Empire Wind Squid
Bottom Trawl/eDNA Monitoring Survey
2024 Annual Report

Prepared for:

Empire Offshore Wind LLC
Stamford Office
600 Washington Blvd
Suite 800
Stamford, CT 06901

Prepared by:

INSPIRE Environmental
513 Broadway
Newport, RI 02840

and

Monmouth University
West Long Branch, New Jersey

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PROJECT DISTRIBUTION LIST

Name	Project Role	Email	Company
Michelle Fogarty	Environmental Surveys Manager and Company Representative to Contract		Equinor
Ashanti Storr	Marine Operations Project Engineer		Equinor
Elizabeth Kordowski	Fisheries Liaison Officer		Equinor
Brian Gervelis	Program and Contract Manager		INSPIRE

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ACRONYMS AND TERMS

ASV	Amplicon Sequence Variant
BACI	Before-After Control-Impact
BOEM	Bureau of Ocean Energy Management
cm	centimeter(s)
CTD	conductivity, temperature, and depth
eDNA	environmental DNA
EFH	essential fish habitat
Empire	Empire Offshore Wind LLC
FBMP	Fisheries and Benthic Monitoring Plan
ft	feet
F/V	fishing vessel
gal	gallon
GPS	global positioning system
HSSE	Health, Safety, Security, and Environmental
in	inch
INSPIRE	INSPIRE Environmental, Inc.
kg	kilogram(s)
km	kilometer(s)
L	liter(s)
m	meter(s)
MAB	Mid-Atlantic Bight
mi	mile(s)
ML	mantle length
mm	millimeter(s)
NEAMAP	Northeast Area Monitoring and Assessment Program
NEFOP	Northeast Fishery Observer Program
NEFSC	Northeast Fisheries Science Center
NJDEP	New Jersey Department of Environmental Protection
nm	nautical mile(s)
nMDS	non-metric multidimensional scaling
NOAA Fisheries	National Oceanic and Atmospheric Administration National Marine Fisheries Service
NYSERDA	New York State Energy Research and Development Authority

PCR	polymerase chain reaction
PERMANOVA	Permutational Multivariate Analysis of Variance
RI-MA WEA	Rhode Island-Massachusetts Wind Energy Area
ROSA	Responsible Offshore Science Alliance
SIMPER	similarity percentage analysis
TL	total length
USCG	United States Coast Guard
VMS	Vessel Monitoring System
VTR	Vessel Trip Report

1.0 INTRODUCTION

Empire Offshore Wind LLC (Empire) proposes to construct and operate an offshore wind farm located in the designated Renewable Energy Lease Area OCS-A 0512. The Empire Wind Lease Area covers approximately 79,350 acres (32,112 hectares) and is located approximately 14 statute miles (mi) (12 nautical miles [nm], 22 kilometers [km]) south of Long Island, New York and 19.5 mi (16.9 nm, 31.4 km) east of Long Branch, New Jersey (Figure 1-1). The Empire Wind Lease Area will be developed as two wind farms, known as Empire Wind 1 and Empire Wind 2. Monitoring efforts are combined for the proposed wind farms, covering the entire Empire Wind Lease Area as described in the Empire Wind Fisheries and Benthic Monitoring Plan (FBMP) (INSPIRE Environmental [INSPIRE] 2023). The results provided in this report pertain to samples collected across the entire Empire Wind Lease Area and a Reference Area.

The New York Bight supports diverse fish and invertebrate assemblages (Guida et al. 2017; Thorne et al. 2020; NJDEP 2022). Fisheries monitoring was designed to assess potential impacts of construction and operation activities within the Empire Wind Lease Area on these biological communities. A monitoring plan was developed in accordance with recommendations made by the Bureau of Ocean Energy Management's (BOEM) *Guidelines for Providing Information on Fisheries for Renewable Energy Development on the Atlantic Outer Continental Shelf* (BOEM 2019), New York State Energy Research and Development Authority's (NYSERDA) *New York State Offshore Wind Master Plan: Fish and Fisheries Study* (NYSERDA 2017), and the Responsible Offshore Science Alliance's (ROSA's) O*ffshore Wind Project Monitoring Framework and Guidelines* (ROSA 2021). This FBMP was created using an iterative process with the Empire Wind team coordinating with regional fishing organizations, working groups, and individual fishermen. In addition, through the permitting and development process the Empire Wind team consulted with state and federal fisheries resource management agencies and solicited feedback directly from stakeholders.

Due in part to the concerns of local fishing interests, the FBMP includes a survey designed to document the distribution and biomass of longfin squid (*Doryteuthis pealeii*) in the Empire Wind Lease Area and at a designated Reference Area during baseline, construction, and post-construction time periods. This monitoring study uses a combination of bottom trawl and aquatic environmental DNA (eDNA) sampling to monitor longfin squid. Bottom trawl sampling is a non-selective method that can detrimentally affect benthic habitat and result in bycatch mortality (reviewed by Methratta 2021). Therefore, eDNA sampling is included to promote development of this non-extractive and sustainable monitoring method of marine fauna (Stat et al. 2019; Methratta 2021). Use of eDNA has emerged in recent years as a potential alternative method to traditional, extractive sampling techniques. It is relatively inexpensive and can generate accurate, unbiased, and high-resolution data (Stat et al. 2019). Results, however, can be influenced by several factors, including DNA persistence and degradation, sampling strategies, workflows, and availability of taxa markers in reference databases (reviewed by Stat et al. 2019; Kopp et al. 2023). Inclusion of an eDNA assessment in the Empire Wind longfin squid survey is designed in part to ground truth the development of this relatively novel fisheries monitoring technique by comparing results to the fish and elasmobranch catches in the bottom trawl survey.

1.1 Study Organism

Longfin squid occur on the continental shelf from Newfoundland to the Gulf of Venezuela with a commercial fishery that ranges from Southern Georges Bank to Cape Hatteras, North Carolina (Jacobson 2005). The Northwest Atlantic population is managed as a single stock primarily by the Mid-Atlantic Fishery Management Council. Juvenile longfin squid are pelagic until reaching 2 inches (in) (5.1 centimeters [cm]) mantle length (ML) and then adopt a demersal lifestyle. In the fall, sub-adults migrate to outer shelf areas where they remain until the spring and are thought to overwinter in deeper waters along the edge of the continental shelf (Jacobson 2005, Buresch et al. 2006). Longfin squid were a core species present in an August beam trawl survey conducted in the Rhode Island-Massachusetts Wind Energy Area (RI-MA WEA) that also collected their benthic egg mops (Guida et al. 2017) and was among the 39 species with one or more life stage with designated Essential Fish Habitat (EFH) within the Empire Wind Project Area (Lease Area and cable routes).

Longfin squid supports a valuable commercial fishery in the northeastern U.S. with a twelve-year revenue (2008 to 2019) worth $877,000 (ex-vessel value; National Oceanic and Atmospheric Administration National Matine Fisheries Service [NOAA Fisheries] 2024). The longfin squid fishery accounted for the second highest revenue of any commercial fisheries within the Empire Wind Lease Area from 2008 to 2019 (INSPIRE 2023). According to NOAA Fisheries, in 2023 longfin squid commercial landings totaled 39 million pounds valued at $39 million (https://www.fisheries.noaa.gov/species/longfin-squid). Most longfin squid are harvested primarily in Rhode Island, New York, New Jersey, and Massachusetts using small-mesh bottom trawls, with a few fishermen using pound nets and fish traps. Across all fisheries, commercial fishing vessel activity within the Empire Wind Lease Area steadily decreased from 2008 to 2019 (Table 3-1 of FBMP [INSPIRE 2023]; NOAA Fisheries 2025). However, longfin squid are among the target species that accounted for the greatest number of trips to the Empire Wind Lease Area (Table 3-3 of FBMP [INSPIRE 2023]) when commercial fishing is characterized using several sources of publicly available information that include vessel monitoring system (VMS) and vessel trip report (VTR) data from the Northeast and Mid-Atlantic Ocean Data Portals (Northeast Ocean Data 2022; Mid-Atlantic Data Portal 2022) and VTR data from NOAA Fisheries (2025). VMS data for 2015 to 2016 indicate the longfin squid fleet operated in the middle to eastern portion of the area (Figure 1-2). In 2019, there were 434 trips by 86 vessels that targeted longfin squid (Table 3-3 of FBMP [INSPIRE 2023]; NOAA Fisheries 2025). Viewed on a regional scale, the Empire Wind Lease Area minimally overlaps active-fishing footprints for longfin squid, suggesting this lease area has limited effects on economic exposure (Figure 3 in Allen-Jacobson et al. 2023) and longfin squid vessel participation in the Northeast Fisheries Science Center (NEFSC) Study Fleet program upon which this study was based has increased in recent years (Jones et al. 2022).

1.2 Noise Studies

Because of the importance of the commercial longfin squid fishery in the Northwest Atlantic, there is considerable concern about potential impacts on the fishery due to offshore wind construction and operation. Pile driving generates high sound levels that can propagate for tens of kilometers (Sigray et al. 2022) and may affect sound sensitive organisms that include invertebrates, such as longfin squid. Longfin squid and other cephalopods perceive vibration stimuli through their statocyst receptor and lateral line systems (Budelmann et al. 1997) that are also essential for orientation and balance (Solé et al. 2018). Structural damage to adult cephalopod statocysts is caused by exposure to low-frequency sounds (reviewed in Andre et al. 2011). Damage to these systems, therefore, could diminish prey detection or capture in low light conditions.

Laboratory studies on longfin squid hatchlings indicate sound exposure can damage statocyst sensory epithelia (Solé et al. 2018). Research on adult longfin squid hearing indicates that longfin squid detect sound similarly to most fish via the particle motion of a sound field (Mooney et al. 2010) and respond with escape and predator avoidance behaviors (e.g., inking and jetting; Mooney et al. 2016). Laboratory studies of repeated exposures to playbacks of pile driving noise indicate longfin squid alarm responses attenuate over time, i.e., they become habituated to the noise (Mooney et al. 2016, Jones et al. 2020). Similarly, longfin squid alarm responses to in-situ pile driving decrease quickly (after 14 seconds) indicating pile driving noise effects are short-lived and unlikely to affect longfin squid energetics (Cones et al. 2022; Jezequel et al. 2023). Longfin squid exhibit no appreciable changes in reproductive behaviors when exposed to pile driving noises (Jones et al. 2023) but do exhibit failed capture rates and higher failed predation attempts (Jones et al. 2021). Jones et al. (2023) illustrated a continuum of responses exhibited by longfin squid to pile-driving noise based on squid activity, i.e., resting squid exhibited escape responses as do squid pursuing prey, but at a lower frequency, and squid engaged in reproductive behaviors were unresponsive. In summary, longfin squid may be robust to sound impacts from offshore wind farm construction, at least at exposures experienced 0.6 mi (1.0 km) from a full-scale pile driving activity (Jezequel and Mooney 2024).

1.3 Study Objectives

This report provides results of the first year of pre-construction longfin squid monitoring, which consists of two sampling efforts in August 2024 and two efforts in October 2024, in the Empire Wind Lease Area and associated Reference Area. Monitoring goals include evaluating relative changes to the following parameters between areas and between pre-construction, during construction, and post-construction time periods:

- The distribution, biomass, and size structure of longfin squid;
- The distribution, biomass, and size structure of fish and invertebrate bycatch species; and
- The taxonomic assemblage composition of fish and invertebrate species sampled using trawl and eDNA methods.

Plans for the Empire Wind longfin squid survey included two years of monitoring prior to offshore construction, sampling during construction, and two years of post-construction monitoring in accordance with the guidance of NYSERDA (NYSERDA 2017) and ROSA (ROSA 2021). Due to delays during the permitting process, only a single year of pre-construction monitoring will be conducted.

2.0 METHODS

The survey was conducted on the 96-foot (ft) commercial trawl vessel fishing vessel (F/V) *Susan L*, which was approved by United States Coast Guard (USCG) and by Equinor. Each survey trip was approximately three days in duration; this included roundtrip transit time between the dock in Point Judith, Rhode Island and the survey area, with approximately 12 hours of sample collections. Bottom trawl and seawater samples were collected at four randomly selected stations in both the Empire Wind Lease Area and Reference Area during each sampling event.

The Reference Area was selected to be within the vicinity of the Empire Wind Lease Area but distant from any potential direct effects of offshore wind construction and operation. A common goal in reference area selection for monitoring studies is to locate areas with similar habitat type (e.g., water depth and seafloor complexity) to the area where the disturbance is expected to occur. The same reference area is used in the Empire Wind longfin squid and scallop surveys and is integral to the Before-After-Control-Impact (BACI) design and other statistical analyses.

2.1 Sampling Design

A BACI design (Underwood 1991; Smith et al. 1993; Kerr et al. 2019) was planned to assess potential impacts of the wind farm development on longfin squid, fish, and invertebrate bycatch abundance and distribution in the Empire Wind Lease Area. The Empire Wind Lease Area and the Reference Area both have water depths that range from 72 to 138 ft (22 to 42 meters [m]). The survey was stratified by depth with an even number (n = 2) of stations assigned to a "shallow" depth stratum (<115 ft, [<35 m]) and "deep" stratum (>115 ft, [>35 m]) in each area. Therefore, during each sampling event, a total of eight stations (four stations in each area) were randomly selected from among grid cells in the Empire Wind Lease Area (Figure 2-1) and Reference Area (Figure 2-2) (Appendix A).

2.2 Data Collection

2.2.1 Water Column Profiles

A CastAway CTD Sensor was used prior to trawling operations to collect conductivity, temperature, and depth (CTD) information. CTD casts were conducted within 6.6 ft (2.0 m) of the bottom and data collected from each deployment was downloaded and stored on an external solid-state hard drive upon retrieval. Further oceanographic data were collected using a HOBO TidbiT MX Temperature 400 ft (122 m) data logger attached to the trawl net to record in-situ bottom temperature for the duration the net was deployed to record ambient water temperature at 1-minute intervals.

2.2.2 Environmental DNA (eDNA)

At each station, an eDNA water sample was collected within 6.6 ft (2 m) of the seafloor utilizing a 0.3-gallon (gal) (1.2-liter [L]) stainless steel polypropylene-lined Kemmerer Bottle. Water (eDNA) samples were collected once the vessel was positioned at the center of the grid cell prior to trawl deployment. Sample bottles were triple rinsed with sample water prior to being filled with collected water to be analyzed. All final samples were retained in a sterilized 0.26-gal (1.0-L) polypropylene bottle and frozen onboard until transferred to a laboratory for filtering as described in INSPIRE 2023.

After the completion of each survey, the chest freezer and eDNA samples were relocated from the vessel to INSPIRE storage facilities. Collected eDNA water samples remained frozen during packing and were shipped overnight to Monmouth University in an insulated shipping container. The frozen sample bottles were received by Monmouth University and then thawed for ~24 hours at 39°F (4°C). Thawed seawater was vacuum filtered onto 0.45-micrometer pore size, 47-millimeter (mm) diameter filters (Cytiva-Whatman NC 45 ST #10401170). The filters were stored with the sample surface folded on the inside, frozen, in sterile tubes until extraction. DNA was extracted from the tubes using the Qiagen DNeasy PowerWater Kit (cat. Nos. 14900-50-NF and 14900-100-NF), with a slight modification to the final DNA elution step to increase yield (Stoeckle et al. 2022). Primers used for amplification were from Riaz et al. (2011) modified to include Illumina adapters for subsequent sequencing.

A portion of the polymerase chain reaction (PCR) product was visualized on a 2.5% agarose gel to confirm the presence of a dominant band at roughly 200 base pairs, indicating successful amplification of fish (and other vertebrate) sequences. With the samples, a positive (either striped bass DNA or a mixture of elasmobranch species, obtained from verified fin clips) and negative control (molecular grade water) were also run for quality assurance/quality control. Extracted DNA with a band was quantified, and quality checked on a NanoDrop spectrometer (ThermoFisher). Following the acceptance of results from the PCR amplification technique (based on gel electrophoresis, standard quality assessment and control), 20x diluted aliquots of PCR products were shipped to the Bioanalytical Services Lab for sequencing. Laboratory controls (+ and -) as well as blank sample bottles were evaluated by looking at the number of DNA reads and taxa detected compared to field samples and deemed acceptable.

2.2.3 Bottom Trawl Survey

A VFAN USB Global Positioning System (GPS) Receiver, paired with OpenCPN software was used to record vessel position during trawling activities. All sampling was conducted within the boundaries of each grid cell. A 20-minute standard tow was completed at each of the eight randomly selected sampling stations, although this survey used 15 minutes as a minimum acceptable tow time to correspond with Northeast Area Monitoring and Assessment Program (NEAMAP) protocols (Bonzek et al. 2017). The INSPIRE field scientist recorded a suite of technical and environmental parameters, including the date, survey area, station number, start and end times for completed tows, start and end water depths for completed tows, net mensuration sensor values, tow speed, and Beaufort Sea State manually on the station datasheet. When the winches locked, signifying that trawling operations have begun, INSPIRE field scientists began the GPS and timing tow duration. Similar station-level information to the 'Squid Trawl' datasheet extended to eDNA and CTD data collection; except that coordinates were sourced from the vessel's GPS. This process was repeated for each tow. To remain in compliance with permitting requirements, representatives holding current certifications from the Northeast Fishery Observer Program (NEFOP) were aboard the vessel.

Commercial bottom trawl gear designed to target longfin squid was used to assess longfin squid biomass and overall taxonomic composition of other commercially important species within the Empire Wind Lease Area and the Reference Area. The trawl used a two-seam net with a 2 1/8-in cod end. The vessel crew employed Simrad PX Multi-sensor wireless monitoring mensuration equipment to measure spread and twin spread, roll and pitch, height, geometry, and geometry differential. After completing each 20-minute tow, the catch was hauled and released on deck where INSPIRE field scientists sorted the catch to the lowest practical taxonomic level and counted, measured, and weighed individuals or subsamples of large catches of a species. Subsampling occurred when a high volume of a single species was present. If subsampling was necessary, it was dictated by catch volume of the tow and time before next station to maintain the daylight sampling regime. Subsample methods were derived from the NEFSC Observer Operations Manual (NEFSC 2021) and are as follows:

1. Actual: All individuals of a single species were counted and weighed.

2. Tally Count: All individuals from a single species were counted, but only a subset of the individuals was weighed. The average individual weight calculated from the subset was applied to individuals that were not weighed.

3. Basket Count: All individuals from a single species were separated into baskets. All individuals from the subset of those baskets were counted and weighed. The average count and weight calculated from the subset was applied to the remaining baskets.

4. Weight to Weight: A random, well-mixed, and evenly distributed composition from multiple species were separated into baskets. The total number of baskets were accounted for, but a subset of those baskets was sampled for actual counts and weights. A multiplier was calculated based on the ratio of sampled baskets to unsampled baskets (adapted from volume to volume).

Biological sampling was performed on longfin squid and other priority species to characterize length distributions and determine fish condition. Up to 100 individuals were individually measured and weighed when sampling conditions allowed (e.g., time between tows). Length types (ML, total length [TL], etc.) were derived from the NEFSC Fishery Sampling Branch Observer On-Deck Reference Guide (NEFSC 2020). These data were used to establish initial baseline conditions regarding the abundance of longfin squid and other commercially valuable species within the Empire Wind Lease Area and the Reference Area. Catch information was first recorded in the field log, while the length and weight data were entered into either physical or digital copies of a catch sampling data sheet. The CTD, eDNA, and Squid Trawl datasheets were photographed following the completion of either area. The field log containing catch sampling information was photographed after completing each station. Catch from the previous tow was either discarded on the transit to the next station or held until after the eDNA sampling at a station was completed to reduce the likelihood of contaminating the water sample with eDNA from the trawl catch.

2.3 Data Analysis

The following sections describe the methods used to evaluate each of the various data types collected during the 2024 Empire Wind longfin squid survey. Summary tables and graphical presentations of the results are used to illustrate the trends between the areas and months. Little skate (*Leucoraja erinacea*) and winter skate (*L. ocellata*) were not always distinguished in the field; therefore, a third taxonomic category (unclassified little/winter skate) was used when enumerating and weighing skates with an uncertain species identity.

2.3.1 Water Column Profiles

Average bottom depth, temperature, and salinity were plotted using box plots. In addition, CTD profiles of temperature by depth were plotted for the August 22nd and October 11th sampling events to illustrate thermal stratification of the water column.

2.3.2 Environmental DNA (eDNA)

Nine samples (eight stations and one field control) were processed for each sampling event in August and October 2024.

Sample indexing, normalization, denaturing, and Illumina sequencing were performed at the Biological Services Laboratory according to standard protocols (complete protocols available upon request). For each sample, a set of two FastQ files containing forward and reverse sequences of the amplified DNA was produced. These were delivered via Illumina's data transfer server, BaseSpace, and stored backed up on several different servers when received.

Amplified sequences were then processed by Monmouth University using the DADA2 pipeline (Callahan et al. 2016) in the statistical computing program R (R Core Team 2024) to identify unique sequence variants and match them to a reference of known sequences. The output of DADA2 bioinformatics includes a 'taxa table' that contains detected Amplicon Sequence Variants (ASVs), associated taxa names for known ASVs from a reference database, and the number of times that ASVs were detected for a given sample (i.e., number of reads). ASVs are bits of DNA code that have been ascribed to specific taxa and used to characterize community composition. For instance, the number of unique ASVs detected for a species increases confidence in the identification of the species. It is also common practice to interpret the number of ASV reads of all variants for a given taxa as a relative approximation of a taxa's abundance in a sampled environment (Deagle et al. 2019). However, it should be noted that eDNA methodology assumes DNA release correlates with the abundance of individual present and therefore cannot determine the true number of individuals in an area. The availability of eDNA for inferring relative abundance can also be influenced by various factors, including DNA release and from differences in animal density, degradation from environmental conditions, mechanical force, microbial activity, and chemical reactions (reviewed by Ramirez-Amaro et al. 2022), and masking from overabundant taxa (Skelton et al. 2023) as well as differences in applied methodologies (reviewed by Goldberg et al. 2016).

It is important to note that eDNA metabarcoding detects fish as ASVs and there are some considerations that need to be accounted for when comparing with capture data. First, some

ASVs are the same for different taxa (e.g., “Red_White_or_Spotted_Hake”). In richness comparisons, for instance, if all of these hake were counted in a capture survey (richness = 3), the eDNA data would only show richness = 1. Additionally, some ASVs are redundant because they are ‘compound’ ASVs (e.g., belong to more than one taxon). For instance, while the “Atl_menhaden_LS17” sequence is 100% identical to *Brevoria tyranus* and *B. patronus* but only 99.06% identical to several alosid species (therefore specific for menhaden), “Atl_menhadenLS16_or_river_herring” is 100% identical to several species of river herring and menhaden.

2.3.3 Bottom Trawl Survey

Longfin squid biomass was plotted by survey area, depth strata, and month using box plots. Longfin squid size (i.e., ML) was plotted by survey area, depth strata, and sampling event using box plots. Fish biomass and size were compared qualitatively between areas using box plots for those species with sufficient sample sizes within sampling events or months. These species include black sea bass (*Centropristis striata*), butterfish (*Peprilus triacanthus*), scup (*Stenotomus chrysops*), and silver hake (*Merluccius bilinearis*). Little skate (*L. erinacea*) and northern sea robin (*Prionotus carolinus*) biomass also was plotted by area, depth strata, and month using box plots. Box plots illustrate the distribution (both location and skewness) of the data. Several box plots placed side by side allow visual comparisons of the main distributional attributes (e.g., distinctly separate distributions of the length measurements from different areas). The box plots show the 25th, 50th (median), and 75th percentiles, along with limits based on the inter-quartile range (the magnitude difference between the 25th and 75th percentiles), range, and extreme values (outliers).

Multivariate analyses were conducted using PRIMER Version 7.0.1 (Clarke et al. 2014) to determine whether the taxonomic composition of fish/invertebrate bycatch assemblages differed between months, survey areas or depth strata (nested within area) using a two-way Permutational Multivariate Analysis of Variance (PERMANOVA; Anderson et al. 2008) test. For each term in the model, 999 permutations of the data were computed to obtain significance (p) values. Dissimilarities were visualized using a non-metric multidimensional scaling (nMDS) plot. A similarity percentage analysis (SIMPER) analysis was used to determine the taxa that contributed the most to observed dissimilarities between either month or areas. In the nMDS ordinations, symbols representing samples with similar fish/invertebrate taxonomic compositions are positioned more closely to each other than samples with dissimilar assemblages. Fish/invertebrate abundances were square-root transformed to reduce the influence of abundant taxa and permit taxa with low or rare occurrences to contribute to similarity groupings of the samples.

Condition indices were estimated for individual black sea bass, butterfish, scup and silver hake, which had sufficient samples sizes of both length and weight data. The condition index (Le Cren 1951; Jakob et al. 1996) was calculated for each individual as its residual from the $\log_{10}$-$\log_{10}$ regressions of weight to length and were calculated separately by species.

3.0 QUALITY ASSURANCE AND QUALITY CONTROL

A protocol to certify or reject tow data for each survey tow is essential to

- Ensure that sampling effort remains consistent throughout the duration of the survey effort; and
- Address the high risk of invalidating sampling data due to issues associated with improper net deployment and fishing performance.

A tow certification procedure protocol was established for this program following NEAMAP procedures. INSPIRE's chief biologist and vessel captain implemented the following procedure prior to each tow:

- **Pre-tow check:** Following NEAMAP procedures, a certified tow requires that all configured net components be consistent for every tow conducted during the survey. The net is observed for tears and other damage.
- **Trawl Deployment:** When the net is deployed and the winch brakes are on, the sampling tow commences. A minimum tow duration of 15 minutes out of the target 20-minute duration is required to certify a tow as complete, as per NEAMAP protocol. During net deployment, if the captain notes any equipment malfunction that would affect the function of the net, a re-tow is required. During a tow, should the net hang on the bottom or other obstruction, another tow would be required. If this occurs after the minimum 15-minute tow duration, and the captain and the chief biologist concur that the sampling effort would not be adversely affected, a re-tow is not required.
- **Data Management:** INSPIRE conducted a comprehensive review of all data. Hard copy data sheets were reviewed for data entry errors prior to importing into a relational database. Additional quality assurance/quality control checks were performed by INSPIRE on database tables by running standardized, systematic queries to identify input errors and anomalous data values. Box plots of numeric data were used to identify extreme values, or outliers, which might constitute a data input error.

4.0 RESULTS

Sampling was originally scheduled for July and August, but was delayed due to evolving Health, Safety, Security, and Environment (HSSE) requirements and inclement weather. Therefore, bottom trawls to sample longfin squid were conducted twice per month in August (on the 22nd and 28th) and October (on the 4th and 11th) of 2024, with eight tow lines per sampling event. All sampling was conducted in accordance with the aforementioned study design and there were no missed sampling events or bottom trawl tows. Each of the sample dates was executed in accordance with the Empire Wind FBMP and the requirements associated with the NOAA Fisheries Exempted Fishing Permit. In addition, following the approval of the Empire Wind Construction and Operations Plan, the survey team followed all of the reasonable and prudent measures that were stipulated by the agencies.

