The Rhode Island Chapter of The Nature Conservancy
Annual Performance Report

Submitted to

The Rhode Island Department of Environmental Management
Division of Fish and Wildlife

Title: Block Island Seine Survey

Cooperative Agreement Award Number: 3425240

Award Term: January 15, 2020 to December 31, 2024

Reporting Period: January 15, 2020 to December 31, 2024

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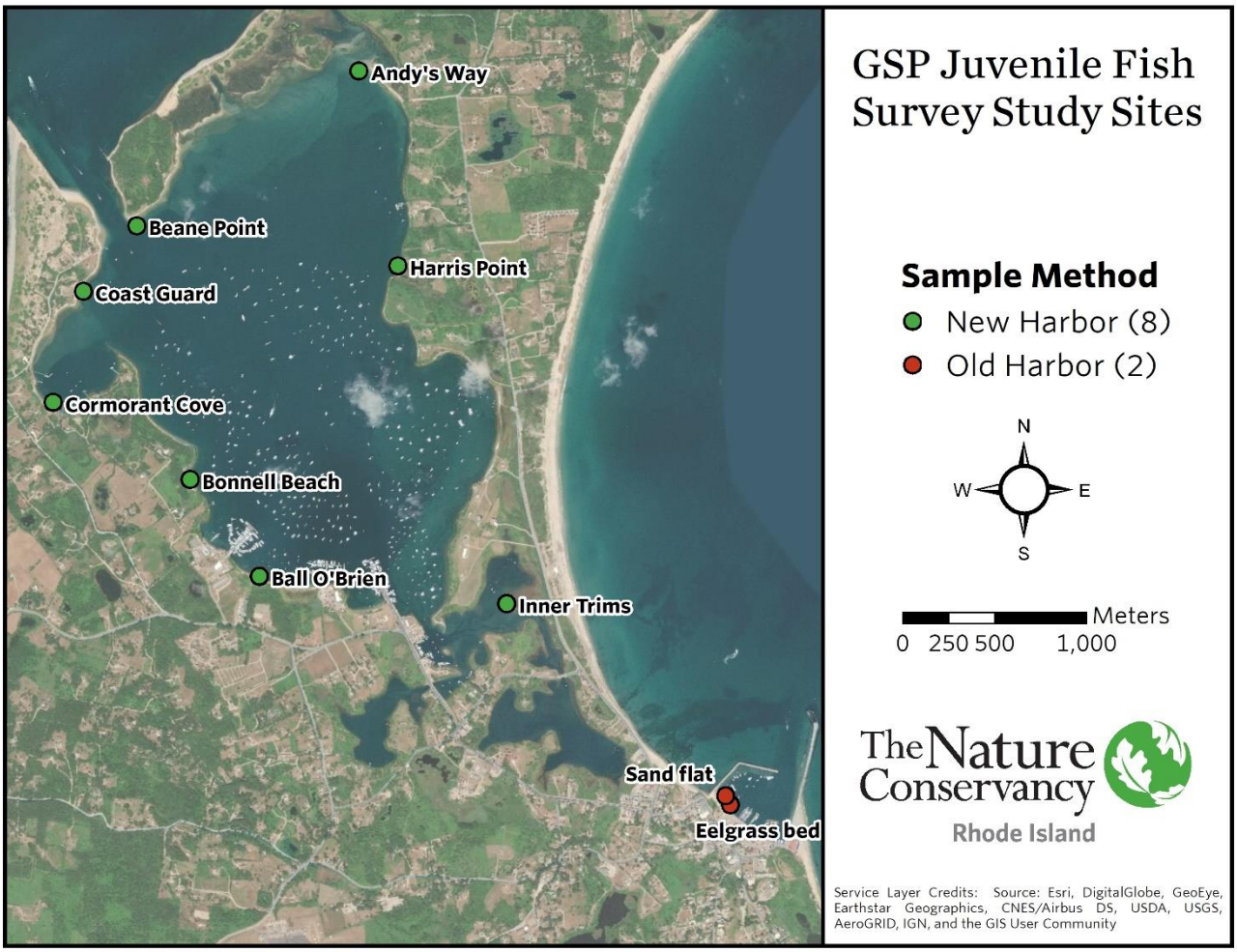
Map of study area and sampling locations.



SUMMARY

During the 2024 season a total of 60 seines were hauled across 10 sites in May through October resulting in the enumeration of 20,048 individuals. Of the animals caught, 19,482 of those individuals were finfish and 566 were other marine invertebrates. A total of 3,513 individuals were measured and 64 species were identified. During the grant period from 2020-2024, 300 seines were hauled resulting in the enumeration of 119,989 individuals across 84 species representing 40 families. All scoped work was completed. All raw data have been shared with the appropriate Rhode Island Department of Environmental Management, Division of Marine Fisheries staff for incorporation into existing datasets.

TARGET DATE

December 31, 2024

NEXT STEPS

Investigators intend to continue sampling with the same methodology during the field season of 2025 under a new cooperative agreement. The Block Island project team will continue coordinating with the primary investigators of the Coastal Ponds and Providence River Estuary juvenile fish surveys to evaluate variations in fish assemblages across study areas in Rhode Island.

REMARKS

For the entire Block Island time series (2014-2024), all individuals of the target species: winter flounder, summer flounder, tautog, scup, and black sea bass were enumerated and measured. The abundance indices for the target species only target young-of-the-year individuals. Other species of interest and their relative abundances were also included in this report. These species include members of the Clupeidae family: Atlantic menhaden and river herring (alewife and blueback herring), as well as four forage fish species: Atlantic silverside, mummichog, sheepshead minnow, and striped killifish. Adults and juveniles of these fish species were not differentiated for data analysis or descriptive purposes. Of all the species caught, only finfish were included in the results of this report. All crustaceans and other marine invertebrates were excluded.

INTRODUCTION

Estuaries are some of the most productive and ecologically significant ecosystems on Earth, yet they are also among the most threatened (Suchanek 1994; Lotze et al. 2006; Murphy et al. 2021). These coastal habitats are notably important to juvenile fishes, providing foraging opportunities, reduced predation risks, and a mosaic of habitats suitable for a variety of life stages (Able 2005; Seitz et al. 2020; Pessanha et al. 2021). Estuaries are also important spawning grounds for many fish species, and they contribute directly to the production of future recruits into recreational and commercial fisheries (Jänes et al. 2021). As such, these coastal habitats are commonly referred to as nurseries by fisheries scientists and managers, and assessing fish nursery function within estuarine and marine environments can help prioritize protection and restoration efforts (Beck et al. 2001; Peterson 2003).

Along the East Coast of the United States, estuaries are estimated to support more than two-thirds of the economically important finfish species (Boesch and Turner 1984; Lellis-Dibble et al. 2008). In Rhode Island, the commercial and recreational fishing industries have a longstanding history and are sustained by the natural resources and waterbodies of Narragansett Bay, Rhode Island Sound, and Block Island Sound (RIDEM DMF 2024). Block Island's waterbody, the Great Salt Pond, is one of the most unique examples of an estuary since it is located offshore and distinguished as a body of salt water surrounded by salt water. It is also positioned between Rhode Island Sound, Block Island Sound,

and two biogeographic regions, making it ideal grounds for fish seeking habitat that could not survive on the continental shelf (Able 2005). While past assessments have supported this clam, a subsequent literature review revealed limited historical and empirical data on fisheries assessments in the Great Salt Pond (Neumann 1993; Katz 2000). This missing information is critically important to have because it has been estimated that more than 70% of Rhode Island's recreationally and commercially important finfish spend at least one part of their life history in coastal habitats like the Great Salt Pond, particularly young-of-the-year (Meng et al. 1999; RIDEM DMF 2024).

In 2014, the Division of Marine Fisheries and The Nature Conservancy entered into a cooperative agreement to begin evaluating the Great Salt Pond and its role in supporting fish populations. Through a holistic approach to monitoring, investigators evaluated fish assemblages, water quality, and benthic and coastal habitats in the Great Salt Pond and Old Harbor on Block Island. Not only did initial results reveal that this study area supports recreationally and commercially important finfish, but it also recognized that Block Island could support habitat improvements aimed at increasing fish recruitment. Now that the Block Island seine survey has accrued over ten years of data, time series results continue to be a valuable tool for the Division of Marine Fisheries in managing fish populations.

As we move forward into the renewed cooperative agreement, investigators will continue to work together on incorporating datasets amongst the other established seine surveys: the Providence River Estuary and coastal salt ponds of southern Rhode Island. Investigators also acknowledge as habitat and water quality in these study areas continue to change, this long-term monitoring serves as a collective baseline to document how these changes affect fish assemblage in Rhode Island and will inform our future work together.

METHODS

Ten stations on Block Island were sampled at monthly intervals from May through October: eight stations in the Great Salt Pond and two stations in Old Harbor. Investigators attempted to perform all seining on an incoming tide and in the intertidal zone at depths shallower than two meters. At each site a 130' long, 6'deep, ¼" mesh net beach seine was used to collect species. This net was also outfitted with a midpoint pocket, weighted footrope, and a floated headrope, all consistent with the net used in the Young-of-the-Year Survey of Selected Rhode Island Coastal Ponds and Embayments (conducted as part of F-61-R-23, Job #3).

For sampling, the seine net was deployed by boat along the shoreline in a semicircle shape. The net was then hauled onto shore manually from both ends. All animals caught were transferred from the midpoint pocket of the net into water-filled totes. All collected animals were identified to genus or species and measured to the nearest centimeter, except for flounder and crustacean species which were measured in millimeters. All finfish were measured in total length and crustaceans were measured by carapace width. When appropriate, species were subsampled by measuring the first 20 individuals identified and the remaining individuals enumerated. Upon completion, all animals were released back into the water at the collection site. Additionally, water temperature (°C), salinity (ppt), dissolved oxygen (mg/L), water depth (m), and transparency (m) were measured using a Professional Plus series handheld YSI multiparameter meter and Secchi disk. The YSI multiparameter meter was calibrated monthly throughout the sampling season per manufacturer recommendations.

RESULTS & DISCUSSION

For the 2024 field season, a total of 60 seines were hauled across the ten sampling sites. A total of 19,482 finfish were identified and enumerated, and 2,947 of those were measured. A total of 20,048 species were caught (Table 1). Of the species caught, only finfish were included in the results below.

A mean of 324.70 ± 57.17 SE finfish was caught per haul in 2024. Catch per haul across sites for the Block Island survey was greatest at Andy's Way at 987.67 ± 269.91 SE and lowest at Ball O'Brien at 79.50 ± 36.39 SE (Figure 1). Catch per haul across months was greatest in July at 535.50 ± 173.07 SE and lowest in June at 60.70 ± 33.29 SE (Figure 2).

