

**SFW01-0097 South Fork Fisheries Monitoring Plan  
WP4: Fish Pot Survey  
Year 1 Report**

**Reporting Period:**

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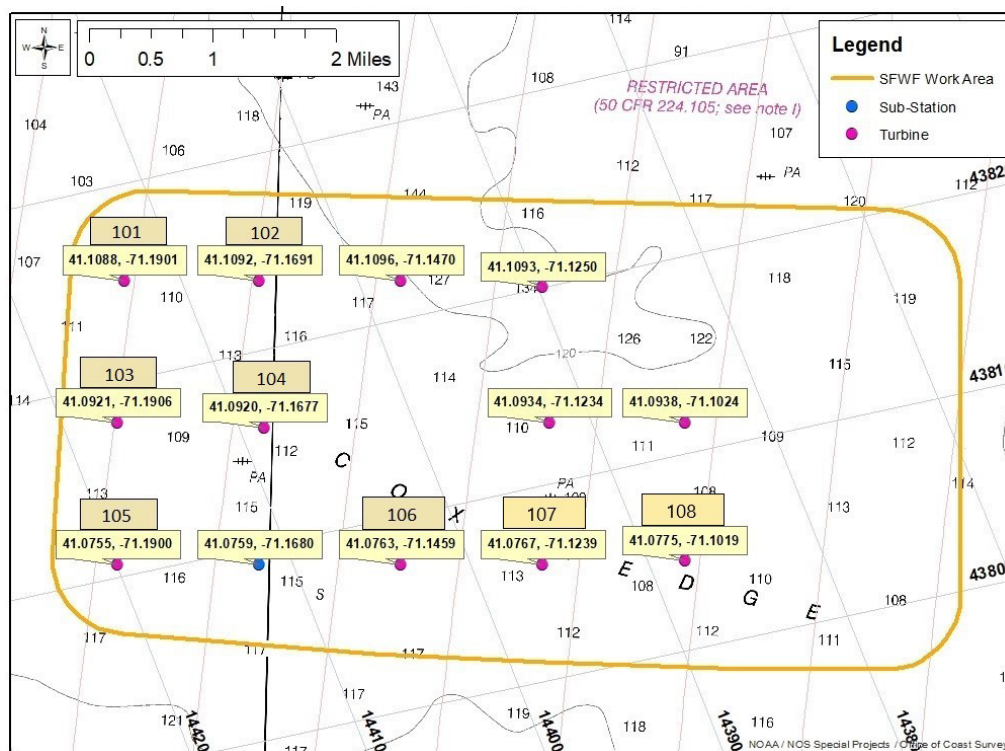


## Summary

The Commercial Fisheries Research Foundation (CFRF), with the assistance of the fishing vessel (F/V), Harvest Moon, have completed the first year of the South Fork Wind Farm pre-development ventless fish pot survey for demersal fisheries resources. The survey is conducted to determine the spatial scale of potential impacts on the abundance and distribution of juvenile and adult fish species, particularly structured associated finfish such as black sea bass, scup, and tautog as a result of South Fork Wind Farm development. In particular, the survey is designed to determine if the immediate areas, closest to the turbines, experience alteration in the distribution and abundance of the above identified structure associated fish species as a result of the turbines creating a “reef effect” due to the addition of new structure in the South Fork area. The South Fork Wind development area was sampled once per month from June through December 2021. Within the development area, eight turbine locations were sampled with a single string of ventless fish pots at each location. Each string of ventless fish pots consisted of 18 identical ventless fish pots evenly spaced at 50-meter increments with the first pot of the string set on the exact location of a potential turbine and the last pot of the string set due south of the turbine. Monthly, each pot was baited and left to soak for 24-hours prior to sampling. Sampling consisted of speciating the catch from each pot and recording total number of individuals and total weight of each species per pot. Individual lengths were recorded for the above identified target species as well as other fish species. Individual weights were also recorded when feasible for target species. Oceanographic data was obtained at each sampling stations with a conductivity, temperature, and depth cast and temperature loggers. The catch throughout the first year of sampling exhibited a strong seasonal component and was dominated by a handful of species. Catch was relatively low the first two months of the survey and was largely comprised of rock crabs. Catch increased substantially in August and remained high through the rest of the survey season with the catch dominated by black sea bass and Jonah crabs with a consistent presence of scup.