Scientific sampling activities did not result in the inadvertent take of any marine mammals or federally endangered species.

4.1 Environmental Conditions

Bottom depths for the deep stations were similar between the Empire Wind Lease Area and Reference Area, ranging from 34 to 39 m. Bottom depths were more variable at shallow stations, ranging from 22 to 34 m (Figure 4-1). The shallowest sampling depths were in the Reference Area where station depths averaged 27 m. Mean bottom salinities did not vary much across all stations, ranging from 30.6 to 32.1 ppt, with the lowest salinities at shallow stations in the Reference Area (Figure 4-2). Bottom water temperatures were substantially lower during the August sampling events, averaging 10.8°C across both depth strata and areas; October bottom water temperatures averaged 18.1°C (Figure 4-3). In August, thermal stratification was present in the water column, with temperatures decreasing from approximately 22°C at the surface to 10°C at the bottom (Figure 4-4a). In contrast, temperature profiles of the water column in October indicate there was a well-mixed condition with temperature ranging only a few degrees throughout the water column (Figure 4-4b). There was no corresponding change in salinity by depth as evidenced by the narrow range in salinity concentrations.

4.2 Bottom Trawl Survey

During the October 4th survey (24F7), large catches of longfin squid, Atlantic croaker (*Micropogonias undulatus*), butterfish, and scup were landed. Consequently, onboard processing of the catch prioritized obtaining biomass values for all species and individual count data were recorded for only the less numerous species. Because biomass data were recorded consistently throughout the four sampling events, this parameter is used in all tabulations and analyses.

4.2.1 Longfin Squid

A total of 327.54 kilograms (kg) of longfin squid was collected during the 2024 Empire Wind longfin squid trawl survey (Table 4-1), with relatively low biomass in August at both the deep and shallow stations (Figure 4-5). Longfin squid biomass was high during the October sampling events, especially at the deep stations in the Reference Area. A total of 4,715 individual longfin squid were enumerated (Table 4-1). Subsampling to obtain longfin squid abundance estimates occurred at two stations during the October 4th sampling event and abundance estimates were not obtained at three other stations during the same sampling event (Table 4-2).

Overall, 2,545 longfin squid were measured. Longfin squid collected in August were generally smaller, averaging 8.2 cm ML compared to 13.0 cm ML in October (Figure 4-6). Longfin squid size was similar across the depth strata in August. In October, longfin squid were larger at the deep stations in both areas during the October 4th sampling event. During the October 11th sampling event, longfin squid size was similar across areas and depth strata (Figure 4-6). The number of longfin squid measured for each combination of survey area and depth stratum within a sampling event ranged from 89 to 200 individuals.

4.2.2 Fish Bycatch

A total of 9,863.63 kg of fish representing 40 taxa was collected as bycatch in the 2024 Empire Wind longfin squid trawl survey, with 86% of the fish biomass collected in October (Table 4-3). Invertebrate bycatch included Jonah crab *Cancer borealis*, rock crab *C. irroratus*, sand dollar *Echinarachnius parma*, sea star *Astropecten* spp., shortfin squid *Illex illecebrosus*, and sponge Spongiidae. Invertebrates are included in analyses of assemblage composition (Section 4.2.3) but are not analyzed individually and are not targeted for detection by eDNA methods. Abundance and biomass information for all species collected in the bottom trawl are available in Appendix B.

In August, 20 fish taxa were collected with northern sea robin (66%) and butterfish (23%) accounting for 89% of the total fish biomass (Table 4-4). In October, 31 fish taxa were collected with Atlantic croaker (35%), scup (23%), and butterfish (19%) accounting for 77% of the total fish biomass (Table 4-5). Catches of the dominant fish were highly variable, with no clear tendency for consistently high biomass of any fish in either area or depth stratum, however monthly differences were evident for some species. Black sea bass biomass was substantially higher in October at the Empire Wind Lease Area deep stations (Figure 4-7a). Butterfish biomass was higher in October, with no clear trend associated with area or depth (Figure 4-7b). Little skate biomass was highest in August at the Reference Area deep stations (Figure 4-8a) and northern sea robin biomass was highest in August at the Reference Area shallow stations (Figure 4-8b). Scup biomass was greatest in October and silver hake biomass was greatest in August, with no area or depth trends for either species (Figure 4-9 a and b).

A total count of 32,101 fish was estimated based on direct counts and subsampling estimates. Subsampling to obtain fish abundance estimates occurred using tally counts twice, basket counts four times, and the weight-to-weight volume method 100 times.

Black sea bass size did not differ consistently between areas or depth strata (Figure 4-10a). Butterfish size was consistent across areas and depth strata and was more variable in the Empire Wind Lease Area, deep stratum for in October (Figure 4-10b). Scup were more common in October and did not exhibit any pattern relative to individual size (Figure 4-11a). Smaller silver hake were more common at the Reference Area shallow stations in August and were slightly larger in the shallow stratum for both areas (Figure 4-11b).

Individual condition for black sea bass was estimated using data collected during the August 22nd and October 4th sampling events (Figure 4-12a), with no obvious difference in condition between deep and shallow stations (Figure 4-12b). Butterfish condition was estimated from both of the August and the first October sampling events (Figure 4-13a). Butterfish condition was relatively high at Empire Wind Lease Area shallow stations in October (Figure 4-13b). Scup condition was estimated using data collected during the August 22nd and October 4th sampling events (Figure 4-14a), with no obvious differences related to area or depth strata (Figure 4-14b). Silver hake condition was estimated for fish collected on August 22nd (Figure 4-15a) and did not differ appreciably by area or depth stratum (Figure 4-15b).

4.2.3 Fish/Invertebrate Assemblage Composition

The taxonomic composition of the trawl assemblages differed between August and October (Pseudo-F = 25.7, $p = 0.001$, Figure 4-16a), with no significant differences between areas or depth strata (Figure 4-16b). Higher scup, butterfish, longfin squid, and Atlantic croaker biomass in October and higher northern sea robin biomass in August cumulatively accounted for 78% of the dissimilarity in taxonomic composition between months (SIMPER, Figure 4-17). The high Atlantic croaker biomass in October was attributable to a large catch (3,137.50 kg) on October 4th at a shallow station (#23) in the Empire Wind Lease Area.

4.3 Environmental DNA (eDNA)

Nine eDNA samples (eight stations and one laboratory control) were processed for each sampling event resulting in 36 water samples. Freezing and light protection successfully prevented excessive DNA degradation. For the purposes of the eDNA results, “taxa” in this section refers to ASV reads that are associated with taxonomic groups (usually species) listed in a DNA library.

Overall, the eDNA of 35 teleost and 11 elasmobranch taxa were detected across the four sampling events (Figure 4-18). Taxa numbers approximate species richness, however, a single

ASV read may correspond to the presence of more than one species. Twenty-five teleost taxa were detected in August and 33 teleost taxa were detected in October using eDNA methods. Northern sea robin and butterfish were detected in all samples for all sampling events, whereas black drum/spot was detected in all samples in October and butterfish was detected in all samples for the August 22nd and both October sampling events (Figure 4-18). Other taxa with high detection rates in terms of overall number of reads included various hakes (e.g., silver, red, and spotted), windowpane flounder, striped sea robin, northern kingfish, and black sea bass. Nine elasmobranch taxa were detected in August and seven elasmobranch taxa were detected in October (Figure 4-18). Little/winter skate was the most commonly detected elasmobranch taxonomic group across all sampling events. Other commonly detected elasmobranch taxa included clearnose skate, smooth dogfish, and cownose ray. Additional information on identified taxa and number of reads by station and sampling event can be found in Appendix C.

Teleost and elasmobranch taxa richness in August was higher at the Reference Area and was higher and more variable at both locations in October (Figure 4-19). In August, taxonomic richness was similar for all stations in the Empire Wind Lease Area and the Reference Area, whereas in October taxonomic richness varied spatially within each area (Figure 4-20).

4.4 Comparison of Bottom Trawl and eDNA Results

In most sampling events, a greater number of teleost and elasmobranch taxa were detected by eDNA methods than by bottom trawl collections (Table 4-6). There were 35 teleost and elasmobranch taxa that were collected in the bottom trawl and detected by eDNA methods throughout the study. Five taxa were collected in the bottom trawl only and 15 taxa were detected by eDNA methods only (Table 4-7). The 15 taxa detected only by the eDNA method includes shelter-seeking species (e.g., tautog and Atlantic cod), bottom-dwelling species (e.g., bullnose ray, fawn cuskeel, smallmouth flounder) and species that can become large-bodied, fast swimmers that are unlikely to be sampled with a net (e.g., tuna, ocean sunfish, sandbar shark). Overall, 87.5% of the fish and elasmobranchs collected in the bottom trawl survey were detected using eDNA methods.

Table 4-1. Longfin Squid Abundance and Biomass Summarized by Survey Date, Area (Empire Wind and Reference), and Depth Stratum (Deep and Shallow)

Date	Area	Depth Strata	Total Frequency (#)	Total Catch (kg)
22 August 2024	EW	D	104	2.65
22 August 2024	EW	S	211	6.81
22 August 2024	Ref	D	118	2.84
22 August 2024	Ref	S	89	2.78
28 August 2024	EW	D	516	6.12
28 August 2024	EW	S	204	8.40
28 August 2024	Ref	D	197	6.71
28 August 2024	Ref	S	250	6.79
4 October 2024	EW	D	210	21.05
4 October 2024	EW	S	107	5.52
4 October 2024	Ref	D	NA	71.42
4 October 2024	Ref	S	82	17.83
11 October 2024	EW	D	559	33.24
11 October 2024	EW	S	328	19.70
11 October 2024	Ref	D	960	80.50
11 October 2024	Ref	S	780	35.18
		Total	**4715**	**327.54**

EW=Empire Wind
Ref=Reference
D=deep
S=shallow

Table 4-2. Longfin Squid Abundance and Biomass Data by Survey Date, Area (Empire Wind and Reference), Depth Stratum (Deep and Shallow), and Station ID

Survey Date	Area	Depth Strata	Station	Frequency (#)	Catch (kg)
22 August 2024	EW	D	B045	36	1.09
22 August 2024	EW	D	B051	68	1.56
22 August 2024	EW	S	B007	120	3.83
22 August 2024	EW	S	B023	91	2.98
22 August 2024	Ref	D	B079	66	1.19
22 August 2024	Ref	D	B117	52	1.65
22 August 2024	Ref	S	B082	30	2.42
22 August 2024	Ref	S	B112	59	0.36
28 August 2024	EW	D	B047	305	1.59
28 August 2024	EW	D	B059	211	4.53
28 August 2024	EW	S	B017	135	5.20
28 August 2024	EW	S	B020	69	3.20
28 August 2024	Ref	D	B076	55	1.92
28 August 2024	Ref	D	B106	142	4.79
28 August 2024	Ref	S	B073	68	2.15
28 August 2024	Ref	S	B112	182	4.64
4 October 2024	EW	D	B031	170	16.83
4 October 2024	EW	D	B046	40	4.22
4 October 2024	EW	S	B003	62	2.07
4 October 2024	EW	S	B023	45*	3.45
4 October 2024	Ref	D	B080	NA	24.47
4 October 2024	Ref	D	B107	NA	46.95
4 October 2024	Ref	S	B063	82*	4.15
4 October 2024	Ref	S	B083	NA	13.68
11 October 2024	EW	D	B045	243	13.68
11 October 2024	EW	D	B057	316	19.56
11 October 2024	EW	S	B010	126	13.83
11 October 2024	EW	S	B018	202	5.87
11 October 2024	Ref	D	B088	462	35.70
11 October 2024	Ref	D	B100	498	44.80
11 October 2024	Ref	S	B081	384	14.48
11 October 2024	Ref	S	B093	396	20.70

*Abundance estimate derived from subsampling.
EW=Empire Wind
Ref=Reference
D=deep
S=shallow

Table 4-3. Total Fish Biomass by Species and Month of Sampling

Common Name	Scientific Name	August	October	Total
Atlantic croaker	*Micropogonias undulatus*	0	3164.40	3164.40
Scup	*Stenotomus chrysops*	3.08	2077.74	2080.82
Butterfish	*Peprilus triacanthus*	315.91	1758.99	2074.9
Northern sea robin	*Prionotus carolinus*	917.82	218.26	1136.08
Smooth dogfish	*Mustelus canis*	0	425.27	425.27
Thresher shark	*Alopias vulpinus*	0	181.40	181.40
Weakfish	*Cynoscion regalis*	0	161.13	161.13
Spot	*Leiostomus xanthurus*	0	116.04	116.04
Clearnose skate	*Raja eglanteria*	0	88.17	88.17
Little skate	*Leucoraja erinacea*	55.46	25.34	80.80
Menhaden	*Brevoortia tyrannus*	0	63.39	63.39
Black sea bass	*Centropristis striata*	3.69	55.43	59.12
Silver hake	*Merluccius bilinearis*	47.27	5.71	52.98
Summer flounder	*Paralichthys dentatus*	0	37.73	37.73
Spiny dogfish	*Squalus acanthias*	0	36.38	36.38
Windowpane flounder	*Scophthalmus aquosus*	5.06	29.37	34.43
Red hake	*Urophycis chuss*	18.21	0	18.21
Spotted hake	*Urophycis regia*	1.65	8.43	10.08
Striped sea robin	*Prionotus evolans*	0	9.84	9.84
Winter flounder	*Pseudopleuronectes americanus*	5.74	1.07	6.81
Northern kingfish	*Menticirrhus saxatilis*	0	5.15	5.15
Winter skate	*Leucoraja ocellata*	3.50	0.61	4.11
Little/Winter skate	*Leucoraja erinacea/ocellata*	1.43	1.80	3.23
Atlantic mackerel	*Scomber scombrus*	0.16	3.04	3.20
Fourspot flounder	*Paralichthys oblongus*	2.76	0	2.76
Northern sennet	*Sphyraena borealis*	0	1.52	1.52
Bluefish	*Pomatomus saltatrix*	0	1.49	1.49
Haddock	*Melanogrammus aeglefinus*	1.19	0.02	1.21
Gulfstream flounder	*Citharichthys arctifrons*	0.70	0	0.70
Rough scad	*Trachurus lathami*	0	0.57	0.57
Triggerfish	*Balistes capriscus*	0	0.52	0.52
Northern pufferfish	*Sphoeroides maculatus*	0	0.50	0.50
Blue spotted cornetfish	*Fistularia commersonii*	0	0.24	0.24
Planehead filefish	*Stephanolepis hispidus*	0	0.20	0.20
Driftfish	*Cubiceps gracilis*	0.09	0	0.09
Sand lance	*Ammodytes americanus*	0.08	0	0.08
Monkfish	*Lophius americanus*	0.06	0	0.06
Blueback herring	*Alosa aestivalis*	0.02	0	0.02
Cownose ray	*Rhinoptera bonasus*	0	0	0
Roughtail stingray	*Bathytoshia centroura*	0	0	0
Total		**1383.88**	**8479.75**	**9863.63**
Percent Total		**14.00**	**86.00**	**100.00**

Table 4-4. Average Fish Biomass by August Sampling Event, Area (Empire Wind and Reference), and Depth Stratum (Deep and Shallow)

Average Biomass	**22 August 2024**				**28 August 2024**					
	Empire Wind		**Reference**		**Empire Wind**		**Reference**			
Common name	**D**	**S**	**D**	**S**	**D**	**S**	**D**	**S**	**Total**	**%**
Northern sea robin	0.00	23.75	1.32	354.57	0.00	0.00	1.06	78.75	57.43	65.87
Butterfish	3.49	0.16	1.23	0.40	3.65	4.13	143.26	1.66	19.74	22.65
Little skate	3.54	2.00	9.95	0.74	2.31	1.90	6.72	0.59	3.47	3.98
Silver hake	2.26	2.66	8.31	2.11	3.27	1.77	2.16	1.12	2.95	3.39
Red hake	0.54	2.40	5.44	0.00	0.06	0.36	0.79	0.00	1.20	1.37
Winter skate	0.00	1.09	1.73	0.68	0.00	0.00	0.00	0.00	0.44	0.50
Winter flounder	0.45	0.73	0.53	0.00	0.30	0.35	0.79	0.28	0.43	0.49
Windowpane flounder	0.14	0.63	0.67	0.48	0.47	0.00	0.21	0.03	0.33	0.37
Scup	0.78	0.00	0.32	0.65	0.00	0.00	0.00	0.24	0.25	0.28
Black sea bass	0.00	1.41	0.44	0.00	0.00	0.00	0.00	0.00	0.23	0.26
Fourspot flounder	0.00	0.21	0.44	0.12	0.28	0.07	0.19	0.37	0.21	0.24
Spotted hake	0.00	0.00	0.15	0.29	0.00	0.00	0.32	0.60	0.17	0.19
Haddock	0.13	0.00	0.01	0.02	0.85	0.00	0.03	0.03	0.13	0.15
Little/Winter skate	0.02	0.13	0.53	0.14	0.00	0.09	0.00	0.00	0.11	0.13
Gulfstream flounder	0.05	0.04	0.08	0.00	0.08	0.00	0.11	0.00	0.04	0.05
Atlantic mackerel	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.02	0.02
Driftfish	0.00	0.00	0.02	0.01	0.04	0.02	0.00	0.00	0.01	0.01
Sand lance	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Monkfish	0.02	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Blueback herring	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cownose ray					x					
Roughtail stingray	x									
								Total	**87.18**	**100**

D=deep depth stratum
S=shallow depth stratum
x=indicates species was caught but not weighed

Table 4-5. Average Fish Biomass by October Sampling Event, Area (Empire Wind and Reference), and Depth Stratum (Deep and Shallow)

Average Biomass	**4 October 2024**				**11 October 2024**					
	Empire		**Reference**		**Empire**		**Reference**			
Common Name	**D**	**S**	**D**	**S**	**D**	**S**	**D**	**S**	**Total**	**%**
Atlantic croaker	5.81	1574.54	0.00	0.00	0.00	0.52	0.96	8.04	198.73	35.18
Scup	127.85	110.71	251.78	20.78	19.00	242.41	77.63	188.74	129.86	22.98
Butterfish	38.73	244.75	148.30	94.40	2.61	103.36	83.57	163.79	109.94	19.46
Smooth dogfish	62.26	32.72	98.93	15.22	1.58	79.53	31.20	12.15	41.70	7.38
Thresher shark	0.00	0.00	0.00	0.00	0.00	0.00	0.00	181.40	22.68	4.01
Northern sea robin	12.18	4.23	40.44	13.76	14.22	5.45	9.89	8.99	13.64	2.41
Weakfish	10.06	13.70	17.27	17.83	0.00	6.93	3.87	26.51	12.02	2.13
Spot	34.18	14.14	3.55	2.16	0.00	2.04	0.60	3.31	7.50	1.33
Clearnose skate	2.26	8.62	4.89	5.11	4.95	9.42	0.00	14.28	6.19	1.10
Atlantic menhaden	1.15	1.43	2.48	0.00	0.00	0.00	8.43	22.43	4.49	0.79
Summer flounder	2.42	22.94	3.47	0.00	0.83	1.24	1.27	0.00	4.02	0.71
Black sea bass	3.38	3.29	1.01	0.00	18.32	1.75	0.76	0.19	3.59	0.63
Spiny dogfish	11.73	0.00	0.00	0.00	0.00	1.33	5.15	1.30	2.44	0.43
Windowpane flounder	0.72	2.73	4.22	4.87	0.23	0.36	1.17	3.26	2.19	0.39
Little skate	1.63	1.28	2.10	1.43	3.36	1.35	1.54	0.00	1.58	0.28
Striped sea robin	3.16	1.04	2.21	0.00	0.62	1.85	0.00	0.34	1.15	0.20
Spotted hake	4.26	0.84	0.21	0.00	0.96	0.70	0.00	0.63	0.95	0.17
Northern kingfish	0.00	1.52	2.31	1.05	0.00	0.27	0.00	0.00	0.64	0.11
Silver hake	0.00	0.00	2.18	0.00	0.05	0.00	0.66	0.00	0.36	0.06
Atlantic mackerel	0.00	0.00	0.41	0.58	0.00	0.91	0.00	0.57	0.31	0.05
Little/Winter skate	0.35	0.00	0.22	0.00	0.00	1.23	0.00	0.00	0.23	0.04
Northern sennet	0.00	1.03	0.00	0.00	0.00	0.00	0.00	0.49	0.19	0.03
Bluefish	0.00	0.00	0.00	0.00	0.42	0.66	0.00	0.00	0.13	0.02
Winter flounder	0.00	0.30	0.22	0.00	0.00	0.23	0.16	0.00	0.11	0.02
Winter skate	0.00	0.00	0.00	0.00	0.61	0.00	0.00	0.00	0.08	0.01
Rough scad	0.06	0.00	0.00	0.40	0.00	0.00	0.07	0.04	0.07	0.01
Triggerfish	0.48	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.07	0.01
Northern pufferfish	0.00	0.00	0.00	0.34	0.00	0.16	0.00	0.00	0.06	0.01
Blue spotted cornetfish	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.19	0.03	0.01
Planehead filefish	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.03	<0.01
Haddock	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	<0.01
Cownose ray		x								
								Total	**564.97**	**100.00**

D=deep depth stratum
S=shallow depth stratum
x=indicates species was caught but not weighed

Table 4-6. Number of Taxa Detected Using eDNA and Bottom Trawl Sampling Methods in August and October 2024 by Area (Empire Wind and Reference). Frequencies Represent Number of Unique Taxa and are Broadly Summarized by Teleosts (i.e., bony fish) and Elasmobranchs (i.e., skates and rays, and sharks).

	eDNA				Bottom Trawl			
	August		October		August		October	
	EW	Ref	EW	Ref	EW	Ref	EW	Ref
Elasmobranch	6	8	6	6	4	4	7	6
Teleost	20	19	29	32	15	15	24	21
Total	26	27	35	38	19	19	31	27

EW=Empire Wind
Ref=Reference

Table 4-7. Taxa Detected Using Bottom Trawl and eDNA Sampling Methods in August and October 2024. Shaded Cells Indicate the ASV Corresponds to More Than One Species.

Common name	Scientific name	Bottom trawl	eDNA
Atlantic cod	*Gadus morhua*		x
Atlantic croaker	*Micropogonias undulatus*	x	x
Atlantic herring	*Clupea harengus*		x
Bay anchovy	*Anchoa mitchelli*		x
Black sea bass	*Centropristis striata*	x	x
Blue spotted cornetfish	*Fistularia commersonii*	x	
Blueback herring	*Alosa aestivalis*	x	x
Bluefish	*Pomatomus saltatrix*	x	x
Brazilian cownose ray	*Rhinoptera brasiliensis*		x
Buckler dory	*Zenopsis conchifer*		x
Bullnose ray	*Myliobatis freminvillei*		x
Butterfish	*Peprilus triacanthus*	x	x
Clearnose skate	*Raja eglanteria*	x	x
Cownose ray	*Rhinoptera bonasus*	x	x
Driftfish	*Cubiceps gracilis*	x	
Fawn cuskeel	*Lepophidium profundorum*		x
Fourspot flounder	*Paralichthys oblongus*	x	x
Frigate or bullet tuna	*Auxis rochei*		x
Gulf stream flounder	*Citharichthys arctifrons*	x	x
Haddock	*Melanogrammus aeglefinus*	x	
Little skate	*Leucoraja erinacea*	x	x
Little/Winter skate	*Leucoraja erinacea/ ocellata*	x	x
Mackerel	*Scomber scombrus*	x	x
Menhaden	*Brevoortia tyrannus*	x	x
Monkfish	*Lophius americanus*	x	x
Northern kingfish	*Menticirrhus saxatilis*	x	x
Northern pufferfish	*Sphoeroides maculatus*	x	x
Northern sea robin	*Prionotus carolinus*	x	x
Northern sennet	*Sphyraena borealis*	x	x
Ocean sunfish	*Mola mola*		x
Planehead filefish	*Stephanolepis hispidus*	x	
Red hake	*Urophycis chuss*	x	x
Rough scad	*Trachurus lathami*	x	
Roughtail stingray	*Bathytoshia centroura*	x	x
Sand lance	*Ammodytes americanus*	x	x
Sandbar shark	*Carcharhinus plumbeus*		x
Scup	*Stenotomus chrysops*	x	x
Silver anchovy	*Engraulis eurystole*		x
Silver hake	*Merluccius bilinearis*	x	x
Smallmouth flounder	*Etropus microstomus*		x
Smooth dogfish	*Mustelus canis*	x	x
Spiny dogfish	*Squalus acanthias*	x	x
Spot (or black drum)	*Leiostomus xanthurus*	x	x
Spotted hake	*Urophycis regia*	x	x
Striped sea robin	*Prionotus evolans*	x	x
Summer flounder	*Paralichthys dentatus*	x	x
Tautog	*Tautoga onitis*		x
Thresher shark	*Alopias vulpinus*	x	x
Triggerfish	*Balistes capriscus*	x	x
Tuna	*Thunnus spp.*		x

Common name	Scientific name	Bottom trawl	eDNA
Unknown ray			x
Weakfish	*Cynoscion regalis*	x	x
Windowpane flounder	*Scophthalmus aquosus*	x	x
Winter flounder	*Pseudopleuronectes americanus*	x	x
Winter skate	*Leucoraja ocellata*	x	x
		40	50

5.0 DISCUSSION

This annual report presents results of the first year of baseline monitoring for the Empire Wind longfin squid survey, which was conducted in August and October 2024. All planned stations were successfully sampled using a bottom trawl and water collections to assess eDNA of teleost fish and elasmobranchs in the Empire Wind Lease Area and a Reference Area. Fish bycatch is substantial in longfin squid bottom trawl surveys (Riedel and Leaf 2023); therefore, inclusion of paired eDNA/bottom trawl assessments is an important contribution to the development of eDNA methods as an informative to offshore wind monitoring.

Longfin squid were collected in all bottom trawls conducted throughout the study period. Biomass was substantially greater in October at the Reference Area for both depth strata. Environmental conditions changed between the August and October sampling events, with well-defined thermal stratification of decreasing temperatures with increasing depth present in August and well-mixed conditions throughout the water column in October. Thermal stratification is common in the summer in the Mid-Atlantic Bight (MAB) and it dissipates in the late fall and winter to a well-mixed condition that coincides with phytoplankton blooms (Schofield et al. 2008). The thermal stratification in the MAB, also known as the Cold Pool, extends from George's Bank off of Cape Cod, Massachusetts to Cape Hatteras, North Carolina (Houghton et al. 1982) and strongly influences the ecosystem dynamics such as phytoplankton production, behavior and recruitment of pelagic and demersal fish on the continental shelf, recreational and commercial fisheries, and highly migratory species (Brown et al. 2023; Horwitz et al. 2023). These cold waters are advected from the Gulf of Maine and Scotian Shelf southward (Houghton et al. 1982). The Cold Pool first appears when vernal (springtime) warming creates stratification of the surface water throughout the summer until the thermocline is deepened as the water column overturns and mixes by fall (Houghton et al. 1982). The thermal stratification observed in Empire Wind Squid Survey CTD profiles in August and the well-mixed conditions present in October reflect this phenomenon. Cold waters produced during the spring are persistent through summer and fall and maintained by Arctic currents (Friedland et al. 2022). However, recent studies have found significant and rapid warming of the Cold Pool due to climate change (Friedland et al. 2022) and there is additional concern that offshore wind will affect ocean mixing and therefore seasonal stratification, although currently there is little relevant empirical information (Horwitz et al. 2023).