TARGET SPECIES

Winter Flounder (*Pseudopleuronectes americanus*)

Of the total 766 winter flounder caught in 2024 seines, 761 individuals were YOY, and 5 individuals were age 1+ (max length = 220 mm; Able and Fahay 1998; Berry et al. 1965; Meng et al. 2000). In 2024, winter flounder were collected during all months and caught at all sites except for Harris Point, Andy's Way, and Ball O'Brien in the Great Salt Pond. The most abundant site for winter flounder was the Sand Flat in Old Harbor at a catch per haul of 109.50 ± 81.49 SE (Figure 3a). The most abundant month for winter flounder was July at a catch per haul of 51.10 ± 50.21 SE fish/seine haul (Figure 3b). The 2024 juvenile winter flounder abundance index was 12.77 ± 8.63 SE fish/seine haul, which was higher than the 2023 index of 3.80 ± 1.04 SE. This year marked the highest abundance index of juvenile winter flounder for the Block Island time series.

Black Sea Bass (*Centropristis striata*)

A total of 24 black sea bass were caught in 2024, which was a decrease from the 284 individuals that were collected in 2023. Black sea bass were caught at five out of the ten sites for the survey: Coast Guard Station, Cormorant Cove, and Bonnell Beach in the Great Salt Pond and both sites in Old Harbor. They were most abundant at the Sand Flat in Old Harbor at a catch per haul of 1.67 ± 1.12 SE (Figure 4a). Most individuals were caught in September at a catch per haul of 1.30 ± 0.80 SE (Figure 4b). Black sea bass ranged in size between 4cm and 11cm in 2024. The abundance index for black sea bass in 2024 was 0.40 ± 0.16 SE fish/seine haul. This was lower than the 2023 index of 4.73 ± 2.59 SE fish/seine haul. In the last five years of the Block Island dataset, black sea bass abundance indices have been significantly lower than the indices recorded between 2015 and 2019. While investigators acknowledge that indices rise and fall, the presence of black sea bass has been increasingly prevalent across regional seine surveys and supported by recruitment signals observed along the Northern Atlantic Coast (NEFSC 2017; Tuckey and Fabrizio 2019).

Summer Flounder (*Paralichthys dentatus*)

A total of 14 summer flounder were caught in 2024 beach seines ranging in size from 4mm to 124mm. Summer flounder were caught at four of the ten sites: Beane Point and Cormorant Cove in the Great Salt Pond, and both sites in Old Harbor. Summer flounder were most abundant at the Sand Flat in Old Harbor at a catch per haul of 1.50 ± 1.50 SE (Figure 5a). Most individuals were caught in August at a catch per haul of 1.00 ± 0.89 SE (Figure 5b). The 2024 abundance index was 0.23 ± 0.15 SE, which was similar, but slightly higher than the 2023 abundance index of 0.22 ± 0.09 SE. Since the start of the Block Island seine survey, summer flounder has been the least abundant catch for the interest group.

Tautog (*Tautoga onitis*)

During the 2024 survey 72 tautog were collected and ranged in size from 1cm to 19cm. This total number was a decrease from the 2023 survey when 123 juveniles were collected. The 2024 abundance index was 1.20 ± 0.33 SE, a decrease from the 2023 index of 2.05 ± 0.92 SE. Tautog were caught at all sites except for two sites in the Great Salt Pond: Beane Point and Coast Guard Station. Of the eight sites they were caught at tautog were most abundant at the Sand Flat in Old Harbor at a catch per haul of 3.50 ± 2.08 SE (Figure 6a). Tautog were most abundant in August with a catch per haul of 2.40 ±

0.69 SE (Figure 6b). This season was one of the lowest abundance indices for the species since the start of the Block Island survey.

Scup (*Stenotomus chrysops*)

A total of 13 scup were caught in 2024 beach seines ranging in size from 5cm to 10cm. Scup were caught during August and September and only at the two stations in Old Harbor this year. They were most abundant at the Eelgrass Bed in Old Harbor with a catch per haul of 1.50 ± 0.96 SE (Figure 7a). Most individuals were caught in September at a catch per haul of 0.80 ± 0.53 SE in 2024 (Figure 7b). The total survey abundance in 2024 for scup was 0.22 ± 0.12 SE, which marked it as the lowest abundance index recorded for the species in the Block Island time series.

OTHER SPECIES OF INTEREST

Family Clupeidae

In 2024, three species of clupeids were collected during the sampling season: Alewife, Atlantic menhaden, and blueback herring. While other species of clupeids have been collected in past Block Island surveys such as Atlantic herring and hickory shad, they were not captured during the 2024 season. Due to the difficulty of separating juvenile alewives from juvenile blueback herring without sacrificing them, both species are collectively referred to as river herring. Investigators also acknowledge while large schools of clupeid species were not encountered during the 2024 season, they were most likely present in the system and may have been missed during sampling.

Atlantic Menhaden (*Brevoortia tyrannus*)

In the 2024 sampling season, 82 Atlantic menhaden were caught and ranged in size between 5cm and 12cm. The total survey mean abundance index was 1.37 ± 1.19 SE in 2024, which was higher than last year's mean abundance index of 0.37 ± 0.26 SE. Atlantic menhaden were found in August, September, and October this year and at three out of the ten sites: Beane Point and Coast Guard Station in the Great Salt Pond and the Sand Flat in Old Harbor. The species was most abundant at the Sand Flat with a catch per haul of 11.83 ± 11.83 SE. The highest number of individuals were caught in October at a catch per haul of 7.10 ± 7.10 SE.

River Herring: Alewife & Blueback Herring (*Alosa pseudoharengus & Alosa aestivalis*)

Both alewife and blueback herring are classified as river herring for the time series survey. A total of 10 river herring were caught in 2024 and ranged in size from 4cm to 8cm. They were found in July at two sites in the Great Salt Pond: Ball O'Brien and Inner Pond. The total survey mean abundance for blueback herring was 0.17 ± 0.12 SE fish/seine haul in 2024.

FORAGE FISH SPECIES

Forage fish species are commonly encountered across stations and months throughout the sampling season. In 2024, Atlantic silverside, mummichog, sheepshead minnow, and striped killifish comprised 87.8 % of the total fish catch. For the Block Island time series, forage fish species have accounted for about 85-90% of the total fish catch each season.

Atlantic Silverside (*Menidia menidia*)

A total of 13,964 Atlantic silversides were caught in 2024. The total mean abundance was 232.73 ± 47.11 SE in 2024 and was higher than last year's index of 210.65 ± 69.77 SE. The species was most abundant at the Andy's Way in Great Salt Pond with a catch per haul of 719.50 ± 234.61 SE in 2024. The highest number of silversides were caught in September at a catch per haul of 442.60 ± 148.91 SE

in 2024. Silversides ranged in size from 1cm to 16cm and were found in all months and at all sites. The species had the highest abundance of all species caught during the 2024 season and have ranked as the most abundant finfish species since the start of the Block Island survey in 2014.

Mummichog (*Fundulus heteroclitus*)

A total of 571 mummichogs were caught in 2024 and ranged in size from 2cm to 11cm. The species was caught at all sites this season except for the Sand Flat site in Old Harbor. Mummichogs had the highest abundance at Inner Pond in the Great Salt Pond with a catch per haul of 36.33 ± 23.90 SE in 2024. They were caught during all months in 2024 except for May. Mummichogs were most abundant in July at a catch per haul of 17.80 ± 13.68 SE. The total mean abundance was 9.52 ± 3.08 SE in 2024. Since the start of the Block Island time series, mummichogs have been consistently caught across most of the sampling sites and during all months of the season. This year yielded the highest number of mummichog individuals caught across sampling seasons since 2014.

Sheepshead Minnow (*Cyprinodon variegatus*)

Nine hundred and twenty-one sheepshead minnows were caught during the 2024 sampling season. Individuals ranged in size from 3cm to 5cm. The total mean abundance index for the species was 15.35 ± 14.86 SE in 2024. Sheepshead minnows were most abundant in October at a catch per haul of 91.70 ± 88.94 SE and Andy's Way was the most abundant site at a catch per haul of 149.33 ± 148.53 SE in 2024. This past sampling season caught the highest number of sheepshead minnows for the Block Island time series.

Striped Killifish (*Fundulus majalis*)

In 2024, a total of 1,913 striped killifish were collected during the sampling season and ranged in size from 2cm to 13cm. Striped killifish occurred during all months and at all sites except for the two sites in Old Harbor. The total mean abundance was 31.88 ± 10.09 SE in 2024, which was higher than the 2023 index of 12.43 ± 4.43 SE. In 2024, the highest number of striped killifish were caught in October at a catch per haul of 53.60 ± 31.85 SE, and they were most abundant at Inner Pond site in the Great Salt Pond with a catch per haul of 99.17 ± 65.31 SE. Each season since 2014, striped killifish have been consistently documented across all sampling events and sites. Their high abundances also contribute greatly to the total catches comprised for forage fish species each year.

WATER QUALITY DATA

Water quality data for the 2024 season can be found in Table 2. In the Great Salt Pond, water temperature ranged from 14.6°C in May to 27.1°C in July. In Old Harbor, water temperature ranged from 13.7°C in May and 23.4°C in August. The mean salinity of the eight sites in the Great Salt Pond was 29.91ppt ± 0.14 SE, and the mean salinity of the two sites in Old Harbor were 30.28ppt ± 0.19 SE. The lowest dissolved oxygen value recorded across the Great Salt Pond sites was 7.12mg/L in July at Beane Point, while the mean was 8.42mg/L ± 0.11 SE. In 2024, the Sand Flat site in Old Harbor recorded the lowest dissolved oxygen value at 7.69mg/L in June, with a mean of 8.86mg/L ± 0.30 SE between the Old Harbor sites.

TIME SERIES SUMMARY

Since the beginning of the time series in 2014, a total of 650 seines have been hauled across ten sites on Block Island. Since 2014, a total of 239,241 finfish individuals of 101 different species representing 45 families were documented throughout the Block Island seine survey. During the grant period from 2020-2024, 300 seines were hauled resulting in the enumeration of 119,989 individuals across 84

species representing 40 families. In 2024, six new species were recorded in the Block Island survey for the first time — fringed filefish, gray snapper, permit, short bigeye, snowy grouper, and spotfin butterfly. 2024 yielded the highest abundance of silversides, sheepshead minnow, and striped killifish, as well as the lowest abundance of black sea bass, scup, and tautog since the start of the survey in 2014. This year also documented the highest abundance index of juvenile winter flounder for the Block Island time series. Throughout the grant period, and the full time series, the abundance per haul has been highly variable. Investigators acknowledge notable peaks have been largely attributed to schools of forage fish and members of the Clupeid family being caught in the net. Figures displaying abundance and diversity can be found in the Appendix. Additional data is available upon request.