## Introduction

The CFRF, in partnership with local fishermen, is conducting pre-construction fisheries monitoring surveys for the South Fork Wind Farm development area. Monitoring is aimed towards collecting baseline fisheries abundance and distribution data to assess potential anthropogenic impacts on resources as a result of wind farm development and construction. Unlike the other three surveys undertaken by the CFRF, the ventless fish pot survey utilizes a different approach to assess these impacts; the Before-After-Gradient design (BAG). The survey is designed to sample at increasing distances from turbine locations to examine the spatial scale of effects from construction and operation of turbines on the surrounding habitat and structure associated fish species. Unlike the other surveys operated by the CFRF, the BAG design eliminates the need for control areas as the sampling effort is focused along a spatial gradient within the South Fork development area (Figure 1). This design allows for the investigation of spatial variation in fisheries resources and does not assume homogeneity across sampling locations. Specifically, the ventless fish pot survey is designed to collect data on the abundance, distribution, and biological makeup of the fishery communities immediately around potential turbine sites with specific target species of black sea bass, scup, and tautog. This report details the methods of the survey and summarizes the results from the first year of survey activities conducted from June 2021 through the end of December 2021.



**Figure 1.** The South Fork Wind Farm development area with all potential turbine locations. Turbines selected for monitoring by the ventless fish pot survey are identified and numbered 101 through 108.

## Methods

All survey activities completed by the CFRF for the ventless fish pot survey were done in collaboration with the crew and fishing vessel, F/V Harvest Moon which is home ported in Point Judith, Rhode Island. The eight survey locations were selected from the potential turbine locations within the South Fork Wind Farm development area (Figure 1). Due to the ventless fish pot survey being the last of the four pre-construction surveys to start and the proximity of the other CFRF surveys already operating within the South Fork area, the eight turbine locations selected for sampling allowed for ample distance between the ventless fish pot survey and the gillnet and beam trawl surveys to minimize gear conflicts.

Each of the eight stations is surveyed with a single string of 18 ventless fish pots. All fish pots are identical and were purchased from Ketcham Traps in New Bedford, MA. The ventless fish pots measure 43.5 inches long, 23 inches wide, and 16 inches high and are made from 1.5-inch coated wire mesh and are standard lobster-pot-style scup pots. Squid offcuts were used as bait throughout the entire survey. Originally, clam bellies were proposed to be used, however due to COVID related supply chain issues, clam bellies became much harder to source and significantly more expensive. Squid offcuts are used frequently in the commercial fish pot fishery and are readily available throughout the year and using a consistent bait throughout the entire survey was deemed a high priority.

Once per month, starting in June 2021, the F/V Harvest Moon would haul each string of gear at each turbine location, bait each pot, close the escape vents on each pot, and reset each string of gear. A Research Biologist was on all fish pot survey set days to monitor the catch from each un-baited and opened string of pots as the survey utilized wet storage of the gear and kept the fish pots in the water each month between survey trips. When setting the gear, the first pot of the string was deployed on the proposed turbine location and the last pot of the string due south. Each pot is evenly spaced from the previous pot by 50 meters of sinking groundline. Pots were left to soak for a 24-hour period. On each set day, the CFRF Research Biologist on board would retrieve a HOBO temperature logger secured in the first pot of each string, offload all temperature data, and then redeploy the logger in the same pot, logging the temperature every 30 minutes.

After the 24-hour soak period each month, the F/V Harvest Moon returned to haul and sample the gear with CFRF scientists. Upon arrival to each station, and prior to hauling any gear, a conductivity, temperature, and depth probe was lowered to the bottom and slowly retrieved to the surface using the vessel's pot hauler. The crew of the F/V Harvest Moon would empty the catch out of each individual fish pot into a fish basket for processing by the CFRF scientists. Prior to processing the catch, the CFRF scientist would collect the following station related data at each of the eight survey locations;

- Trawl Number - Sequential tow of the trip
- Station ID (Trip + Station Label)