Longfin squid migrate inshore-offshore seasonally, moving offshore in the late fall as water temperatures decline (Jacobson 2005). These cross-continental shelf migrations contribute to variability in catch rates leading to relatively high interannual variability in longfin squid biomass when assessed at the spatial scale of wind energy areas (Methratta 2024). Individual body size of longfin squid in the Empire Wind longfin squid survey was greater in October, contributing to the greater biomass of these catches.

5.1 Longfin Squid Fishery-Dependent Studies

Available data collected on commercial longfin squid vessel activity indicates that the Empire Wind Lease Area does not substantially overlap with high-value, commercial longfin squid fishing grounds. A heat map of VMS data collected in 2015 to 2016 depicts relatively low commercial longfin squid vessel activity in the middle to eastern portion of the Empire Wind Lease Area (Figure 1-2). Active longfin squid fishing footprints generally occur to the north or east of the Empire Wind Lease Area (Allen-Jacobson et al. 2023).

5.2 Longfin Squid Fishery-Independent Studies

Aside from potential noise impacts from pile driving, longfin squid are susceptible to offshore wind farm effects during the egg stage when eggs are attached to the bottom (egg mops). Site assessment surveys of wind energy areas found longfin squid egg mops within the Empire Wind Lease Area (Guida et al. 2017). Guida et al. 2017 reviewed NEFSC seasonal trawl survey data from 2003 to 2016 and qualitative records from beam trawls.

5.3 Longfin Squid Trawl Bycatch

There was substantial fish bycatch in the Empire Wind longfin squid survey, which was expected. The longfin squid fishery is the uncommon commercial fishery in which the target species is not the most commonly species landed. A study examining discards from commercial fisheries in the U.S. Mid-Atlantic found that in the longfin squid fishery four fish species (butterfish, spotted hake, windowpane, and sliver hake) were more commonly landed than the targeted longfin squid (Riedel and Leaf 2023). In this initial baseline year of the Empire Wind longfin squid survey, northern sea robin, butterfish, Atlantic croaker, and scup were the dominant fish bycatch species.

5.4 Comparison of Bottom Trawl and eDNA Results

The greater number of fish/elasmobranch taxa detected by eDNA methods compared to taxa collected in the bottom trawl is consistent with other studies that paired these monitoring methods (e.g., Liu et al. 2019; Afzali et al. 2020; Stoeckle et al. 2021; Jiang et al. 2023). Stoeckle et al. (2021) found that the number of eDNA reads did not differ between surface and bottom conditions during periods of thermal stratification. In the Empire Wind longfin squid study, the majority of taxa not detected by eDNA methods, but not collected by the trawl were either large fish that could out swim the net or bottom-dwelling fish that may not have raised into the net as it passed. The finding that 87.5% of the fish and elasmobranchs collected in the Empire Wind longfin squid bottom trawl survey were detected using eDNA methods is similar to comparable percentages in other studies, i.e., 71% across the study period (Russo et al. 2021) and 70 to 87% for monthly samples (Stoeckle et al. 2021). Results of eDNA sampling also included the detection of the Brazilian cownose ray during the August sampling periods.

Although the northern extent of this species' range is not well defined, a range extension in the western North Atlantic to Florida was recently established (Weber et al. 2020; Swenson 2021). The Brazilian cownose ray was also detected in the September 2023 (INSPIRE 2024) and September 2024 (J. Adolf pers. comm.) eDNA sampling for the Empire Wind BRUV/eDNA survey, suggesting a broadened range expansion may be warranted.

6.0 SUMMARY

The Empire Wind longfin squid bottom trawl survey was conducted twice per month in August (22nd and 28th) and October (4th and 11th) 2024. In each sampling event, four tows were conducted in each of the Empire Wind Lease Area and the Reference Area, and these tows were evenly divided between deep and shallow depth strata. Results of this Year 1 Empire Wind longfin squid survey are summarized below.

- Results of the first year of baseline Empire Wind longfin squid sampling revealed strong temporal variation in squid biomass and size, with higher biomass and greater individual size in October, but little spatial variation in these parameters, i.e., no clear trends involved areas or depth strata. These baseline results suggest the sampling design is well-suited to detect potential wind farm effects on longfin squid during the construction and operation phases.
- Water column conditions differed between the August and October sampling events, with strong thermal stratification present in August, yielding average bottom water temperatures of 10^{o}C compared to warmer (18^{o}C), well-mixed conditions in October.
- A total of 327.54 kg of longfin squid was collected with relatively low biomass in August at both the deep and shallow stations. The highest longfin squid biomass occurred during the October sampling events at the deep stations in the Reference Area.
- Longfin squid collected in August were generally smaller, averaging 8.2 cm ML length compared to 13.0 cm ML in October. Longfin squid size was similar across the depth strata in August. In October, longfin squid were larger at the deep stations in both areas during the October 4th sampling event.
- A total of 9,863.63 kg of fish representing 38 taxa was collected as bycatch in the 2024 Empire Wind longfin squid trawl survey, with 86% of the fish biomass collected in October. In August, 19 fish taxa were collected with northern sea robin (65%) and butterfish (22%) accounting for 87% of the total fish biomass. In October, 31 fish taxa were collected with Atlantic croaker (35%), scup (23%), and butterfish (19%) accounting for 77% of the total fish biomass. There was no consistent trend for fish biomass related to either area or depth stratum for any fish species.
- Fish size and condition (analyzed for black sea bass, butterfish, scup, and silver hake) did not differ consistently by area or depth stratum.

- Fish/invertebrate assemblage composition differed between months with higher northern sea robin biomass in August and higher scup, butterfish, longfin squid, and Atlantic croaker biomass in October.
- Overall, the eDNA of 35 teleost and 11 elasmobranch taxa were detected across the four sampling events.
- In most sampling events, a greater number of teleost and elasmobranch taxa were detected by eDNA methods than by bottom trawl collections. There were 35 teleost and elasmobranch taxa that were sampled by both bottom trawl and eDNA methods. Five taxa were collected in the bottom trawl only and 14 taxa were detected by eDNA only. Overall, 87.5% of the fish and elasmobranchs collected in the bottom trawl survey also were detected using eDNA methods.

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Empire Wind Squid
Bottom Trawl/eDNA Monitoring Survey
2024 Annual Report

FIGURES

Prepared for:

Empire Offshore Wind LLC
Stamford Office
600 Washington Blvd
Suite 800
Stamford, CT 06901

Prepared by:

INSPIRE Environmental
513 Broadway
Newport, RI 02840

and

Monmouth University
West Long Branch, New Jersey

April 2025

LIST OF FIGURES

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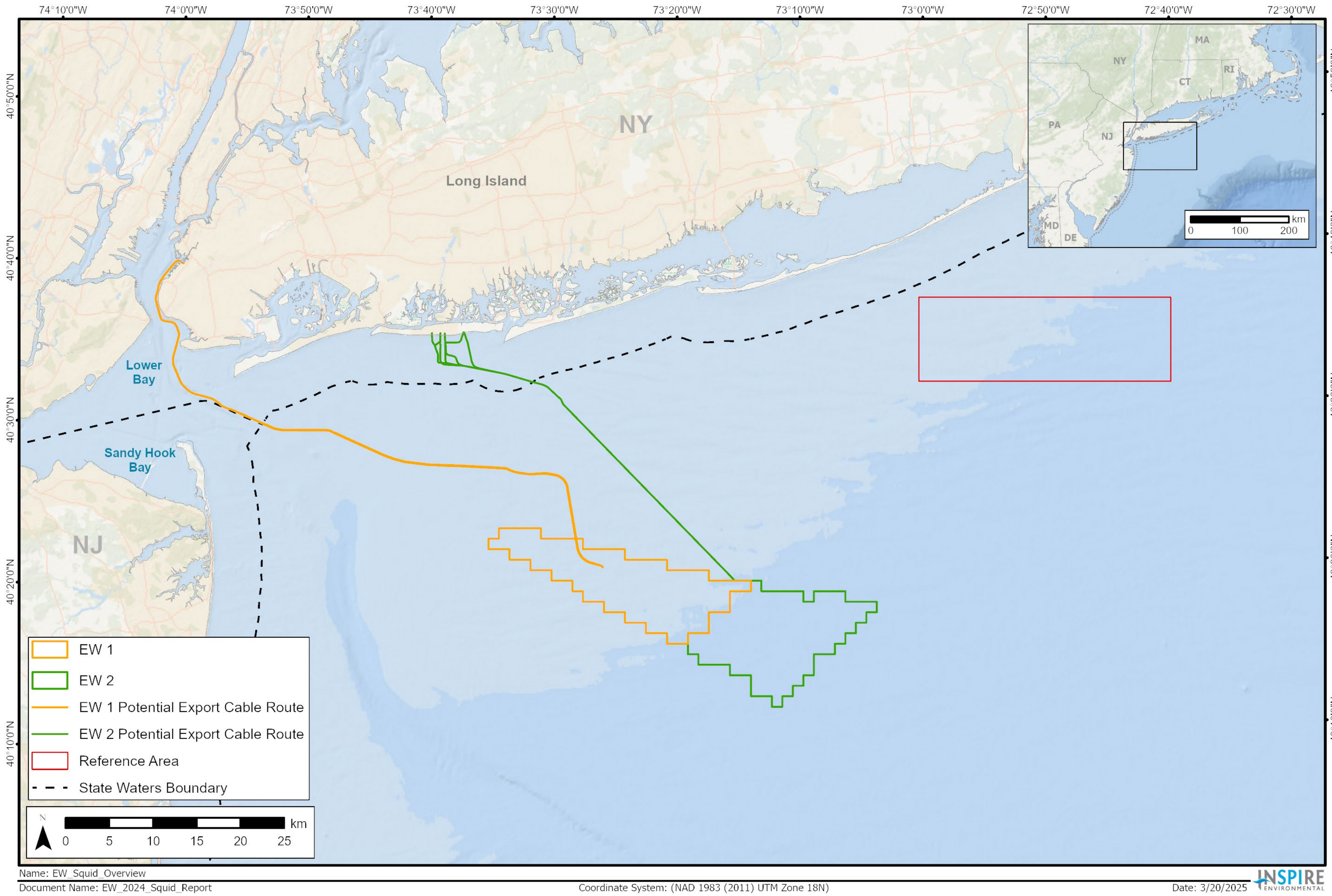


Figure 1-1. Map of the Empire Wind Lease Area including export cable routes

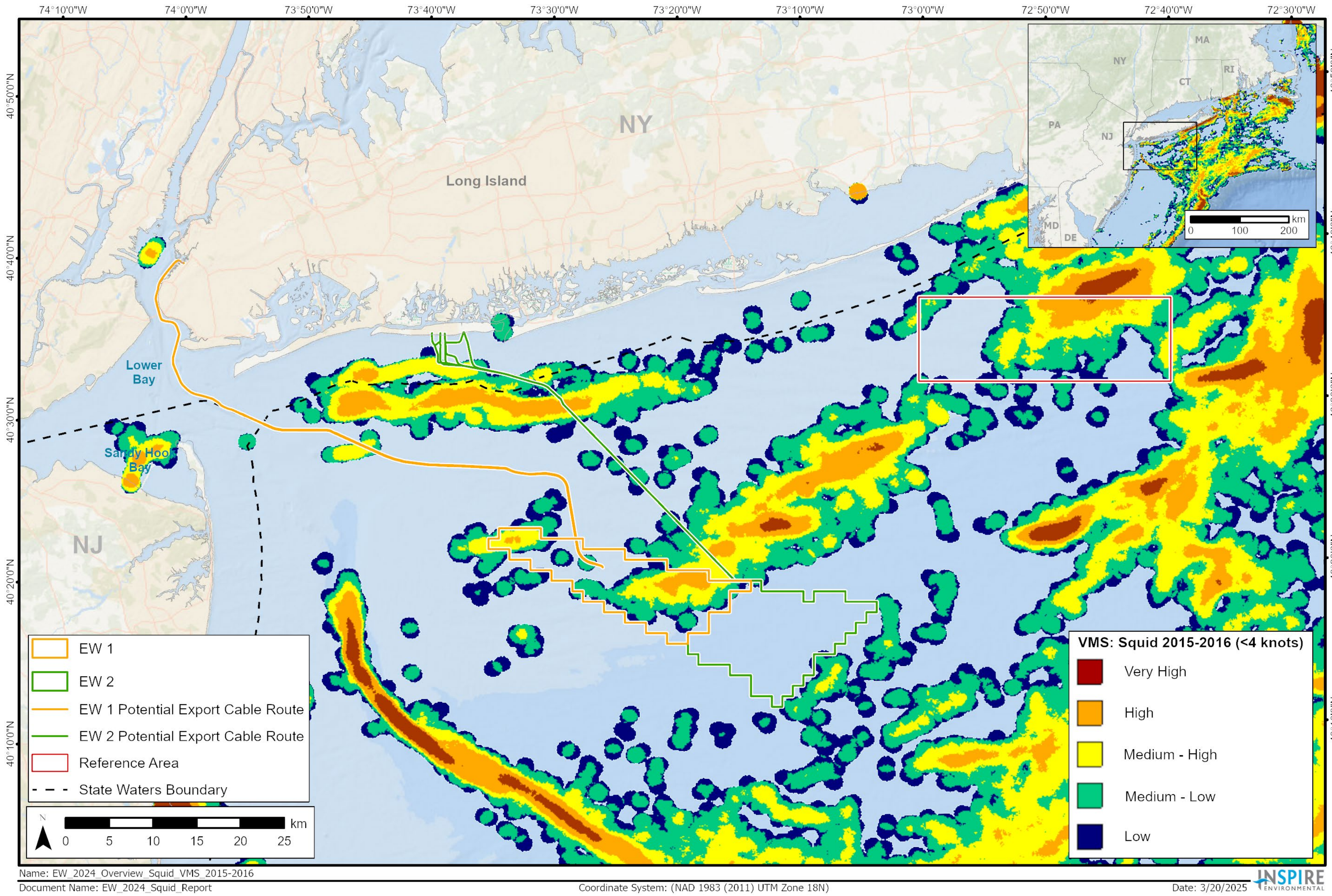


Figure 1-2. Vessel Monitoring System (VMS) data for the longfin squid fleet from 2015 to 2016 in the Empire Wind region

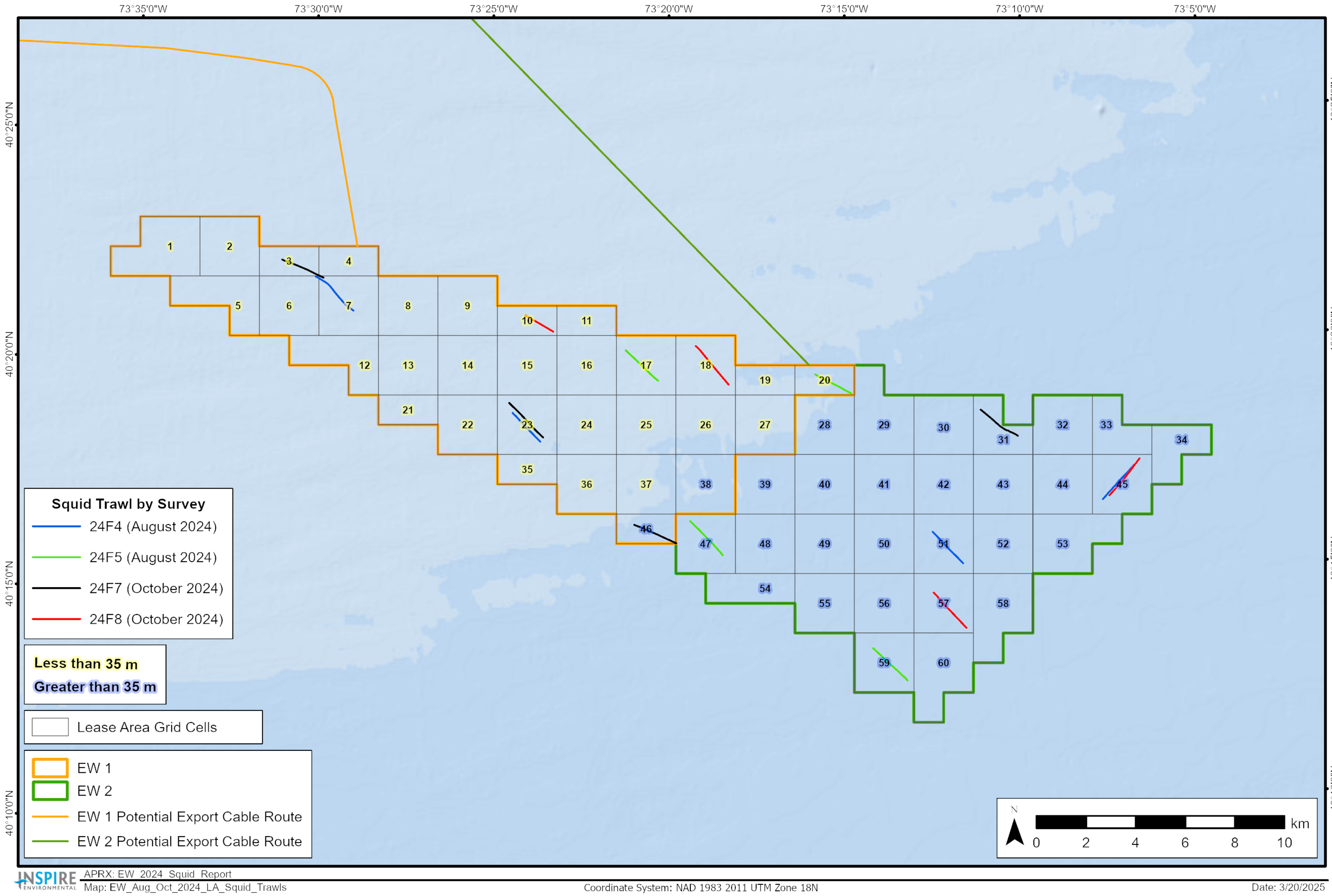


Figure 2-1. Locations of longfin squid bottom trawl stations in the Empire Wind Lease Area for the August and October 2024 sampling events. Grid cells in the shallow (<35 meters [m]) and deeper (>35 m) strata are numbered.

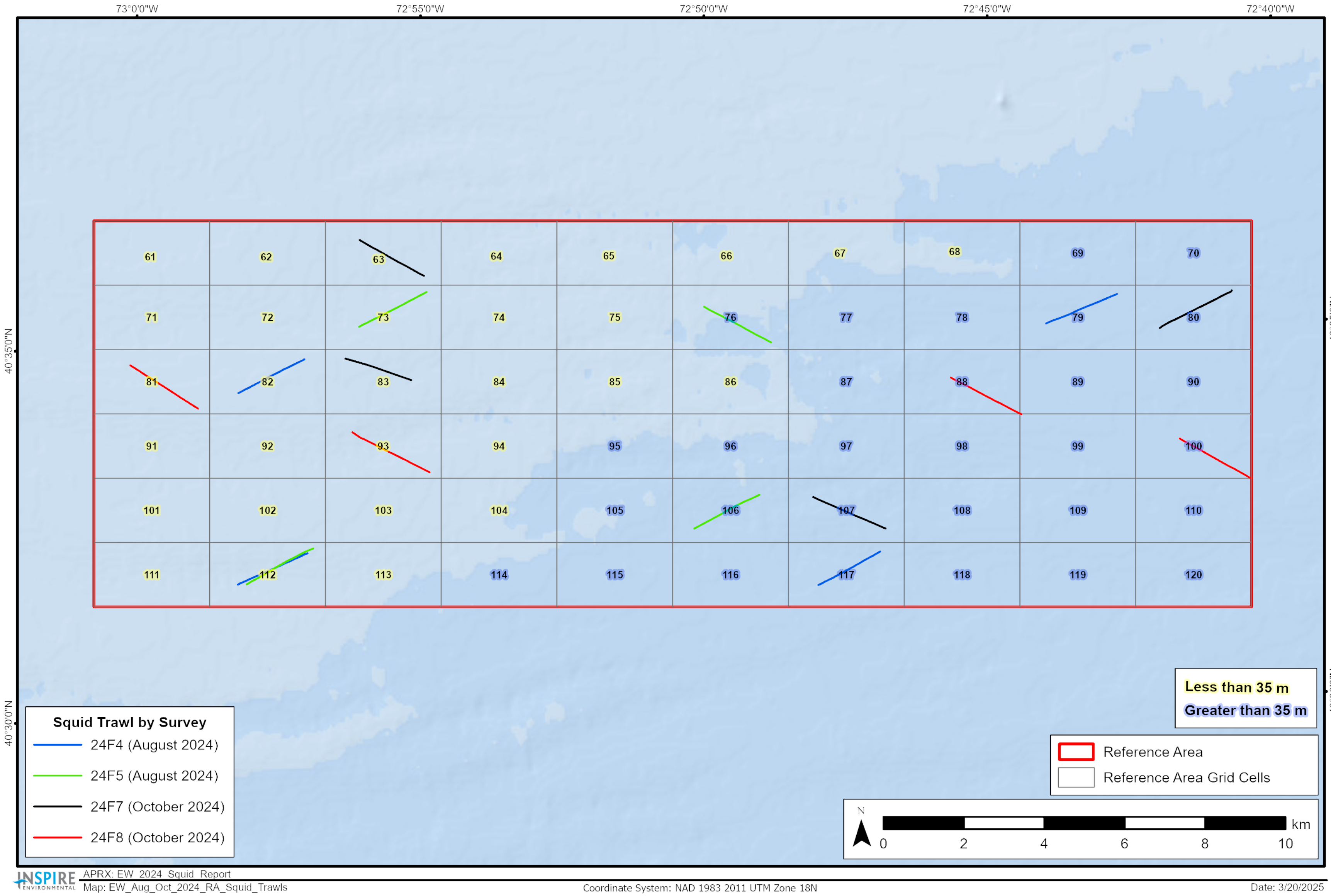


Figure 2-2. Locations of longfin squid bottom trawl stations in the Reference Area for the August and October 2024 sampling events. Grid cells in the shallow (<35 m) and deeper (>35 m) strata are numbered.

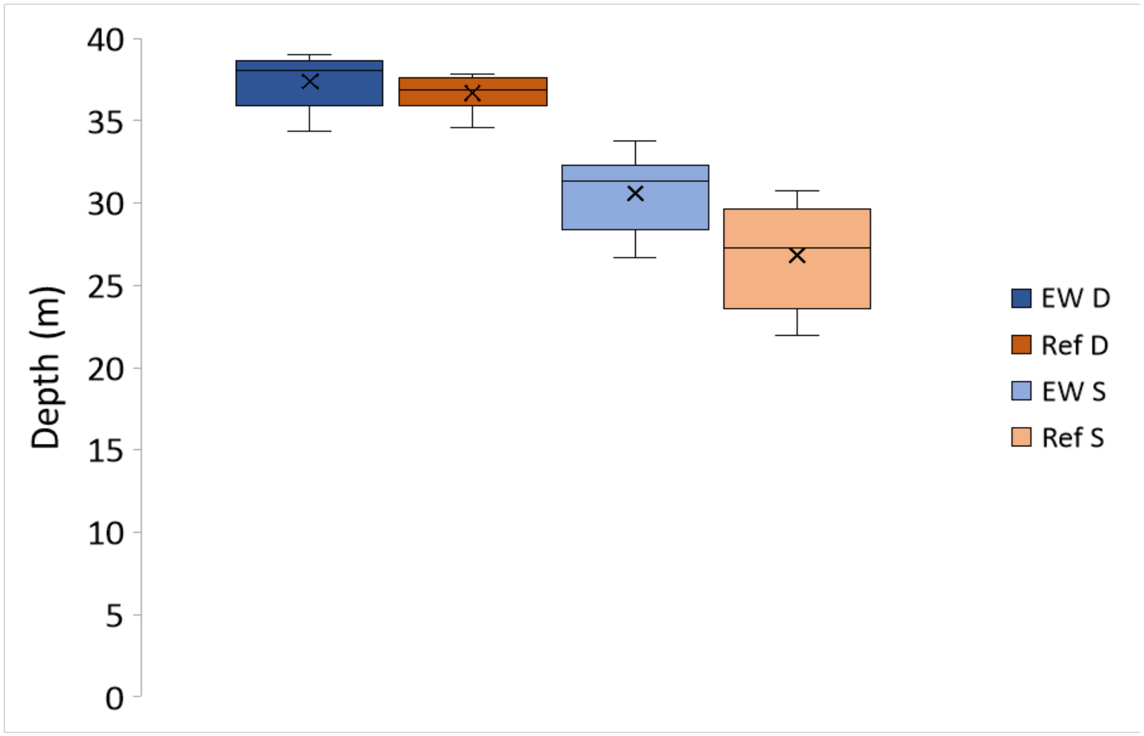


Figure 4-1. Bottom depth distributions by area (Empire Wind [EW] and Reference [Ref]) x depth stratum (Deep [D] and Shallow [S]) combination. Sample size n = 8 for each box plot.