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FIGURES

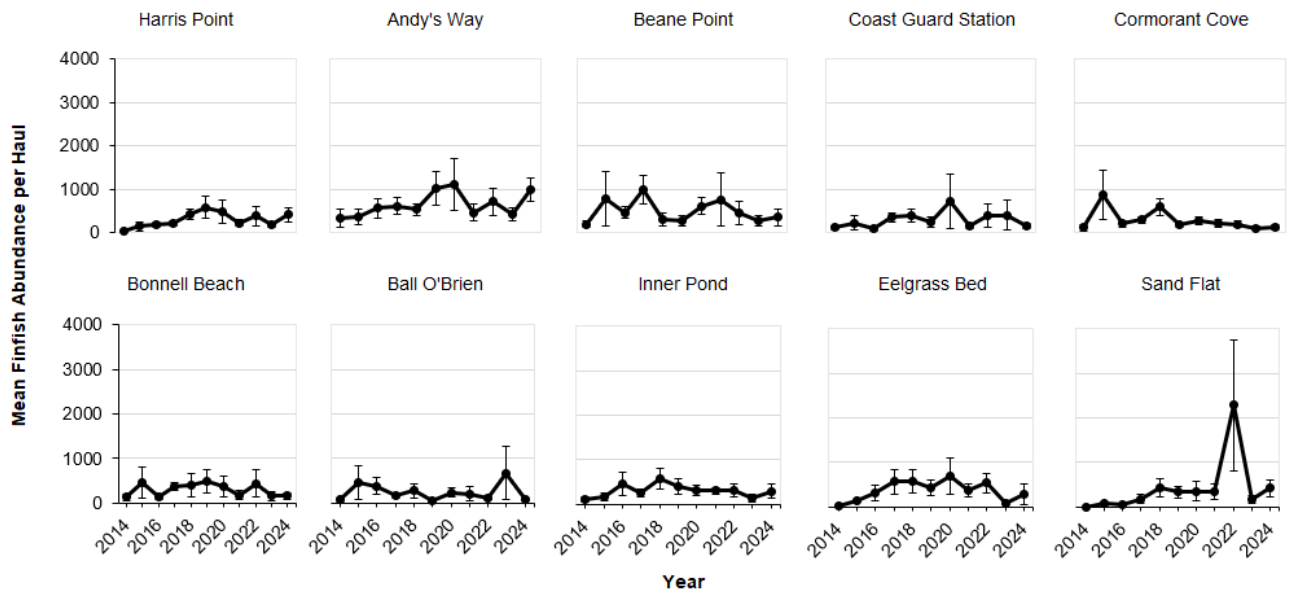

Figure 1. Mean abundance of finfish across sites (± SE) in 2014-2024 beach seines.

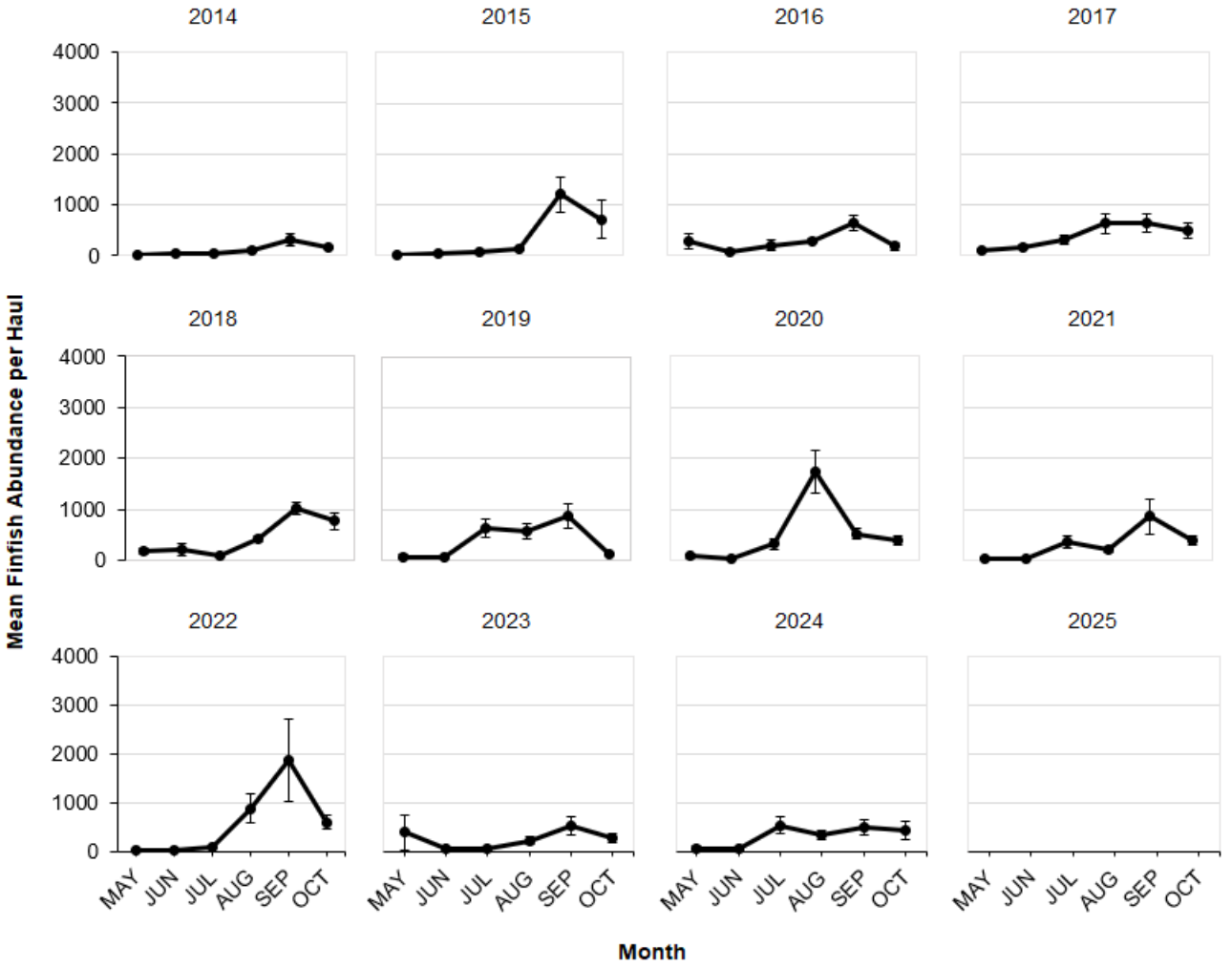

Figure 2. Mean abundance of finfish caught each month (± SE) in 2014-2024 beach seines.

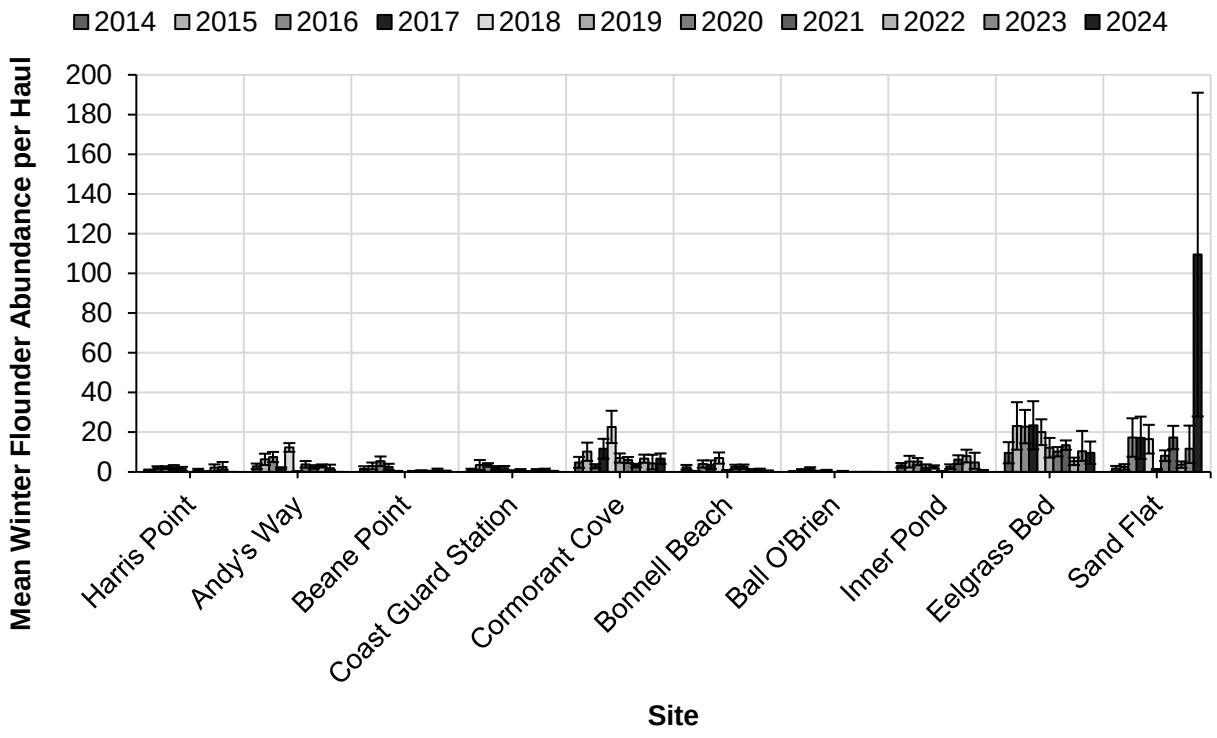

Figure 3a. Mean abundance of winter flounder caught by site (± SE) in 2014-2024 beach seines.

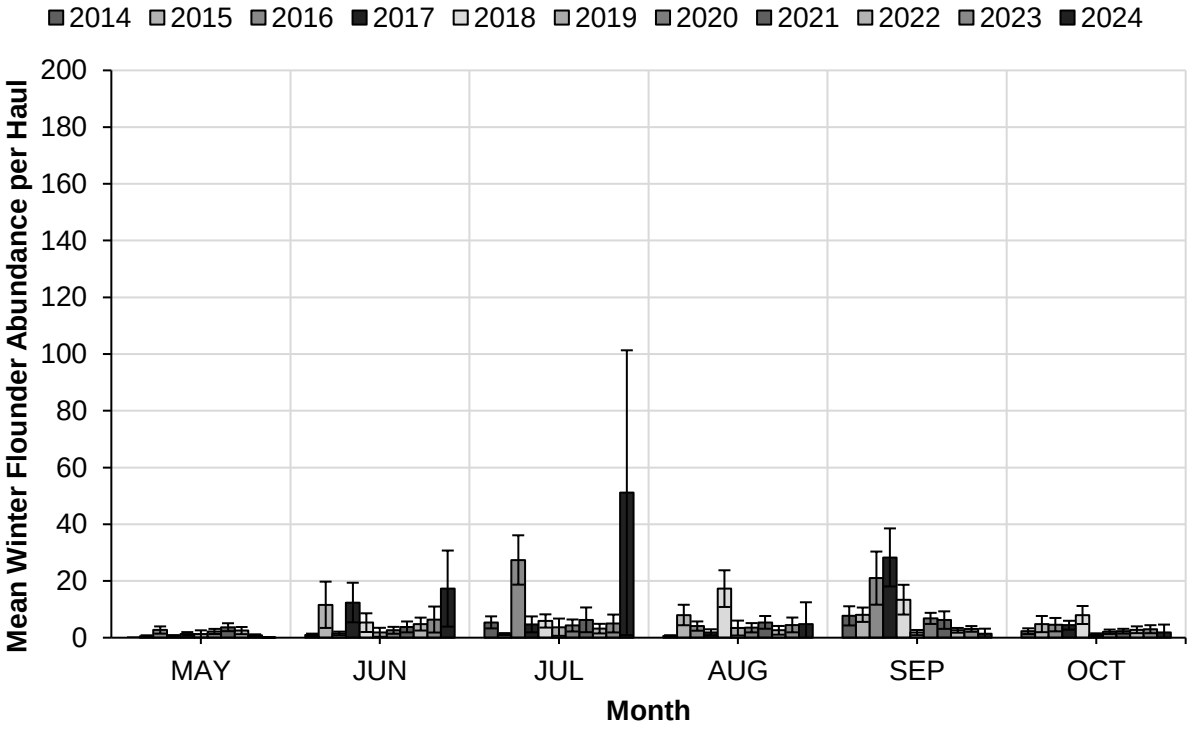

Figure 3b. Mean abundance of winter flounder caught by month (± SE) in 2014-2024 beach seines.