- Start pot (1-18, the pot closest to the turbine location was deemed 1 and the furthest pot 18)
- Start Position (latitude and longitude of first pot hauled)
- Start Water Depth (feet)
- Start time: Time the trawl was set (24-hour format)
- End Position (latitude and longitude of last pot hauled)
- End Time: The moment the first pot leaves the bottom on sampling day (24-hour format)
- Beaufort sea state (see page 9)
- Wind Direction (Cardinal Directions)

After the station related data is recorded, the CFRF scientists would begin processing the catch and collecting biological data from each individual pot. Total number of individuals per species and total weight of all individuals of each species per pot was recorded. Up to 10 individuals per pot of each species of target fin fish (black sea bass, scup, and tautog) were measured for either total (black sea bass and tautog) or fork length (scup). Additionally, and when feasible, the same individuals measured for total or fork length from each pot were also measured for individual weight to later analyze the length weight relationship. Individual weights were not always feasible to record due to high catch rates as it would slow the data collection process considerably or bad weather as the scales would not accurately provide a consistent weight in heavy seas. Total or fork length was recorded for up to 10 individuals of all non-target fish species per pot. Total number of individuals and total catch weight of each species of invertebrate per pot was recorded as well. All of the above mentioned biological and catch data is recorded alongside the individual pot number (1-18) at each station so all data can be attributed to a specific pot. After the processing and data recording of the catch from each pot, all individuals are returned to the water prior to moving on to the next pot. This process is repeated for all 18 pots per string of gear for all eight strings.

All data is imported or entered into an Access survey database for the fish pot survey. Prior to submission of data to INSPIRE Environmental, all data is given a one-to-one check against the paper data logs for quality assurance. For this report the biodiversity was calculated using the Shannon diversity index ( $H = \sum_{i=1}^S p_i \ln(p_i)$ , where  $s$  is the number of species, and  $p$  is the proportion of individuals of one species to the total number of individuals) using the aggregated catch by station of all species for all survey trips in the first year.

### **Preliminary Results**

The data presented in this report covers the entire first year of the South Fork Wind ventless fish pot survey, which ran from June 2021 through December 2021. The targeted 24-hour soak period was achieved for every survey each month. Each survey was planned to occur at roughly the same time each month, however this became difficult to achieve in the fall months as the weather began deteriorating. This was, in part, due to the 24-hour soak period which necessitated a 48-hour good weather window. As a result, the October survey occurred within

the first couple days of November. However, all other trips occurred in the appropriate month (Table 1).