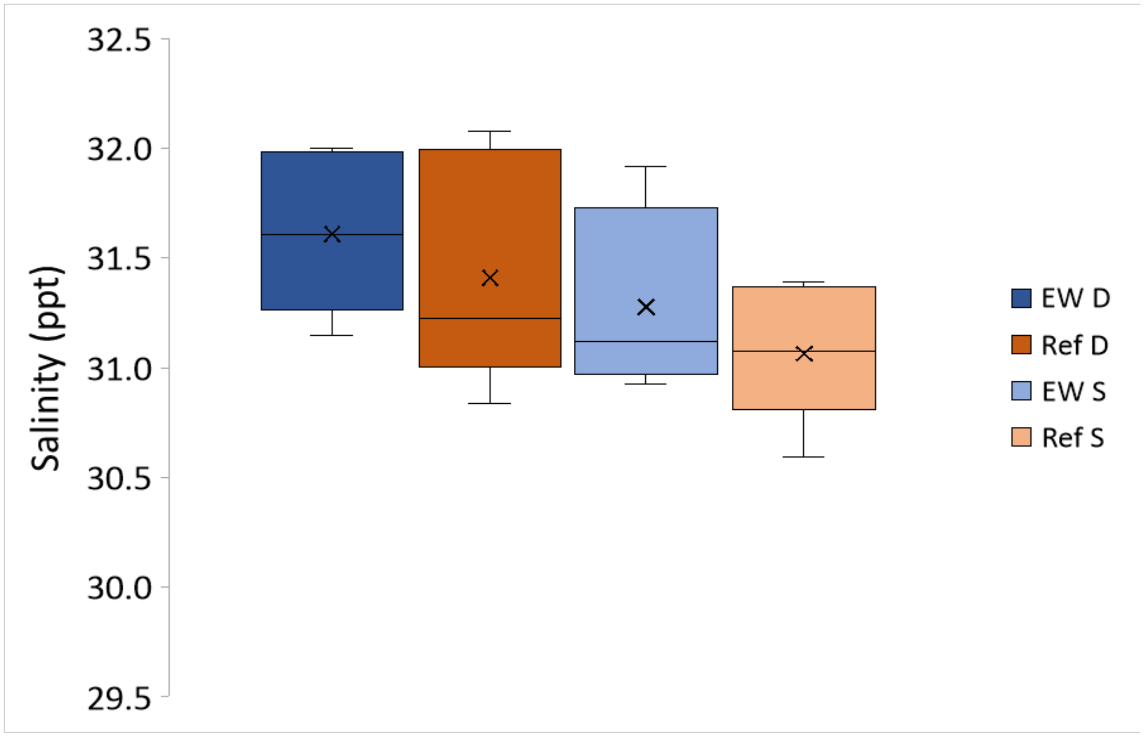


Figure 4-2. Bottom salinity distributions by area (Empire Wind [EW] and Reference [Ref]) x depth stratum (Deep [D] and Shallow [S]) combination. Sample size n = 8 for each box plot.

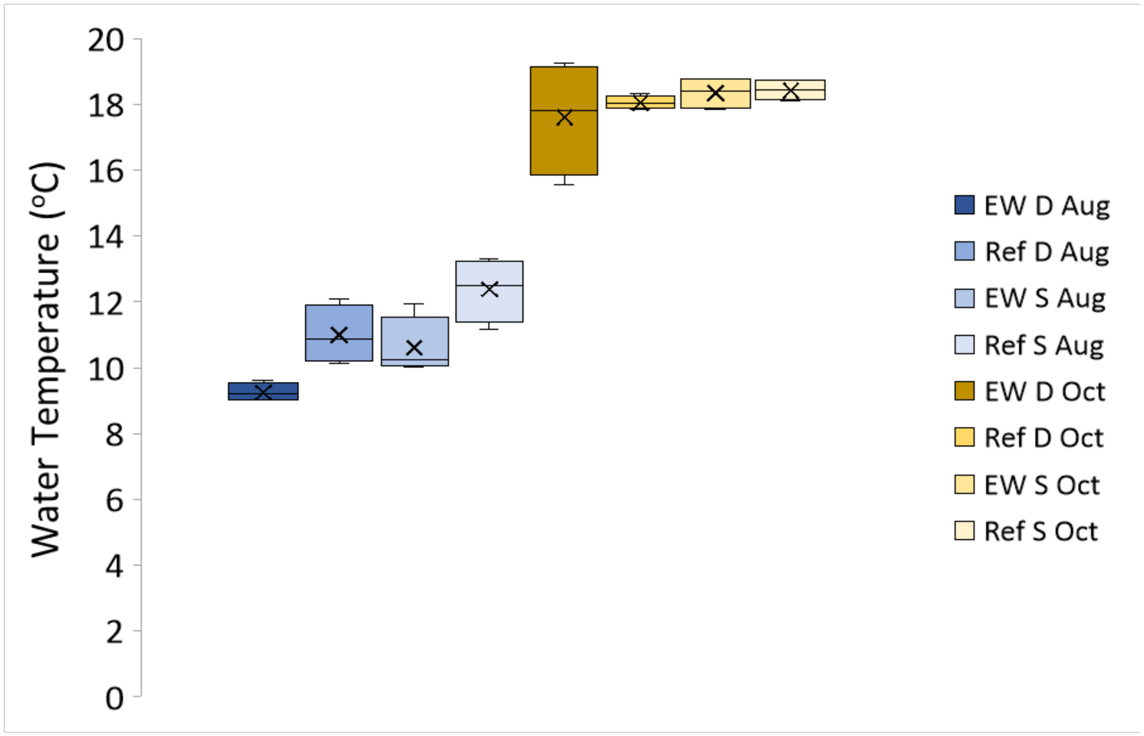
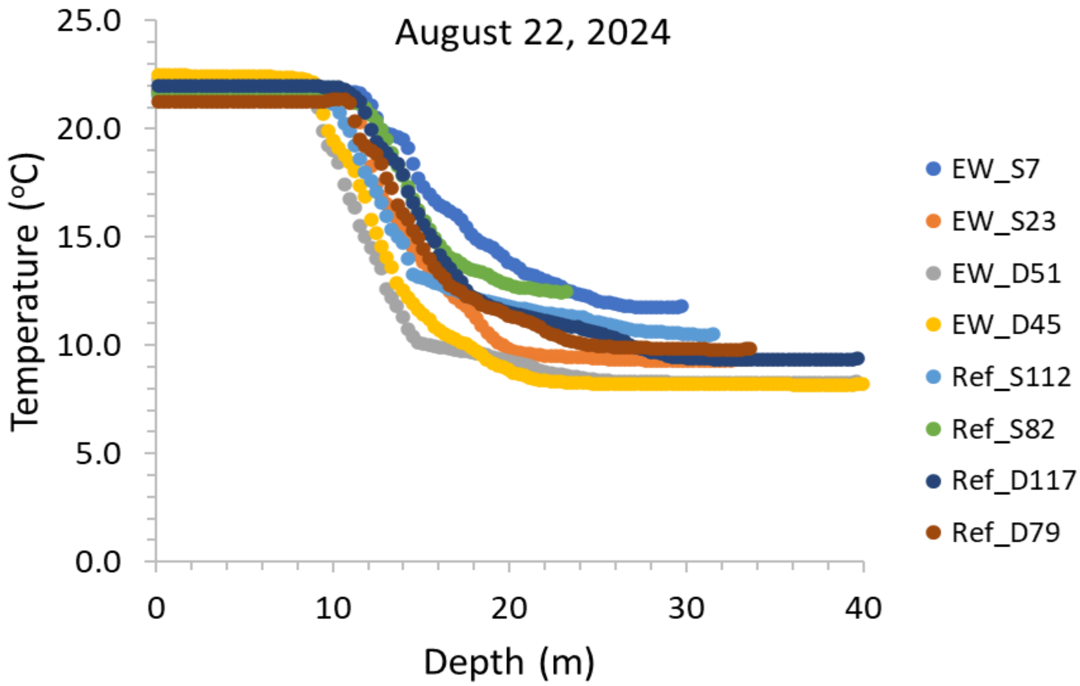


Figure 4-3. Bottom water temperature distributions by area (Empire Wind [EW] and Reference [Ref]) x depth stratum (Deep [D] and Shallow [S]) combination. Sample size n = 4 for each box plot

A



B

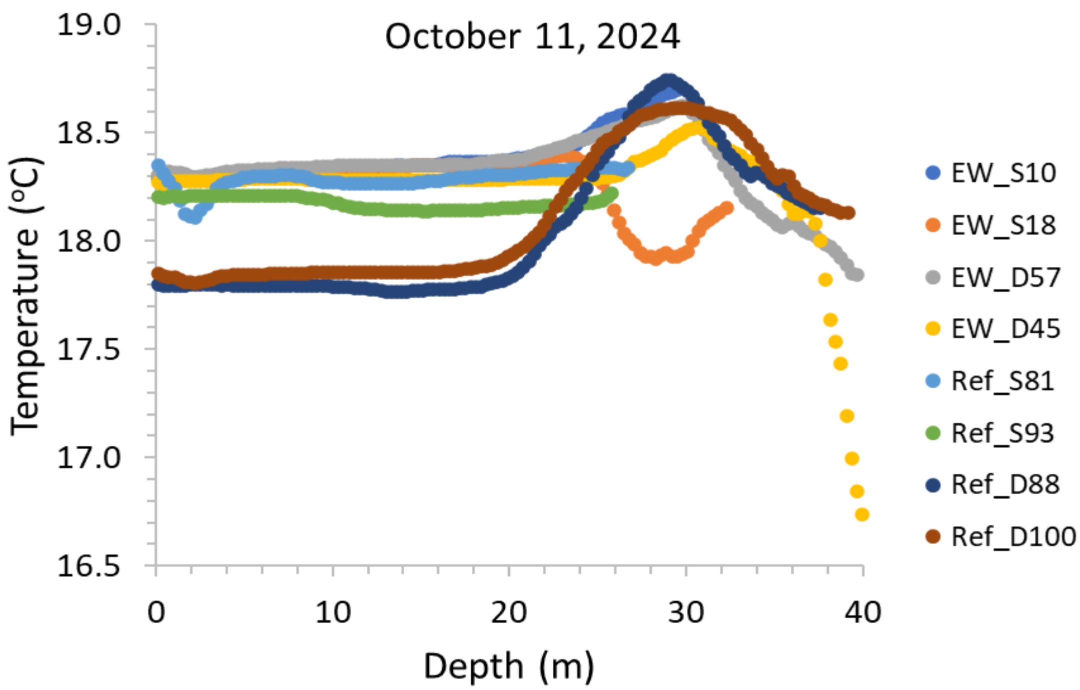


Figure 4-4. Temperature depth profiles recorded by CTD at each station during the (A) August 22nd and (B) October 11th sampling events

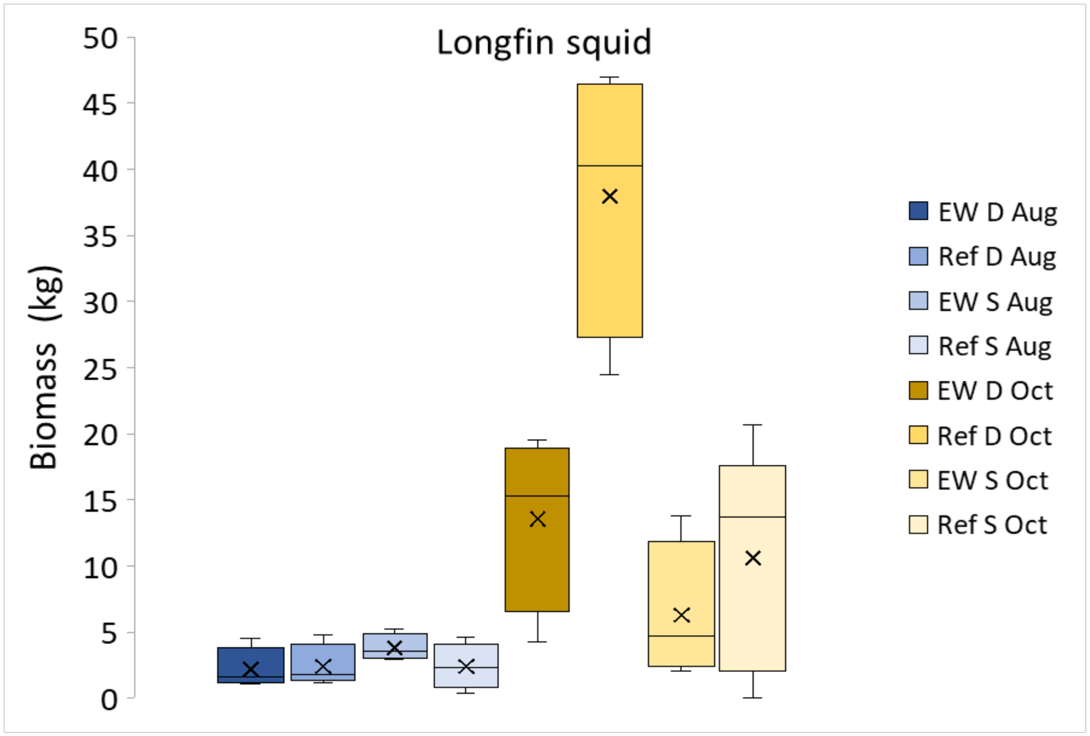


Figure 4-5. Biomass distributions of longfin squid depicted by area (Empire Wind [EW] and Reference [Ref]) x depth stratum (Deep [D] and Shallow [S]) combination in August and October. Sample size n = 4 for each box plot.

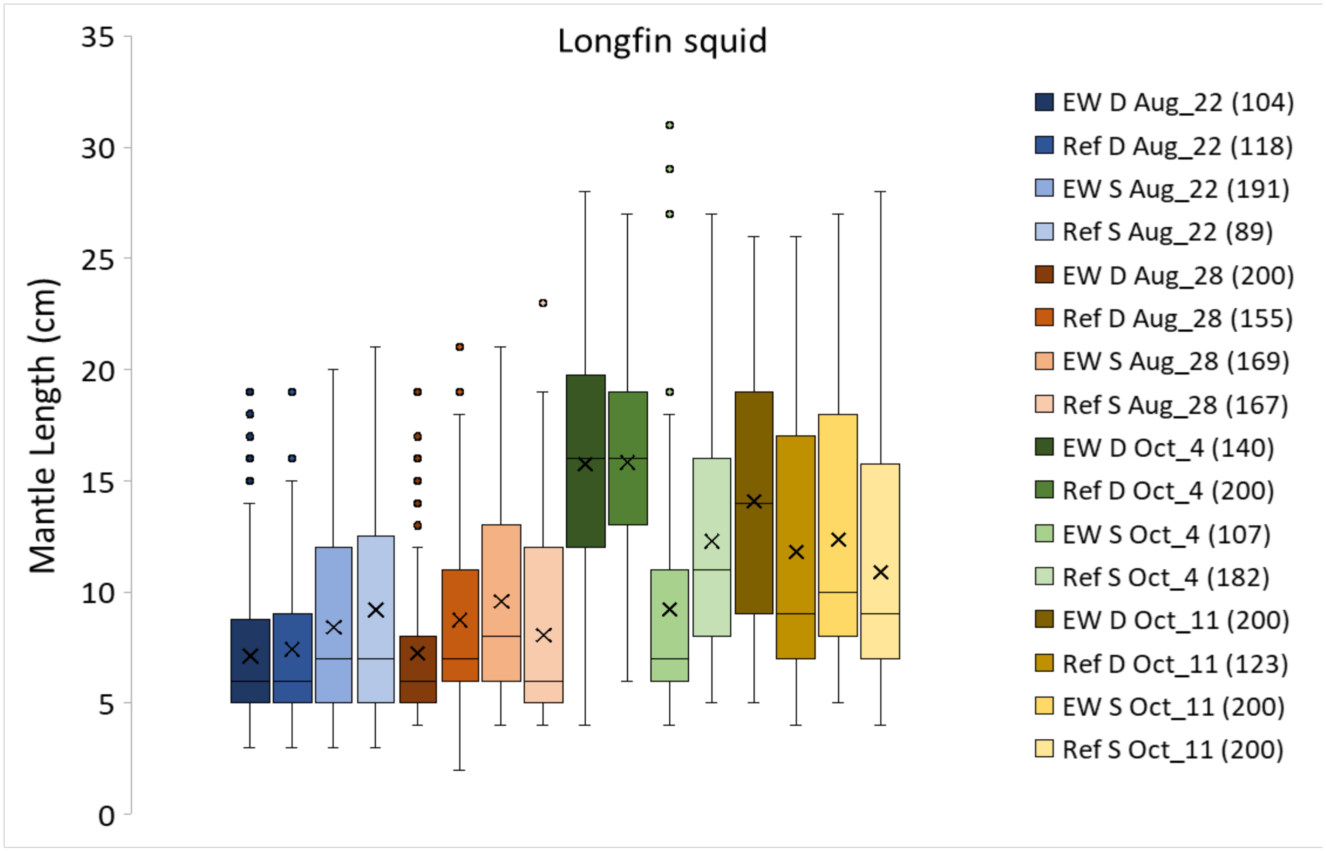
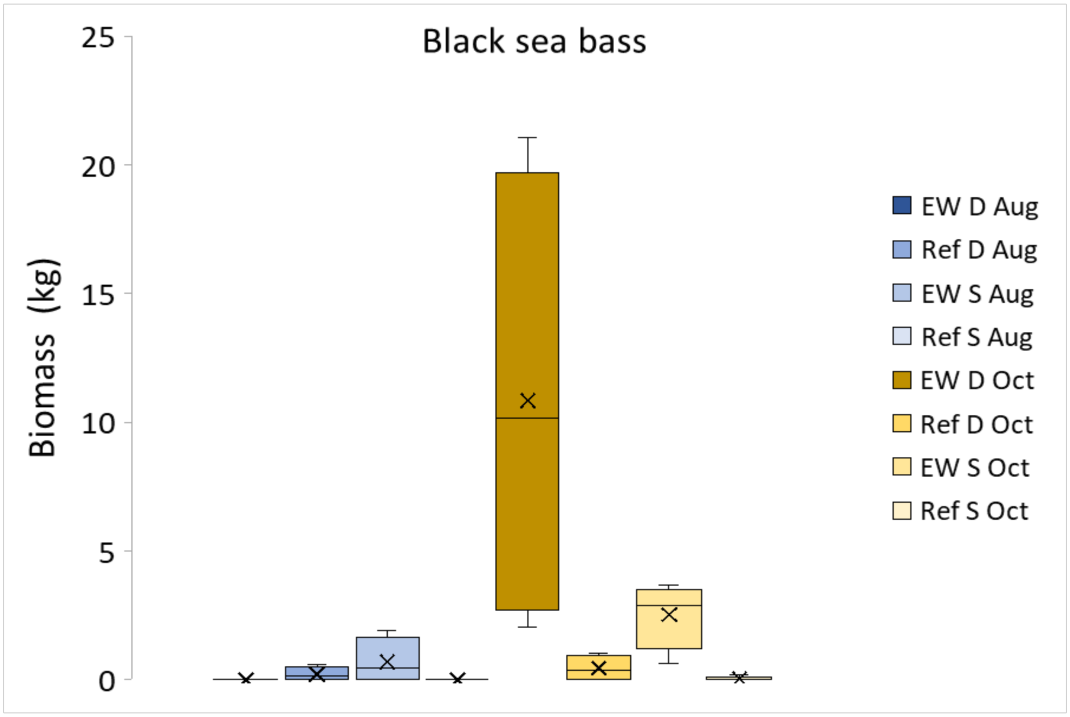


Figure 4-6. Size distributions of longfin squid depicted by area (Empire Wind [EW] and Reference [Ref]) x depth stratum (Deep [D] and Shallow [S]) x sampling event combination. Sample sizes of measured longfin squid are given in parentheses.

A



B

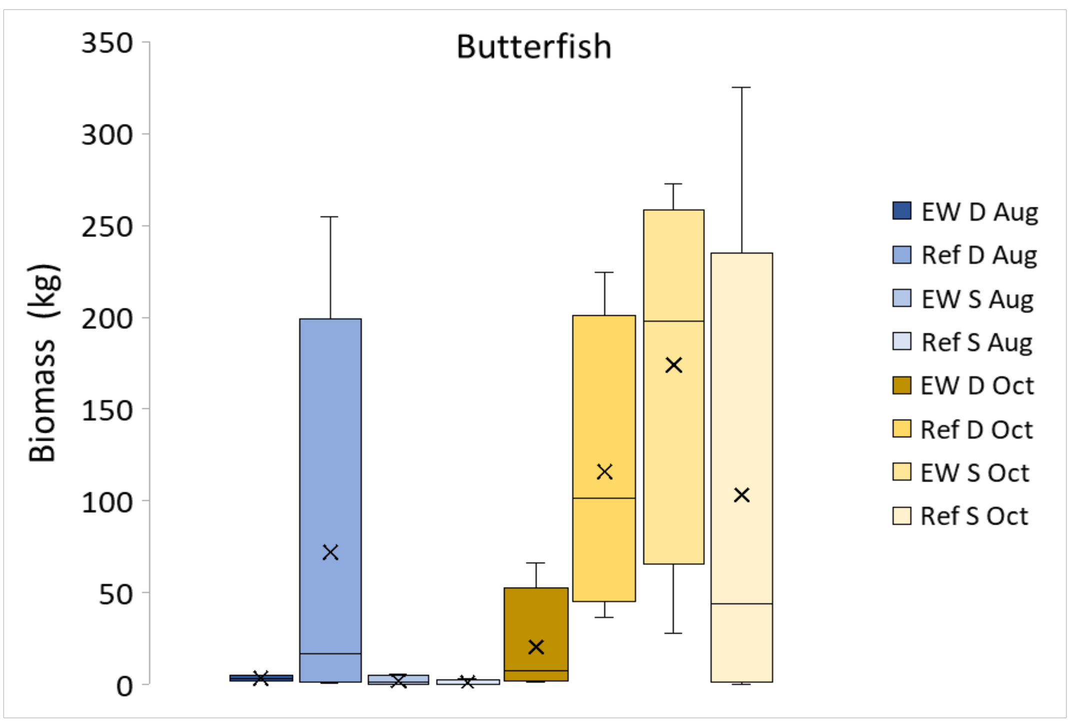
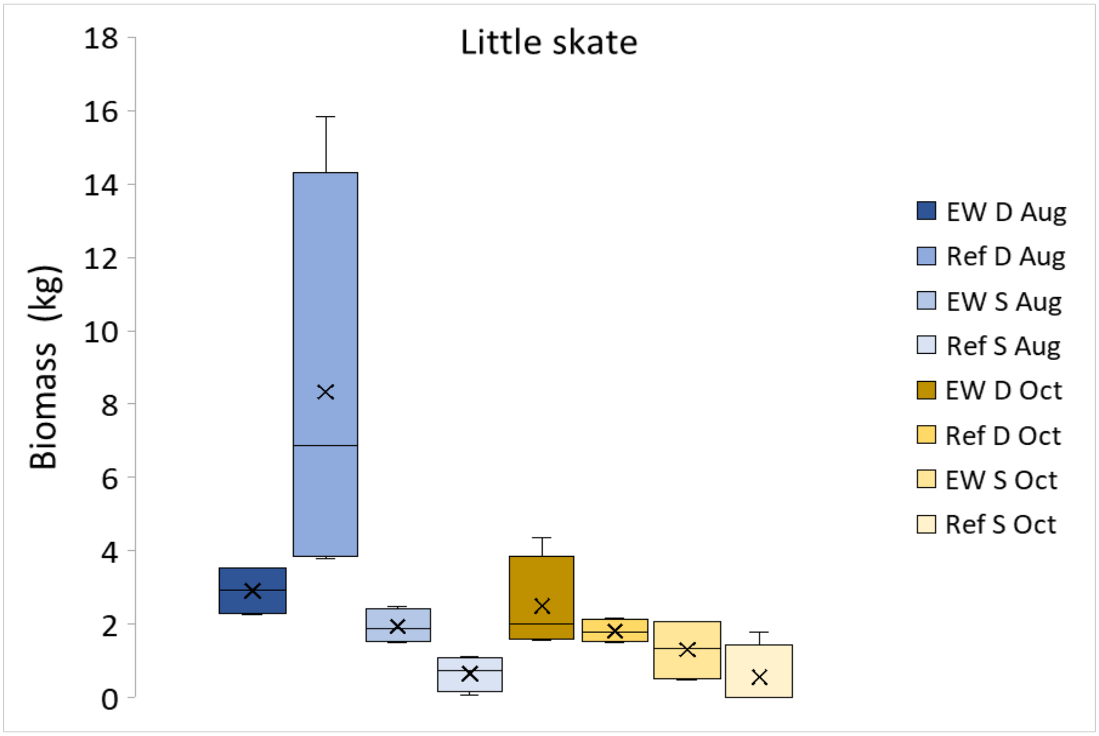


Figure 4-7. Biomass distributions of (A) black sea bass and (B) butterfish depicted area (Empire Wind [EW] and Reference [Ref]) x depth stratum (Deep [D] and Shallow [S]) combination in August and October. Sample size n = 4 for each box plot

A



B

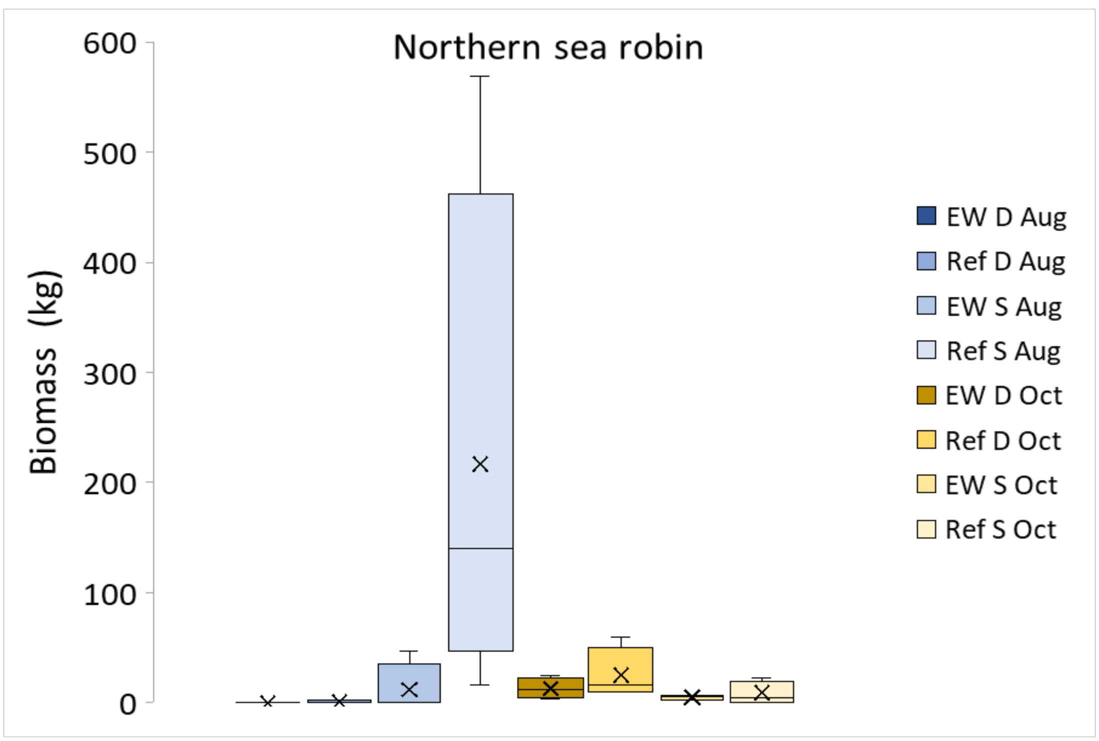
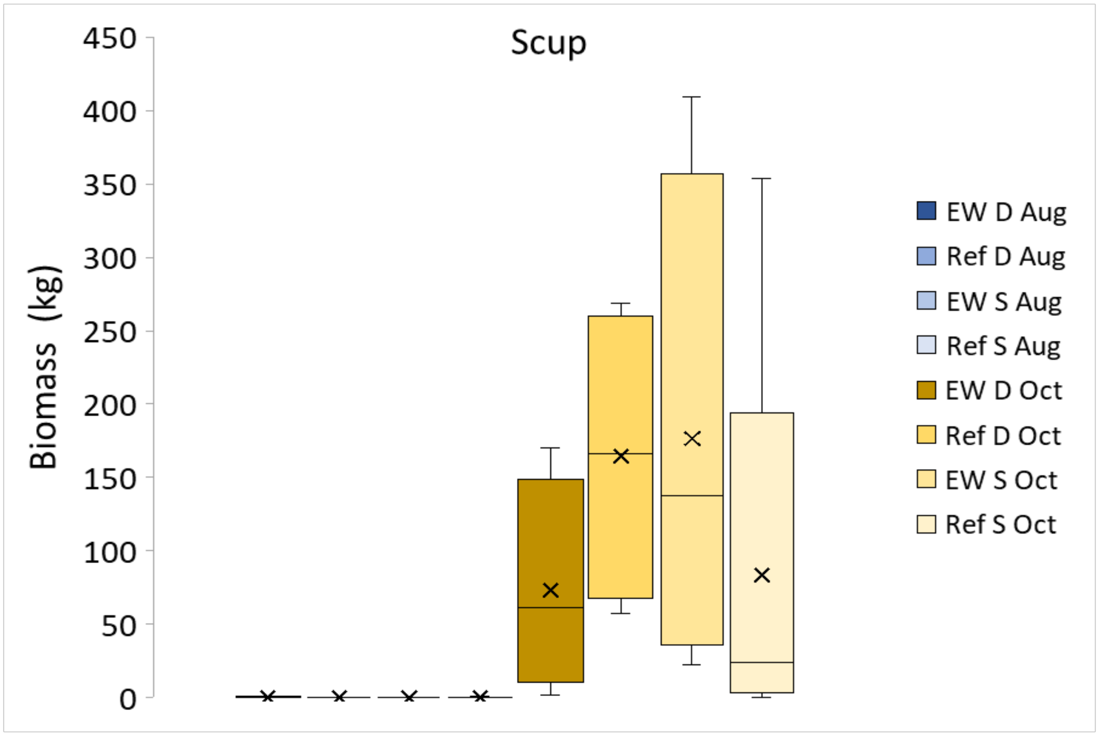