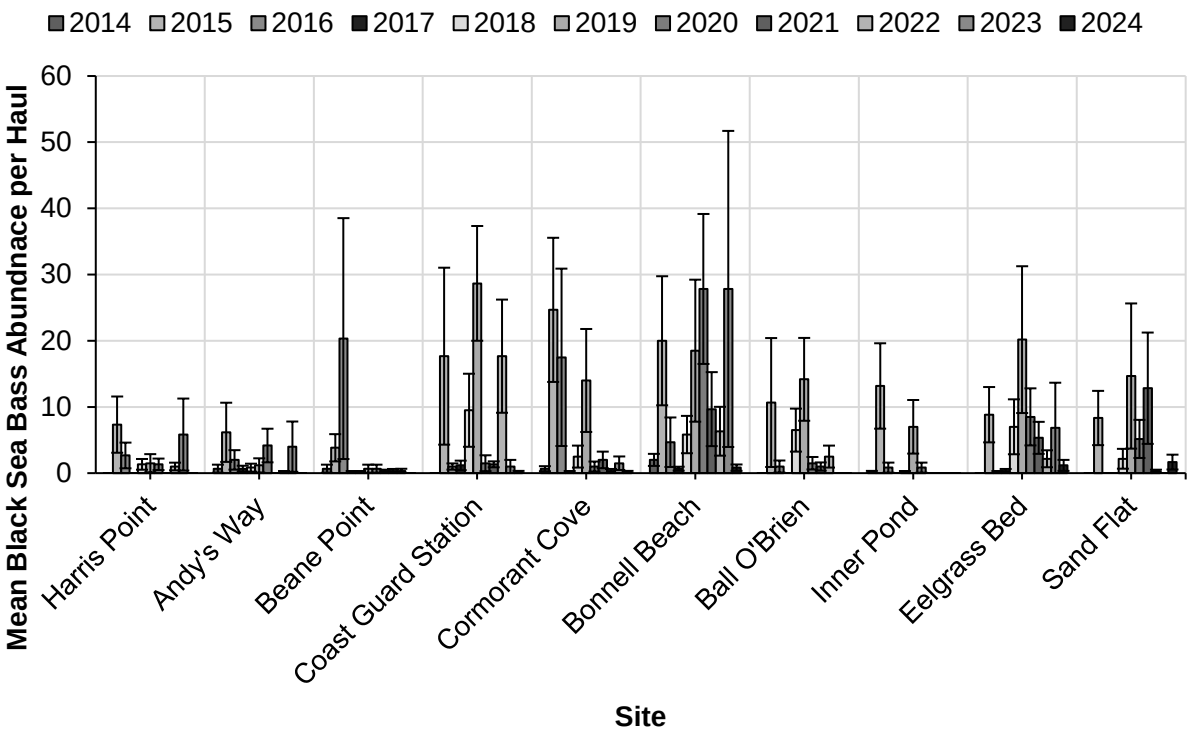

Figure 4a. Mean abundance of black sea bass caught by site (± SE) plotted for each month during the 2014-2024 field seasons.

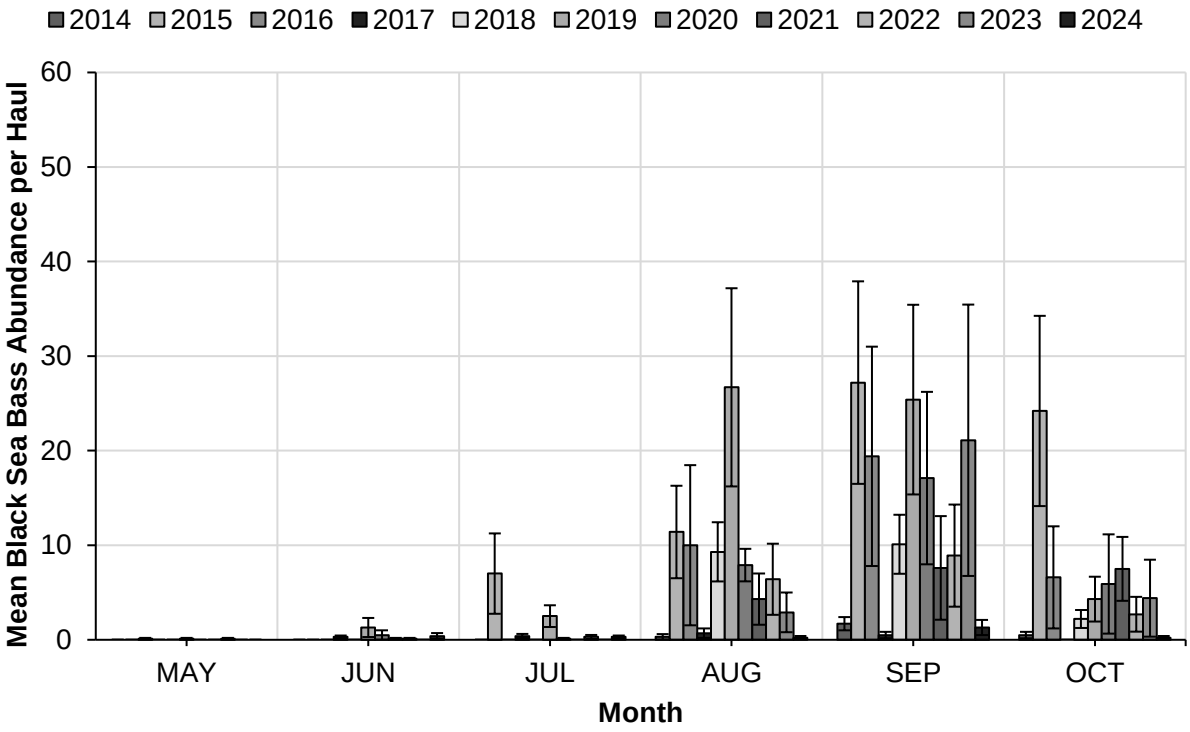

Figure 4b. Mean abundance of black sea bass caught by month (± SE) plotted for each month during the 2014-2024 field seasons.

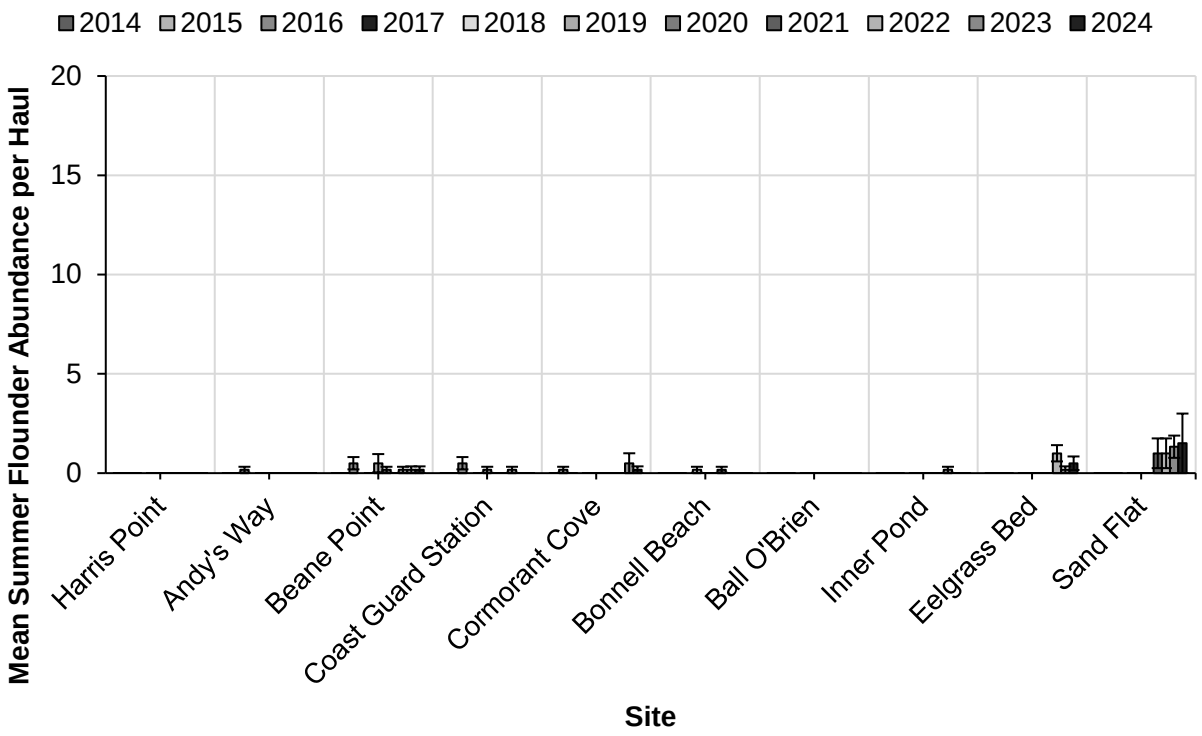

Figure 5a. Mean abundance of summer flounder caught by site (± SE) plotted for each month during the 2014-2024 field seasons.