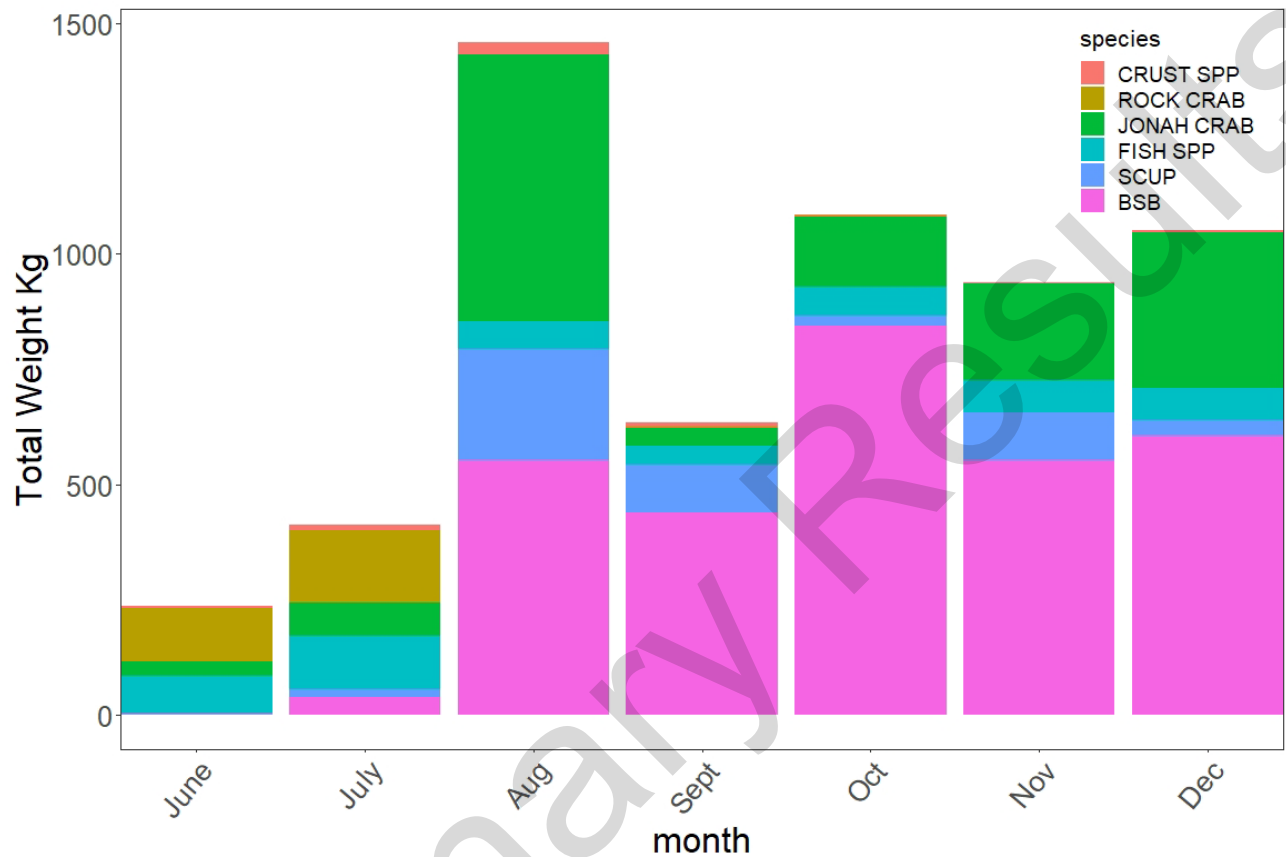
**Table 1.** South Fork Wind Farm ventless fish pot survey set and sample date for the first year of survey activities. Average bottom water temperature and salinity taken from conductivity, temperature, depth casts for each month is included.

Survey Month	Trip Dates		Average Salinity (PSU)	Average Bottom Temp (C)
	Date Set	Date Sampled		
June	6/16/2021	6/17/2021	32.60	10.2
July	7/13/2021	7/14/2021	32.66	11.6
August	8/25/2021	8/26/2021	32.70	15.6
September	9/25/2021	9/26/2021	33.43	18.8
October	11/02/2021	11/03/2021	33.13	16.4
November	11/20/2021	11/21/2021	33.20	14.9
December	12/28/2021	12/29/2021	33.20	10.1