Figure 4-8. Biomass distributions of (A) little skate and (B) northern sea robin depicted area (Empire Wind [EW] and Reference [Ref]) x depth stratum (Deep [D] and Shallow [S]) combination in August and October. Sample size n = 4 for each box plot

A



B

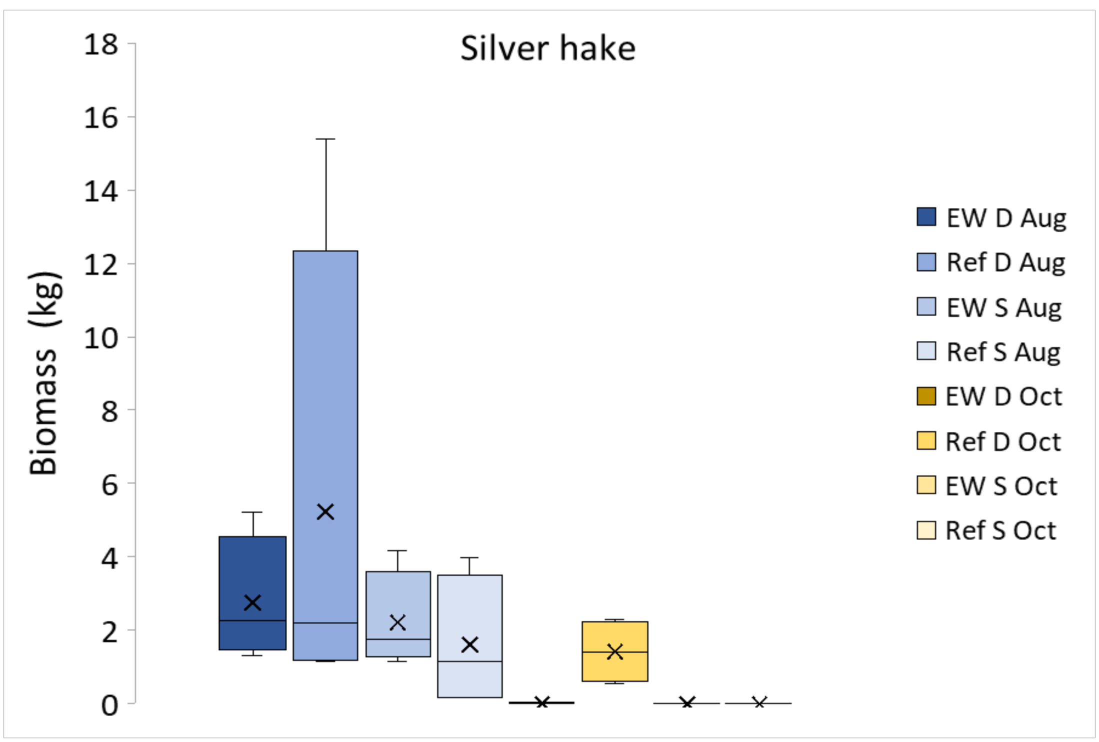
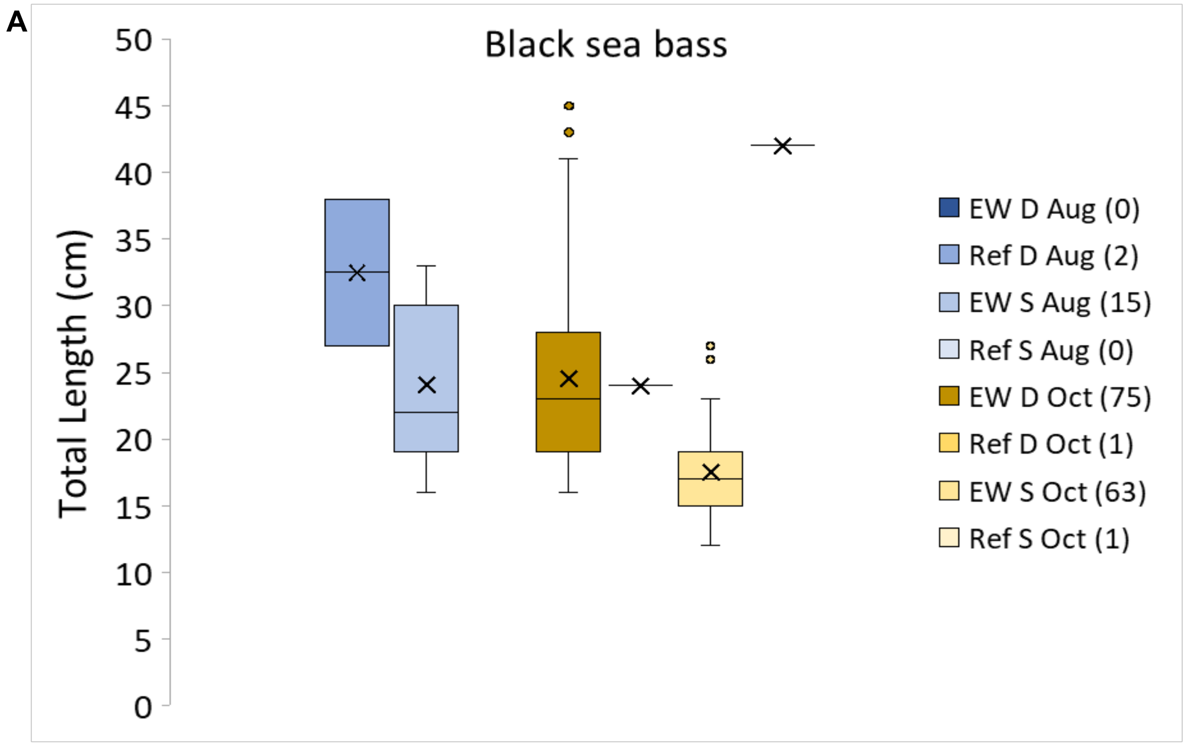


Figure 4-9. Biomass distributions of (A) scup and (B) silver hake depicted area (Empire Wind [EW] and Reference [Ref]) x depth stratum (Deep [D] and Shallow [S]) combination in August and October. Sample size n = 4 for each box plot.



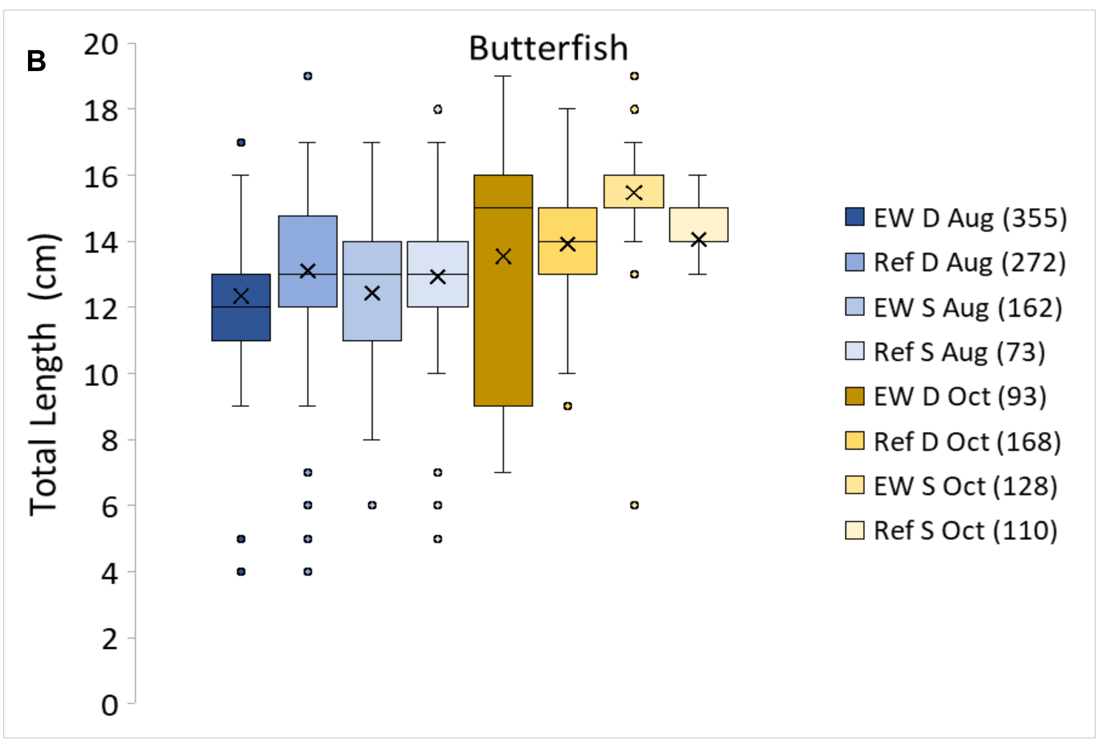


Figure 4-10. Size distributions of (A) black sea bass and (B) butterfish depicted by area (Empire Wind [EW] and Reference [Ref]) x depth stratum (Deep [D] and Shallow [S]) x month combination. Sample sizes of measured black sea bass and butterfish are given in parentheses.

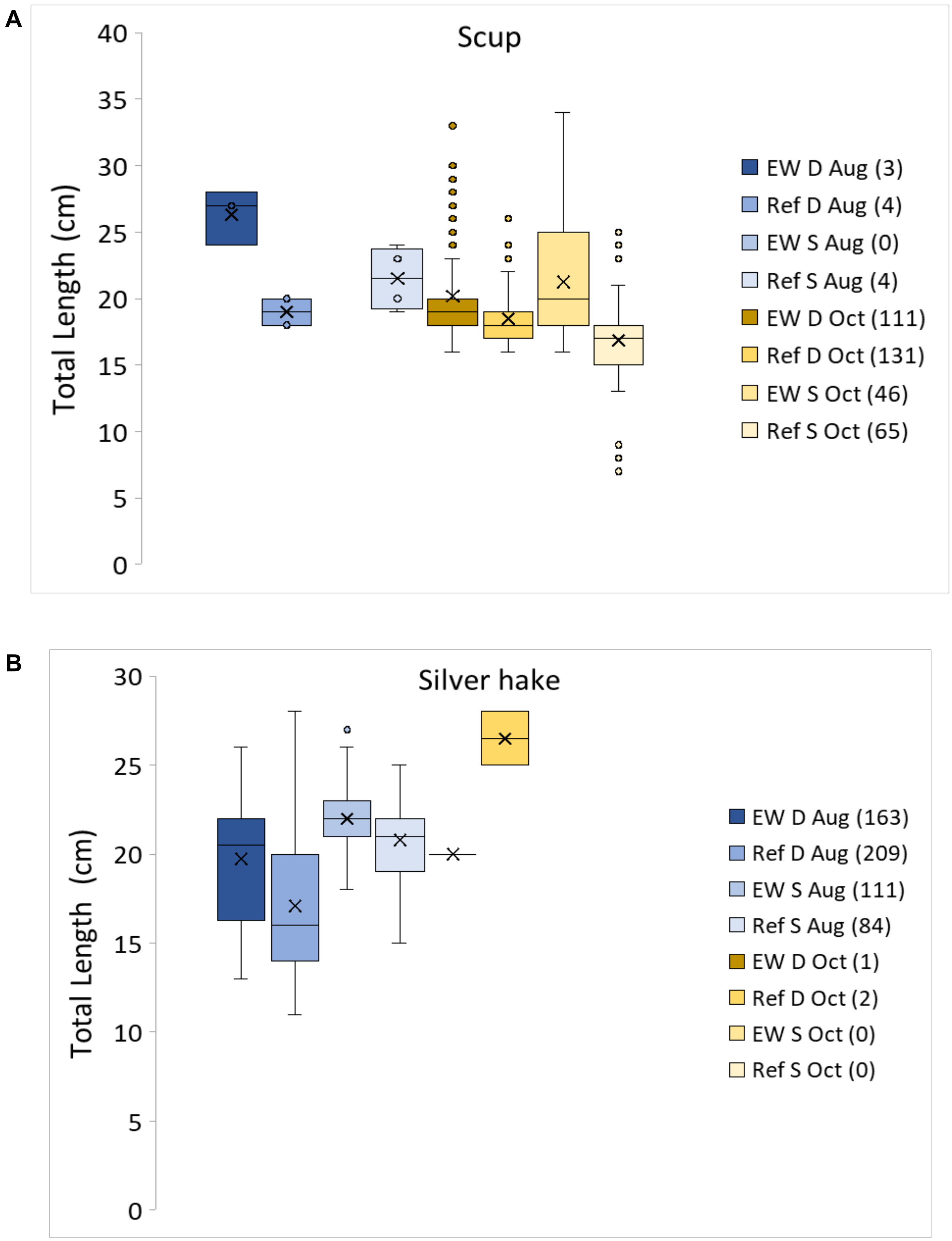
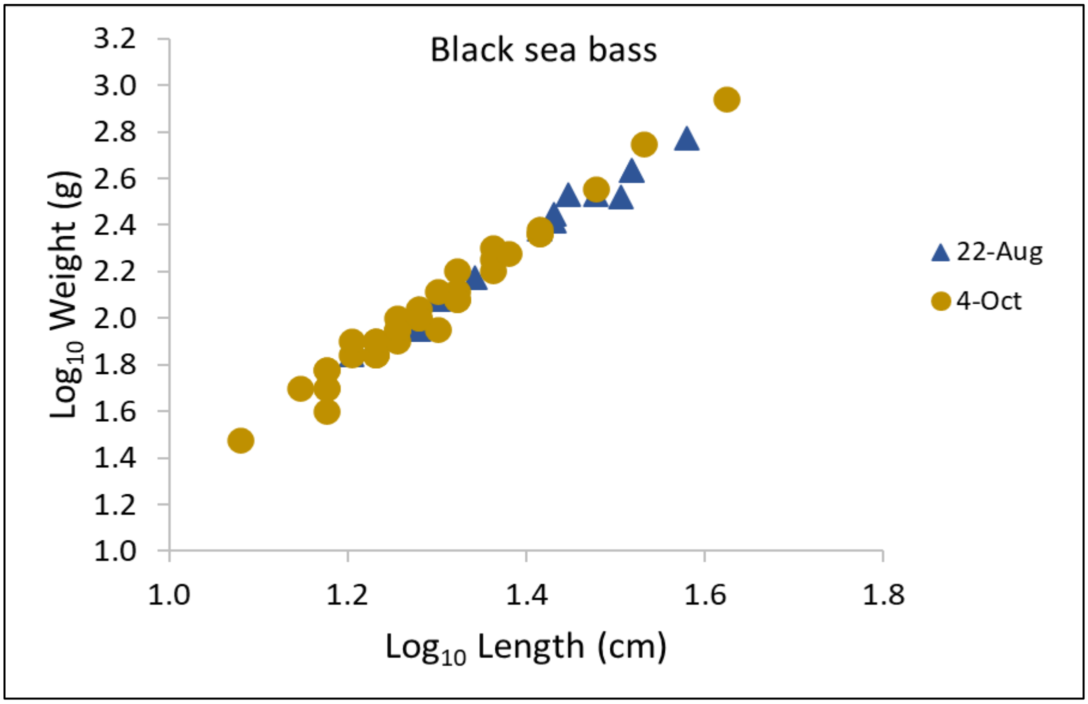


Figure 4-11. Size distributions of (A) scup and (B) silver hake depicted by area (Empire Wind [EW] and Reference [Ref]) x depth stratum (Deep [D] and Shallow [S]) x month combination. Sample sizes of measured scup and silver hake are given in parentheses.

A



B

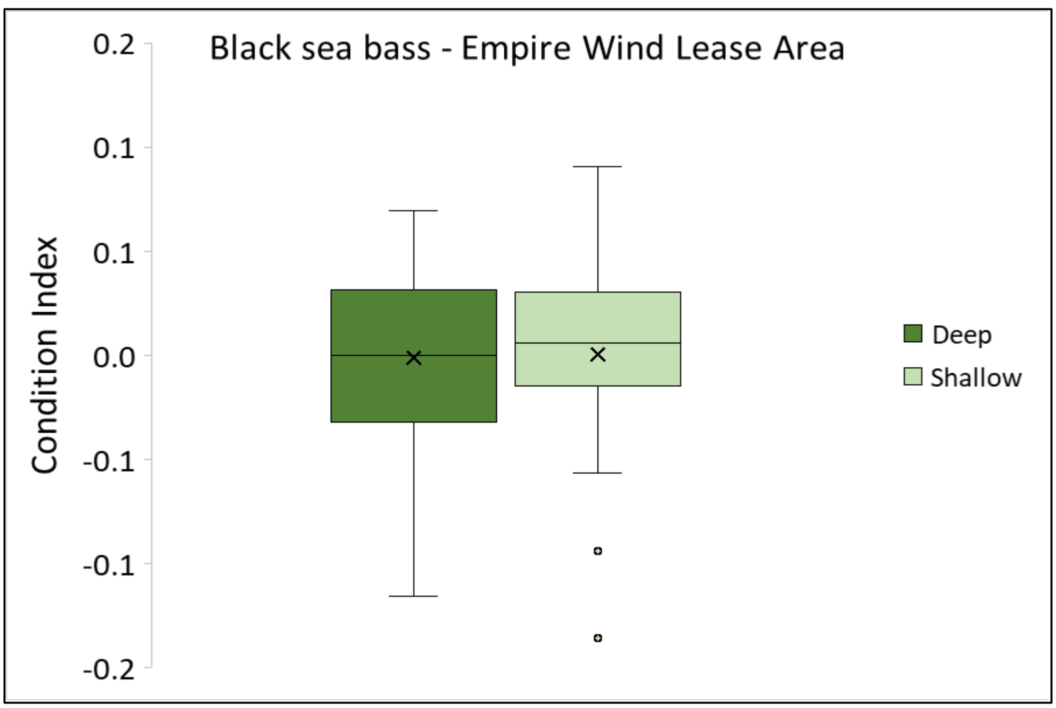
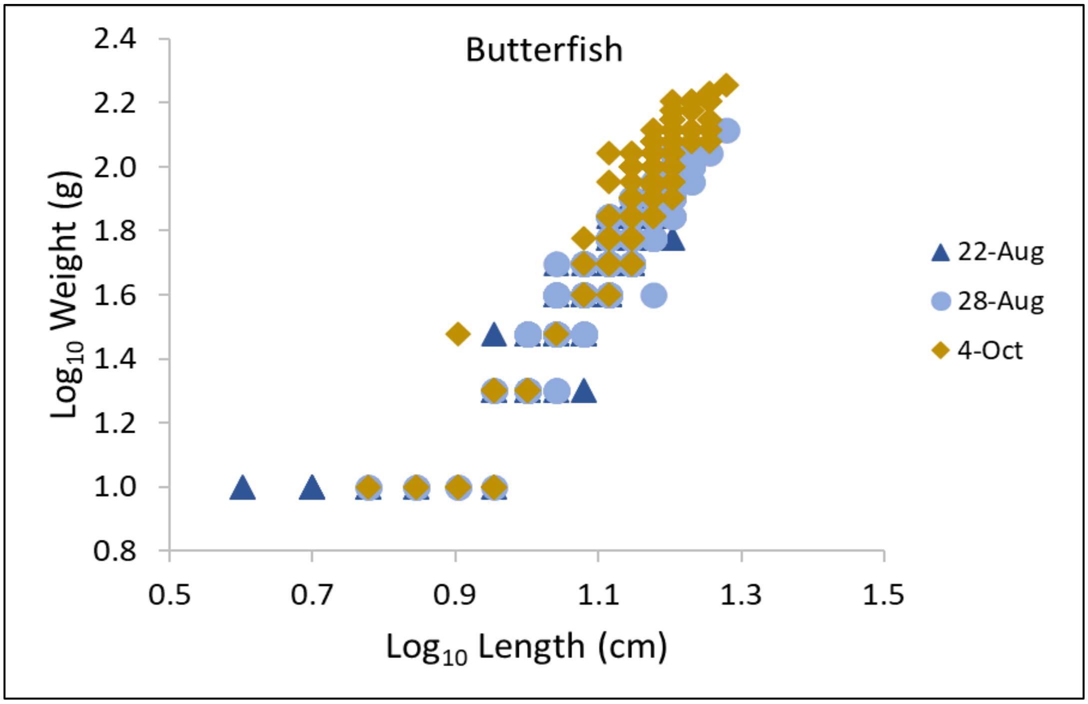


Figure 4-12. (A) Log-log regression of weight on total length for black sea bass depicted by the August 22nd and October 4th sampling events and (B) the distribution of black sea bass condition indices in the Empire Wind Lease Area by Deep (n=17) and Shallow (n=38) depth strata across both sampling events.

A



B

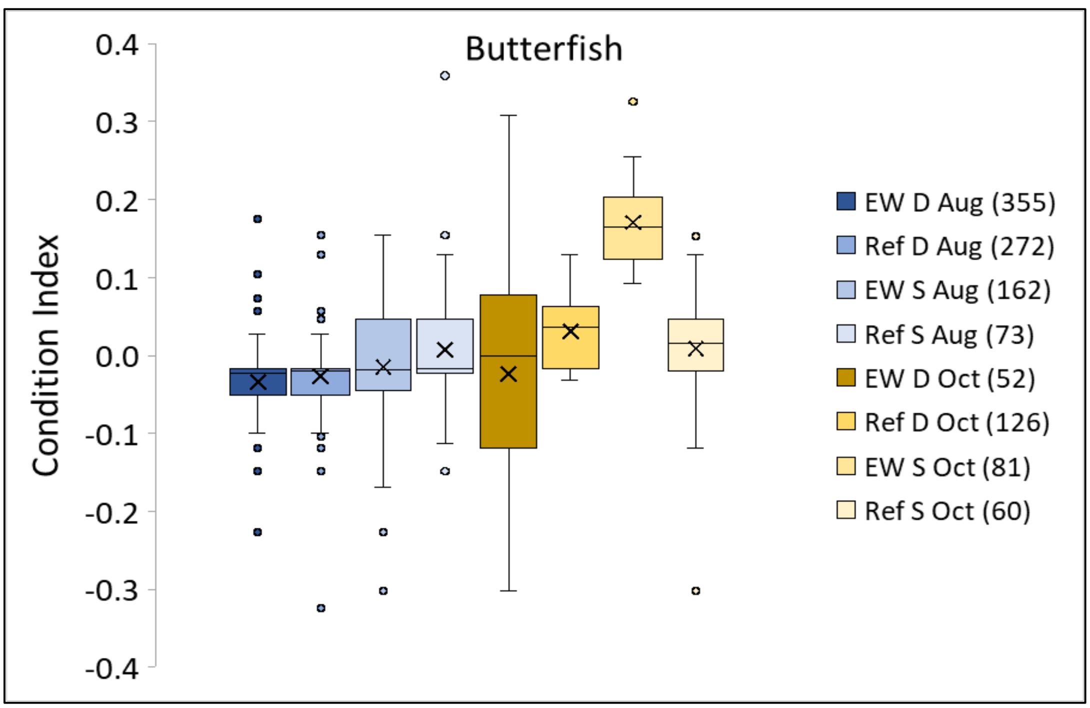
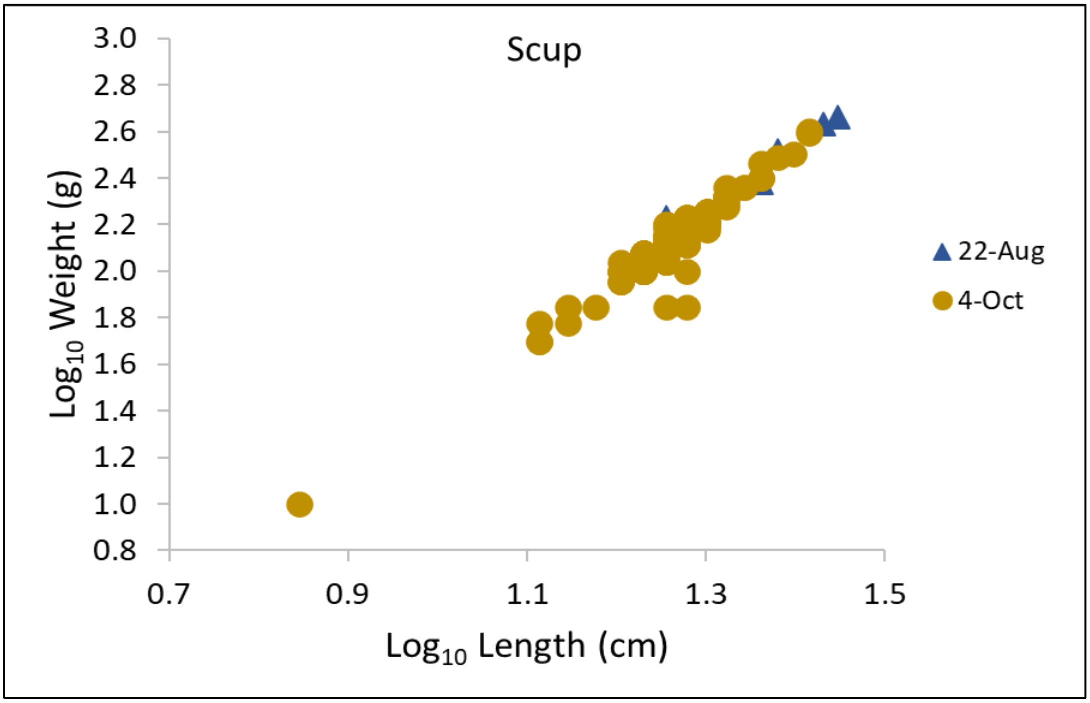


Figure 4-13. (A) Log-log regression of weight on total length for butterfish depicted by the August 22nd, August 28th, and October 4th sampling events and (B) the distribution of butterfish condition indices depicted by area (Empire Wind [EW] and Reference [Ref]) x depth stratum (Deep [D] and Shallow [S]) x month combination. Sample sizes are given in parentheses.

