select species. Size-at-maturity analyses are also possible for several species. Finally, age and growth data will become available once the otolith and eye samples are processed.

Tables and Figures

Table 1. Summary statistics for fork length (cm) and weight (kg) of sampled species, including sample sizes (N) and the minimum and maximum observed values.

Scientific Name	Fork Length N	Min Fork Length (cm)	Max Fork Length (cm)	Weight N	Min Weight (kg)	Max Weight (kg)
<i>Lutjanus vivanus</i>	344	16.3	66.6	275	0.077	5.460
<i>Epinephelus guttatus</i>	278	20.9	48.0	225	0.127	1.661
<i>Cephalopholis fulva</i>	251	15.5	34.2	134	0.058	0.609
<i>Lutjanus buccanella</i>	225	18.6	48.3	210	0.105	2.080
<i>Etelis oculatus</i>	204	17.4	72.5	105	0.063	4.694
<i>Pristipomoides macrophthalmus</i>	117	15.9	44.0	96	0.076	5.200
<i>Pristipomoides aquilonaris</i>	107	14.5	24.5	97	0.060	0.250
<i>Rhomboplites aurorubens</i>	55	17.2	34.6	50	0.086	2.663
<i>Cephalopholis cruentata</i>	54	13.0	29.3	30	0.029	0.409
<i>Malacanthus plumieri</i>	36	25.0	45.9	4	0.257	0.665
<i>Balistes vetula</i>	29	22.0	42.0	10	0.315	1.712
<i>Rhombolites aurorubens</i>	29	17.3	27.5	0	0.000	0.000
<i>Ocyurus chrysurus</i>	26	18.5	29.4	3	0.236	0.414
<i>Haemulon plumieri</i>	15	19.0	28.7	4	0.187	0.379
<i>Seriola rivoliana</i>	14	15.3	45.9	0	0.000	0.000
<i>Lutjanus synagris</i>	13	18.0	28.7	3	0.171	0.305
<i>Holocentrus adscensionis</i>	12	18.5	32.1	0	0.000	0.000
<i>Caranx crysos</i>	11	18.8	35.6	2	0.363	0.615
<i>Holocentrus rufus</i>	10	18.0	24.0	1	0.216	0.216
<i>Squalus cubensis</i>	9	23.0	49.0	0	0.000	0.000
<i>Caranx lugubris</i>	7	20.0	54.4	0	0.000	0.000
<i>Lutjanus analis</i>	7	23.6	57.5	7	0.204	3.402
<i>Mustelus canis</i>	6	51.0	80.0	0	0.000	0.000
<i>Serranus notospilus</i>	6	16.0	19.2	0	0.000	0.000
<i>Calamus pennatula</i>	5	21.4	28.0	0	0.000	0.000
<i>Lachnolaimus maximus</i>	5	31.6	47.8	5	0.716	2.179
<i>Seriola dumerili</i>	5	32.3	82.5	2	0.800	0.959
<i>Apsilus dentatus</i>	4	47.1	54.5	4	1.983	3.477