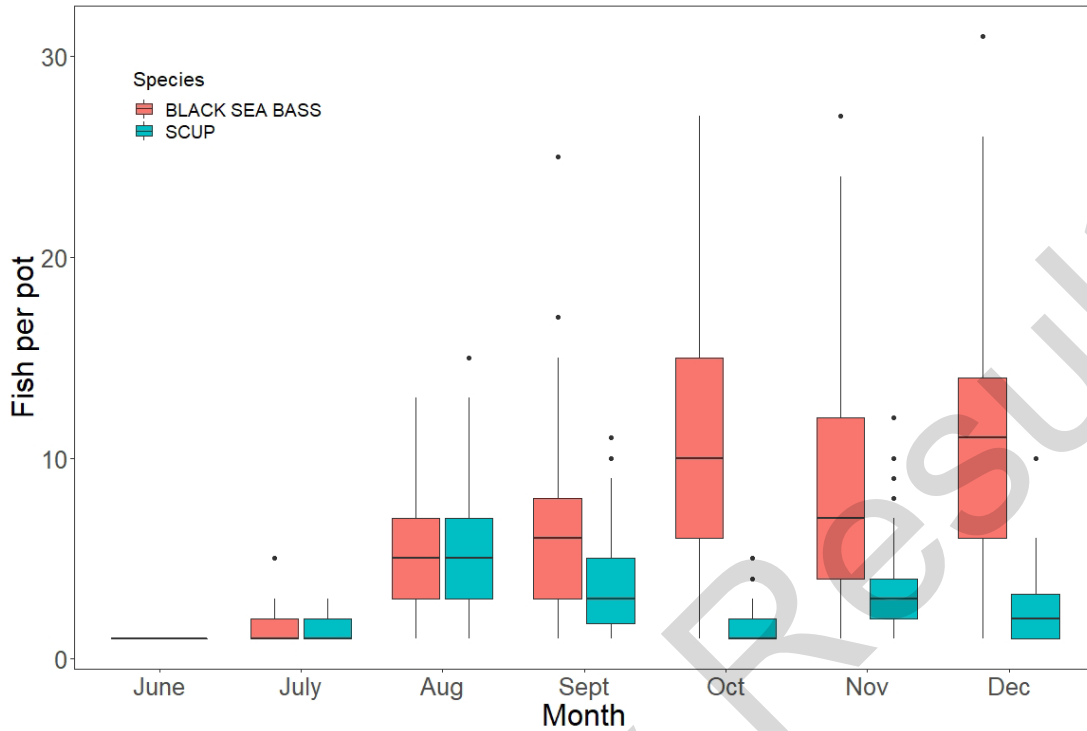
The catch throughout the first year of sampling changed exhibited a strong seasonal component and was dominated by a handful of species (Figure 2). In the summer months of June and July, catch was relatively low with at least one empty pot per string expected. The dominant species was rock crabs through these first two months (Figure 2). Catch of the target species was quite low with only a handful of black sea bass caught and even less scup. Throughout the entire first year of the survey, no tautog were caught. Dominant fish species in the summer months were ocean pout and cunner. Catch increased substantially in August, rock crabs were nearly completely absent from the catch and black sea bass and Jonah crabs were present in large quantities with a similar increase in abundance of scup catch (Figures 2 & 3). Throughout the remainder of the sampling season, black sea bass was by far the dominant species. Jonah crab catch decreased through the fall compared to August, but it was still the second most common species for the remainder of the year. Scup, although decreased compared to August, was still a consistent species for the remainder of the year (Figures 2 & 3). Aside from black sea bass and scup, cunner, conger eels, and red hake were the most common fish species with all other species being relatively uncommon. Despite being a relatively small proportion of the catch, the highest abundance of lobsters was observed in August, with all other month's accounting for very few individuals.

Seasonality within the target species catch was observed particularly for black sea bass. Large individual black sea bass were present through the survey period once the catch increased in August, however as the fall progressed the mean sized decreased as catch became largely comprised of juveniles migrating offshore through the development area (Figure 4). Mean scup size remained relatively stable throughout the survey year however, like black sea bass, the largest individuals were observed in August (Figure 5). Species diversity between each station was relatively similar, with only station 108 appearing to be different (Figure 6). From observations on the water during the survey, the increase in diversity at station 108 was largely