A



B

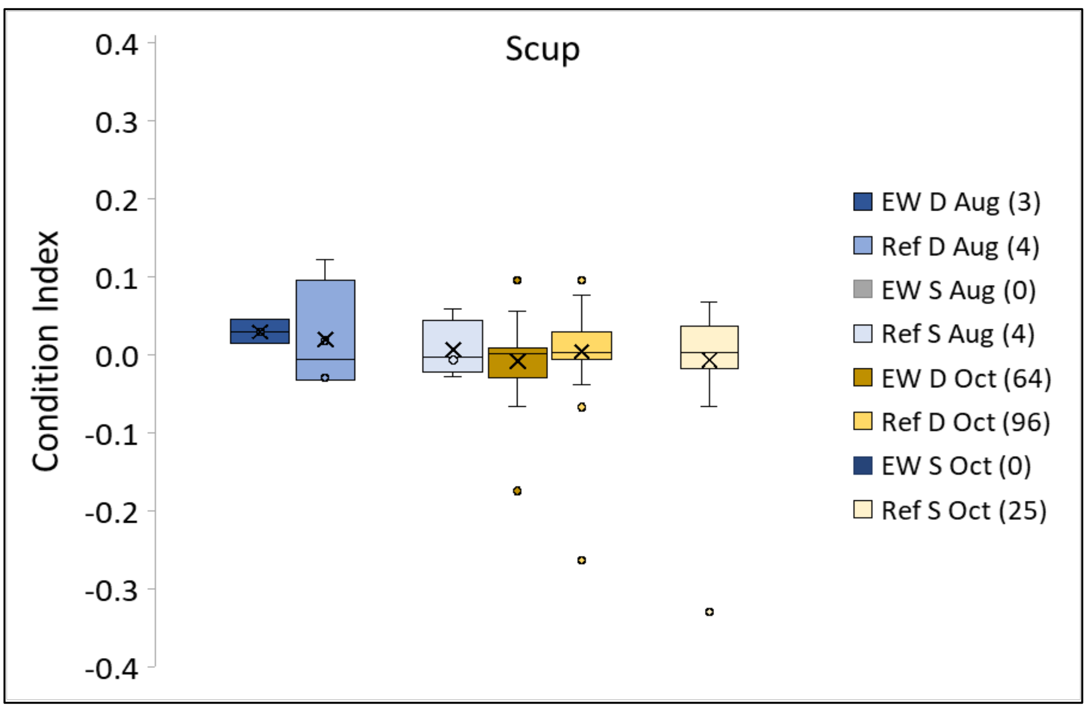
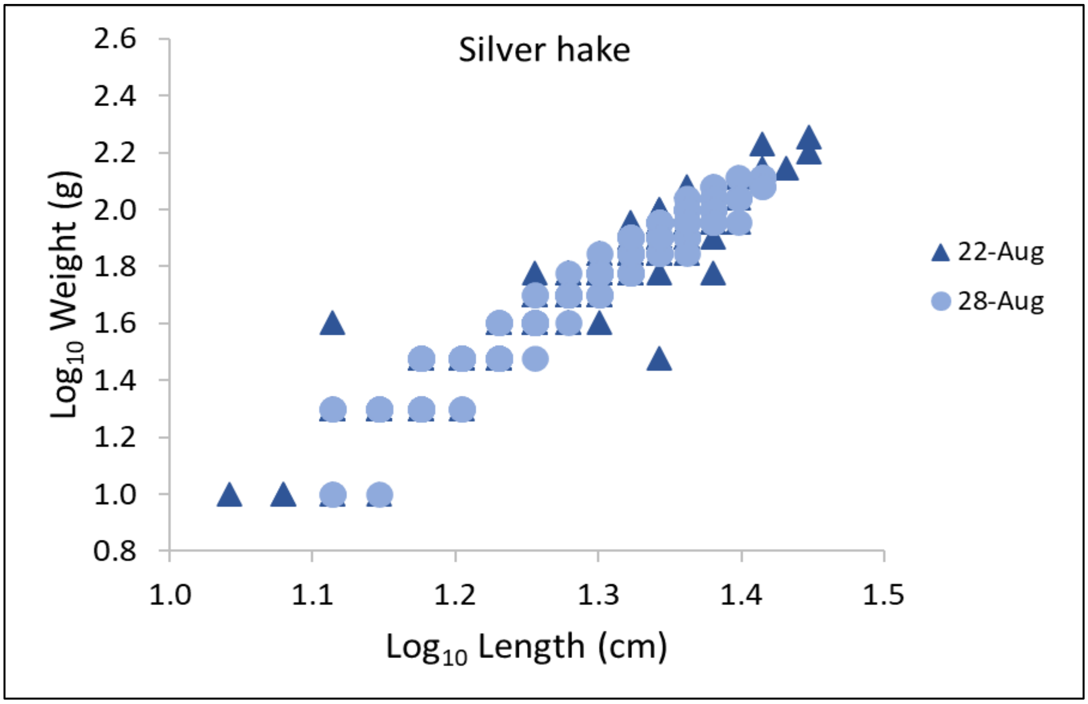


Figure 4-14. (A) Log-log regression of weight on total length for scup depicted by the August 22nd and October 4th sampling events and (B) the distribution of scup condition indices by area (Empire Wind [EW] and Reference [Ref]) x depth stratum (Deep [D] and Shallow [S]) x month combination. Sample sizes are given in parentheses.

A



B

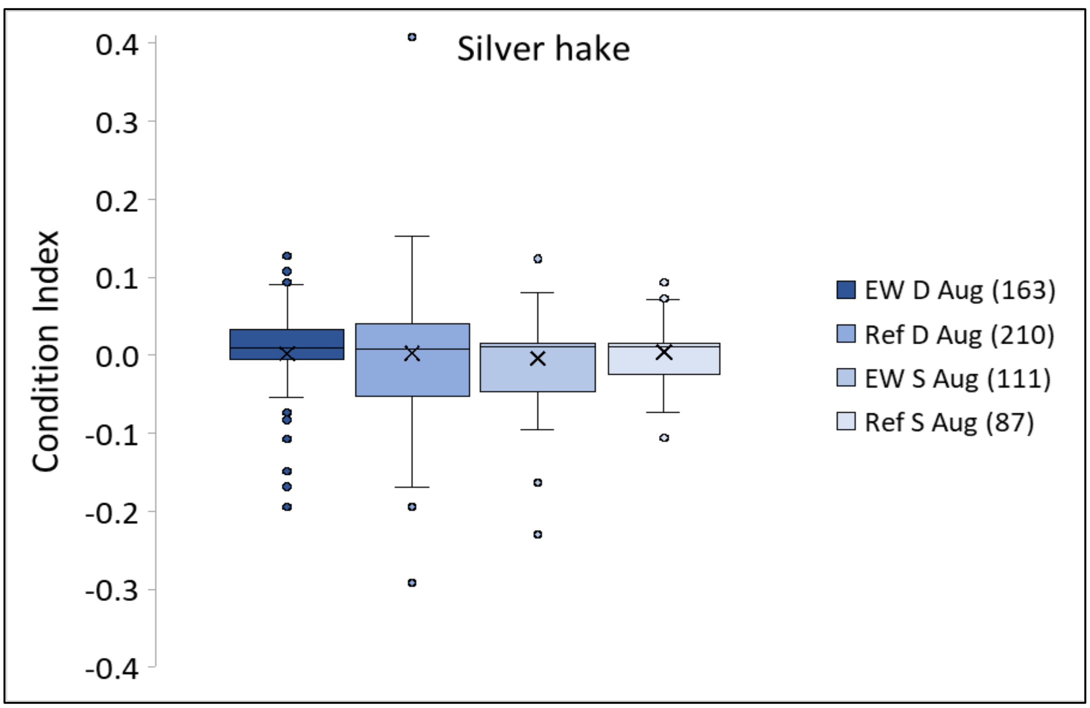
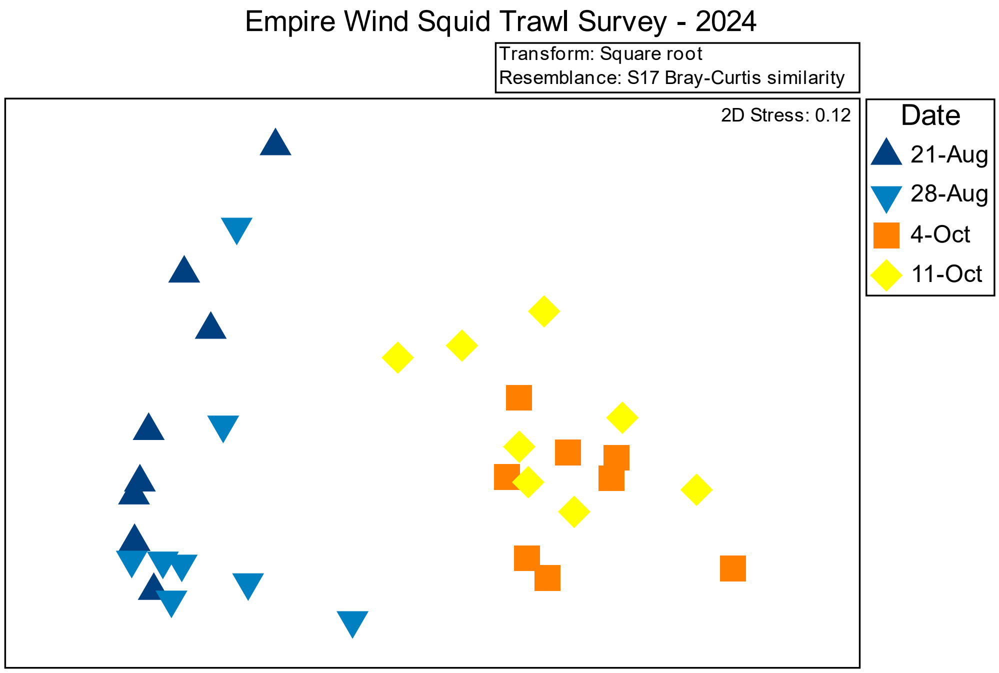


Figure 4-15. (A) Log-log regression of weight on total length for silver hake depicted by the August 22nd and August 28th sampling events and (B) the distribution of silver hake condition indices by area (Empire Wind [EW] and Reference [Ref]) x depth stratum (Deep [D] and Shallow [S]) x month combination. Sample sizes are given in parentheses.

A



B

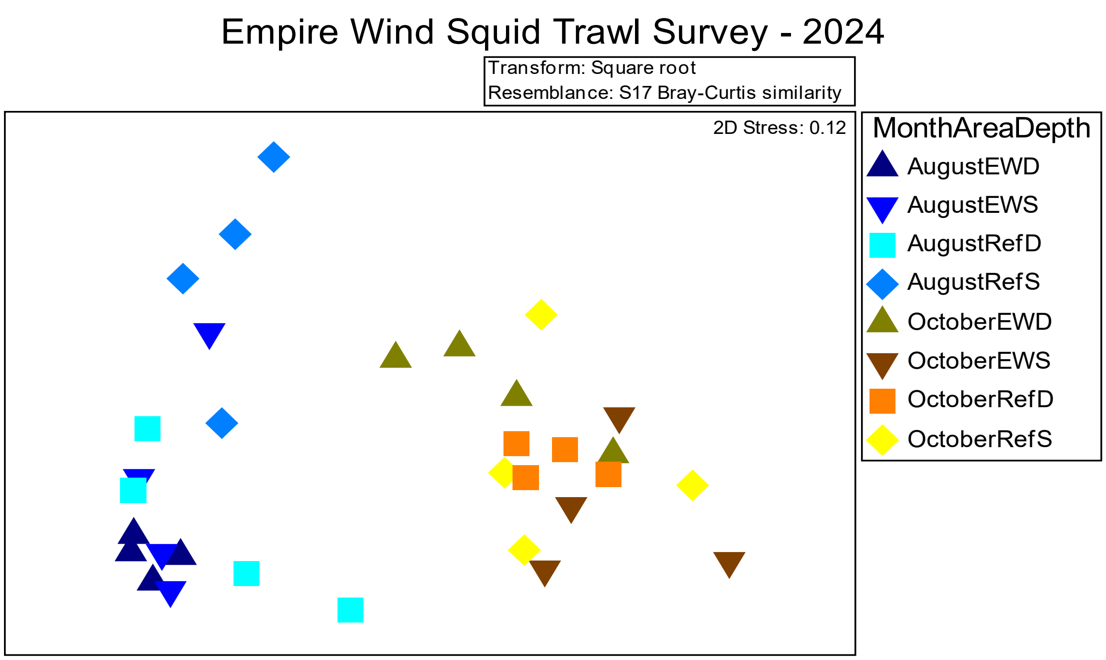


Figure 4-16. Non-metric multidimensional scaling (nMDS) plots of biomass data for all species weighed depicted by (A) sampling event, and (B) month, area, and depth stratum

Figure 4-17. Shade plot of log-transformed biomass data for all species weighed depicted by month, area (Empire Wind [EW] and Reference [Ref]) and depth stratum (Deep [D] and Shallow [S]) combination

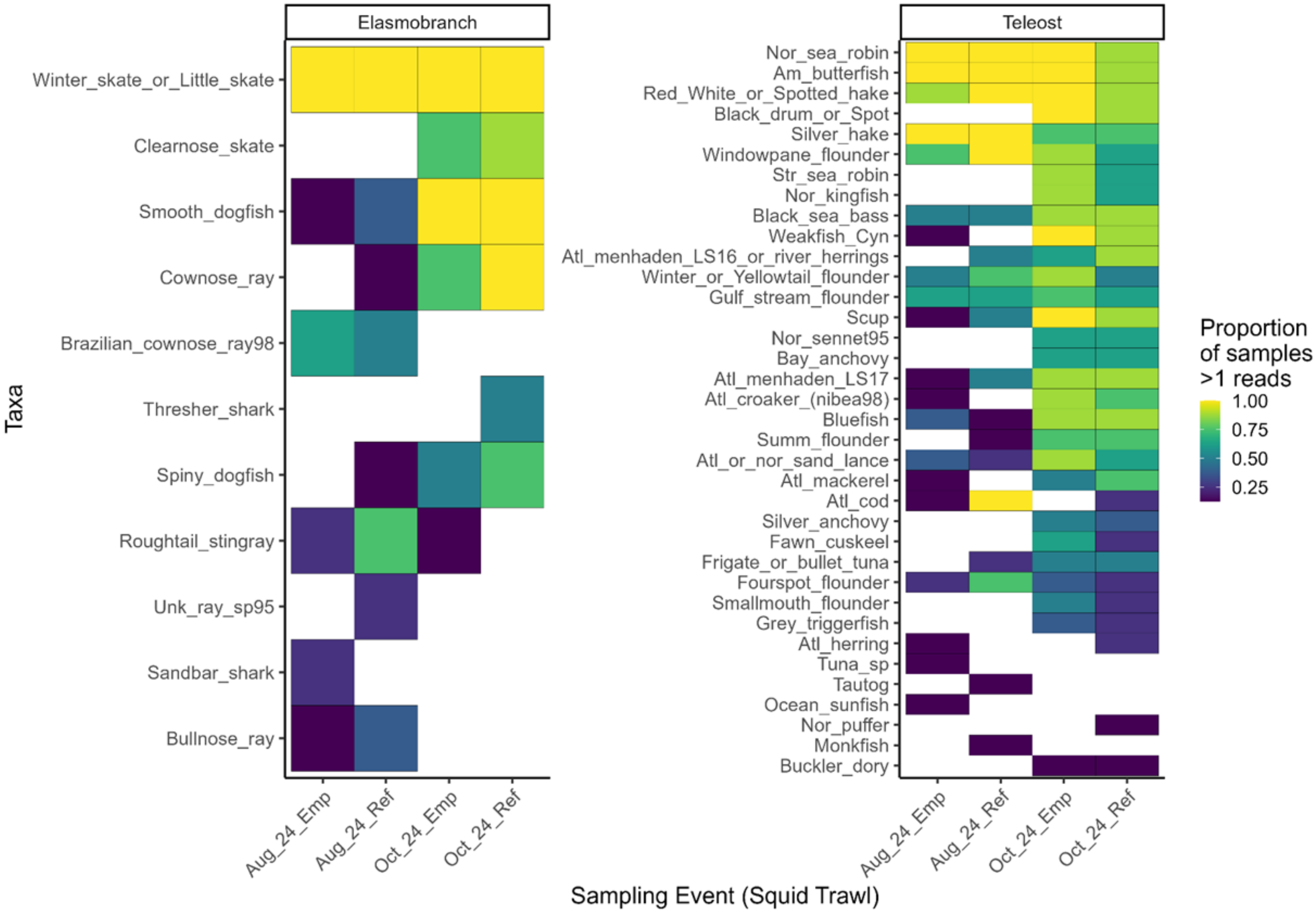


Figure 4-18. Taxa (teleosts and elasmobranchs) detected in eDNA samples in each sampling event. Taxa are presented as the proportion of samples in which they were detected within each sampling event. Ref and Emp denote samples from the Reference Area and Empire Wind Lease Area, respectively.

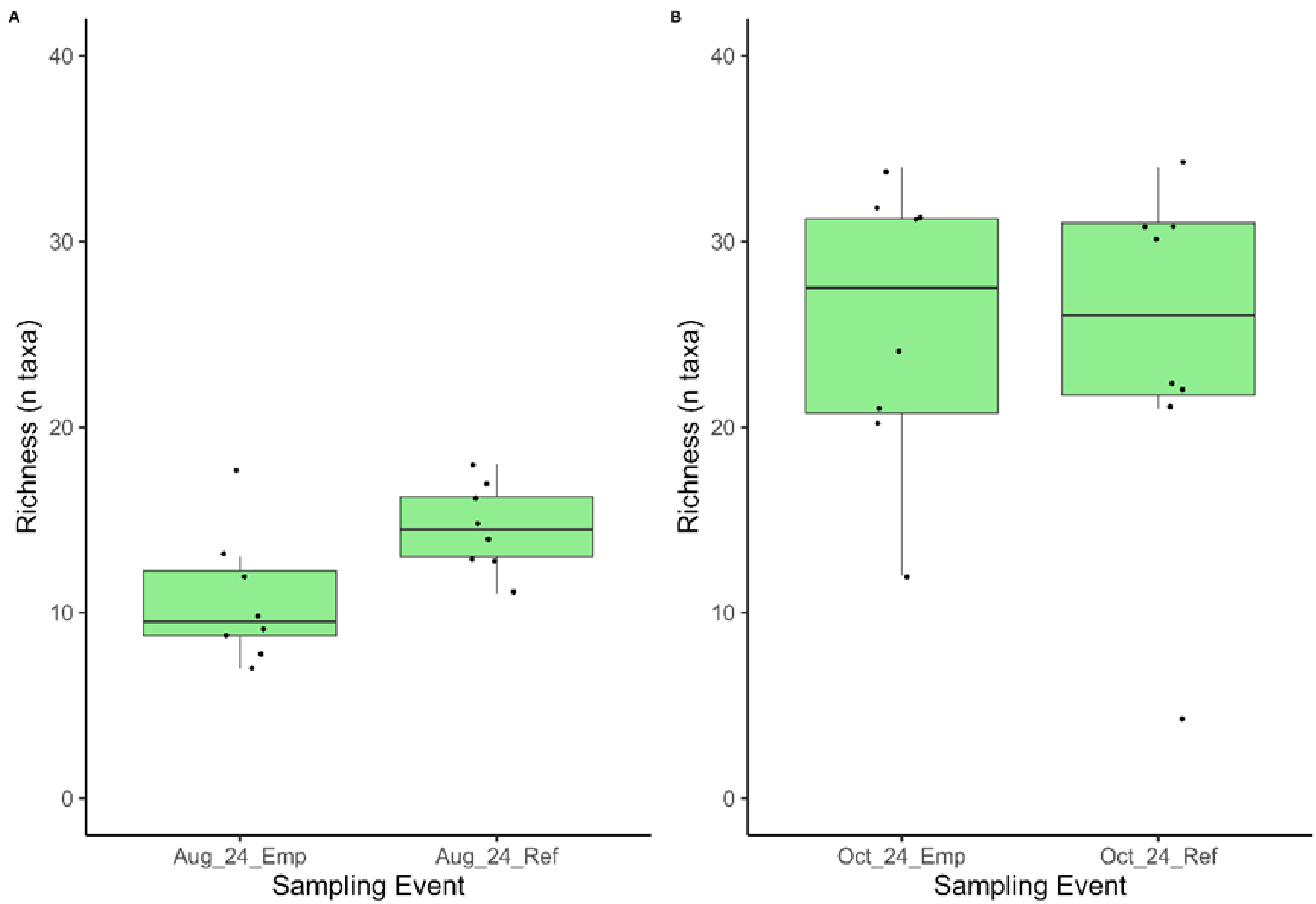


Figure 4-19. Teleost and elasmobranch taxa sample richness by sampling event. The Empire Wind Lease Area (Emp) and Reference Area (Ref) values are plotted separately for each month.

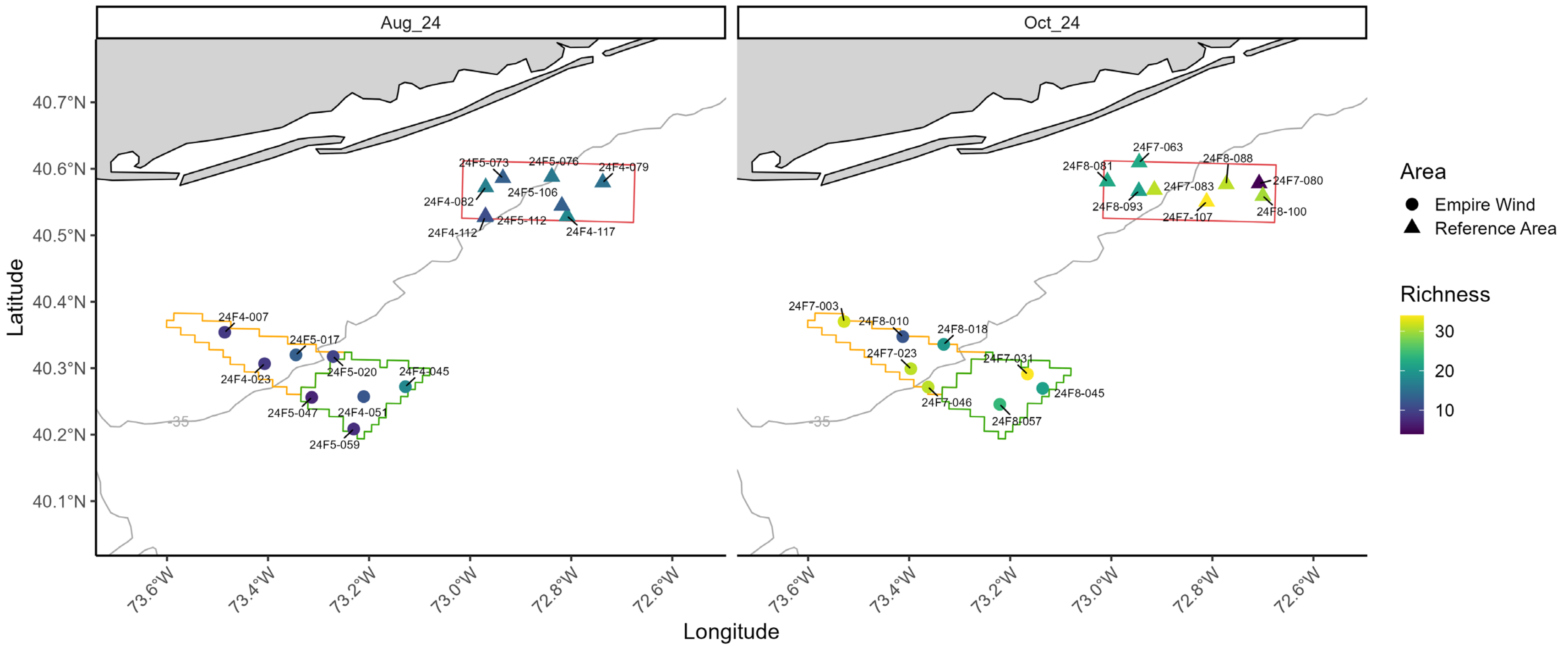


Figure 4-20. Spatial representation of eDNA sample taxonomic richness at each station in the Empire Wind Lease Area (circles) and Reference Area (triangles) sampled in August and October. Delineations for EW 1 (orange), EW 2 (green), Reference Area (red), and the 35 m depth contour (grey) are provided for reference.