Scientific Name	Fork Length N	Min Fork Length (cm)	Max Fork Length (cm)	Weight N	Min Weight (kg)	Max Weight (kg)
<i>Coryphaena hippurus</i>	4	26.8	62.4	0	0.000	0.000
<i>Halichoeres radiatus</i>	4	28.5	35.9	0	0.000	0.000
<i>Polymixia lowei</i>	4	16.0	20.5	0	0.000	0.000
<i>Rhonciscus pauco</i>	4	22.5	26.2	1	0.194	0.194
<i>Serranus phoebe</i>	4	16.0	24.0	1	0.119	0.119
<i>Canthidermis sufflamen</i>	3	37.7	47.8	0	0.000	0.000
<i>Hyporthodus mystacinus</i>	3	28.4	36.6	2	0.700	0.818
<i>Caranx hippos</i>	2	48.5	62.5	0	0.000	0.000
<i>Gonioplectrus hispanus</i>	2	24.0	26.6	2	0.270	0.354
<i>Gymnothorax moringa</i>	2	58.8	68.0	1	0.290	0.290
<i>Haemulon striatum</i>	2	15.5	17.6	1	0.104	0.104
<i>Hyporthodus flavolimbatus</i>	2	105.0	310.5	2	16.329	18.750
<i>Acanthurus tractus</i>	1	18.0	18.0	0	0.000	0.000
<i>Calamus bajonado</i>	1	26.5	26.5	0	0.000	0.000
<i>Calamus calamus</i>	1	29.4	29.4	0	0.000	0.000
<i>Calamus penna</i>	1	39.9	39.9	0	0.000	0.000
<i>Cantherhines macrocerus</i>	1	30.0	30.0	0	0.000	0.000
<i>Channomureana vittata</i>	1	93.5	93.5	0	0.000	0.000
<i>Epinephelus morio</i>	1	67.5	67.5	1	4.200	4.200
<i>Haemulon flavolineatum</i>	1	18.1	18.1	0	0.000	0.000
<i>Lutjanus apodus</i>	1	37.1	37.1	1	1.005	1.005
<i>Melichthys niger</i>	1	22.3	22.3	0	0.000	0.000
<i>Scyliothinus boa</i>	1	37.4	37.4	0	0.000	0.000
<i>Seriola sp.</i>	1	39.5	39.5	1	1.000	1.000
<i>Synodus intermedius</i>	1	38.9	38.9	0	0.000	0.000

Note: Preliminary results.

Table 2. Summary of reproductive samples by species, including total sample size (N), the number of individuals assessed for sex and maturity stage, fork length ranges (cm), and the years of available data.

Scientific Name	N	Sex N	Stage N	Min FL (cm)	Max FL (cm)	Years Available
<i>Lutjanus vivanus</i>	178	178	170	17.6	44.4	2022, 2023, 2024, 2025
<i>Epinephelus guttatus</i>	175	175	149	21.2	48.0	2022, 2023, 2024, 2025
<i>Lutjanus buccanella</i>	154	154	144	18.6	48.3	2022, 2023, 2024, 2025
<i>Cephalopholis fulva</i>	91	91	82	15.5	34.2	2022, 2023, 2024, 2025
<i>Etelis oculatus</i>	82	82	81	20.6	72.5	2022, 2023, 2024
<i>Pristipomoides macrophthalmus</i>	60	60	55	15.9	40.9	2022, 2023
<i>Pristipomoides aquilonaris</i>	57	57	57	15.2	23.5	2023, 2024
<i>Rhomboplites aurorubens</i>	34	34	34	17.4	34.6	2023, 2024, 2025
<i>Cephalopholis cruentata</i>	24	24	23	13.0	26.5	2022, 2024, 2025
<i>Balistes vetula</i>	7	7	6	22.0	42.0	2022, 2023, 2024
<i>Lutjanus analis</i>	6	6	6	23.6	57.5	2022, 2025
<i>Lachnolaimus maximus</i>	5	5	5	31.6	47.8	2024
<i>Haemulon plumierii</i>	4	4	4	20.5	26.6	2022
<i>Apsilus dentatus</i>	3	3	3	49.8	54.5	2022, 2023
<i>Lutjanus synagris</i>	3	3	3	21.5	22.9	2024
<i>Caranx crysos</i>	2	2	2	27.8	32.5	2024
<i>Hyporthodus flavolimbatus</i>	2	2	2	105.0	310.5	2022, 2023
<i>Epinephelus morio</i>	1	1	1	67.5	67.5	2024
<i>Gonioplectrus hispanus</i>	1	1	1	26.6	26.6	2023
<i>Hyporthodus mystacinus</i>	1	1	0	36.6	36.6	2023
<i>Unknown spp</i>	1	1	0	30.6	30.6	2023

Note: Preliminary results.

Table 3. Summary of age and growth samples by species, including total sample size (N), the number of otolith and eye samples extracted, fork length ranges (cm), and the years of available data.