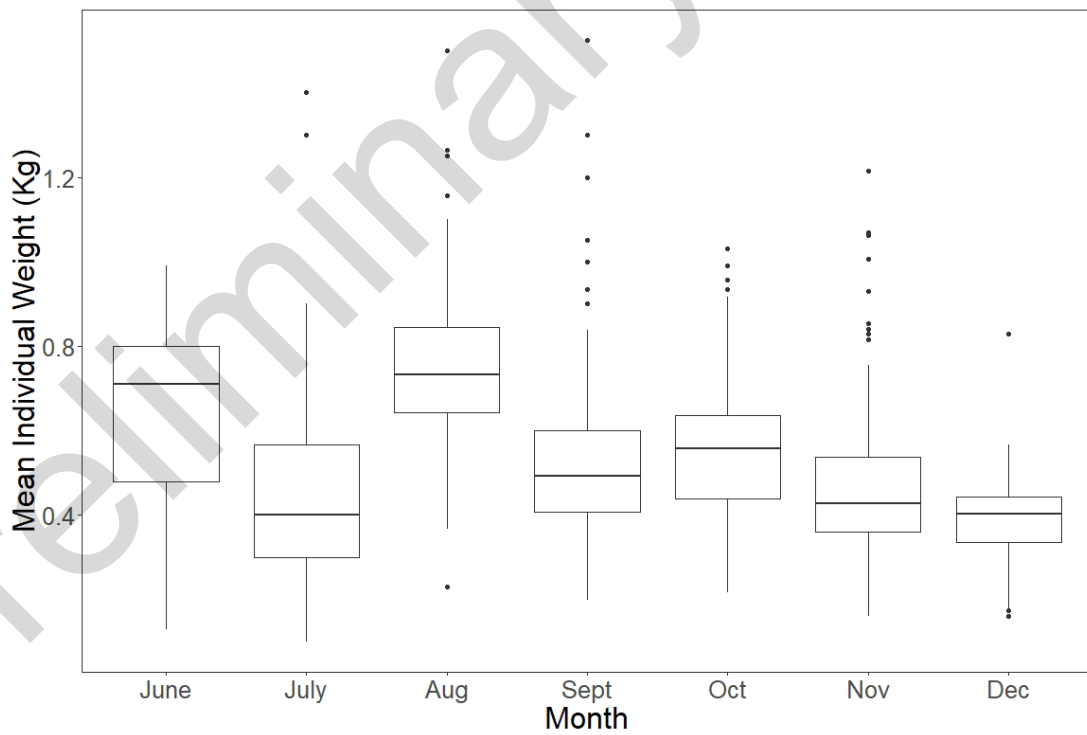
due to higher catch rates of non-target fish species. It was not driven by the presence of species not found at other stations but rather non-target species accounting for a large proportion of the catch at station 108 relative to other stations.



**Figure 2.** Total catch weight per month from the ventless fish pot survey. Crustacean species (CRUST SPP) is comprised almost entirely of lobster. By weight, fish species (FISH SPP) is largely dominated by conger eels, cunner, and red hake however other species such as ocean pout, trigger fish, longhorn sculpin, sea ravens, winter skate, smooth and spiny dogfish were also present. Black sea bass (BSB) were the most commonly fish overall.

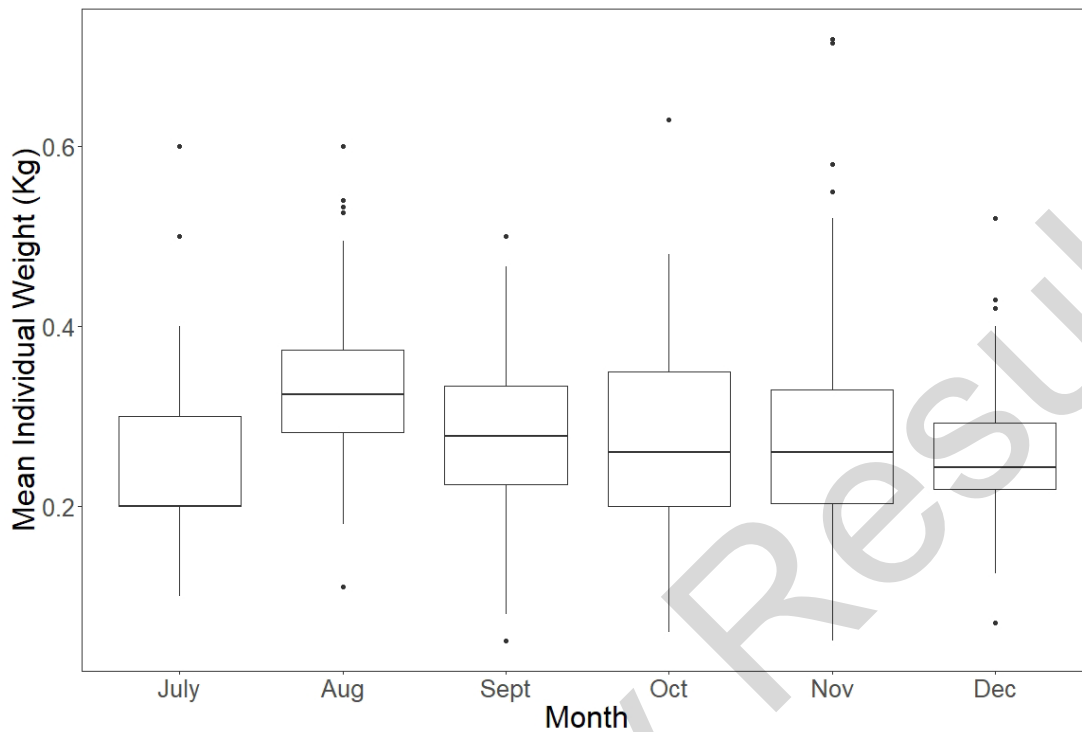


**Figure 3.** Monthly box plots of median number of black sea bass and scup caught per pot from the SFWF ventless fish pot survey of 2021.