Empire Wind Squid
Bottom Trawl/eDNA Monitoring Survey
2024 Annual Report

APPENDICES

Prepared for:

Empire Offshore Wind LLC
Stamford Office
600 Washington Blvd
Suite 800
Stamford, CT 06901

Prepared by:

INSPIRE Environmental
513 Broadway
Newport, RI 02840

and

Monmouth University
West Long Branch, New Jersey

April 2025

LIST OF APPENDICES

Appendix A – Station Location Details

		Empire Wind Farm				Reference Area			
Survey ID	Survey Date	Shallow (<35 m)		Deep (>35 m)		Shallow (<35 m)		Deep (>35 m)	
24F4	22 August 2024	B007	B023	B045	B051	B112	B082	B079	B117
24F5	28 August 2024	B017	B020	B047	B059	B112	B073	B106	B076
24F7	4 October 2024	B003	B023	B031	B046	B083	B063	B107	B080
24F8	11 October 2024	B010	B018	B045	B057	B093	B081	B100	B088

Area	Depth Strata	Survey ID	Survey Date	Trawl Block	Start latitude	Start longitude	End latitude	End longitude
Empire Wind Farm	Shallow (<35 m)	24F4	22 August 2024	B007	40.3599	-73.5036	40.3473	-73.4857
Empire Wind Farm	Shallow (<35 m)	24F4	22 August 2024	B023	40.3113	-73.4136	40.2984	-73.3986
Empire Wind Farm	Shallow (<35 m)	24F5	28 August 2024	B017	40.3197	-73.3417	40.331	-72.6695
Empire Wind Farm	Shallow (<35 m)	24F5	28 August 2024	B020	40.3218	-73.269	40.3139	-73.2502
Empire Wind Farm	Shallow (<35 m)	24F7	4 October 2024	B003	40.3666	-73.5201	40.3594	-73.4999
Empire Wind Farm	Shallow (<35 m)	24F7	4 October 2024	B023	40.2997	-73.3965	40.3126	-73.413
Empire Wind Farm	Shallow (<35 m)	24F8	11 October 2024	B010	40.3474	-73.4095	40.3383	-73.3911
Empire Wind Farm	Shallow (<35 m)	24F8	11 October 2024	B018	40.3321	-73.3236	40.318	-73.3085
Empire Wind Farm	Deep (>35 m)	24F4	22 August 2024	B045	40.2736	-73.132	40.2857	-73.1169
Empire Wind Farm	Deep (>35 m)	24F4	22 August 2024	B051	40.2642	-73.2144	40.2514	-73.1989
Empire Wind Farm	Deep (>35 m)	24F5	28 August 2024	B047	40.2556	-73.3125	40.2684	-73.3277
Empire Wind Farm	Deep (>35 m)	24F5	28 August 2024	B059	40.2089	-73.226	40.221	-73.2421
Empire Wind Farm	Deep (>35 m)	24F7	4 October 2024	B031	40.297	-73.1713	40.3068	-73.1887
Empire Wind Farm	Deep (>35 m)	24F7	4 October 2024	B046	40.2681	-73.3554	40.2607	-73.3347
Empire Wind Farm	Deep (>35 m)	24F8	11 October 2024	B045	40.2751	-73.1285	40.2881	-73.1141
Empire Wind Farm	Deep (>35 m)	24F8	11 October 2024	B057	40.2404	-73.2125	40.228	-73.198
Reference Area	Shallow (<35 m)	24F4	22 August 2024	B082	40.5728	-72.9728	40.5801	-72.9531
Reference Area	Shallow (<35 m)	24F4	22 August 2024	B112	40.53	-72.9742	40.5365	-72.9539
Reference Area	Shallow (<35 m)	24F5	28 August 2024	B073	40.587	-72.9371	40.5945	-72.9169
Reference Area	Shallow (<35 m)	24F5	28 August 2024	B112	40.5287	-72.9696	40.5377	-72.952
Reference Area	Shallow (<35 m)	24F7	4 October 2024	B063	40.6067	-72.9364	40.5982	-72.9176
Reference Area	Shallow (<35 m)	24F7	4 October 2024	B083	40.5742	-72.9201	40.5799	-72.8906
Reference Area	Shallow (<35 m)	24F8	11 October 2024	B081	40.5796	-73.0044	40.5695	-72.9847
Reference Area	Shallow (<35 m)	24F8	11 October 2024	B093	40.5626	-72.9379	40.5541	-72.9172
Reference Area	Deep (>35 m)	24F4	22 August 2024	B079	40.584	-72.7352	40.5902	-72.7141
Reference Area	Deep (>35 m)	24F4	22 August 2024	B117	40.5262	-72.8054	40.5338	-72.7858
Reference Area	Deep (>35 m)	24F5	28 August 2024	B076	40.5898	-72.8355	40.5814	-72.8161
Reference Area	Deep (>35 m)	24F5	28 August 2024	B106	40.5474	-72.8201	40.5401	-72.8398
Reference Area	Deep (>35 m)	24F7	4 October 2024	B080	40.5822	-72.7019	40.5901	-72.6808
Reference Area	Deep (>35 m)	24F7	4 October 2024	B107	40.5467	-72.805	40.5392	-72.784
Reference Area	Deep (>35 m)	24F8	11 October 2024	B088	40.5722	-72.763	40.5639	-72.7429
Reference Area	Deep (>35 m)	24F8	11 October 2024	B100	40.5574	-72.6964	40.5483	-72.6762

Appendix B – Abundance and Biomass of All Species Collected by Bottom Trawl at Each Station and Sampling Event

Table B1- Survey 24F4		Empire Wind Farm				Reference Area				
		Shallow (<35 m)		Deep (>35 m)		Shallow (<35 m)		Deep (>35 m)		
Taxa		B007	B023	B045	B051	B082	B112	B117	B079	**Total**
American lobster	Number							1		1
	Weight (kg)							0		0
Asteroidea spp.	Number			0	0		0		2	2
	Weight (kg)			0.41	0.72		0.14		0.04	1.31
Black sea bass	Number	12	3					1	1	17
	Weight (kg)	1.89	0.93					0.28	0.59	3.69
Blueback herring	Number				1					1
	Weight (kg)				0.02					0.02
Butterfish	Number	2	5	112	55	3	11	32	40	260
	Weight (kg)	0.01	0.31	5.08	1.89	0.23	0.57	1.03	1.43	10.55
Driftfish	Number						1		1	2
	Weight (kg)						0.01		0.02	0.03
Fourspot flounder	Number		3				1	3	3	10
	Weight (kg)		0.21				0.12	0.52	0.35	1.2
Gulf stream flounder	Number	1	1	2	1			6	2	13
	Weight (kg)	0.03	0.04	0.02	0.08			0.13	0.03	0.33
Haddock	Number			6	3		1		1	11
	Weight (kg)			0.08	0.17		0.02		0.01	0.28
Hermit crab	Number			1	2					3
	Weight (kg)			0	0					0
Jonah crab	Number			1	1					2
	Weight (kg)			0.47	0.09	0				0.56
Little skate	Number	3	4	6	6	1	2	28	7	57
	Weight (kg)	1.51	2.49	3.54	3.54	0.49	0.98	15.84	4.06	32.45
Little/Winter skate (unclassified)	Number		1		1		1	1	1	5
	Weight (kg)		0.13		0.02		0.14	1.01	0.04	1.34
Longfin squid	Number	120	91	36	68	30	59	52	66	522
	Weight (kg)	3.83	2.98	1.09	1.56	2.42	0.36	1.65	1.19	15.08
Monkfish	Number				1				1	2
	Weight (kg)				0.02				0.04	0.06
Northern sea robin	Number	0	1			4096	951	10	2	5060
	Weight (kg)	47.37	0.12			569.2	139.93	2.48	0.16	759.26
Red hake	Number	0	2		4			57	11	74
	Weight (kg)	3.78	1.02		0.54			10.12	0.76	16.22
Rock crab	Number		2	2	7		0		1	12
	Weight (kg)		0.06	0.04	0.36		0.06		0.16	0.68
Roughtail stingray	Number			2						2
	Weight (kg)									0
Sand dollar	Number				0		2			2
	Weight (kg)			0.07	0.15		0			0.22
Sand lance	Number			7						7
	Weight (kg)			0.08						0.08
Scup	Number			1	2	3		3	1	10
	Weight (kg)			0.78	0.78	0.65		0.47	0.16	2.84
Sea mouse	Number				1					1
	Weight (kg)				0					0
Sea scallop	Number			2	1			4	4	11
	Weight (kg)			0.07	0.02			0.22	0.11	0.42
Shortfin squid	Number		1						2	3
	Weight (kg)		0.02						0.05	0.07
Silver hake	Number	51	14	31	27	3	53	23	417	619
	Weight (kg)	4.16	1.16	2.51	2.01	0.24	3.97	1.21	15.4	30.66
Sponge	Number			0	0		0	0		0
	Weight (kg)			0.96	1.72		1.12	7.42		11.22
Spotted hake	Number					3	3		4	10
	Weight (kg)					0.29	0.29		0.15	0.73
Windowpane flounder	Number	1	5		5	1	3	5	1	21
	Weight (kg)	0.03	1.22		0.14	0.22	0.73	1.16	0.18	3.68
Winter flounder	Number	2	2		1			5	1	11
	Weight (kg)	0.24	1.22		0.45			0.94	0.11	2.96
Winter skate	Number	2					1	3		6
	Weight (kg)	1.09					0.68	1.73		3.5
Total Number		**194**	**135**	**209**	**187**	**4140**	**1089**	**234**	**569**	**6757**
Total Weight (kg)		**63.9**	**11.9**	**15.2**	**14.3**	**573.7**	**149.1**	**46.2**	**25.0**	**899.4**
Species Richness		**27**				**24**				**30**

Richness does not include unclassified taxa.

Table B2- Survey 24F5		Empire Wind Farm				Reference Area				
		Shallow (<35 m)		**Deep (>35 m)**		**Shallow (<35 m)**		**Deep (>35 m)**		
		B017	B020	B047	B059	B073	B112	B106	B076	**Total**
Asteroides spp	Number		2	2			2			6
	Weight (kg)		0.03	0.07			0.18			0.28
Atlantic mackerel	Number								1	1
	Weight (kg)								0.16	0.16
Butterfish	Number	55	124	169	106	5	54	614	4103	5230
	Weight (kg)	2.71	5.54	1.89	5.4	0.13	3.18	32.1	254.41	305.36
Cownose ray	Number						1			1
	Weight (kg)						0			0
Driftfish	Number		2	0	3					5
	Weight (kg)		0.02	0	0.04					0.06
Fourspot flounder	Number		1	2	1	2	1		1	8
	Weight (kg)		0.07	0.28	0.28	0.41	0.33		0.19	1.56
Gulf stream flounder	Number			1	5			8	1	15
	Weight (kg)			0.01	0.14			0.2	0.02	0.37
Haddock	Number				46		2		1	49
	Weight (kg)				0.85		0.03		0.03	0.91
Little/Winter skate (unclassified)	Number		1							1
	Weight (kg)		0.09							0.09
Longfin squid	Number	135	69	305	211	68	182	142	55	1167
	Weight (kg)	5.2	3.2	1.59	4.53	2.15	4.64	4.79	1.92	28.02
Little skate	Number	4	3	4	4	2	1	17	7	42
	Weight (kg)	2.18	1.61	2.27	2.34	1.11	0.06	9.66	3.78	23.01
Northern sea robin	Number					942	117		8	1067
	Weight (kg)					141.1	16.4		1.06	158.56
Red hake	Number		2		4			12	1	19
	Weight (kg)		0.36		0.06			1.36	0.21	1.99
Rock crab	Number					1	1	2	4	8
	Weight (kg)					0.08	0.03	0.14	0.18	0.43
Scup	Number					1				1
	Weight (kg)					0.24				0.24
Sea scallop	Number			2	3			1		6
	Weight (kg)			0.12	0.15			0.02		0.29
Shortfin squid	Number	1		2	2			1	1	7
	Weight (kg)	0.02		0.03	0.03			0.01	0.01	0.1
Silver hake	Number	25	21	19	86	2	26	59	27	265
	Weight (kg)	1.95	1.58	1.3	5.23	0.16	2.07	3.16	1.16	16.61
Sponge	Number		0	0	0		0	0	0	0
	Weight (kg)		0.35	2.06	0.38		0.48	2.7	2.58	8.55
Spotted hake	Number					2			1	3
	Weight (kg)					0.6			0.32	0.92
Windowpane flounder	Number			2	3	2		1	1	9
	Weight (kg)			0.37	0.57	0.03		0.21	0.2	1.38
Winter flounder	Number		2	1		1	2	6	1	13
	Weight (kg)		0.35	0.3		0.15	0.41	1.34	0.23	2.78
Total Number		**220**	**227**	**509**	**474**	**1028**	**389**	**863**	**4213**	**7923**
Total Weight (kg)		**12.06**	**13.2**	**10.29**	**20**	**146.16**	**27.81**	**55.69**	**266.46**	**551.67**
Species Richness		**15**				**20**				**21**

Richness does not include unclassified taxa

Table B3- Survey 24F7		Empire Wind Farm				Reference Area				
		Shallow (<35 m)		Deep (>35 m)		Shallow (<35 m)		Deep (>35 m)		
		B003	B023	B031	B046	B063	B083	B080	B107	**Total**
Atlantic croaker	Number	0	0		0					0
	Weight (kg)	11.57	3137.5		5.81					3154.88
Atlantic mackerel	Number					2			0	2
	Weight (kg)					0.58			0.41	0.99
Atlantic menhaden	Number	0	0	2	0			2	0	4
	Weight (kg)	1.16	1.69	0.98	1.32			2.31	2.64	10.1
Black sea bass	Number	27	0	16	0			2		45
	Weight (kg)	2.88	3.69	4.74	2.02			1.01		14.34
Butterfish	Number	2319	0	52	0	0	0	0	0	2371
	Weight (kg)	272.49	217	11.04	66.41	144.85	43.95	72.19	224.4	1052.33
Clearnose skate	Number		0		0	0	0	0	0	0
	Weight (kg)		8.62		2.26	7.03	3.19	8.83	0.95	30.88
Cownose ray	Number		201							201
	Weight (kg)		0							0
Little skate	Number	4	0	0	0	0	0	0	0	4
	Weight (kg)	2.05	0.5	1.68	1.58	1.06	1.8	2.02	2.17	12.86
Little /Winter skate (unclassified)	Number				0			0		0
	Weight (kg)				0.35			0.22		0.57
Longfin squid	Number	62	45	170	40	82	0	0	0	399
	Weight (kg)	2.07	3.45	16.83	4.22	4.15	13.68	24.47	46.95	115.82
Northern kingfish	Number	0				0		2		2
	Weight (kg)	1.52				1.05		2.31		4.88
Northern pufferfish	Number					0				0
	Weight (kg)					0.34				0.34
Northern sea robin	Number	15	0	0	0	0	0	0	0	15
	Weight (kg)	2.07	6.38	6.98	17.37	22.5	5.01	21.37	59.5	141.18
Northern sennet	Number	0								0
	Weight (kg)	1.03								1.03
Rock crab	Number			7						7
	Weight (kg)			0.7						0.7
Rough scad	Number			0		0				0
	Weight (kg)			0.06		0.4				0.46
Scup	Number	0	0	0	0	15	0	0	0	15
	Weight (kg)	22.28	199.13	85.72	169.97	7	34.56	234.78	268.77	1022.21
Shortfin squid	Number					21	5			26
	Weight (kg)					0.28	0.14			0.42
Silver hake	Number							2	0	2
	Weight (kg)							2.31	2.04	4.35
Smooth dogfish	Number		0		0		0		0	0
	Weight (kg)		32.72		62.26		15.22		98.93	209.13
Spiny dogfish	Number			0						0
	Weight (kg)			23.45						23.45
Spot	Number	0	0	0	0	0	0	1	0	1
	Weight (kg)	6.72	21.56	15.92	52.44	3	1.32	1.05	6.04	108.05
Spotted hake	Number	0	0		0			1		1
	Weight (kg)	0.29	1.38		4.26			0.21		6.14
Striped sea robin	Number	0			0			0		0
	Weight (kg)	1.04			3.16			2.21		6.41
Summer flounder	Number		0		0			4	0	4
	Weight (kg)		22.94		2.42			3.27	3.66	32.29
Triggerfish	Number				0	0				0
	Weight (kg)				0.48	0.04				0.52
Weakfish	Number	0	0		0	0	4	0		4
	Weight (kg)	19.39	8		10.06	33.05	2.61	17.27		90.38
Windowpane flounder	Number	0	19	2		20	1	6	0	48
	Weight (kg)	0.56	4.9	0.72		9.2	0.54	1.29	7.14	24.35
Winter flounder	Number	0						1		1
	Weight (kg)	0.3						0.22		0.52
Total Number		**2427**	**265**	**249**	**40**	**140**	**10**	**21**	**0**	**3152**
Total Weight (kg)		**347.42**	**3669.46**	**168.82**	**406.39**	**234.53**	**122.02**	**397.34**	**723.6**	**6069.58**
Species Richness		**24**				**23**				**28**

Richness does not include unclassified taxa

Table B4- Survey 24F8		Empire Wind Farm				Reference Area				
		Shallow (<35 m)		Deep (>35 m)		Shallow (<35 m)		Deep (>35 m)		
		B010	B018	B045	B057	B081	B093	B088	B100	**Total**
Atlantic croaker	Number		4				35	3		42
	Weight (kg)		0.52				8.04	0.96		9.52
Atlantic mackerel	Number		4			1	4			9
	Weight (kg)		0.91			0.12	1.02			2.05
Atlantic menhaden	Number					39	116	39		194
	Weight (kg)					8.87	35.99	8.43		53.29
Black sea bass	Number	5	38	51	52	1			2	149
	Weight (kg)	0.62	2.88	15.6	21.04	0.19			0.76	41.09
Blue spotted cornetfish	Number	1					4			5
	Weight (kg)	0.05					0.19			0.24
Bluefish	Number	4		1	1					6
	Weight (kg)	0.66		0.63	0.2					1.49
Butterfish	Number	252	1823	16	34	30	5152	516	1792	9615
	Weight (kg)	27.8	178.92	1.64	3.58	2.26	325.32	36.66	130.48	706.66
Clearnose skate	Number	12	1	3	5	1	15			37
	Weight (kg)	17.09	1.74	4.36	5.54	2.51	26.05			57.29
Haddock	Number			1						1
	Weight (kg)			0.02						0.02
Little skate	Number	1	4	4	9			3	4	25
	Weight (kg)	0.61	2.08	2.36	4.36			1.56	1.51	12.48
Little/Winter skate (unclassified)	Number		5							5
	Weight (kg)		1.23							1.23
Longfin squid	Number	126	202	243	316	384	396	462	498	2627
	Weight (kg)	13.83	5.87	13.68	19.56	14.48	20.7	35.7	44.8	168.62
Northern sea robin	Number	55	48	210	32	10	112	78	109	654
	Weight (kg)	5.35	5.54	24.57	3.87	1.13	16.85	9.69	10.08	77.08
Northern kingfish	Number	1								1
	Weight (kg)	0.27								0.27
Northern pufferfish	Number	2								2
	Weight (kg)	0.16								0.16
Northern sennet	Number						4			4
	Weight (kg)						0.49			0.49
Planehead filefish	Number		1							1
	Weight (kg)		0.2							0.2
Rough scad	Number					2			4	6
	Weight (kg)					0.04			0.07	0.11
Scup	Number	1790	468	127	8	488	1329	624	354	5188
	Weight (kg)	409.3	75.52	36.5	1.49	23.7	353.77	98.16	57.09	1055.53
Sea scallop	Number							1		1
	Weight (kg)							0.01		0.01
Silver hake	Number			1				3	7	11
	Weight (kg)			0.05				0.54	0.77	1.36
Smooth dogfish	Number	58	8	1		2	9		11	89
	Weight (kg)	136.66	22.4	1.58		3.25	21.05		31.2	216.14
Spiny dogfish	Number		1			1		3	5	10
	Weight (kg)		1.33			1.3		4.89	5.41	12.93
Spot	Number	12	26				31	3		72
	Weight (kg)	1.35	2.73				3.31	0.6		7.99
Spotted hake	Number	5		5			4			14
	Weight (kg)	0.7		0.96			0.63			2.29
Striped sea robin	Number	5		1	4	1				11
	Weight (kg)	1.85		0.22	1.02	0.34				3.43
Summer flounder	Number		1	1	1			1	4	8
	Weight (kg)		1.24	0.29	1.37			1.1	1.44	5.44
Thresher shark	Number						1			1
	Weight (kg)						181.4			181.4
Weakfish	Number	2	61			2	190	12		267
	Weight (kg)	0.39	13.47			0.42	52.6	3.87		70.75
Windowpane flounder	Number	1		1			15	6		23
	Weight (kg)	0.36		0.23			3.26	1.17		5.02
Winter flounder	Number	1						1	1	3
	Weight (kg)	0.23						0.14	0.18	0.55
Winter skate	Number				1					1
	Weight (kg)				0.61					0.61
Total Number		**2333**	**2695**	**666**	**463**	**962**	**7417**	**1755**	**2791**	**19082**
Total Weight (kg)		**617.28**	**316.58**	**102.69**	**62.64**	**58.61**	**1050.67**	**203.48**	**283.79**	**2695.74**
Species Richness		**52**				**49**				**62**

Richness does not include unclassified taxa

Appendix C – Physical Data (Bottom Temperature, Salinity, and Depth) and Teleost/Elasmobranch Taxa No. of Reads by Survey and Station

Survey ID	Survey Date	Area	Depth Strata	Station	Bottom Depth (m)	Bottom Salinity (psu)	Bottom Temperature (°C)	ASV Common Name	No. of reads
24F4	22 August 2024	Empire Wind Farm	Shallow (<35 m)	007	29.86	31.46	11.82	Am_butterfish	2015
24F4	22 August 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	31.65	9.30	Am_butterfish	224
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	017	34.12	31.48	9.48	Am_butterfish	24309
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	020	35.81	31.54	9.04	Am_butterfish	15258
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Am_butterfish	35276
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Am_butterfish	52956
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	010	31.09	32.10	18.60	Am_butterfish	51147
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Am_butterfish	19319
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	31.62	8.18	Am_butterfish	1343
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	051	38.98	31.60	8.27	Am_butterfish	994
24F5	28 August 2024	Empire Wind Farm	Deep (>35 m)	047	37.33	31.57	8.58	Am_butterfish	7062
24F5	28 August 2024	Empire Wind Farm	Deep (>35 m)	059	40.24	31.59	8.32	Am_butterfish	7881
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Am_butterfish	48215
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Am_butterfish	71289
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Am_butterfish	59153
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Am_butterfish	135046
24F4	22 August 2024	Reference Area	Shallow (<35 m)	082	25.17	31.24	12.75	Am_butterfish	2955
24F4	22 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.59	Am_butterfish	2197
24F5	28 August 2024	Reference Area	Shallow (<35 m)	073	29.08	31.24	12.55	Am_butterfish	3458
24F5	28 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.83	Am_butterfish	15035
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Am_butterfish	64706
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Am_butterfish	71420
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Am_butterfish	65935
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Am_butterfish	32944
24F4	22 August 2024	Reference Area	Deep (>35 m)	079	39.06	31.52	9.83	Am_butterfish	6726
24F4	22 August 2024	Reference Area	Deep (>35 m)	117	39.94	31.56	9.34	Am_butterfish	2368
24F5	28 August 2024	Reference Area	Deep (>35 m)	076	34.52	31.45	10.92	Am_butterfish	11749
24F5	28 August 2024	Reference Area	Deep (>35 m)	106	39.47	31.52	9.99	Am_butterfish	37327
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Am_butterfish	56581
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Am_butterfish	38970
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Am_butterfish	37611
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	017	34.12	31.48	9.48	Atl_cod	2161
24F4	22 August 2024	Reference Area	Shallow (<35 m)	082	25.17	31.24	12.75	Atl_cod	704
24F4	22 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.59	Atl_cod	9
24F5	28 August 2024	Reference Area	Shallow (<35 m)	073	29.08	31.24	12.55	Atl_cod	903
24F5	28 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.83	Atl_cod	1789
24F4	22 August 2024	Reference Area	Deep (>35 m)	079	39.06	31.52	9.83	Atl_cod	434
24F4	22 August 2024	Reference Area	Deep (>35 m)	117	39.94	31.56	9.34	Atl_cod	203
24F5	28 August 2024	Reference Area	Deep (>35 m)	076	34.52	31.45	10.92	Atl_cod	323
24F5	28 August 2024	Reference Area	Deep (>35 m)	106	39.47	31.52	9.99	Atl_cod	70
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Atl_cod	25
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Atl_cod	31

Survey ID	Survey Date	Area	Depth Strata	Station	Bottom Depth (m)	Bottom Salinity (psu)	Bottom Temperature (°C)	ASV Common Name	No. of reads
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Atl_croaker_(nibea98)	8712
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Atl_croaker_(nibea98)	19556
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	010	31.09	32.10	18.60	Atl_croaker_(nibea98)	23
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	31.62	8.18	Atl_croaker_(nibea98)	297
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Atl_croaker_(nibea98)	15790
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Atl_croaker_(nibea98)	20013
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Atl_croaker_(nibea98)	624
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Atl_croaker_(nibea98)	1165
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Atl_croaker_(nibea98)	7282
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Atl_croaker_(nibea98)	23373
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Atl_croaker_(nibea98)	412
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Atl_croaker_(nibea98)	8855
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Atl_croaker_(nibea98)	1142
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Atl_croaker_(nibea98)	1274
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	051	38.98	31.60	8.27	Atl_herring	617
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Atl_herring	616
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Atl_herring	52
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Atl_mackerel	63
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Atl_mackerel	28
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	31.62	8.18	Atl_mackerel	369
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Atl_mackerel	152
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Atl_mackerel	44
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Atl_mackerel	278
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Atl_mackerel	43
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Atl_mackerel	288
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Atl_mackerel	90
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Atl_mackerel	168
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Atl_mackerel	359
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Atl_menhaden_LS16_or_river_herrings	2471
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Atl_menhaden_LS16_or_river_herrings	5395
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	010	31.09	32.10	18.60	Atl_menhaden_LS16_or_river_herrings	25
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Atl_menhaden_LS16_or_river_herrings	1747
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Atl_menhaden_LS16_or_river_herrings	5677
24F4	22 August 2024	Reference Area	Shallow (<35 m)	082	25.17	31.24	12.75	Atl_menhaden_LS16_or_river_herrings	143
24F4	22 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.59	Atl_menhaden_LS16_or_river_herrings	184
24F5	28 August 2024	Reference Area	Shallow (<35 m)	073	29.08	31.24	12.55	Atl_menhaden_LS16_or_river_herrings	267
24F5	28 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.83	Atl_menhaden_LS16_or_river_herrings	1273
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Atl_menhaden_LS16_or_river_herrings	2081
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Atl_menhaden_LS16_or_river_herrings	2519
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Atl_menhaden_LS16_or_river_herrings	8916
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Atl_menhaden_LS16_or_river_herrings	4304
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Atl_menhaden_LS16_or_river_herrings	3065