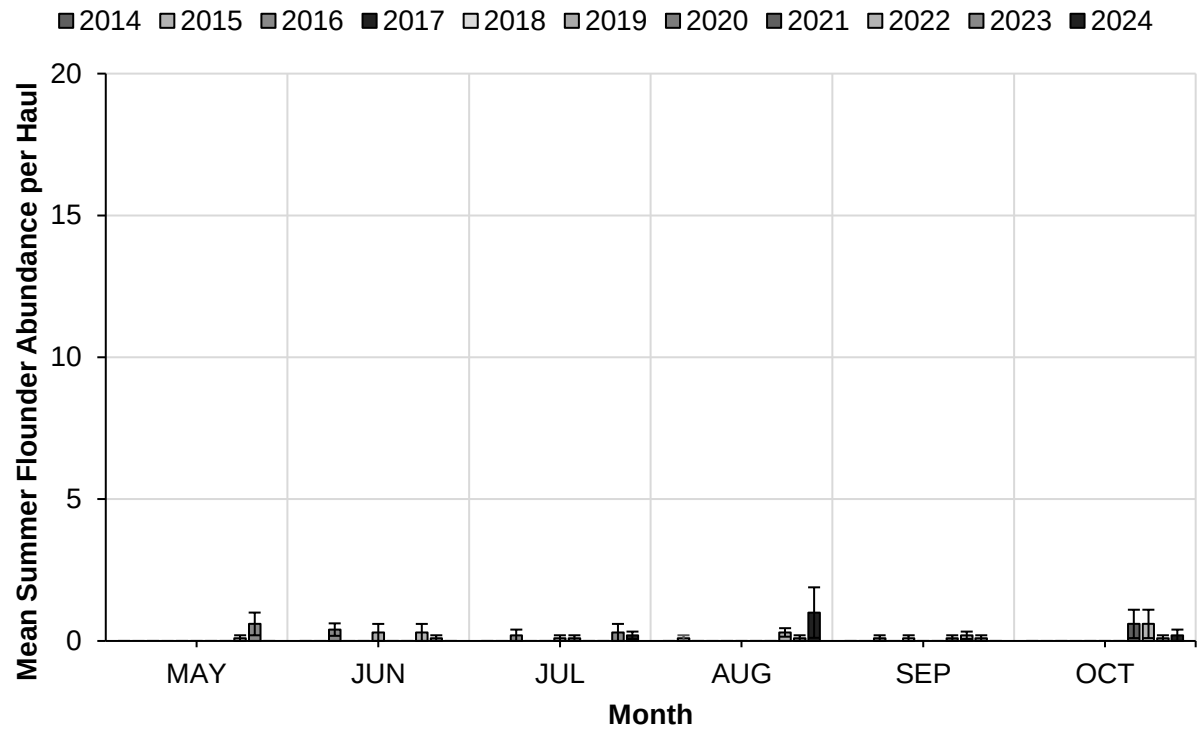

Figure 5b. Mean abundance of summer flounder caught by month (± SE) plotted for each month during the 2014-2024 field seasons.

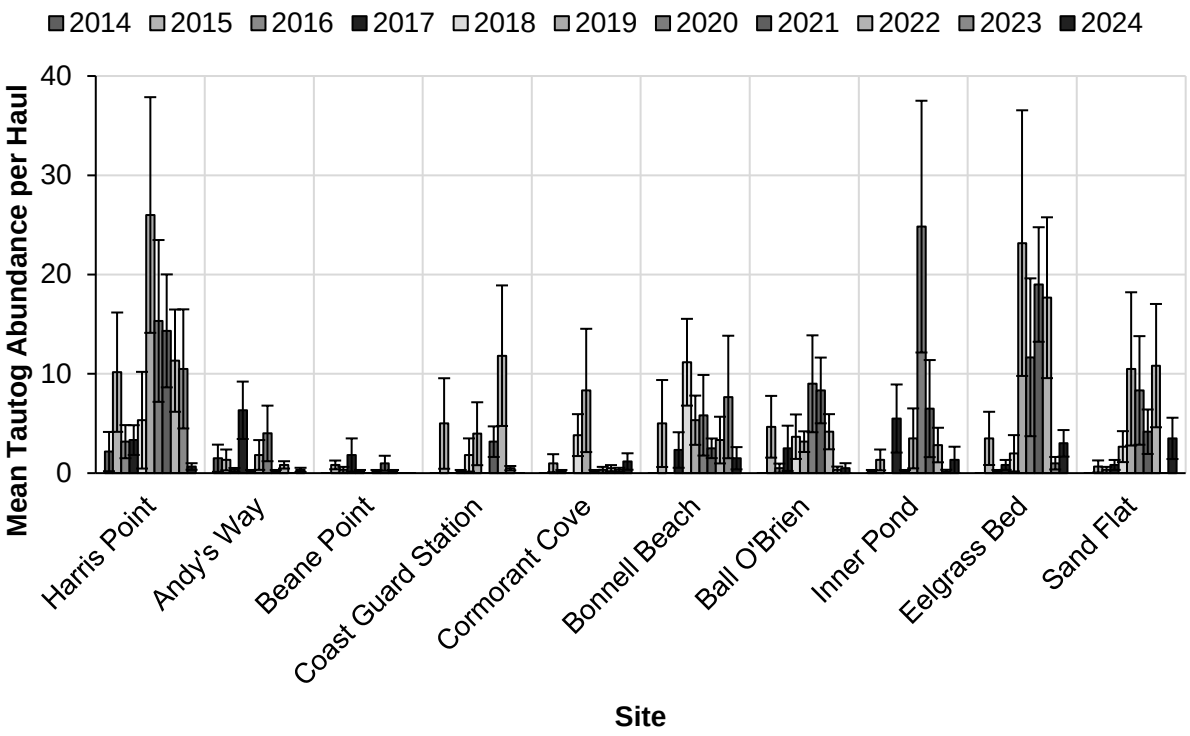

Figure 6a. Mean abundance of tautog caught by site (± SE) plotted for each month during the 2014-2024 field seasons.

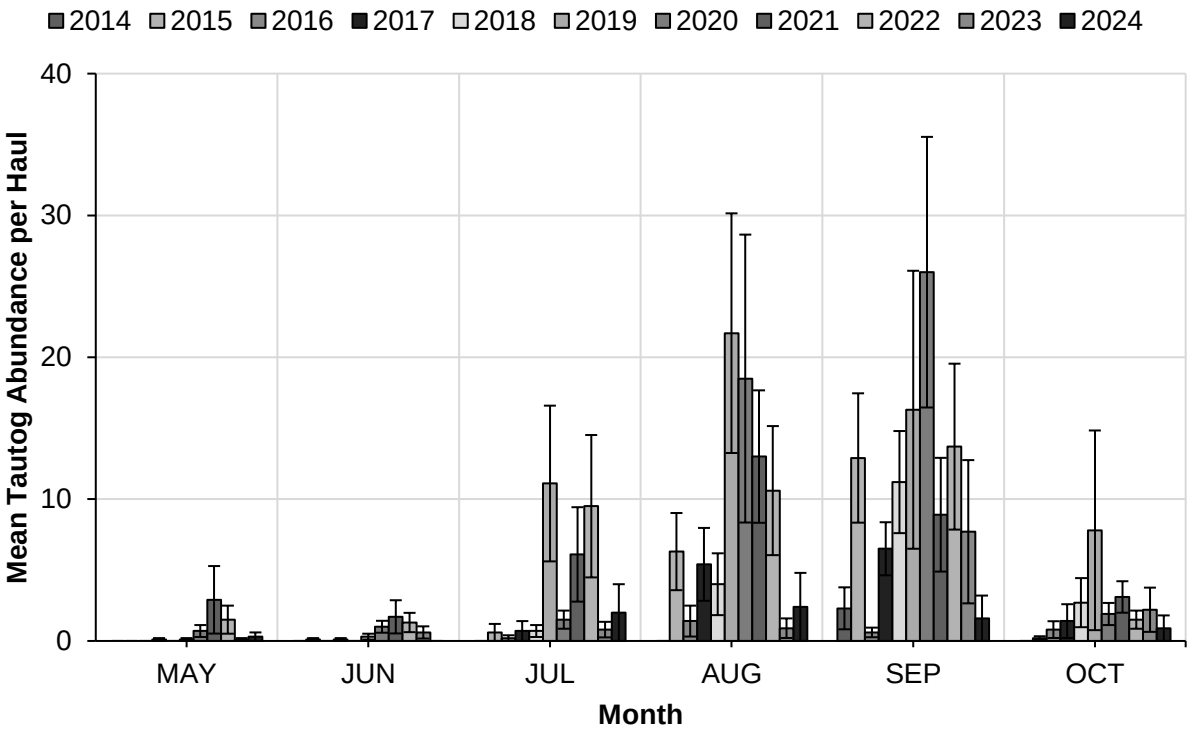

Figure 6b. Mean abundance of tautog caught by month (± SE) plotted for each month during the 2014-2024 field seasons.

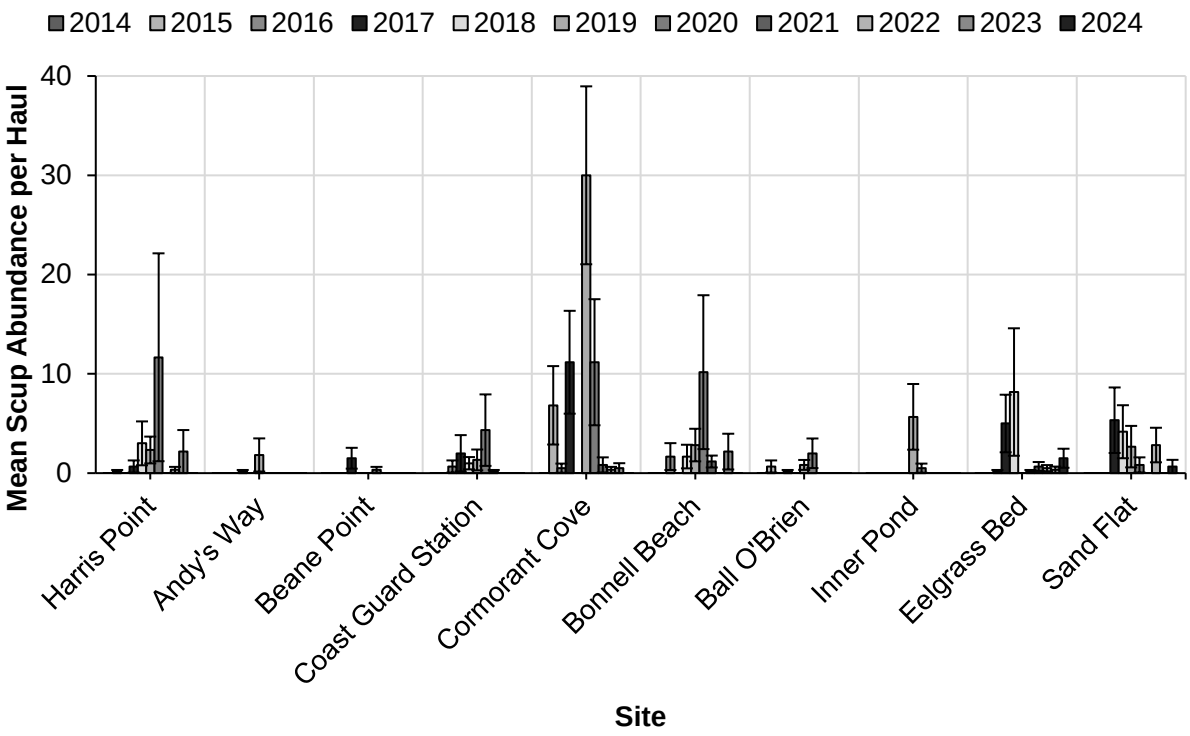

Figure 7a. Mean abundance of scup caught by site (± SE) plotted for each month during the 2014-2024 field seasons.

