# 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, 2025 to December 31, 2029

Reporting Period: January 15, 2025 to December 31, 2029


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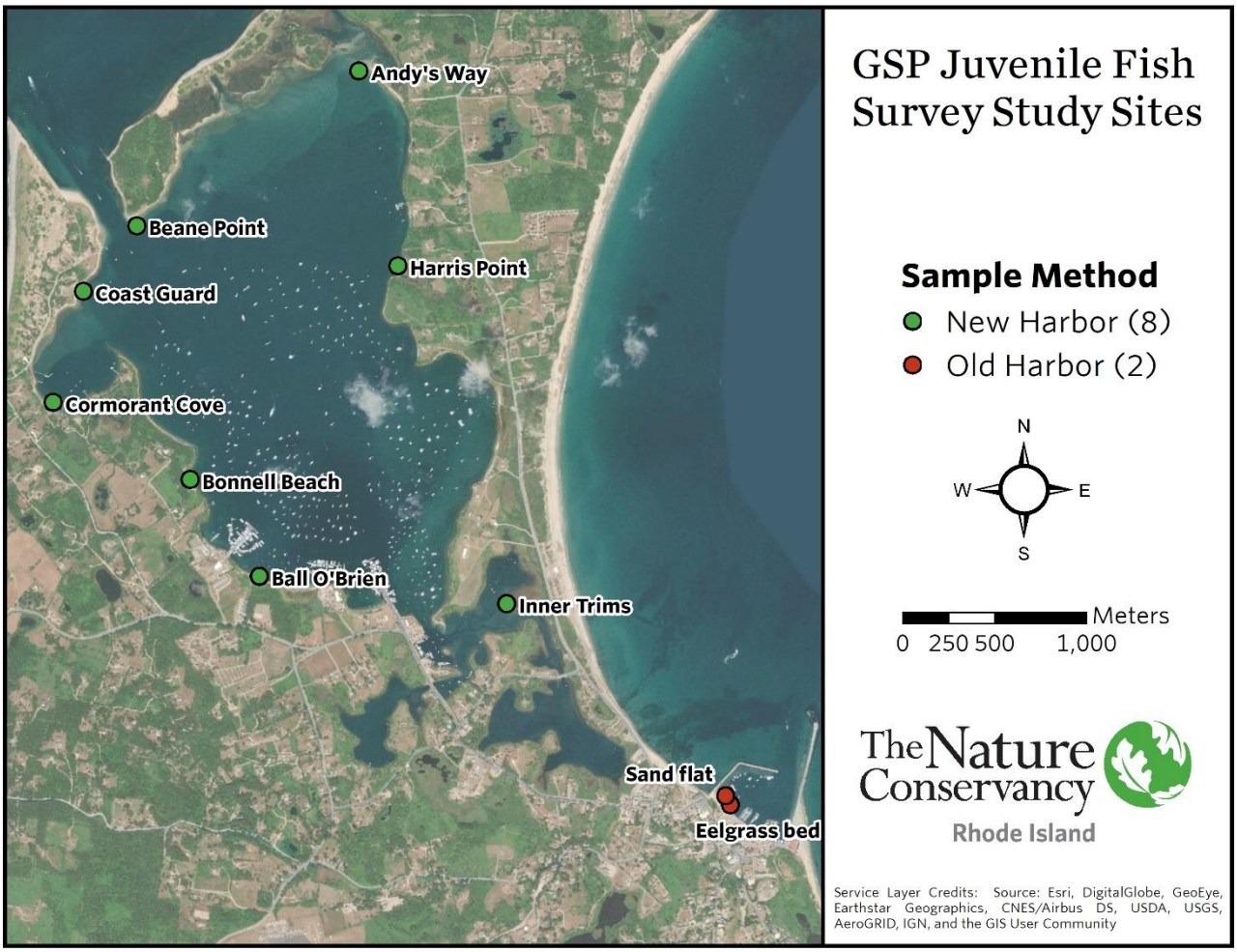
Map of study area and sampling locations.



## SUMMARY

During the 2025 season, a total of 60 seines were hauled across 10 sites in May through October, resulting in the enumeration of 16,385 individuals. Of the animals caught, 15,387 of those individuals were finfish, and 998 were other marine invertebrates. A total of 2,867 individuals were measured, and 47 species were identified. 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, 2025

## NEXT STEPS

Investigators intend to continue sampling with the same methodology during the field season of 2026 under the 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 (2014-2025), captured 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 highlight young-of-the-year individuals, but all are included in the figures and tables located in the Appendix. Other species of interest and their relative abundances were also included in this report. These species include members of the Clupeidae family: Atlantic 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 contribute directly to the production of 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 sustained by the natural resources and waterbodies of Narragansett Bay, Rhode Island Sound, and Block Island Sound. 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 (DMF) and The Nature Conservancy (TNC) 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 DMF 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 2025 field season, a total of 60 seines were hauled across the ten sampling sites. A total of 15,387 finfish were identified and enumerated, and 2,867 of those were measured. A total of 16,385 individuals were caught (Table 1). Of the species caught, only finfish were included in the results below.

A mean of 256.45 ± 75.47 SE finfish were caught per haul in 2025. Catch per haul across sites for the Block Island survey was greatest at the Eelgrass Bed site at 751.00 ± 694.64 SE and lowest at Cormorant Cove at 66.83 ± 28.13 (Figure 1). The high catch rate at Eelgrass Bed is partially due to a large number of Atlantic silversides (see Forage Fish Species below). Catch per haul across months was greatest in September at 842.10 ± 386.23 SE and lowest in June at 23.30 ± 6.24 SE (Figure 2).

*TARGET SPECIES*

Winter Flounder (*Pseudopleuronectes americanus*)

Of the total 42 winter flounder caught in 2025 seines, 39 individuals were YOY (*individuals measuring under 120mm*), and 3 individuals were age 1+ (max length = 220 mm; Able and Fahay 1998; Berry et al. 1965; Meng et al. 2000). In 2025, winter flounder were collected during all months but May and caught at all sites except for Andy's Way, Ball O'Brien, and Inner Pond. The most abundant site for winter flounder was the Sand Flat site in Old Harbor at a catch per haul of 2.833 ± 2.06 SE (Figure 3a). The most abundant month for winter flounder was June at a catch per haul of 2.2 ± 1.36 SE fish/seine haul (Figure 3b). The 2025 juvenile winter flounder abundance index was 0.7 ± 0.27 SE fish/seine haul, which was lower than the 2024 index of 12.77 ± 8.63 SE. This year marked a decrease from 2024, which saw the highest abundance index of winter flounder for the Block Island time series.

Black Sea Bass (*Centropristis striata*)

A total of 33 black sea bass were caught in 2025. Black sea bass were caught at 6 out of the ten sites for the survey: Harris Point, Coast Guard Station, Cormorant Cove, Bonnell Beach, Ball O'Brien, and Eelgrass Bed. They were most abundant at Bonnell Beach in New Harbor at a catch per haul of 3.67 ± 2.09 SE (Figure 4a). Most individuals were caught in September and October at a catch per haul of 1.40 ± 0.74 SE and 1.40 ± 1.12 SE respectively. (Figure 4b). Black sea bass ranged in size between 3cm and 8cm in 2025.

The abundance index for black sea bass in 2025 was 0.55 ± 0.24 SE fish/seine haul. This was higher than the 2024 index of 0.40 ± 0.16 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 1 summer flounder was caught in 2025 beach seines at 56mm. Summer flounder was only caught at the Sand Flat site at Old Harbor in May (Figures 5a and 5b). The 2025 abundance index was 0.02 ± 0.02, which was smaller than the 2024 abundance index of 0.23 ± 0.15 SE. Since the start of the Block Island seine survey, summer flounder have been the least abundant catch out of all species of interest.

Tautog (*Tautoga onitis*)

During the 2025 survey, 120 tautog were collected and ranged in size from 3cm to 15cm. This total number was an increase from the 2024 survey, where 72 juveniles were collected. The 2025 abundance index was 2.00 ± 0.69 SE, an increase from the 2024 index of 1.20 ± 0.33 SE. No tautog were caught at the following four sites: Andy's Way, Beane Point, Coast Guard Station, and Cormorant Cove. At the 6 sites they were caught, tautog were most abundant at Harris Point, with a catch per haul of 6.00 ± 4.30 SE (Figure 6a). Tautog were most abundant in September with a catch per haul of 7.40 ± 3.10 SE (Figure 6b).

0 scup were caught in 2025 beach seines. This marks a decrease from the 2024 abundance index (0.22 ± 0.12 SE). With no catches, this year is marked as the new lowest abundance index recorded for the species in the Block Island time series.

*OTHER SPECIES OF INTEREST*

Family Clupeidae

In 2025, 1 species of clupeid was collected during the sampling season: Atlantic herring. While other species of clupeids have been collected in past Block Island surveys such as river herring and hickory shad, they were not captured during the 2025 season.

Atlantic Menhaden (*Brevoortia tyrannus*)

In the 2025 sampling season, no Atlantic menhaden were caught. The mean abundance index of 0 is lower than last year's mean abundance index of 1.37 ± 1.19 SE.