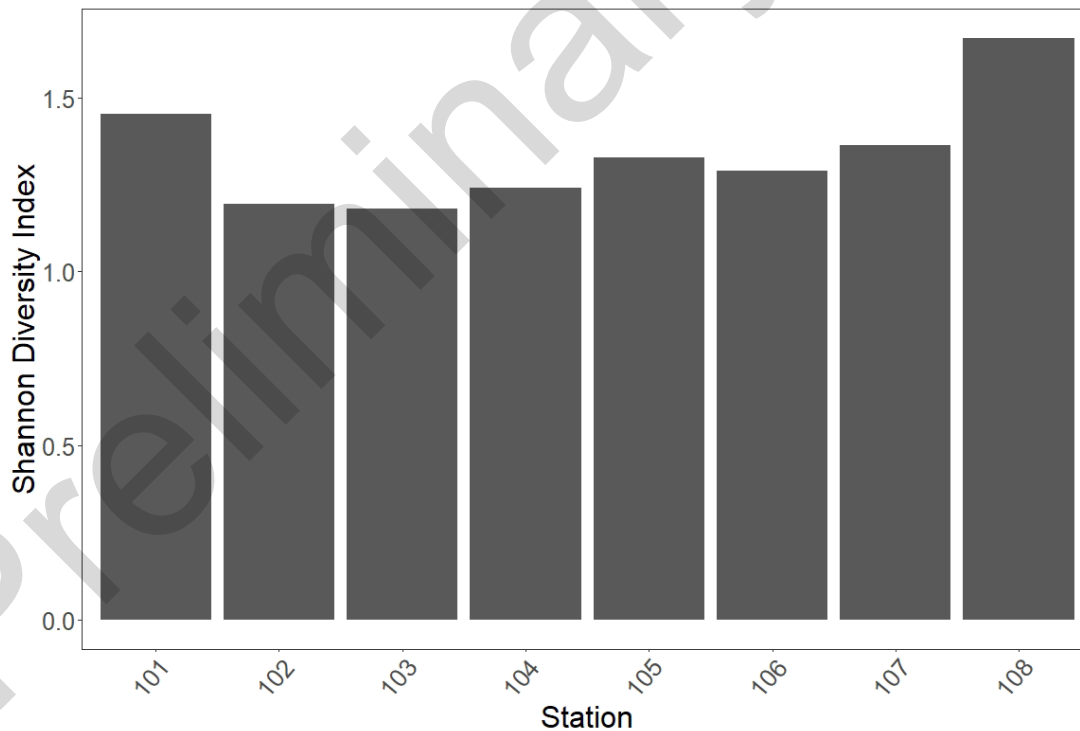


**Figure 4.** Mean individual weight of black sea bass per month from the 2021 South Fork Wind Farm ventless fish pot survey.





**Figure 5.** Mean individual weight of scup per month from the 2021 South Fork Wind Farm ventless fish pot survey.



**Figure 6.** Shannon Diversity index values for each 2021 South Fork Wind Farm ventless fish pot survey location across the entire survey year of 2021.

**Outreach:**

The CFRF maintains a project website at <http://www.cfrfoundation.org/sfwf-fish-pot-survey> where data summaries are uploaded as the survey progresses. This survey has also been highlighted in the CFRF quarterly newsletter ([July 2021](#) and [March 2022](#)). A public outreach event regarding year 1 of the South Fork Wind Farm pre-development surveys was held at Champlin's Seafood Deck in Point Judith, Rhode Island from 1-4 pm on March 28, 2022. At the event a poster displayed survey results and a presentation sharing similar information was given to a live and virtual audience. In total, approximately 40 people attended the event.