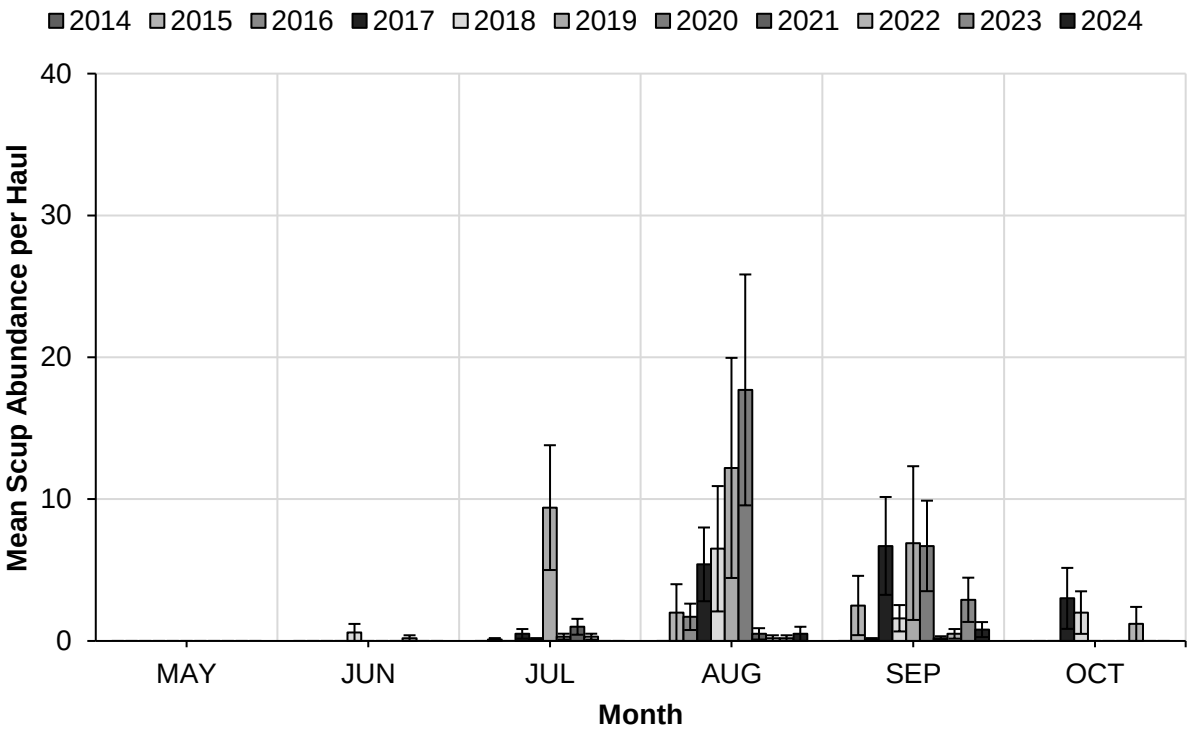

Figure 7b. Mean abundance of scup caught by month (± SE) plotted for each month during the 2014-2024 field seasons.

TABLES

Table 1. Scientific, common names, and total abundance of all species caught in beach seines during 2024.

Common Name	Scientific Name	Abundance
Atlantic Silverside	*Menidia menidia*	13964
Striped Killifish	*Fundulus majalis*	1913
Sheepshead Minnow	*Cyprinodon variegatus*	921
Winter Flounder	*Pseudopleuronectes americanus*	766
Mummichog	*Fundulus heteroclitus*	571
Bay Anchovy	*Anchoa mitchilli*	415
Green Crab	*Carcinus maenas*	413
White Mullet	*Mugil curema*	271
Northern Sennet	*Sphyraena borealis*	119
Atlantic Menhaden	*Brevoortia tyrannus*	82
Tautog	*Tautoga onitis*	72
Blue Crab	*Calinectes sapidus*	71
Rainwater Killifish	*Lucania parva*	57
Lady Crab	*Ovalipes ocellatus*	34
Pollock	*Pollachius virens*	26
Black Sea Bass	*Centropristis striata*	24
Silver Jenny	*Eucinostomus gula*	24
Northern Puffer	*Sphoeroides maculatus*	23
Mojarras spp.	*Gerreidae spp.*	21
Crevalle Jack	*Caranx hippos*	20
Striped Bass	*Morone saxatilis*	18
Cunner	*Tautogolabrus adspersus*	17
Longfin Squid	*Loligo pealei*	15
Summer Flounder	*Paralichthys dentatus*	14
Scup	*Stenotomus chrysops*	13
Pinfish	*Lagodon rhomboides*	12
Horseshoe Crab	*Limulus polyphemus*	11
Oyster Toadfish	*Opsanus tau*	11
Snakefish	*Trachinocephalus myops*	11
Spider Crab	*Libinia emarginata*	11
River Herring (Alewife & Blueback Herring)	*Alosa pseudoharengus & Alosa aestivalis*	10

Table 1. (continued)

Common Name	Scientific Name	Abundance
Northern Pipefish	*Syngnathus fuscus*	7
Chain Pipefish	*Syngnathus louisianae*	6
Grubby	*Myoxocephalus aenaeus*	6
Lined Seahorse	*Hippocampus erectus*	6
Short Bigeye	*Pristigenys alta*	6
Yellow Jack	*Caranx bartholomaei*	6
Horse-eye Jack	*Caranx latus*	5
Jonah Crab	*Cancer borealis*	5
Spotted Whiff	*Citharichthys macrops*	5
Gray Snapper	*Lutjanus griseus*	4
Lookdown	*Selene vomer*	4
Speckled Swimming Crab	*Arenaeus cribrarius*	4
American Sand Lance	*Ammodytes americanus*	3
Atlantic Cod	*Gadus morhua*	3
Sand Diver	*Synodus intermedius*	3
Bay Scallop	*Argopecten irradians*	2
Bluefish	*Pomatomus saltatrix*	2
Bluespotted Cornetfish	*Fistularia tabacaria*	2
Fourspine Stickleback	*Apeltes quadracus*	2
Fourspot Flounder	*Paralichthys oblongus*	2
Red Goatfish	*Mullus auratus*	2
Smooth Trunkfish	*Lactophrys triqueter*	2
Snowy Grouper	*Epinephelus niveatus*	2
Atlantic Croaker	*Micropogonias undulatus*	1
Bay Whiff	*Citharichthys spilopterus*	1
Fringed Filefish	*Monacanthus ciliatus*	1
Leopard Searobin	*Prionotus scitulus*	1
Naked Goby	*Gobiosoma bosc*	1
Northern Kingfish	*Menticirrhus saxatilis*	1
Permit	*Trachinotus falcatus*	1
Spotfin Butterflyfish	*Chaetodon ocellatus*	1
Threespine Stickleback	*Apeltes aculeatus*	1

Table 2. Water temperature, salinity, dissolved oxygen by site and month during the 2024 beach seines.

Site	Month	Temp. (°C)	Sal. (ppt)	DO (mg/L)	Site	Month	Temp. (°C)	Sal. (ppt)	DO (mg/L)
Harris Point	MAY	16.2	27.95	8.20	Cormorant Cove	MAY	16.0	29.04	8.38
	JUN	18.0	29.69	8.69		JUN	18.3	29.50	9.40
	JUL	26.2	30.01	7.22		JUL	24.2	29.88	7.27
	AUG	25.2	29.92	8.64		AUG	23.0	30.04	7.90
	SEP	21.1	30.38	9.37		SEP	19.9	30.73	7.69
	OCT	17.7	31.99	8.65		OCT	20.3	31.00	8.11
Andy's Way	MAY	17.0	28.34	7.85	Bonnell Beach	MAY	17.0	28.82	9.42
	JUN	17.9	30.80	7.56		JUN	18.7	29.43	9.84
	JUL	26.5	30.12	8.11		JUL	23.8	29.82	8.14
	AUG	27.0	29.85	7.99		AUG	23.3	29.69	8.95
	SEP	21.6	30.58	8.32		SEP	20.2	30.51	8.05
	OCT	19.7	31.25	7.87		OCT	18.7	31.17	7.92
Beane Point	MAY	16.0	28.56	8.55	Ball O'Brien	MAY	17.3	28.47	9.61
	JUN	17.6	29.48	8.73		JUN	19.3	29.28	9.98
	JUL	24.9	29.93	7.12		JUL	23.9	29.82	9.27
	AUG	23.5	29.40	8.03		AUG	24.3	29.99	10.00
	SEP	19.9	30.67	7.61		SEP	20.4	30.27	8.03
	OCT	19.5	30.99	7.77		OCT	18.7	31.12	7.74
Coast Guard	MAY	15.8	28.69	8.77	Inner Pond	MAY	14.6	26.92	8.63
	JUN	16.7	29.59	9.51		JUN	19.6	29.12	7.18
	JUL	24.2	29.89	8.96		JUL	27.1	29.91	9.65
	AUG	23.4	29.92	8.93		AUG	24.9	29.44	8.32
	SEP	20.9	30.64	8.15		SEP	21.2	30.68	8.05
	OCT	19.2	31.11	8.25		OCT	18.2	31.20	7.87
Eelgrass Bed	MAY	13.7	29.47	9.08	Sand Flat	MAY	14.3	30.20	8.39
	JUN	17.1	29.91	8.62		JUN	16.8	29.60	7.69
	JUL	22.4	30.42	9.00		JUL	21.9	30.33	7.85
	AUG	23.4	29.14	8.29		AUG	23.4	30.23	8.72
	SEP	20.6	30.87	10.14		SEP	21.5	30.88	11.48
	OCT	19.4	31.16	8.49		OCT	19.7	31.15	8.54

APPENDIX

Table 3a. Catch frequency of all species by site for the 2024 Block Island seine survey.