Atlantic herring (*Alosa*)

A total of 1 Atlantic herring was caught in 2025 and was 4cm in length. It was found in August at Sand Flat in Old Harbor. The total survey mean abundance for Atlantic herring was 0.02 ± 0.02 SE fish/seine haul in 2025.

*FORAGE FISH SPECIES*

Forage fish species are commonly encountered across stations and months throughout the sampling season. In 2025, Atlantic silverside, mummichog, sheepshead minnow, and striped killifish comprised 93.4% 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*)

During the 2025 sampling season a total of 12,554 Atlantic silversides were caught. The total mean abundance was 209.23 ± 73.63 SE in 2025 and was lower than last year's index of 232.73 ± 47.11 SE. The species was most abundant at the Eelgrass Bed site in Old Harbor with a catch per haul of 726.83 ± 692.06 SE. The highest number of silversides were caught in September at a catch per haul of 700.00 ± 395.01 SE. Silversides ranged in size from 3cm to 15cm and were found in all months and at all sites. This species had the highest abundance of all species caught during the 2025 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 491 mummichogs were caught in 2025 and ranged in size from 2cm to 9cm. The species was caught at all sites this season except for the Sand Flat site in Old Harbor. Mummichogs had the highest abundance at the Inner Pond site with a catch per haul of 26.33 ± 12.00 SE in 2025. They were caught during all months in 2025 except for May. Mummichogs were most abundant in September at a catch per haul of 16.70 ± 4.75 SE. The total mean abundance was 8.18 ± 2.31 SE in 2025.

Sheepshead Minnow (*Cyprinodon variegatus*)

During the 2025 sampling season, 10 sheepshead minnows were caught. Individuals ranged in size from 3cm to 4cm. The total mean abundance index for the species was 0.17 ± 0.12 SE. Sheepshead minnows were most abundant in September at a catch per haul of 0.6 ± 0.57 SE and Inner Pond was the most abundant site at a catch per haul of 1.67 ± 1.09 SE.

Striped Killifish (*Fundulus majalis*)

In 2025, a total of 1,317 striped killifish were collected and ranged in size from 2cm to 13cm. Striped killifish occurred during all months except for June and at all sites except for the eelgrass bed and sand flat in Old Harbor. The total mean abundance was 21.95 ± 10.38, which was lower than the 2024 index of 31.88 ± 10.09 SE. In 2025, the highest number of striped killifish were caught in September at a catch per haul of 83.50 ± 57.18 SE, and they were most abundant at the Inner Pond site in the Great Salt Pond with a catch per haul of 108.50 ± 94.28 SE. Their high abundance also contributes greatly to the total catch of forage fish species each year.

*WATER QUALITY DATA*

Water quality data for the 2025 season can be found in Table 2. In the Great Salt Pond, water temperature ranged from 14.2°C in May to 28.4°C in July. In Old Harbor, water temperature ranged from 13.7°C in May and 24.5°C in July. The mean salinity of the eight sites in the Great Salt Pond was 32.87ppt ± 0.21 SE, and the mean salinity of the two sites in Old Harbor were 32.87ppt ± 0.19 SE.

The lowest dissolved oxygen value recorded across the Great Salt Pond sites was 6.25mg/L in September month at Inner Pond, while the mean was 8.53mg/L ± 0.15mg/L SE. In 2025, the Sand Flat site in Old Harbor recorded the lowest dissolved oxygen value at 4.17mg/L in September, with a mean of 8.7mg/L ± 0.59mg/L SE between the Old Harbor sites.

**TIME SERIES SUMMARY**

Since the beginning of the time series in 2014, a total of 710 seines have been hauled across ten sites on Block Island, capturing a total of 254,628 finfish individuals of 101 different species representing 45 families. No new species were recorded on Block Island for the 2025 season. In addition, 2025 marked a decrease in the overall number of many fish species, including winter flounder, summer flounder, scup, Atlantic menhaden, Atlantic silversides, mummichogs, and striped killifish. An increase in species abundance was documented in black sea bass and tautog. Figures displaying abundance and diversity can be found in the Appendix. Additional data is available upon request.

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## FIGURES

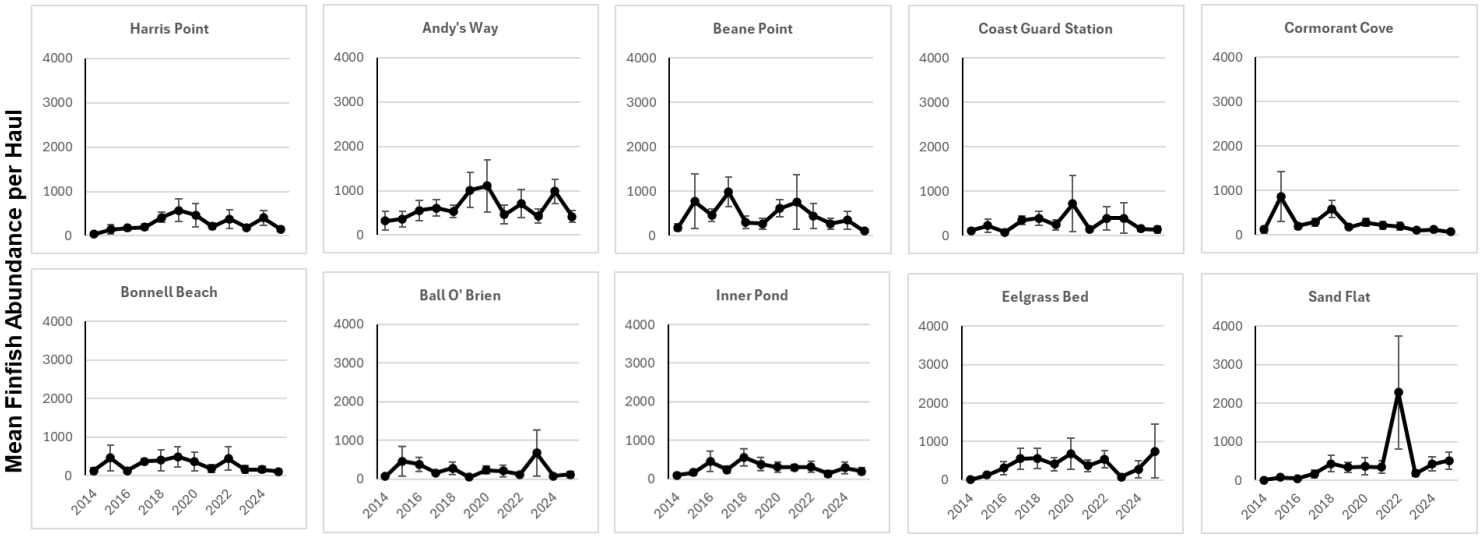


Figure 1. Mean abundance of finfish across sites (± SE) in 2014-2025 beach seines.

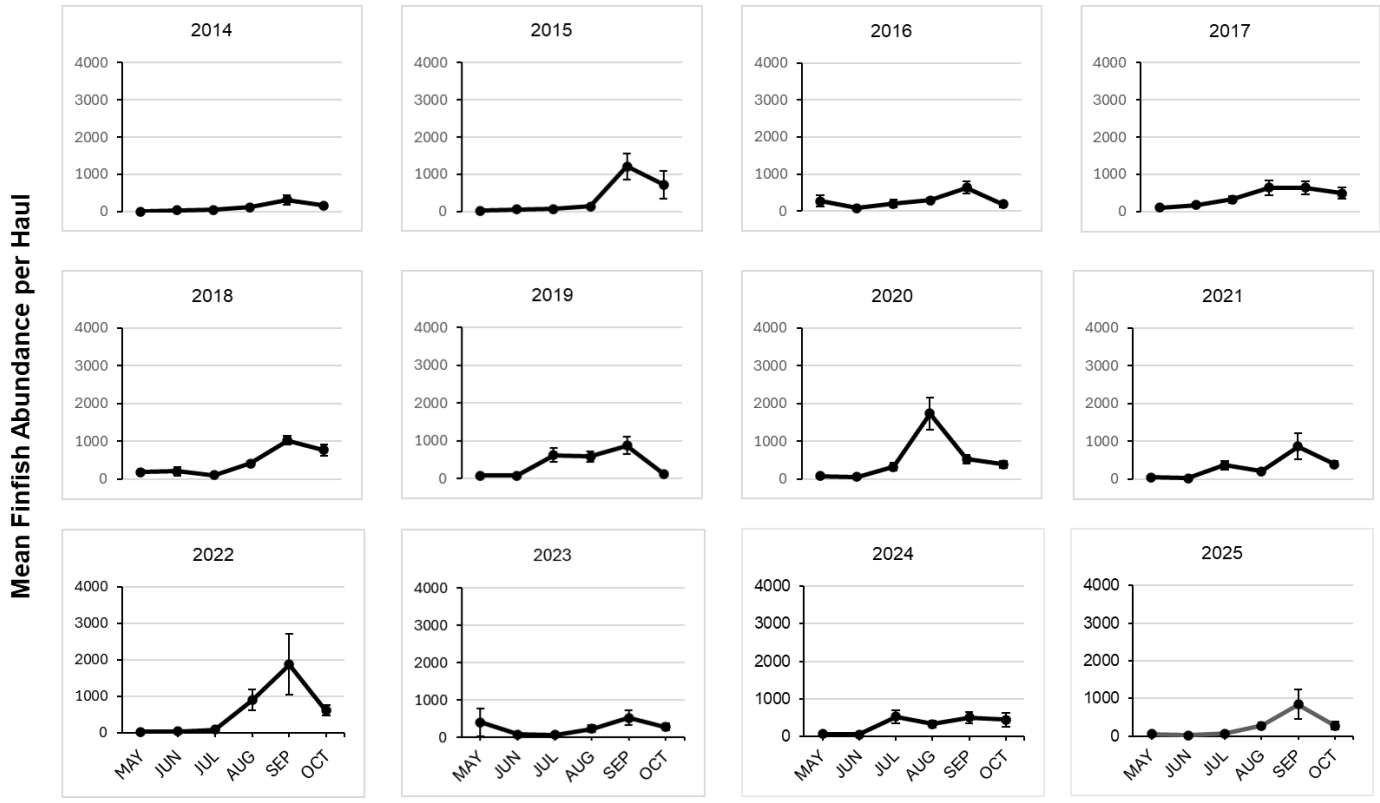


Figure 2. Mean abundance of finfish caught each month (± SE) in 2014-2025 beach seines.