Scientific Name	N	Otoliths N	Eye N	Min FL (cm)	Max FL (cm)	Years Available
<i>Lutjanus vivanus</i>	276	276	276	16.6	66.6	2022, 2023, 2024, 2025
<i>Epinephelus guttatus</i>	225	225	225	21.2	48.0	2022, 2023, 2024, 2025
<i>Lutjanus buccanella</i>	209	209	209	18.6	48.3	2022, 2023, 2024, 2025
<i>Cephalopholis fulva</i>	134	134	134	15.5	34.2	2022, 2023, 2024, 2025
<i>Etelis oculatus</i>	105	105	105	17.4	72.5	2022, 2023, 2024, 2025
<i>Pristipomoides aquilonaris</i>	97	97	97	14.5	23.5	2023, 2024, 2025
<i>Pristipomoides macrophthalmus</i>	96	96	96	15.9	44.0	2022, 2023, 2024, 2025
<i>Rhomboplites aurorubens</i>	50	50	50	17.4	34.6	2023, 2024, 2025
<i>Cephalopholis cruentata</i>	30	30	30	13.0	29.3	2022, 2024, 2025
<i>Balistes vetula</i>	9	9	9	22.0	42.0	2022, 2023, 2024, 2025
<i>Lutjanus analis</i>	7	7	7	23.6	57.5	2022, 2025
<i>Apsilus dentatus</i>	4	4	4	47.1	54.5	2022, 2023, 2025
<i>Haemulon plumieri</i>	4	4	4	20.5	26.6	2022
<i>Unknown spp</i>	4	4	4	15.5	30.6	2023, 2024
<i>Hyporthodus mystacinus</i>	3	3	3	28.4	36.6	2022, 2023
<i>Lutjanus synagris</i>	3	3	3	21.5	22.9	2024
<i>Ocyurus chrysurus</i>	3	3	3	25.3	29.4	2022, 2025
<i>Caranx crysos</i>	2	2	2	27.8	32.5	2024
<i>Gonioplectrus hispanus</i>	2	2	2	24.0	26.6	2022, 2023
<i>Haemulon striatum</i>	2	2	2	15.5	17.6	2022, 2025
<i>Hyporthodus flavolimbatus</i>	2	2	2	105.0	310.5	2022, 2023
<i>Epinephelus morio</i>	1	1	1	67.5	67.5	2024
<i>Lachnolaimus maximus</i>	1	1	1	41.3	41.3	2024
<i>Lutjanus apodus</i>	1	1	1	37.1	37.1	2025
<i>Rhonciscus pauco</i>	1	1	1	22.5	22.5	2025
<i>Serranus phoebe</i>	1	1	1	18.9	18.9	2025

Note: Preliminary results.