Species	Harris Point	Andy's Way	Beane Point	Coast Guard	Cormorant Cove	Bonnell Beach	Ball O'Brien	Inner Pond	Eelgrass Bed	Sand Flat	
American Sand Lance			2			1					3
Atlantic Cod									3		3
Atlantic Croaker						1					1
Atlantic Menhaden			5	6						71	82
Atlantic Silverside	1660	4317	1572	841	525	843	436	804	1385	1581	13964
Bay Anchovy	393							22			415
Bay Scallop				1	1						2
Bay Whiff			1								1
Black Sea Bass				1	1	5			7	10	24
Blue Crab	6	2		1	1			8	11	42	71
Bluefish					1					1	2
Bluespotted Cornetfish				1	1						2
Chain Pipefish	3					2	1				6
Crevalle Jack									15	5	20
Cunner	6				1	4	2		4		17
Fourspine Stickleback								2			2
Fourspot Flounder			2								2
Fringed Filefish			1								1
Gray Snapper		1				1			2		4
Green Crab	5	5	11	24	31	18	87	15	47	170	413
Grubby	1					4				1	6
Horse-eye Jack									5		5
Horseshoe Crab		9	1	1							11
Jonah Crab			1	1	1		2				5
Lady Crab	3	2	6		3	20					34
Leopard Searobin						1					1
Lined Seahorse				1	4	1					6
Longfin Squid		12			3						15
Lookdown										4	4
Mojarras spp.	1					18		1		1	21
Mummichog	156	17	90	15	9	45	19	218	2		571
Naked Goby		1									1
Northern Kingfish		1									1
Northern Pipefish	1					1			1	4	7
Northern Puffer				5	7	9				2	23
Northern Sennet	12	7	29	1	2	6	1	30	28	3	119
Oyster Toadfish								11			11
Permit		1									1
Pinfish							1		11		12
Pollock									26		26
Rainwater Killifish	5	3	13			2		34			57
Red Goatfish									2		2
River Herring: Alewife & Blueback Herring							4	6			10
Sand Diver			3								3
Scup									9	4	13
Sheepshead Minnow	17	896	7				1				921
Short Bigeye			1						2	3	6
Silver Jenny	24										24
Smooth Trunkfish		1							1		2
Snakefish			11								11
Snowy Grouper			2								2
Speckled Swimming Crab		2	2								4
Spider Crab	1	1	1		5	1	1			1	11
Spotfin Butterflyfish									1		1
Spotted Whiff			5								5
Striped Bass								18			18
Striped Killifish	149	676	332	34	108	18	1	595			1913
Summer Flounder			1		1				3	9	14
Tautog	4	2			7	9	11		18	21	72
Threespine Stickleback								1			1
White Mullet		3	3	16					94	155	271
Winter Flounder			2	2	40	3		3	59	657	766
Yellow Jack									5	1	6

APPENDIX

Table 4a. Species presence by site for May 2024 beach seines.

MAY	Site										
Species	Harris Point	Andy's Way	Beane Point	Coast Guard	Cormorant Cove	Bonnell Beach	Ball O'Brien	Inner Pond	Eelgrass Bed	Sand Flat	**Total**
American Sand Lance						1					**1**
Atlantic Silverside	1	1	1			1	1	1			**6**
Blue Crab								1			**1**
Cunner							1				**1**
Green Crab			1	1		1	1	1	1	1	**7**
Horseshoe Crab		1	1								**2**
Jonah Crab			1	1							**2**
Pollock									1		**1**
Striped Killifish		1									**1**
Tautog							1				**1**
Threespine Stickleback								1			**1**
Winter Flounder									1		**1**

APPENDIX

Table 4b. Species by site for June 2024 beach seines.

JUN	Site										
Species	Harris Point	Andy's Way	Beane Point	Coast Guard	Cormorant Cove	Bonnell Beach	Ball O'Brien	Inner Pond	Eelgrass Bed	Sand Flat	**Total**
American Sand Lance			1								**1**
Atlantic Silverside	1	1	1	1		1		1	1		**7**
Bay Scallop				1							**1**
Bay Whiff			1								**1**
Black Sea Bass				1		1					**2**
Blue Crab								1			**1**
Green Crab	1	1	1	1	1		1		1	1	**8**
Horseshoe Crab				1							**1**
Jonah Crab					1						**1**
Lady Crab						1					**1**
Mummichog	1						1	1			**3**
Rainwater Killifish								1			**1**
Spider Crab							1				**1**
Striped Killifish		1		1				1			**3**
Winter Flounder					1				1	1	**3**

APPENDIX

Table 4c. Species presence by site for July 2024 beach seines.

JUL	Site										
Species	Harris Point	Andy's Way	Beane Point	Coast Guard	Cormorant Cove	Bonnell Beach	Ball O'Brien	Inner Pond	Eelgrass Bed	Sand Flat	**Total**
Alewife							1	1			**2**
Atlantic Silverside	1	1	1	1	1	1	1	1	1	1	**10**
Bay Anchovy	1							1			**2**
Bay Scallop					1						**1**
Black Sea Bass					1	1				1	**3**
Blue Crab	1			1	1			1		1	**5**
Blueback Herring								1			**1**
Chain Pipefish	1						1				**2**
Crevalle Jack									1	1	**2**
Cunner	1				1				1		**3**
Fourspine Stickleback								1			**1**
Green Crab	1	1	1	1	1	1	1	1	1	1	**10**
Lady Crab			1		1	1					**3**
Leopard Searobin						1					**1**
Longfin Squid		1									**1**
Mummichog	1	1				1		1			**4**
Naked Goby		1									**1**
Northern Pipefish									1	1	**2**
Northern Puffer						1				1	**2**
Northern Sennet	1	1	1	1	1	1	1	1	1		**9**
Pinfish							1		1		**2**
Rainwater Killifish	1							1			**2**
Red Goatfish									1		**1**
Short Bigeye			1								**1**
Snowy Grouper			1								**1**
Spider Crab			1		1						**2**
Spotted Whiff			1								**1**
Striped Killifish	1	1		1	1			1			**5**
Summer Flounder			1		1						**2**
Tautog	1				1	1	1		1	1	**6**
Winter Flounder			1		1	1				1	**4**

APPENDIX

Table 4d. Species presence by site for August 2024 beach seines.

AUG	Site										
Species	Harris Point	Andy's Way	Beane Point	Coast Guard	Cormorant Cove	Bonnell Beach	Ball O'Brien	Inner Pond	Eelgrass Bed	Sand Flat	**Total**
Atlantic Croaker						1					**1**
Atlantic Menhaden			1								**1**
Atlantic Silverside	1	1	1	1	1	1	1	1	1	1	**10**
Black Sea Bass										1	**1**
Blue Crab	1	1						1	1		**4**
Chain Pipefish						1					**1**
Cunner						1			1		**2**
Fourspot Flounder			1								**1**
Fringed Filefish			1								**1**
Gray Snapper		1							1		**2**
Green Crab		1	1	1	1	1	1		1	1	**8**
Grubby						1				1	**2**
Horse-eye Jack									1		**1**
Lady Crab		1	1			1					**3**
Lined Seahorse				1	1						**2**
Lookdown										1	**1**
Mojarras spp.	1					1				1	**3**
Mummichog	1	1	1	1	1	1		1	1		**8**
Northern Kingfish		1									**1**
Northern Pipefish	1									1	**2**
Northern Puffer				1	1	1					**3**
Northern Sennet		1			1	1				1	**4**
Permit		1									**1**
Rainwater Killifish	1	1	1			1					**4**
Red Goatfish									1		**1**
Sand Diver			1								**1**
Scup									1		**1**
Sheepshead Minnow		1									**1**
Short Bigeye									1	1	**2**
Smooth Trunkfish		1							1		**2**
Snakefish			1								**1**
Speckled Swimming Crab		1									**1**
Spider Crab										1	**1**
Striped Killifish	1	1	1	1	1		1				**6**
Summer Flounder									1	1	**2**
Tautog		1			1	1			1	1	**5**
White Mullet		1	1						1	1	**4**
Winter Flounder					1	1			1	1	**4**
Yellow Jack									1	1	**2**

APPENDIX

Table 4e. Species presence by site for September 2024 beach seines.

SEP	Site										
Species	Harris Point	Andy's Way	Beane Point	Coast Guard	Cormorant Cove	Bonnell Beach	Ball O'Brien	Inner Pond	Eelgrass Bed	Sand Flat	**Total**
Atlantic Menhaden				1							**1**
Atlantic Silverside	1	1	1	1	1	1	1	1	1	1	**10**
Black Sea Bass						1			1	1	**3**
Blue Crab								1	1	1	**3**
Bluefish					1					1	**2**
Bluespotted Cornetfish				1							**1**
Chain Pipefish						1					**1**
Gray Snapper						1					**1**
Green Crab	1	1		1		1	1	1	1	1	**8**
Grubby						1					**1**
Lady Crab						1					**1**
Lined Seahorse					1	1					**2**
Lookdown										1	**1**
Mojarras spp.						1		1			**2**
Mummichog	1	1	1	1	1	1	1		1		**8**
Northern Pipefish						1					**1**
Northern Puffer				1							**1**
Northern Sennet						1					**1**
Oyster Toadfish								1			**1**
Scup									1	1	**2**
Sheepshead Minnow		1									**1**
Short Bigeye										1	**1**
Snakefish			1								**1**
Speckled Swimming Crab			1								**1**
Spotfin Butterflyfish									1		**1**
Striped Killifish	1	1	1	1	1	1					**6**
Tautog	1					1			1	1	**4**
White Mullet				1					1	1	**3**
Winter Flounder				1	1	1		1	1	1	**6**

APPENDIX

Table 4f. Species presence by site for October 2024 beach seines.

OCT	Site										
Species	Harris Point	Andy's Way	Beane Point	Coast Guard	Cormorant Cove	Bonnell Beach	Ball O'Brien	Inner Pond	Eelgrass Bed	Sand Flat	**Total**
Atlantic Cod									1		**1**
Atlantic Menhaden										1	**1**
Atlantic Silverside	1	1	1	1	1	1	1		1	1	**9**
Bay Anchovy	1										**1**
Black Sea Bass									1		**1**
Blue Crab		1							1	1	**3**
Bluespotted Cornetfish					1						**1**
Cunner	1						1		1		**3**
Green Crab	1	1		1			1		1	1	**6**
Grubby	1										**1**
Jonah Crab							1				**1**
Lady Crab	1	1			1						**3**
Lined Seahorse					1						**1**
Longfin Squid					1						**1**
Mummichog	1	1	1		1		1				**5**
Oyster Toadfish								1			**1**
Sheepshead Minnow	1	1	1				1				**4**
Silver Jenny	1										**1**
Spider Crab	1	1				1					**3**
Striped Bass								1			**1**
Striped Killifish	1	1	1	1	1	1					**6**
Summer Flounder									1		**1**
Tautog	1	1							1		**3**
White Mullet									1		**1**
Winter Flounder				1	1			1	1	1	**5**

APPENDIX

Table 5a. Abundances of winter flounder in 2024 beach seines.