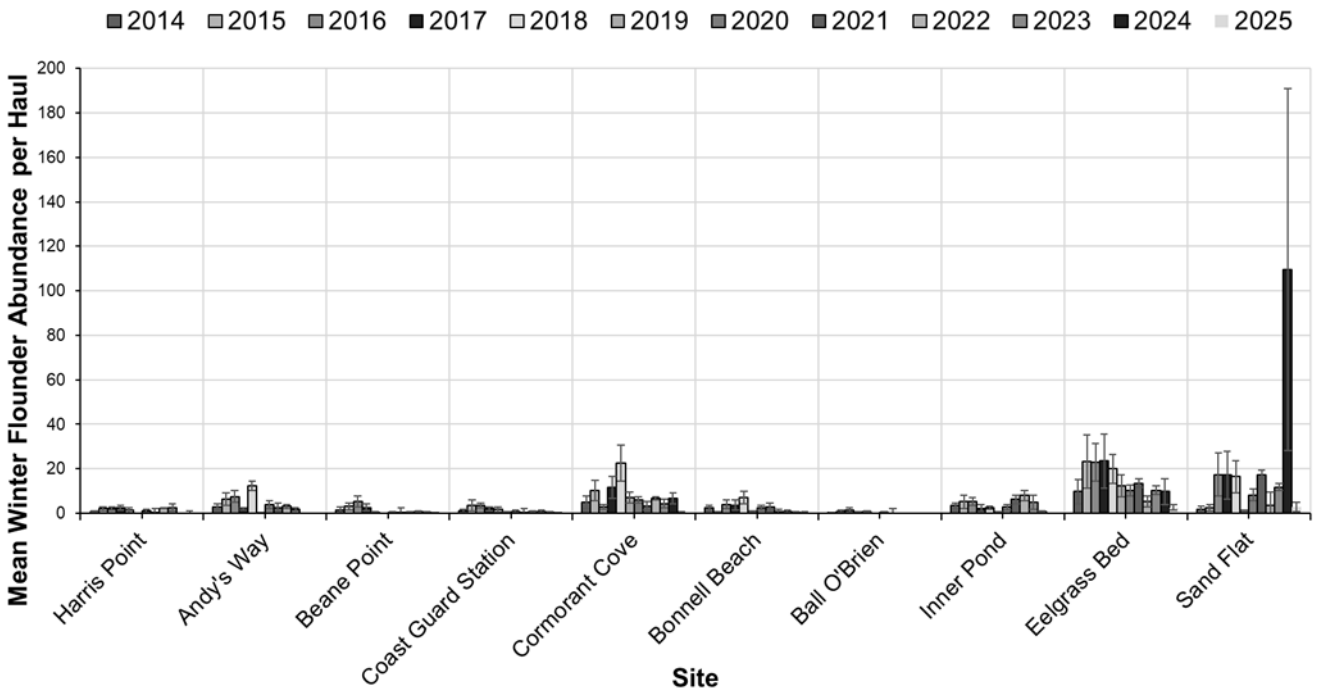


Figure 3a. Mean abundance of winter flounder caught by site (± SE) in 2014-2025 beach seines.

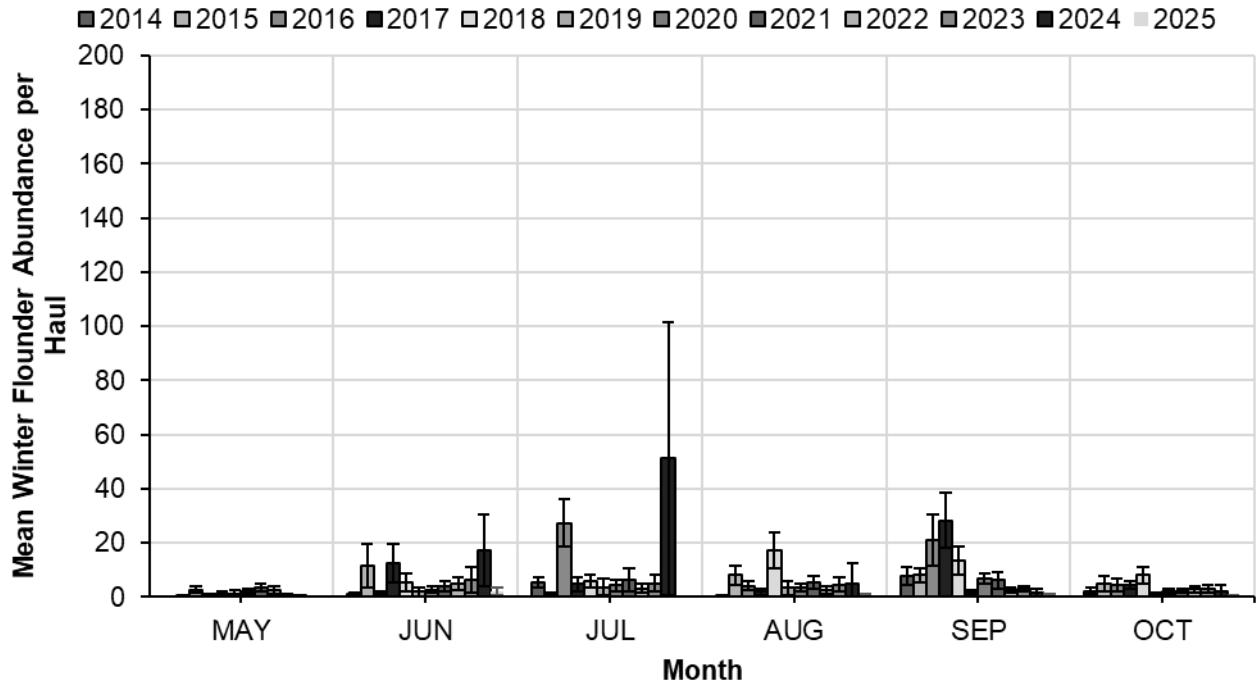


Figure 3b. Mean abundance of winter flounder caught by month (± SE) in 2014-2025 beach seines.

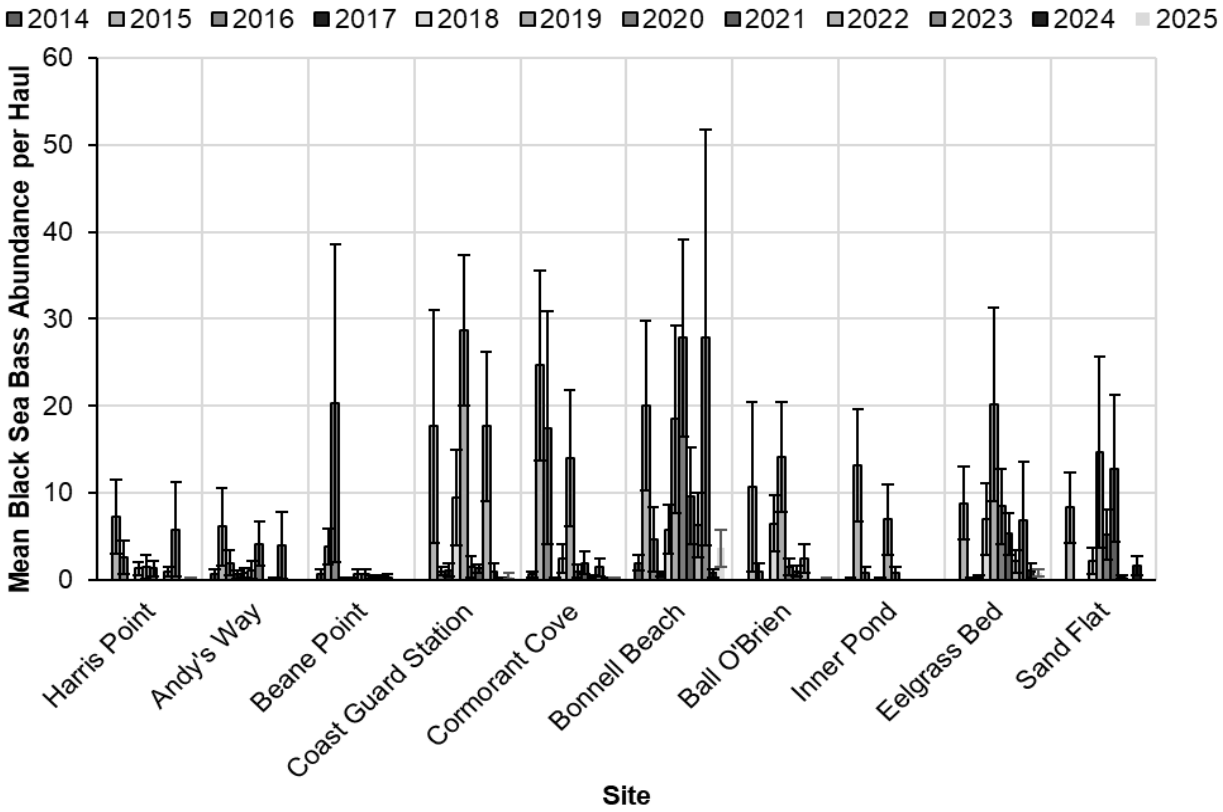


Figure 4a. Mean abundance of black sea bass caught by site (± SE) plotted for each month during the 2014-2025 field seasons.