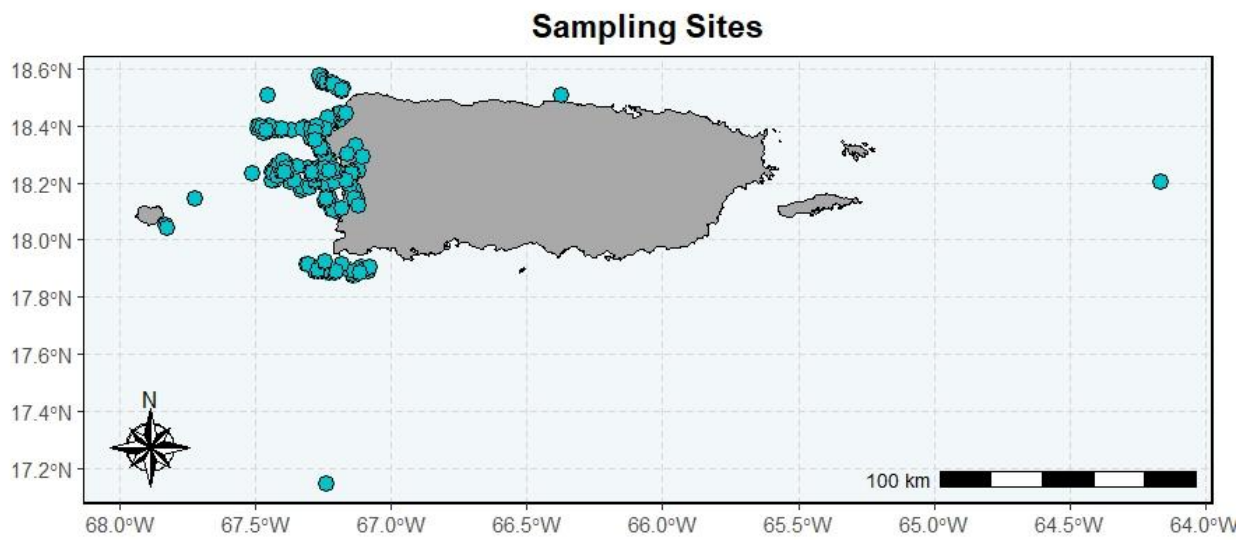


Figure 1. Map of the sampling sites.

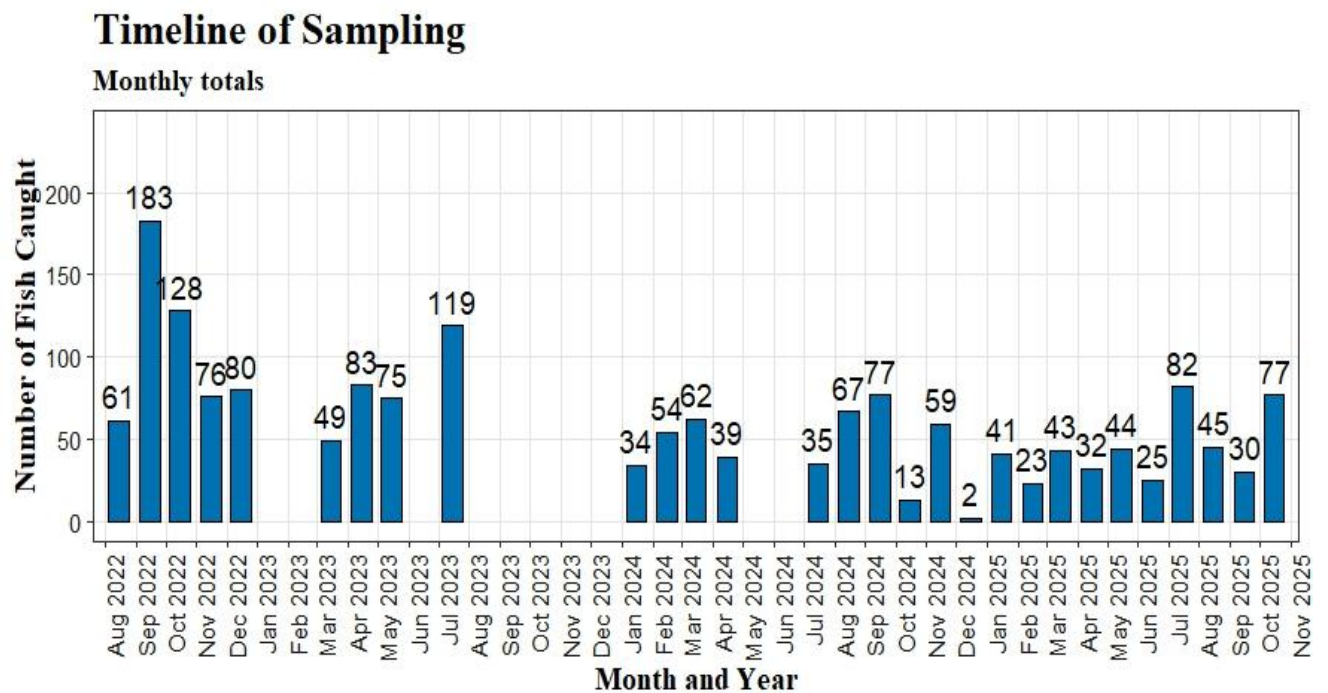


Figure 2. The timeline of sample collection and the number of fish caught.