Winter Flounder

Month	Harris Point	Andy's Way	Beane Point	Coast Guard Station	Cormorant Cove	Bonnell Beach	Ball O'Brien	Inner Pond	Eelgrass Bed	Sand Flat	Mean	SD	SE	Total
	Site													
MAY	0	0	0	0	0	0	0	1	0	0	0.10	0.32	0.10	1
JUN	0	0	0	0	4	0	0	0	35	134	17.30	42.43	13.42	173
JUL	0	0	2	0	5	1	0	0	0	503	51.10	158.79	50.21	511
AUG	0	0	0	0	19	1	0	0	16	12	4.80	7.69	2.43	48
SEP	0	0	0	1	5	1	0	2	1	4	1.40	1.78	0.56	14
OCT	0	0	0	1	7	0	0	1	6	4	1.90	2.73	0.86	19
Mean	0.00	0.00	0.33	0.33	6.67	0.50	0.00	0.67	9.67	109.50				
SD	0.00	0.00	0.82	0.52	6.47	0.55	0.00	0.82	13.84	199.60		**Total Fish**		
SE	0.00	0.00	0.33	0.21	2.64	0.22	0.00	0.33	5.65	81.49		**766**		
Total	0	0	2	2	40	3	0	4	58	657				

APPENDIX

Table 5b. Abundances of summer flounder in 2024 beach seines.

Summer Flounder

Month	Site: Harris Point	Andy's Way	Beane Point	Coast Guard Station	Cormorant Cove	Bonnell Beach	Ball O'Brien	Inner Pond	Eelgrass Bed	Sand Flat	Mean	SD	SE	Total
MAY	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0
JUN	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0
JUL	0	0	1	0	1	0	0	0	0	0	0.20	0.42	0.13	2
AUG	0	0	0	0	0	0	0	0	1	9	1.00	2.83	0.89	10
SEP	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0
OCT	0	0	0	0	0	0	0	0	2	0	0.20	0.63	0.20	2
Mean	0.00	0.00	0.17	0.00	0.17	0.00	0.00	0.00	0.50	1.50				
SD	0.00	0.00	0.41	0.00	0.41	0.00	0.00	0.00	0.84	3.67		**Total Fish**		
SE	0.00	0.00	0.17	0.00	0.17	0.00	0.00	0.00	0.34	1.50		**14**		
Total	0	0	1	0	1	0	0	0	3	9				

APPENDIX

Table 5c. Abundances of black sea bass in 2024 beach seines.

Black Sea Bass

Month	Harris Point	Andy's Way	Beane Point	Coast Guard Station	Cormorant Cove	Bonnell Beach	Ball O'Brien	Inner Pond	Eelgrass Bed	Sand Flat	Mean	SD	SE	Total
MAY	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0
JUN	0	0	0	1	0	3	0	0	0	0	0.40	0.97	0.31	4
JUL	0	0	0	0	1	1	0	0	0	1	0.30	0.48	0.15	3
AUG	0	0	0	0	0	0	0	0	0	2	0.20	0.63	0.20	2
SEP	0	0	0	0	0	1	0	0	5	7	1.30	2.54	0.80	13
OCT	0	0	0	0	0	0	0	0	2	0	0.20	0.63	0.20	2
Mean	0.00	0.00	0.00	0.17	0.17	0.83	0.00	0.00	1.17	1.67				
SD	0.00	0.00	0.00	0.41	0.41	1.17	0.00	0.00	2.04	2.73		**Total Fish**		
SE	0.00	0.00	0.00	0.17	0.17	0.48	0.00	0.00	0.83	1.12		**24**		
Total	0	0	0	1	1	5	0	0	7	10				

APPENDIX

Table 5d. Abundances of scup in 2024 beach seines.

Scup

Month	Harris Point	Andy's Way	Beane Point	Coast Guard Station	Cormorant Cove	Bonnell Beach	Ball O'Brien	Inner Pond	Eelgrass Bed	Sand Flat	Mean	SD	SE	Total
MAY	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0
JUN	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0
JUL	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0
AUG	0	0	0	0	0	0	0	0	5	0	0.50	1.58	0.50	5
SEP	0	0	0	0	0	0	0	0	4	4	0.80	1.69	0.53	8
OCT	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0
Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.67				
SD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.35	1.63		**Total Fish**		
SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.67		**13**		
Total	0	0	0	0	0	0	0	0	9	4				

APPENDIX

Table 5e. Abundances of tautog in 2024 beach seines.

Tautog

Month	Harris Point	Andy's Way	Beane Point	Coast Guard Station	Cormorant Cove	Bonnell Beach	Ball O'Brien	Inner Pond	Eelgrass Bed	Sand Flat	Mean	SD	SE	Total
	Site													
MAY	0	0	0	0	0	0	3	0	0	0	0.30	0.95	0.30	3
JUN	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0
JUL	2	0	0	0	5	1	0	8	1	3	2.00	2.67	0.84	20
AUG	0	1	0	0	2	1	0	0	7	13	2.40	4.30	1.36	24
SEP	1	0	0	0	0	7	0	0	3	5	1.60	2.55	0.81	16
OCT	1	1	0	0	0	0	0	0	7	0	0.90	2.18	0.69	9
Mean	0.67	0.33	0.00	0.00	1.17	1.50	0.50	1.33	3.00	3.50				
SD	0.82	0.52	0.00	0.00	2.04	2.74	1.22	3.27	3.29	5.09		**Total Fish**		
SE	0.33	0.21	0.00	0.00	0.83	1.12	0.50	1.33	1.34	2.08		**72**		
Total	4	2	0	0	7	9	3	8	18	21				

APPENDIX

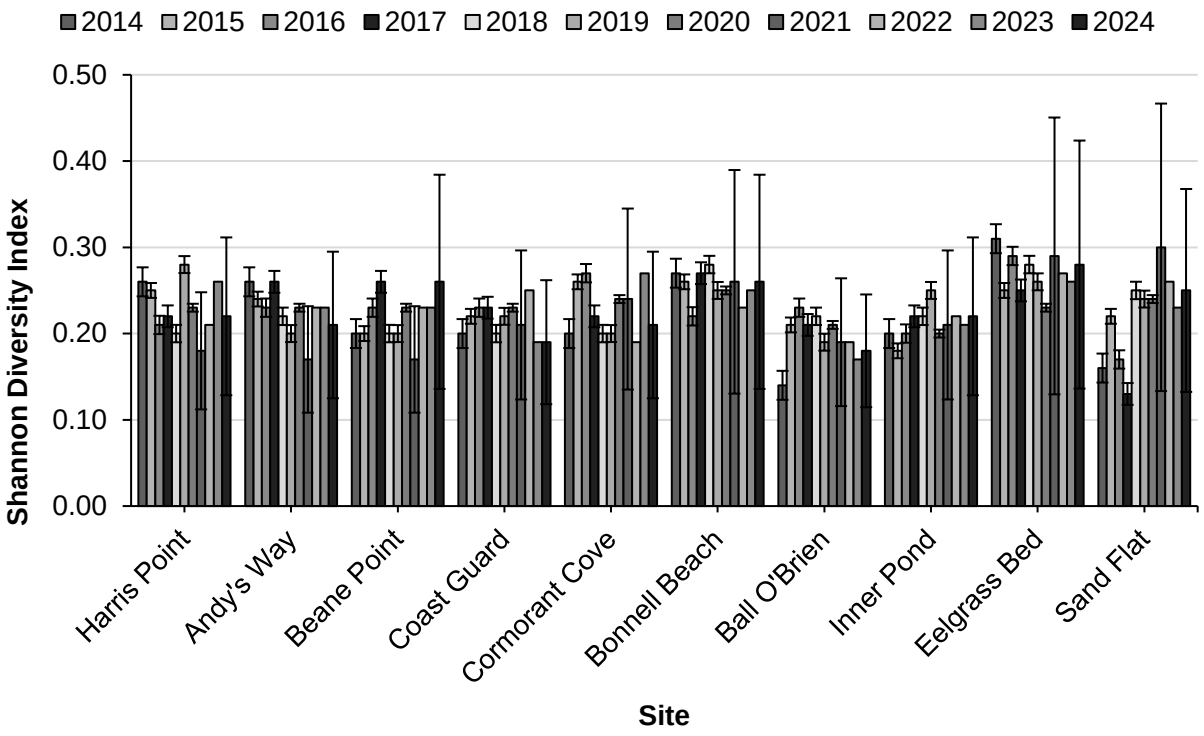

Figure 4. Mean Shannon diversity across sites in 2014-2024 beach seines.

APPENDIX

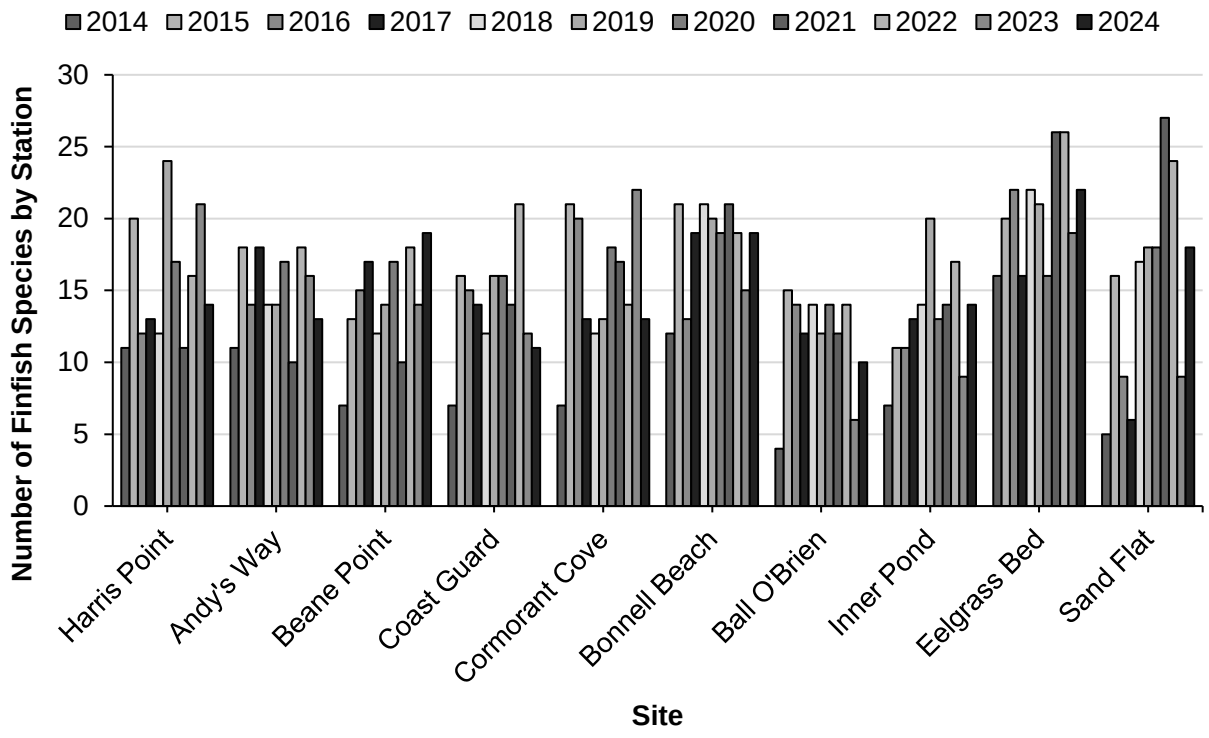

Figure 5. Cumulative number of finfish species by site in 2014-2024 beach seines.