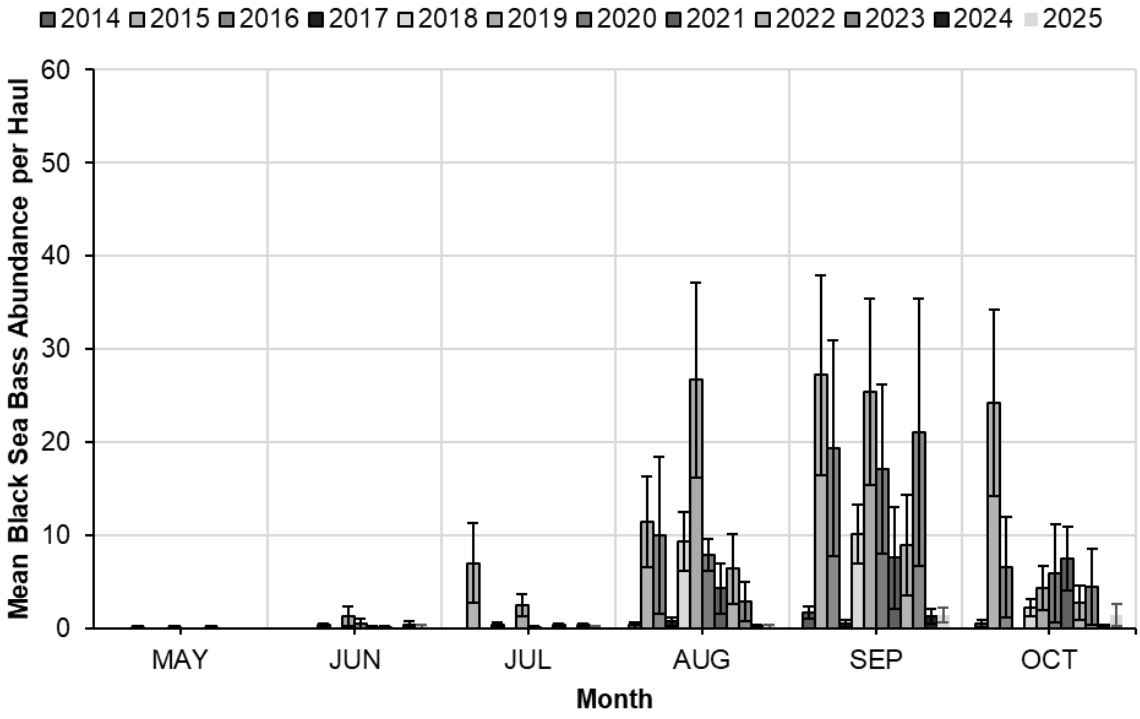


Figure 4b. Mean abundance of black sea bass caught by month (± SE) plotted for each month during the 2014-2024 field seasons.

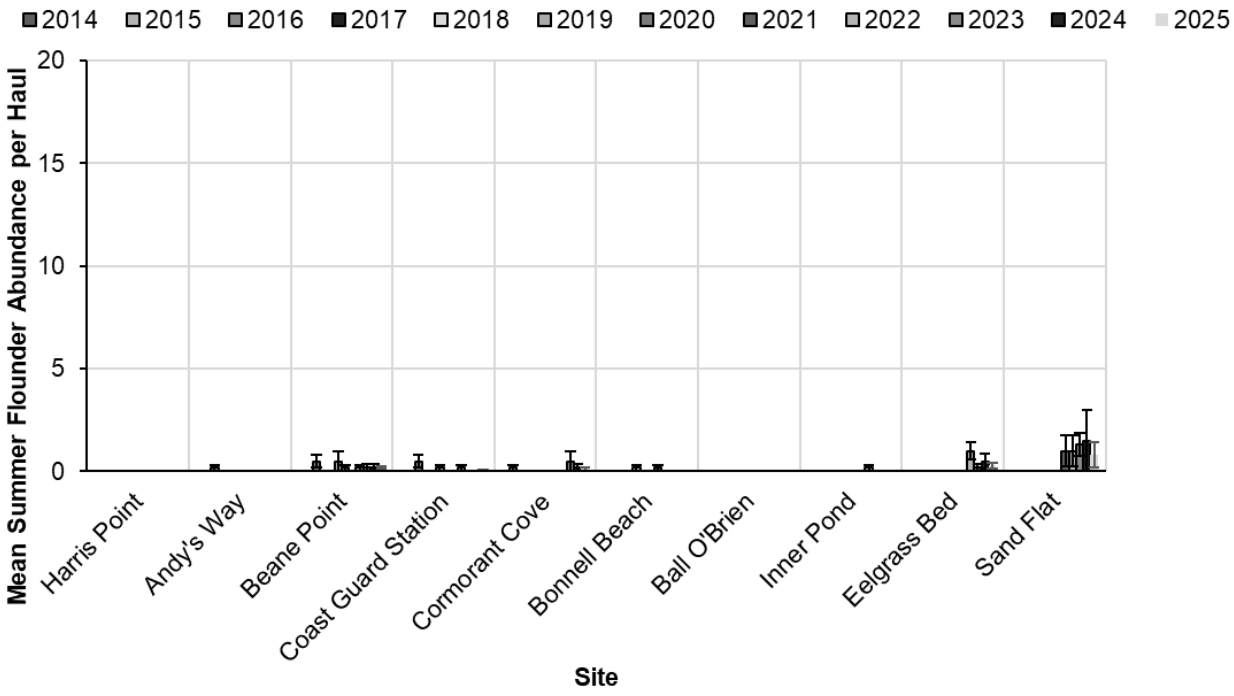


Figure 5a. Mean abundance of summer flounder caught by site (± SE) plotted for each month during the 2014-2025 field seasons.

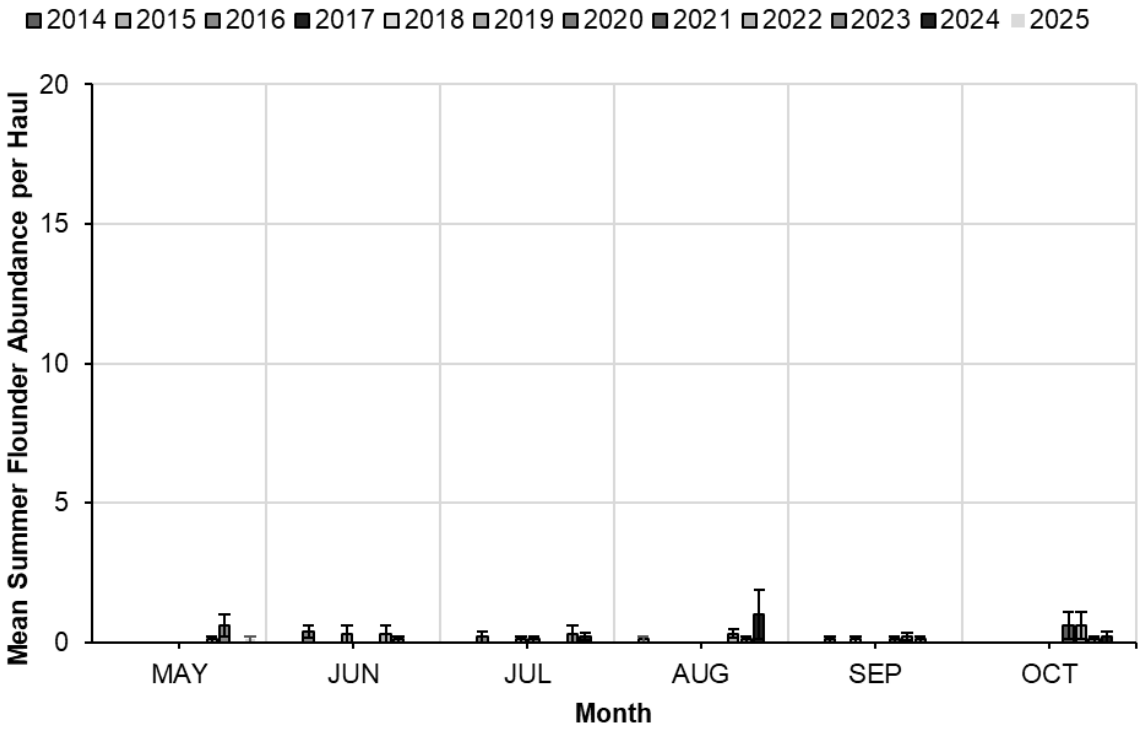


Figure 5b. Mean abundance of summer flounder caught by month (± SE) plotted for each month during the 2014-2025 field seasons.

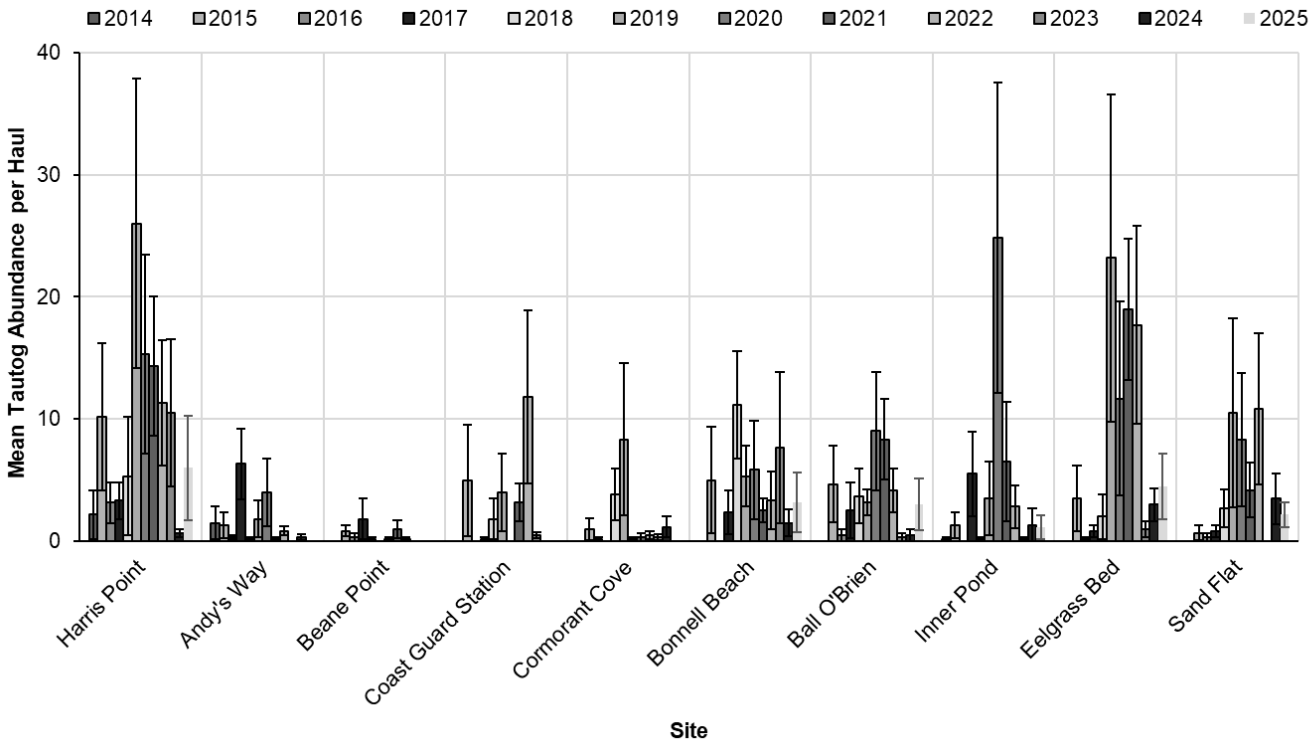


Figure 6a. Mean abundance of tautog caught by site (± SE) plotted for each month during the 2014-2025 field seasons.

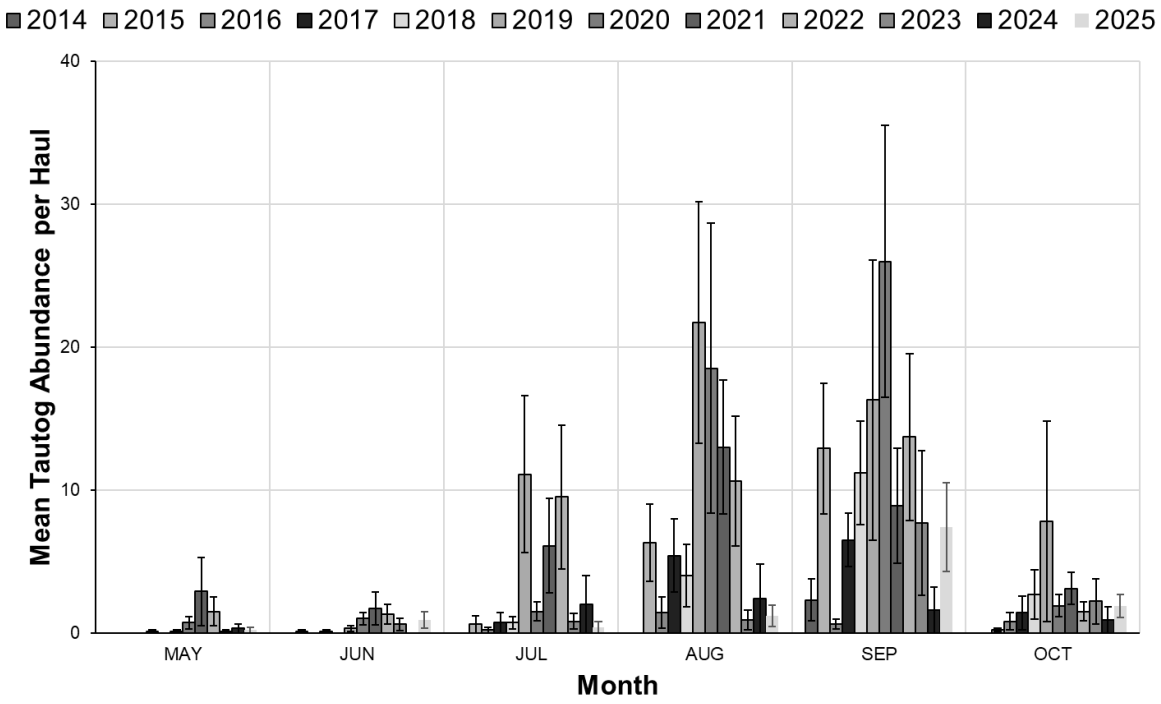


Figure 6b. Mean abundance of tautog caught by month (± SE) plotted for each month during the 2014-2025 field seasons.

## TABLES

Table 1. Scientific, common names, and total abundance of all species caught in beach seines during 2025

| Common Name | Scientific Name | Abundance |
|---|---|---|
| Atlantic Silverside | *Menidia menidia* | 12554 |
| Striped Killifish | *Fundulus majalis* | 1317 |
| Green Crab | *Carcinus maenas* | 865 |
| Mummichog | *Fundulus heteroclitus* | 491 |
| White Mullet | *Mugil curema* | 335 |
| Bay Anchovy | *Anchoa mitchilli* | 147 |
| Tautog | *Tautoga onitis* | 120 |
| American Sand Lance | *Ammodytes americanus* | 75 |
| Atlantic Croaker | *Micropogonias undulatus* | 52 |
| Blue Crab | *Calinectes sapidius* | 52 |
| Fourspine Stickleback | *Apeltes quadracus* | 45 |
| Cunner | *Tautogolabrus adspersus* | 42 |
| Winter Flounder | *Pseudopleuronectes americanus* | 42 |
| Lady Crab | *Ovalipes ocellatus* | 38 |
| Black Sea Bass | *Centropristis striata* | 33 |
| Spider Crab | *Libinia emarginata* | 26 |
| Grubby | *Myoxocephalus aenaeus* | 20 |
| Northern Pipefish | *Syngnathus fuscus* | 20 |
| Pollock | *Pollachius virens* | 14 |
| Longfin Squid | *Loligo pealei* | 11 |
| Sheepshead Minnow | *Cyprinodon variegatus* | 10 |
| Crevalle Jack | *Caranx hippos* | 9 |

Table 1. (continued)

| Common Name | Scientific Name | Abundance |
|---|---|---|
| Northern Puffer | *Sphoeroides maculatus* | 9 |
| Northern Sennet | *Sphyraena borealis* | 7 |
| Northern Kingfish | *Menticirrhus saxatilis* | 5 |
| Rainwater Killifish | *Lucania parva* | 5 |
| Jonah Crab | *Cancer borealis* | 4 |
| Oyster Toadfish | *Opsanus tau* | 4 |
| Pinfish | *Lagodon rhomboides* | 4 |
| Snakefish | *Trachinocephalus myops* | 4 |
| Spotfin Mojarra | *Eucinostomus argentus* | 4 |
| Atlantic Cod | *Gadus morhua* | 2 |
| Atlantic Tomcod | *Microcadus tomcod* | 2 |
| Bay Scallop | *Agropecten irradians* | 2 |
| Northern Searobin | *Prionotus carolinus* | 2 |
| Sargassum Swimming Crab | *Portunus sayi* | 2 |
| Atlantic herring | *Clupea harengus* | 1 |
| Atlantic Needlefish | *Strongylura marina* | 1 |
| Bluespotted Cornetfish | *Fistularia tabacaria* | 1 |
| Lined Seahorse | *Hippocampus erectus* | 1 |
| Lookdown | *Selene vomer* | 1 |
| Naked Goby | *Gobiosoma bosc* | 1 |
| Permit | *Trachinotus falcatus* | 1 |
| Shorthorn sculpin | *Myoxocephalus scorpius* | 1 |
| Spot | *Leiostomus xanthurus* | 1 |
| Striped Cuskeel | *Ophidion marginatum* | 1 |
| Summer Flounder | *Paralichthys dentatus* | 1 |

Table 2. Water temperature, salinity, dissolved oxygen by site and month during the 2025 beach seines.

| Site | Month | Temp. (˚C) | Sal. (ppt) | DO (mg/L) | Site | Month | Temp (˚C) | Sal. (ppt) | DO (mg/L) |
|---|---|---|---|---|---|---|---|---|---|
| Harris Point | MAY | 16.7 | 35.02 | 7.72 | Bonnell Beach | MAY | 17 | 36.29 | 7.58 |
| | JUN | 19.2 | 32.72 | 9.88 | | JUN | 17.5 | 32.83 | 8.22 |
| | JUL | 27.7 | 31.51 | 11.8 | | JUL | 23.5 | 30.9 | 8.18 |
| | AUG | 26.6 | 32.34 | 8.37 | | AUG | 24.2 | 31.6 | 9.23 |
| | SEP | 23.1 | 32.59 | 8.06 | | SEP | 23.1 | 32.52 | 8.95 |
| | OCT | 22.3 | 33.42 | 8.51 | | OCT | 21.7 | 33.29 | 7.47 |
| Andy's Way | MAY | 18.2 | 35.32 | 7.27 | Ball O'Brien | MAY | 17.8 | 35.75 | 8.48 |
| | JUN | 21 | 32.36 | 8.6 | | JUN | 17.6 | 32.34 | 9.39 |
| | JUL | 25.6 | 31.21 | 9.34 | | JUL | 24.2 | 30.98 | 8.77 |
| | AUG | 24.3 | 32.46 | 9.02 | | AUG | 24.6 | 32.6 | 10.69 |
| | SEP | 24.1 | 32.75 | 8.1 | | SEP | 22.6 | 32.26 | 8.55 |
| | OCT | 22.4 | 33.45 | 8.15 | | OCT | 21.2 | 31.88 | 7.49 |
| Beane Point | MAY | 14.2 | 35.88 | 7.67 | Inner Pond | MAY | 16.7 | 31.78 | 7.67 |
| | JUN | 22.7 | 32.12 | 8.86 | | JUN | 18.2 | 32.57 | 8.15 |
| | JUL | 23.3 | 31.1 | 8.27 | | JUL | 28.4 | 31.52 | 9.39 |
| | AUG | 25 | 32.62 | 9.29 | | AUG | 22.4 | 32.85 | 6.9 |
| | SEP | 23.9 | 32.88 | 9.71 | | SEP | 21.6 | 33.24 | 6.25 |
| | OCT | 22.1 | 33.56 | 9.21 | | OCT | 17.8 | 33.91 | 7.7 |
| Coast Guard | MAY | 14.6 | 36.14 | 8.15 | Eelgrass Bed | MAY | 14.1 | 33.22 | 8.32 |
| | JUN | 19 | 32.84 | 8.45 | | JUN | 17.2 | 32.77 | 8.67 |
| | JUL | 23.8 | 31.05 | 8.8 | | JUL | 24.5 | 32.38 | 10.22 |
| | AUG | 24.4 | 30.8 | 10.3 | | AUG | 22.4 | 32.64 | 9.5 |
| | SEP | 23.5 | 32.97 | 9.7 | | SEP | 22.8 | 32.89 | 11.23 |
| | OCT | 22.1 | 33.48 | 9.3 | | OCT | 20.4 | 33.87 | 11.82 |
| Cormorant Cove | MAY | 15.1 | 36.15 | 7.54 | Sand Flat | MAY | 13.7 | 33.22 | 8.17 |
| | JUN | 17 | 32.23 | 7.52 | | JUN | 17.4 | 32.71 | 8.79 |
| | JUL | 23.2 | 31.12 | 7.05 | | JUL | 23.9 | 31.78 | 8.92 |
| | AUG | 24.2 | 32.17 | 8.15 | | AUG | 23.6 | 32.06 | 6.36 |
| | SEP | 23.5 | 32.95 | 7.87 | | SEP | 21.7 | 32.85 | 4.17 |
| | OCT | 22.3 | 33.45 | 9.85 | | OCT | 19.7 | 34.05 | 8.25 |

Table 3a. Catch frequency of all species by site for the 2025 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 | **Total** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| American Sand Lance | | | | 65 | 10 | | | | | | **75** |
| Atlantic Cod | | | | | | | | | 1 | 1 | **2** |
| Atlantic Croaker | | | | | | | | | 49 | 3 | **52** |
| Atlantic Herring | | | | | | | | | | 1 | **1** |
| Atlantic needlefish | | | | | | | | | | 1 | **1** |
| Atlantic Silverside | 788 | 2013 | 491 | 732 | 196 | 540 | 589 | 197 | 4361 | 2647 | **12554** |
| Atlantic tomcod | | | | | | | | | 2 | | **2** |
| Bay Anchovy | | | | | | | | 147 | | | **147** |
| Bay Scallop | | | | | | 1 | 1 | | | | **2** |
| Black Sea Bass | 1 | | | 3 | 1 | 22 | 1 | | 5 | | **33** |
| Blue Crab | 1 | 2 | | | 4 | | | 35 | 5 | 5 | **52** |
| Bluespotted Cornetfish | | | | | | 1 | | | | | **1** |
| Crevalle Jack | | | | | 1 | | | | 2 | 6 | **9** |
| Cunner | 17 | | | | | 12 | | | 12 | 1 | **42** |
| Fourspine Stickleback | | | | | | | | 45 | | | **45** |
| Green Crab | 26 | 14 | 10 | 29 | 21 | 82 | 200 | 10 | 228 | 245 | **865** |
| Grubby | 3 | | | | 2 | | 3 | | 10 | 2 | **20** |
| Jonah Crab | | | | | | 1 | 1 | | | 2 | **4** |
| Lady Crab | 1 | 4 | 7 | 8 | 5 | 12 | 1 | | | | **38** |
| Lined Seahorse | | | | | | 1 | | | | | **1** |
| Longfin Squid | 1 | | | 6 | 1 | 2 | 1 | | | | **11** |
| Lookdown | | | | | | | | | | 1 | **1** |
| Mummichog | 85 | 96 | 10 | 16 | 25 | 31 | 69 | 158 | 1 | | **491** |
| Naked Goby | | | | | | | | | | 1 | **1** |
| Northern Kingfish | | | | | 1 | 1 | | 1 | | 2 | **5** |
| Northern Pipefish | 2 | | | | 3 | 2 | 4 | 1 | 3 | 5 | **20** |
| Northern Puffer | | | | | | 2 | 2 | | 1 | 4 | **9** |
| Northern Searobin | | | | | 1 | | | | | 1 | **2** |
| Northern Sennet | 1 | | 3 | | 2 | | | | | 1 | **7** |
| Oyster Toadfish | | | | | | | | 4 | | | **4** |
| Permit | | | | | | | | | | 1 | **1** |
| Pinfish | | | | | | | 1 | | 3 | | **4** |
| Pollock | | | | | 1 | | | | 5 | 8 | **14** |
| Rainwater Killifish | | | | | | | | 5 | | | **5** |
| Sargassum Swimming Crab | | | | | 2 | | | | | | **2** |
| Sheepshead Minnow | | | | | | | | 10 | | | **10** |
| Shorthorn sculpin | | | | | | 1 | | | | | **1** |
| Snakefish | | | 1 | | 1 | | | 2 | | | **4** |
| Spider crab | 6 | 1 | 7 | | 2 | 2 | 1 | 3 | 3 | 1 | **26** |
| Spot | | | | | | | | | 1 | | **1** |
| Spotfin Mojarra | | 2 | | | 1 | | | | | 1 | **4** |
| Striped cuskeel | | | | | | | 1 | | | | **1** |
| Striped Killifish | 2 | 371 | 110 | 12 | 153 | 2 | 16 | 651 | | | **1317** |
| Summer Flounder | | | | | | | | | | 1 | **1** |
| Tautog | 36 | | | | | 19 | 18 | 7 | 27 | 13 | **120** |
| White Mullet | | | | | | | | 7 | 8 | 320 | **335** |
| Winter Founder | 3 | | 1 | 1 | 3 | 2 | | | 15 | 17 | **42** |

Table 4a. Species presence by site for May 2025 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** |
| Atlantic Silverside | 1 | 1 | 1 | | | 1 | 1 | 1 | | | **6** |
| Blue crab | | | | | 1 | | | | | | **1** |
| Green crab | 1 | | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | **8** |
| Jonah crab | | | | | | 1 | 1 | | | 1 | **3** |
| Lady crab | | | | | 1 | | | | | | **1** |
| Pollock | | | | | 1 | | | | 1 | 1 | **3** |
| Rainwater Killifish | | | | | | | | 1 | | | **1** |
| Spider crab | 1 | | | | 1 | | | | | | **2** |
| Striped killifish | | | | | | | | 1 | | | **1** |
| Summer flounder | | | | | | | | | | 1 | **1** |
| Tautog | | | | | | | | | | 1 | **1** |
| Tomcod | | | | | | | | | 1 | | **1** |

Table 4b. Species by site for June 2025 beach seines.

| **JUNE** | 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 Silverside | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | | **7** |
| Black Sea Bass | | | | | | | | | 1 | | **1** |
| Blue crab | | 1 | | | 1 | | | | 1 | 1 | **4** |
| Cod | | | | | | | | | 1 | 1 | **2** |
| Green crab | 1 | 1 | | 1 | 1 | 1 | 1 | | 1 | 1 | **8** |
| Grubby | 1 | | | | | | 1 | | | | **2** |
| Lady crab | | | 1 | | | 1 | 1 | | | | **3** |
| Mummichog | | | | | | | 1 | | | | **1** |
| Northern Pipefish | 1 | | | | | | | | | 1 | **2** |
| Pollock | | | | | | | | | 1 | | **1** |
| Spider crab | | | 1 | | | | | | | | **1** |
| Tautog | 1 | | | | | | | | 1 | 1 | **3** |
| Winter flounder | | | | | 1 | | | | 1 | 1 | **3** |

Table 4c. Species presence by site for July 2025 beach seines.

| **JULY** | 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 | | | | | | **2** |
| Atlantic croaker | | | | | | | | 1 | 1 | | **2** |
| Atlantic Silverside | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | | **7** |
| Bay anchovy | | | | | | | | 1 | | | **1** |
| Black Sea Bass | | | | 1 | | | | | | | **1** |
| Blue crab | 1 | | | | | | | 1 | 1 | | **3** |
| Four-spine Stickleback | | | | | | | | 1 | | | **1** |
| Green crab | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | **9** |
| Grubby | | | | | 1 | | | | | 1 | **2** |
| Lady crab | | 1 | | 1 | | 1 | | | | | **3** |
| Lined seahorse | | | | | | 1 | | | | | **1** |
| Longfin Squid | 1 | | | 1 | 1 | 1 | 1 | | | | **5** |
| Mummichog | 1 | | | | | | | 1 | 1 | | **3** |
| Northern Pipefish | 1 | | | | | 1 | 1 | | 1 | | **4** |
| Oyster toadfish | | | | | | | | 1 | | | **1** |
| Pinfish | | | | | | | 1 | | 1 | | **2** |
| Striped cusk-eel | | | | | | | 1 | | | | **1** |
| Striped killifish | | 1 | | | | | | 1 | | | **2** |
| Spot | | | | | | | | | 1 | | **1** |
| Spider crab | | | | | | | 1 | 1 | 1 | | **3** |
| Tautog | | | | | | | 1 | | | | **1** |
| Winter flounder | | | | | | | | | | 1 | **1** |

Table 4d. Species presence by site for August 2025 beach seines.

| **AUGUST** | 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 herring | | | | | | | | | | 1 | **1** |
| Atlantic Silverside | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | **10** |
| Bay scallop | | | | | | 1 | | | | | **1** |
| Black Sea Bass | | | | | | 1 | | | | | **1** |
| Blue crab | | 1 | | | | | | 1 | | | **2** |
| Crevalle jack | | | | | 1 | | | | | 1 | **2** |
| Cunner | | | | | | 1 | | | | | **1** |
| Four-spine Stickleback | | | | | | | | 1 | | | **1** |
| Green crab | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | **9** |
| Grubby | | | | | 1 | | | | 1 | 1 | **3** |
| Lady crab | | | | 1 | | | | | | | **1** |
| Lookdown | | | | | | | | | | 1 | **1** |
| Mummichog | | 1 | 1 | | 1 | 1 | 1 | 1 | | | **6** |
| Naked Goby | | | | | | | | | | 1 | **1** |
| Northern kingfish | | | | | 1 | 1 | | 1 | | 1 | **4** |
| Northern Pipefish | | | | | 1 | | | 1 | 1 | 1 | **4** |
| Northern Puffer | | | | | | 1 | 1 | | | 1 | **3** |
| Northern sennet | 1 | | 1 | | | | | | | | **2** |
| Oyster toadfish | | | | | | | | 1 | | | **1** |
| Permit | | | | | | | | | | 1 | **1** |
| Pinfish | | | | | | | | | 1 | | **1** |
| Rainwater killifish | | | | | | | | 1 | | | **1** |
| Striped killifish | | 1 | 1 | 1 | 1 | | | 1 | | | **5** |
| Spider crab | | | | | | 1 | | | 1 | | **2** |
| Tautog | | | | | | 1 | | | 1 | 1 | **3** |
| Winter flounder | | | | 1 | | 1 | | | 1 | | **3** |
| White mullet | | | | | | | | | | 1 | **1** |

Table 4e. Species presence by site for September 2025 beach seines.

| **SEPTEMBER** | 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 Silverside | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | **10** |
| Atlantic Needlefish | | | | | | | | | | 1 | **1** |
| Black Sea Bass | 1 | | | 1 | | 1 | 1 | | 1 | | **5** |
| Blue crab | | | | | | | | 1 | | 1 | **2** |
| Crevalle jack | | | | | | | | | 1 | 1 | **2** |
| Cunner | 1 | | | | | 1 | | | 1 | | **3** |
| Green crab | 1 | | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | **8** |
| Grubby | 1 | | | | | | 1 | | 1 | | **3** |
| Lady crab | 1 | | 1 | | | 1 | | | | | **3** |
| Mummichog | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | **8** |
| Northern kingfish | | | | | | | | | | 1 | **1** |
| Northern Pipefish | | | | | 1 | 1 | | | | | **2** |
| Northern Searobin | | | | | 1 | | | | | | **1** |
| Northern sennet | | | | | 1 | | | | | 1 | **2** |
| Sargassum swimming crab | | | | | 1 | | | | | | **1** |
| Sheepshead Minnow | | | | | | | | 1 | | | **1** |
| Spotfin Mojarra | | | | | 1 | | | | | | **1** |
| Snakefish | | | 1 | | 1 | | | | | | **2** |
| Striped killifish | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | **7** |
| Spider crab | 1 | | 1 | | | | | | | 1 | **3** |
| Tautog | 1 | | | | | 1 | 1 | 1 | 1 | 1 | **6** |
| Winter flounder | 1 | | 1 | | | | | | 1 | 1 | **4** |
| White mullet | | | | | | | | 1 | 1 | 1 | **3** |

Table 4f. Species presence by site for October 2025 beach seines.

| **OCTOBER** | 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 Silverside | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | **10** |
| Bay scallop | | | | | | | 1 | | | | **1** |
| Black Sea Bass | | | | | 1 | 1 | | | 1 | | **3** |
| Blue crab | | | | | 1 | | | 1 | 1 | | **3** |
| Bluespotted cornetfish | | | | | | 1 | | | | | **1** |
| Cunner | | | | | | 1 | | | 1 | 1 | **3** |
| Four-spine stickleback | | | | | | | | 1 | | | **1** |
| Green crab | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | **10** |
| Grubby | | | | | | | | | 1 | | **1** |
| Lady crab | | 1 | 1 | | 1 | 1 | | | | | **4** |
| Mummichog | 1 | | | 1 | 1 | 1 | 1 | | | | **5** |
| Northern Pipefish | | | | | 1 | | | | | 1 | **2** |
| Northern Puffer | | | | | | | | | 1 | | **1** |
| Northern Searobin | | | | | | | | | | 1 | **1** |
| Northern sennet | | | | | 1 | | | | | | **1** |
| Oyster toadfish | | | | | | | | 1 | | | **1** |
| Sargassum swimming crab | | | | | 1 | | | | | | **1** |
| Sheepshead Minnow | | | | | | | | 1 | | | **1** |
| Shorthorn Sculpin | | | | | | 1 | | | | | **1** |
| Spotfin Mojarra | | 1 | | | | | | | | 1 | **2** |
| Snakefish | | | | | | | | 1 | | | **1** |
| Striped killifish | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | | **7** |
| Spider crab | 1 | 1 | | | 1 | 1 | | 1 | 1 | | **6** |
| Tautog | 1 | | | | | | 1 | 1 | 1 | 1 | **5** |
| Winter flounder | | | | | 1 | | | | 1 | 1 | **3** |
| White mullet | | | | | | | | | | 1 | **1** |

Table 5a. Abundances of winter flounder in 2025 beach seines.

Winter 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 | 1 | 0 | 0 | 0 | 8 | 13 | 2.20 | 4.54 | 1.44 | 22 |
| JUL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0.20 | 0.63 | 0.20 | 2 |
| AUG | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 3 | 0 | 0.60 | 1.07 | 0.34 | 6 |
| SEP | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0.80 | 1.23 | 0.39 | 8 |
| OCT | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 1 | 0.40 | 0.70 | 0.22 | 4 |
| **Mean** | 0.50 | 0.00 | 0.17 | 0.17 | 0.50 | 0.33 | 0.00 | 0.00 | 2.50 | 2.83 | | | | |
| **SD** | 1.22 | 0.00 | 0.41 | 0.41 | 0.84 | 0.82 | 0.00 | 0.00 | 3.02 | 5.04 | | **Total Fish** | | |
| **SE** | 0.50 | 0.00 | 0.17 | 0.17 | 0.34 | 0.33 | 0.00 | 0.00 | 1.23 | 2.06 | | **42** | | |
| **Total** | 3 | 0 | 1 | 1 | 3 | 2 | 0 | 0 | 15 | 17 | | | | |

Table 5b. Abundances of summer flounder in 2025 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 | 1 | 0.10 | 0.32 | 0.10 | 1 |
| 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 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0 |
| 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 | 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 | 0.00 | 0.17 | | | | |
| **SD** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.41 | | **Total Fish** | | |
| **SE** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | | **1** | | |
| **Total** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | | | | |

Table 5c. Abundances of black sea bass in 2025 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 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0.20 | 0.63 | 0.20 | 2 |
| JUL | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.10 | 0.32 | 0.10 | 1 |
| AUG | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0.20 | 0.63 | 0.20 | 2 |
| SEP | 1 | 0 | 0 | 2 | 0 | 8 | 1 | 0 | 2 | 0 | 1.40 | 2.46 | 0.78 | 14 |
| OCT | 0 | 0 | 0 | 0 | 1 | 12 | 0 | 0 | 1 | 0 | 1.40 | 3.75 | 1.19 | 14 |
| **Mean** | 0.17 | 0.00 | 0.00 | 0.50 | 0.17 | 3.67 | 0.17 | 0.00 | 0.83 | 0.00 | | | | |
| **SD** | 0.41 | 0.00 | 0.00 | 0.84 | 0.41 | 5.13 | 0.41 | 0.00 | 0.98 | 0.00 | | **Total Fish** | | |
| **SE** | 0.17 | 0.00 | 0.00 | 0.34 | 0.17 | 2.09 | 0.17 | 0.00 | 0.40 | 0.00 | | **33** | | |
| **Total** | 1 | 0 | 0 | 3 | 1 | 22 | 1 | 0 | 5 | 0 | | | | |

Table 5d. Abundances of tautog in 2025 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0.20 | 0.63 | 0.20 | 2 |
| JUN | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0.90 | 1.73 | 0.55 | 9 |
| JUL | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0.40 | 1.26 | 0.40 | 4 |
| AUG | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 1 | 7 | 1.20 | 2.39 | 0.76 | 12 |
| SEP | 27 | 0 | 0 | 0 | 0 | 15 | 13 | 1 | 17 | 1 | 7.40 | 9.81 | 3.10 | 74 |
| OCT | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 6 | 2 | 1.90 | 2.51 | 0.80 | 19 |
| **Mean** | 6.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.17 | 3.00 | 1.17 | 4.50 | 2.17 | | | | |
| **SD** | 10.53 | 0.00 | 0.00 | 0.00 | 0.00 | 6.01 | 5.14 | 2.40 | 6.53 | 2.48 | | **Total Fish** | | |
| **SE** | 4.30 | 0.00 | 0.00 | 0.00 | 0.00 | 2.46 | 2.10 | 0.98 | 2.67 | 1.01 | | **120** | | |
| **Total** | 36 | 0 | 0 | 0 | 0 | 19 | 18 | 7 | 27 | 13 | | | | |

## APPENDIX

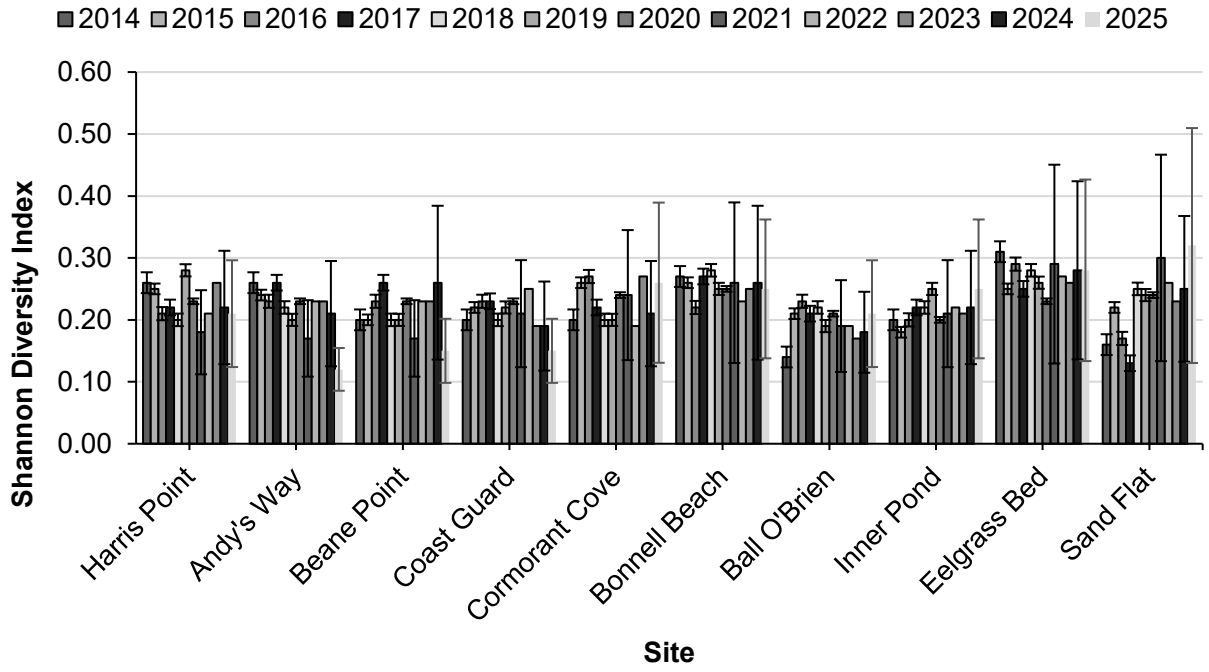


Figure 7. Mean Shannon diversity across sites in 2014-2025 beach seines

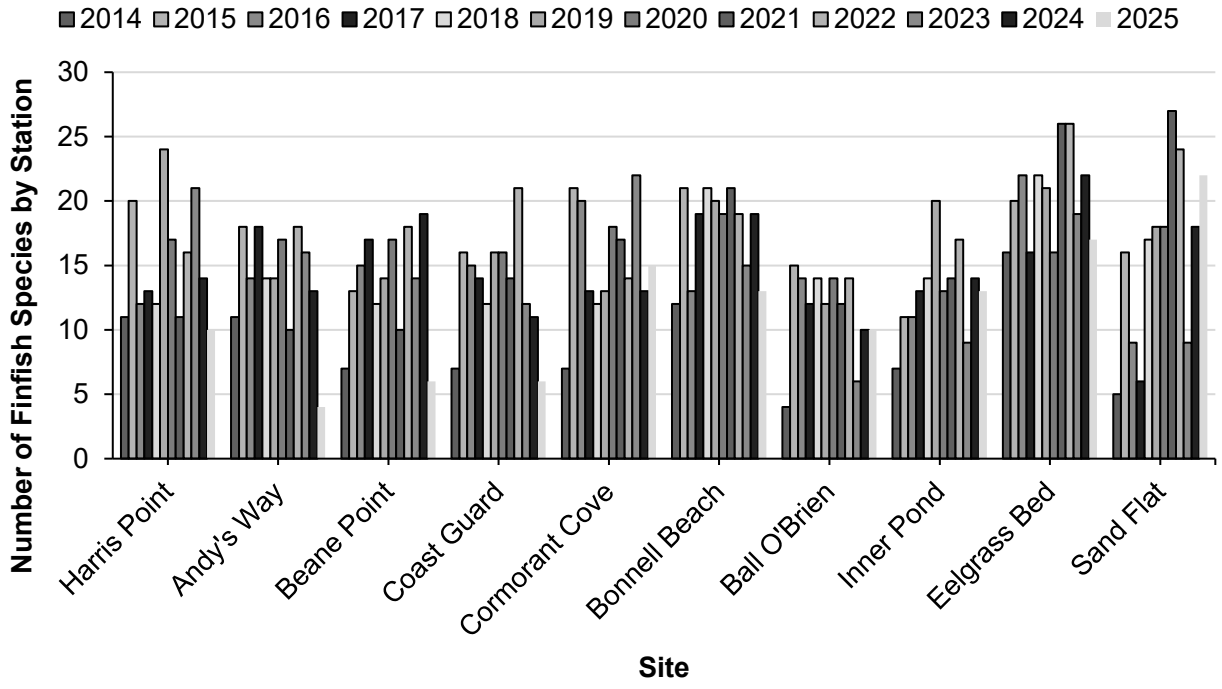


Figure 8. Cumulative number of finfish species by site in 2014-2025 beach seine