Survey ID	Survey Date	Area	Depth Strata	Station	Bottom Depth (m)	Bottom Salinity (psu)	Bottom Temperature (°C)	ASV Common Name	No. of reads
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Atl_menhaden_LS16_or_river_herrings	3532
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Atl_menhaden_LS16_or_river_herrings	2262
24F4	22 August 2024	Empire Wind Farm	Shallow (<35 m)	007	29.86	31.46	11.82	Atl_menhaden_LS17	1616
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Atl_menhaden_LS17	3267
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Atl_menhaden_LS17	7267
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Atl_menhaden_LS17	181
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Atl_menhaden_LS17	2891
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Atl_menhaden_LS17	8703
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Atl_menhaden_LS17	230
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Atl_menhaden_LS17	84
24F4	22 August 2024	Reference Area	Shallow (<35 m)	082	25.17	31.24	12.75	Atl_menhaden_LS17	175
24F4	22 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.59	Atl_menhaden_LS17	141
24F5	28 August 2024	Reference Area	Shallow (<35 m)	073	29.08	31.24	12.55	Atl_menhaden_LS17	720
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Atl_menhaden_LS17	1431
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Atl_menhaden_LS17	5206
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Atl_menhaden_LS17	10968
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Atl_menhaden_LS17	4960
24F5	28 August 2024	Reference Area	Deep (>35 m)	076	34.52	31.45	10.92	Atl_menhaden_LS17	758
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Atl_menhaden_LS17	4168
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Atl_menhaden_LS17	5479
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Atl_menhaden_LS17	2909
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Atl_or_nor_sand_lance	76
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Atl_or_nor_sand_lance	57
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Atl_or_nor_sand_lance	569
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	31.62	8.18	Atl_or_nor_sand_lance	18555
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	051	38.98	31.60	8.27	Atl_or_nor_sand_lance	1206
24F5	28 August 2024	Empire Wind Farm	Deep (>35 m)	059	40.24	31.59	8.32	Atl_or_nor_sand_lance	12229
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Atl_or_nor_sand_lance	81
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Atl_or_nor_sand_lance	33
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Atl_or_nor_sand_lance	304
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Atl_or_nor_sand_lance	409
24F4	22 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.59	Atl_or_nor_sand_lance	51
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Atl_or_nor_sand_lance	45
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Atl_or_nor_sand_lance	1461
24F4	22 August 2024	Reference Area	Deep (>35 m)	117	39.94	31.56	9.34	Atl_or_nor_sand_lance	45
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Atl_or_nor_sand_lance	150
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Atl_or_nor_sand_lance	628
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Atl_or_nor_sand_lance	535
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Bay_anchovy	583
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Bay_anchovy	810
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	010	31.09	32.10	18.60	Bay_anchovy	1996
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Bay_anchovy	1842

Survey ID	Survey Date	Area	Depth Strata	Station	Bottom Depth (m)	Bottom Salinity (psu)	Bottom Temperature (°C)	ASV Common Name	No. of reads
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Bay_anchovy	870
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Bay_anchovy	1530
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Bay_anchovy	1179
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Bay_anchovy	2752
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Bay_anchovy	718
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Bay_anchovy	296
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Black_drum_or_Spot	4459
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Black_drum_or_Spot	4970
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	010	31.09	32.10	18.60	Black_drum_or_Spot	15803
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Black_drum_or_Spot	4781
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Black_drum_or_Spot	11085
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Black_drum_or_Spot	8794
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Black_drum_or_Spot	1951
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Black_drum_or_Spot	3197
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Black_drum_or_Spot	13601
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Black_drum_or_Spot	15029
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Black_drum_or_Spot	3085
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Black_drum_or_Spot	2154
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Black_drum_or_Spot	7226
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Black_drum_or_Spot	2336
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Black_drum_or_Spot	1969
24F4	22 August 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	31.65	9.30	Black_sea_bass	572
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Black_sea_bass	1406
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Black_sea_bass	1337
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Black_sea_bass	870
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	31.62	8.18	Black_sea_bass	1031
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	051	38.98	31.60	8.27	Black_sea_bass	1248
24F5	28 August 2024	Empire Wind Farm	Deep (>35 m)	059	40.24	31.59	8.32	Black_sea_bass	301
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Black_sea_bass	2173
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Black_sea_bass	1580
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Black_sea_bass	6754
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Black_sea_bass	1564
24F4	22 August 2024	Reference Area	Shallow (<35 m)	082	25.17	31.24	12.75	Black_sea_bass	672
24F4	22 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.59	Black_sea_bass	579
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Black_sea_bass	3796
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Black_sea_bass	3718
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Black_sea_bass	12934
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Black_sea_bass	7296
24F4	22 August 2024	Reference Area	Deep (>35 m)	079	39.06	31.52	9.83	Black_sea_bass	313
24F4	22 August 2024	Reference Area	Deep (>35 m)	117	39.94	31.56	9.34	Black_sea_bass	626
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Black_sea_bass	3074
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Black_sea_bass	12868

Survey ID	Survey Date	Area	Depth Strata	Station	Bottom Depth (m)	Bottom Salinity (psu)	Bottom Temperature (°C)	ASV Common Name	No. of reads
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Black_sea_bass	8258
24F4	22 August 2024	Empire Wind Farm	Shallow (<35 m)	007	29.86	31.46	11.82	Bluefish	4106
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Bluefish	1120
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Bluefish	1767
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Bluefish	2065
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	31.62	8.18	Bluefish	26
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	051	38.98	31.60	8.27	Bluefish	1062
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Bluefish	2267
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Bluefish	3094
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Bluefish	649
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Bluefish	285
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Bluefish	60
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Bluefish	5479
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Bluefish	939
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Bluefish	475
24F4	22 August 2024	Reference Area	Deep (>35 m)	117	39.94	31.56	9.34	Bluefish	22
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Bluefish	1359
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Bluefish	705
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Bluefish	298
24F4	22 August 2024	Empire Wind Farm	Shallow (<35 m)	007	29.86	31.46	11.82	Brazilian_cownose_ray98	1013
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	31.62	8.18	Brazilian_cownose_ray98	404
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	051	38.98	31.60	8.27	Brazilian_cownose_ray98	2310
24F5	28 August 2024	Empire Wind Farm	Deep (>35 m)	020	35.81	31.54	9.04	Brazilian_cownose_ray98	14
24F5	28 August 2024	Empire Wind Farm	Deep (>35 m)	047	37.33	31.57	8.58	Brazilian_cownose_ray98	149
24F5	28 August 2024	Reference Area	Shallow (<35 m)	073	29.08	31.24	12.55	Brazilian_cownose_ray98	37194
24F5	28 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.83	Brazilian_cownose_ray98	1620
24F5	28 August 2024	Reference Area	Deep (>35 m)	076	34.52	31.45	10.92	Brazilian_cownose_ray98	9542
24F5	28 August 2024	Reference Area	Deep (>35 m)	106	39.47	31.52	9.99	Brazilian_cownose_ray98	17075
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Buckler_dory	10
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Buckler_dory	39
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	017	34.12	31.48	9.48	Bullnose_ray	76
24F4	22 August 2024	Reference Area	Shallow (<35 m)	082	25.17	31.24	12.75	Bullnose_ray	33
24F5	28 August 2024	Reference Area	Shallow (<35 m)	073	29.08	31.24	12.55	Bullnose_ray	8513
24F5	28 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.83	Bullnose_ray	203
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Clearnose_skate	21
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Clearnose_skate	14279
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Clearnose_skate	2735
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Clearnose_skate	3188
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Clearnose_skate	19430
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Clearnose_skate	9105
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Clearnose_skate	5236
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Clearnose_skate	4627

Survey ID	Survey Date	Area	Depth Strata	Station	Bottom Depth (m)	Bottom Salinity (psu)	Bottom Temperature (°C)	ASV Common Name	No. of reads
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Clearnose_skate	8120
24F7	4 October 2024	Reference Area	Deep (>35 m)	080	39.31	32.53	18.22	Clearnose_skate	3184
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Clearnose_skate	19839
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Clearnose_skate	10623
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Clearnose_skate	37120
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Cownose_ray	255
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Cownose_ray	3280
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Cownose_ray	46
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Cownose_ray	56409
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Cownose_ray	26510
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Cownose_ray	166
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Cownose_ray	50846
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Cownose_ray	36697
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Cownose_ray	237
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Cownose_ray	1268
24F5	28 August 2024	Reference Area	Deep (>35 m)	076	34.52	31.45	10.92	Cownose_ray	100
24F7	4 October 2024	Reference Area	Deep (>35 m)	080	39.31	32.53	18.22	Cownose_ray	10177
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Cownose_ray	18972
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Cownose_ray	660
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Cownose_ray	1189
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Fawn_cuskeel	26
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Fawn_cuskeel	16
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Fawn_cuskeel	22
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Fawn_cuskeel	17
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Fawn_cuskeel	7
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Fawn_cuskeel	22
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Fawn_cuskeel	18
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	017	34.12	31.48	9.48	Fourspot_flounder	3117
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	020	35.81	31.54	9.04	Fourspot_flounder	1813
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Fourspot_flounder	19
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Fourspot_flounder	167
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Fourspot_flounder	21
24F4	22 August 2024	Reference Area	Shallow (<35 m)	082	25.17	31.24	12.75	Fourspot_flounder	158
24F5	28 August 2024	Reference Area	Shallow (<35 m)	073	29.08	31.24	12.55	Fourspot_flounder	372
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Fourspot_flounder	21
24F4	22 August 2024	Reference Area	Deep (>35 m)	079	39.06	31.52	9.83	Fourspot_flounder	112
24F4	22 August 2024	Reference Area	Deep (>35 m)	117	39.94	31.56	9.34	Fourspot_flounder	81
24F5	28 August 2024	Reference Area	Deep (>35 m)	076	34.52	31.45	10.92	Fourspot_flounder	515
24F5	28 August 2024	Reference Area	Deep (>35 m)	106	39.47	31.52	9.99	Fourspot_flounder	54
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Fourspot_flounder	22
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Frigate_or_bullet_tuna	22
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Frigate_or_bullet_tuna	14

Survey ID	Survey Date	Area	Depth Strata	Station	Bottom Depth (m)	Bottom Salinity (psu)	Bottom Temperature (°C)	ASV Common Name	No. of reads
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Frigate_or_bullet_tuna	21
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Frigate_or_bullet_tuna	23
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Frigate_or_bullet_tuna	274
24F4	22 August 2024	Reference Area	Deep (>35 m)	079	39.06	31.52	9.83	Frigate_or_bullet_tuna	388
24F4	22 August 2024	Reference Area	Deep (>35 m)	117	39.94	31.56	9.34	Frigate_or_bullet_tuna	64
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Frigate_or_bullet_tuna	24
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Frigate_or_bullet_tuna	37
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Frigate_or_bullet_tuna	27
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Grey_triggerfish	15
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Grey_triggerfish	8
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Grey_triggerfish	47
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Grey_triggerfish	12
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Grey_triggerfish	11
24F4	22 August 2024	Empire Wind Farm	Shallow (<35 m)	007	29.86	31.46	11.82	Gulf_stream_flounder	2066
24F4	22 August 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	31.65	9.30	Gulf_stream_flounder	494
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	017	34.12	31.48	9.48	Gulf_stream_flounder	1210
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	020	35.81	31.54	9.04	Gulf_stream_flounder	2499
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Gulf_stream_flounder	114
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Gulf_stream_flounder	101
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Gulf_stream_flounder	695
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	31.62	8.18	Gulf_stream_flounder	887
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Gulf_stream_flounder	257
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Gulf_stream_flounder	71
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Gulf_stream_flounder	76
24F4	22 August 2024	Reference Area	Shallow (<35 m)	082	25.17	31.24	12.75	Gulf_stream_flounder	215
24F4	22 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.59	Gulf_stream_flounder	270
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Gulf_stream_flounder	98
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Gulf_stream_flounder	1116
24F4	22 August 2024	Reference Area	Deep (>35 m)	079	39.06	31.52	9.83	Gulf_stream_flounder	255
24F4	22 August 2024	Reference Area	Deep (>35 m)	117	39.94	31.56	9.34	Gulf_stream_flounder	386
24F5	28 August 2024	Reference Area	Deep (>35 m)	106	39.47	31.52	9.99	Gulf_stream_flounder	98
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Gulf_stream_flounder	350
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Gulf_stream_flounder	368
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Gulf_stream_flounder	54
24F4	22 August 2024	Reference Area	Deep (>35 m)	117	39.94	31.56	9.34	Monkfish	2
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Nor_kingfish	150
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Nor_kingfish	200
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Nor_kingfish	91
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Nor_kingfish	285
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Nor_kingfish	712
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Nor_kingfish	406
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Nor_kingfish	58

Survey ID	Survey Date	Area	Depth Strata	Station	Bottom Depth (m)	Bottom Salinity (psu)	Bottom Temperature (°C)	ASV Common Name	No. of reads
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Nor_kingfish	164
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Nor_kingfish	236
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Nor_kingfish	217
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Nor_kingfish	133
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Nor_kingfish	273
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Nor_puffer	14
24F4	22 August 2024	Empire Wind Farm	Shallow (<35 m)	007	29.86	31.46	11.82	Nor_sea_robin	94820
24F4	22 August 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	31.65	9.30	Nor_sea_robin	4916
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	017	34.12	31.48	9.48	Nor_sea_robin	23351
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	020	35.81	31.54	9.04	Nor_sea_robin	8758
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Nor_sea_robin	3725
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Nor_sea_robin	3572
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	010	31.09	32.10	18.60	Nor_sea_robin	3947
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Nor_sea_robin	5260
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	31.62	8.18	Nor_sea_robin	11478
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	051	38.98	31.60	8.27	Nor_sea_robin	5543
24F5	28 August 2024	Empire Wind Farm	Deep (>35 m)	047	37.33	31.57	8.58	Nor_sea_robin	33324
24F5	28 August 2024	Empire Wind Farm	Deep (>35 m)	059	40.24	31.59	8.32	Nor_sea_robin	42588
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Nor_sea_robin	9169
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Nor_sea_robin	5692
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Nor_sea_robin	10633
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Nor_sea_robin	6898
24F4	22 August 2024	Reference Area	Shallow (<35 m)	082	25.17	31.24	12.75	Nor_sea_robin	8599
24F4	22 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.59	Nor_sea_robin	9114
24F5	28 August 2024	Reference Area	Shallow (<35 m)	073	29.08	31.24	12.55	Nor_sea_robin	30280
24F5	28 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.83	Nor_sea_robin	56958
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Nor_sea_robin	5451
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Nor_sea_robin	8112
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Nor_sea_robin	13922
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Nor_sea_robin	6293
24F4	22 August 2024	Reference Area	Deep (>35 m)	079	39.06	31.52	9.83	Nor_sea_robin	71330
24F4	22 August 2024	Reference Area	Deep (>35 m)	117	39.94	31.56	9.34	Nor_sea_robin	10532
24F5	28 August 2024	Reference Area	Deep (>35 m)	076	34.52	31.45	10.92	Nor_sea_robin	32685
24F5	28 August 2024	Reference Area	Deep (>35 m)	106	39.47	31.52	9.99	Nor_sea_robin	10792
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Nor_sea_robin	7119
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Nor_sea_robin	8998
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Nor_sea_robin	8035
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Nor_sennet95	366
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Nor_sennet95	391
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	010	31.09	32.10	18.60	Nor_sennet95	7051
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Nor_sennet95	570
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Nor_sennet95	1352

Survey ID	Survey Date	Area	Depth Strata	Station	Bottom Depth (m)	Bottom Salinity (psu)	Bottom Temperature (°C)	ASV Common Name	No. of reads
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Nor_sennet95	166
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Nor_sennet95	1097
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Nor_sennet95	282
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Nor_sennet95	20
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Nor_sennet95	7
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	017	34.12	31.48	9.48	Ocean_sunfish	222
24F4	22 August 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	31.65	9.30	Red_White_or_Spotted_hake	1016
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	017	34.12	31.48	9.48	Red_White_or_Spotted_hake	2197
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	020	35.81	31.54	9.04	Red_White_or_Spotted_hake	1906
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Red_White_or_Spotted_hake	993
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Red_White_or_Spotted_hake	921
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	010	31.09	32.10	18.60	Red_White_or_Spotted_hake	1989
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Red_White_or_Spotted_hake	444
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	31.62	8.18	Red_White_or_Spotted_hake	5663
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	051	38.98	31.60	8.27	Red_White_or_Spotted_hake	346
24F5	28 August 2024	Empire Wind Farm	Deep (>35 m)	047	37.33	31.57	8.58	Red_White_or_Spotted_hake	792
24F5	28 August 2024	Empire Wind Farm	Deep (>35 m)	059	40.24	31.59	8.32	Red_White_or_Spotted_hake	6236
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Red_White_or_Spotted_hake	2553
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Red_White_or_Spotted_hake	1674
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Red_White_or_Spotted_hake	810
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Red_White_or_Spotted_hake	2386
24F4	22 August 2024	Reference Area	Shallow (<35 m)	082	25.17	31.24	12.75	Red_White_or_Spotted_hake	569
24F4	22 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.59	Red_White_or_Spotted_hake	5
24F5	28 August 2024	Reference Area	Shallow (<35 m)	073	29.08	31.24	12.55	Red_White_or_Spotted_hake	194
24F5	28 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.83	Red_White_or_Spotted_hake	1009
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Red_White_or_Spotted_hake	1138
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Red_White_or_Spotted_hake	5326
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Red_White_or_Spotted_hake	688
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Red_White_or_Spotted_hake	852
24F4	22 August 2024	Reference Area	Deep (>35 m)	079	39.06	31.52	9.83	Red_White_or_Spotted_hake	7562
24F4	22 August 2024	Reference Area	Deep (>35 m)	117	39.94	31.56	9.34	Red_White_or_Spotted_hake	1046
24F5	28 August 2024	Reference Area	Deep (>35 m)	076	34.52	31.45	10.92	Red_White_or_Spotted_hake	250
24F5	28 August 2024	Reference Area	Deep (>35 m)	106	39.47	31.52	9.99	Red_White_or_Spotted_hake	30
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Red_White_or_Spotted_hake	1525
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Red_White_or_Spotted_hake	671
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Red_White_or_Spotted_hake	554
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Roughtail_stingray	37
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	31.62	8.18	Roughtail_stingray	475
24F5	28 August 2024	Empire Wind Farm	Deep (>35 m)	059	40.24	31.59	8.32	Roughtail_stingray	278
24F4	22 August 2024	Reference Area	Shallow (<35 m)	082	25.17	31.24	12.75	Roughtail_stingray	7111
24F4	22 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.59	Roughtail_stingray	1473
24F4	22 August 2024	Reference Area	Deep (>35 m)	079	39.06	31.52	9.83	Roughtail_stingray	3046

Survey ID	Survey Date	Area	Depth Strata	Station	Bottom Depth (m)	Bottom Salinity (psu)	Bottom Temperature (°C)	ASV Common Name	No. of reads
24F4	22 August 2024	Reference Area	Deep (>35 m)	117	39.94	31.56	9.34	Roughtail_stingray	695
24F5	28 August 2024	Reference Area	Deep (>35 m)	076	34.52	31.45	10.92	Roughtail_stingray	102
24F5	28 August 2024	Reference Area	Deep (>35 m)	106	39.47	31.52	9.99	Roughtail_stingray	653
24F4	22 August 2024	Empire Wind Farm	Shallow (<35 m)	007	29.86	31.46	11.82	Sandbar_shark	4801
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	31.62	8.18	Sandbar_shark	159
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Scup	17260
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Scup	13172
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	010	31.09	32.10	18.60	Scup	38063
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Scup	209381
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	31.62	8.18	Scup	369
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Scup	29345
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Scup	15621
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Scup	42206
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Scup	68258
24F4	22 August 2024	Reference Area	Shallow (<35 m)	082	25.17	31.24	12.75	Scup	258
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Scup	48683
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Scup	36810
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Scup	70947
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Scup	37518
24F4	22 August 2024	Reference Area	Deep (>35 m)	079	39.06	31.52	9.83	Scup	894
24F4	22 August 2024	Reference Area	Deep (>35 m)	117	39.94	31.56	9.34	Scup	80
24F5	28 August 2024	Reference Area	Deep (>35 m)	076	34.52	31.45	10.92	Scup	312
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Scup	31739
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Scup	80324
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Scup	78877
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Silver_anchovy	61
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Silver_anchovy	47
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Silver_anchovy	24
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Silver_anchovy	49
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Silver_anchovy	63
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Silver_anchovy	487
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Silver_anchovy	27
24F4	22 August 2024	Empire Wind Farm	Shallow (<35 m)	007	29.86	31.46	11.82	Silver_hake	780
24F4	22 August 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	31.65	9.30	Silver_hake	2580
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	017	34.12	31.48	9.48	Silver_hake	17341
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	020	35.81	31.54	9.04	Silver_hake	9822
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Silver_hake	146
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Silver_hake	284
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	31.62	8.18	Silver_hake	6100
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	051	38.98	31.60	8.27	Silver_hake	2310
24F5	28 August 2024	Empire Wind Farm	Deep (>35 m)	047	37.33	31.57	8.58	Silver_hake	12673
24F5	28 August 2024	Empire Wind Farm	Deep (>35 m)	059	40.24	31.59	8.32	Silver_hake	6291

Survey ID	Survey Date	Area	Depth Strata	Station	Bottom Depth (m)	Bottom Salinity (psu)	Bottom Temperature (°C)	ASV Common Name	No. of reads
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Silver_hake	227
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Silver_hake	253
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Silver_hake	175
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Silver_hake	83
24F4	22 August 2024	Reference Area	Shallow (<35 m)	082	25.17	31.24	12.75	Silver_hake	5202
24F4	22 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.59	Silver_hake	3194
24F5	28 August 2024	Reference Area	Shallow (<35 m)	073	29.08	31.24	12.55	Silver_hake	2948
24F5	28 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.83	Silver_hake	19115
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Silver_hake	606
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Silver_hake	372
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Silver_hake	316
24F4	22 August 2024	Reference Area	Deep (>35 m)	079	39.06	31.52	9.83	Silver_hake	13217
24F4	22 August 2024	Reference Area	Deep (>35 m)	117	39.94	31.56	9.34	Silver_hake	4885
24F5	28 August 2024	Reference Area	Deep (>35 m)	076	34.52	31.45	10.92	Silver_hake	10904
24F5	28 August 2024	Reference Area	Deep (>35 m)	106	39.47	31.52	9.99	Silver_hake	1151
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Silver_hake	815
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Silver_hake	161
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Silver_hake	33
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Smallmouth_flounder	152
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Smallmouth_flounder	107
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Smallmouth_flounder	83
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Smallmouth_flounder	84
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Smallmouth_flounder	189
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Smallmouth_flounder	98
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	017	34.12	31.48	9.48	Smooth_dogfish	198
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Smooth_dogfish	376
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Smooth_dogfish	1343
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	010	31.09	32.10	18.60	Smooth_dogfish	757
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Smooth_dogfish	29760
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Smooth_dogfish	5017
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Smooth_dogfish	4593
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Smooth_dogfish	5249
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Smooth_dogfish	4491
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Smooth_dogfish	5089
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Smooth_dogfish	1246
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Smooth_dogfish	10996
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Smooth_dogfish	4547
24F4	22 August 2024	Reference Area	Deep (>35 m)	117	39.94	31.56	9.34	Smooth_dogfish	354
24F5	28 August 2024	Reference Area	Deep (>35 m)	076	34.52	31.45	10.92	Smooth_dogfish	514
24F5	28 August 2024	Reference Area	Deep (>35 m)	106	39.47	31.52	9.99	Smooth_dogfish	527
24F7	4 October 2024	Reference Area	Deep (>35 m)	080	39.31	32.53	18.22	Smooth_dogfish	1416
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Smooth_dogfish	1911

Survey ID	Survey Date	Area	Depth Strata	Station	Bottom Depth (m)	Bottom Salinity (psu)	Bottom Temperature (°C)	ASV Common Name	No. of reads
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Smooth_dogfish	11042
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Smooth_dogfish	7995
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Spiny_dogfish	217
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Spiny_dogfish	3085
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Spiny_dogfish	547
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Spiny_dogfish	449
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Spiny_dogfish	4619
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Spiny_dogfish	434
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Spiny_dogfish	694
24F5	28 August 2024	Reference Area	Deep (>35 m)	076	34.52	31.45	10.92	Spiny_dogfish	23
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Spiny_dogfish	299
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Spiny_dogfish	2832
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Spiny_dogfish	1481
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Str_sea_robin	35
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Str_sea_robin	23
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Str_sea_robin	237
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Str_sea_robin	86
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Str_sea_robin	32
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Str_sea_robin	538
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Str_sea_robin	268
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Str_sea_robin	34
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Str_sea_robin	141
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Str_sea_robin	136
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Str_sea_robin	274
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Str_sea_robin	101
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Summ_flounder	487
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Summ_flounder	380
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Summ_flounder	1903
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Summ_flounder	869
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Summ_flounder	11991
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Summ_flounder	51
24F5	28 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.83	Summ_flounder	1159
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Summ_flounder	1155
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Summ_flounder	3409
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Summ_flounder	4383
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Summ_flounder	935
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Summ_flounder	1152
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Summ_flounder	948
24F4	22 August 2024	Reference Area	Deep (>35 m)	079	39.06	31.52	9.83	Tautog	6
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Thresher_shark	163
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Thresher_shark	45
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Thresher_shark	899

Survey ID	Survey Date	Area	Depth Strata	Station	Bottom Depth (m)	Bottom Salinity (psu)	Bottom Temperature (°C)	ASV Common Name	No. of reads
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Thresher_shark	520
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	31.62	8.18	Tuna_sp	728
24F4	22 August 2024	Reference Area	Shallow (<35 m)	082	25.17	31.24	12.75	Unk_ray_sp95	605
24F4	22 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.59	Unk_ray_sp95	377
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	017	34.12	31.48	9.48	Weakfish_Cyn	1692
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Weakfish_Cyn	3890
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Weakfish_Cyn	3982
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	010	31.09	32.10	18.60	Weakfish_Cyn	5415
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Weakfish_Cyn	1079
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Weakfish_Cyn	7903
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Weakfish_Cyn	8521
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Weakfish_Cyn	10966
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Weakfish_Cyn	18074
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Weakfish_Cyn	14939
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Weakfish_Cyn	6044
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Weakfish_Cyn	10298
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Weakfish_Cyn	3172
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Weakfish_Cyn	6502
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Weakfish_Cyn	13417
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Weakfish_Cyn	13687
24F4	22 August 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	31.65	9.30	Windowpane_flounder	143
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	017	34.12	31.48	9.48	Windowpane_flounder	1723
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	020	35.81	31.54	9.04	Windowpane_flounder	3028
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Windowpane_flounder	600
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Windowpane_flounder	501
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Windowpane_flounder	3222
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	31.62	8.18	Windowpane_flounder	655
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	051	38.98	31.60	8.27	Windowpane_flounder	666
24F5	28 August 2024	Empire Wind Farm	Deep (>35 m)	047	37.33	31.57	8.58	Windowpane_flounder	1028
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Windowpane_flounder	2113
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Windowpane_flounder	1429
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Windowpane_flounder	95
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Windowpane_flounder	220
24F4	22 August 2024	Reference Area	Shallow (<35 m)	082	25.17	31.24	12.75	Windowpane_flounder	672
24F4	22 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.59	Windowpane_flounder	404
24F5	28 August 2024	Reference Area	Shallow (<35 m)	073	29.08	31.24	12.55	Windowpane_flounder	1438
24F5	28 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.83	Windowpane_flounder	4523
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Windowpane_flounder	2543
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Windowpane_flounder	2040
24F4	22 August 2024	Reference Area	Deep (>35 m)	079	39.06	31.52	9.83	Windowpane_flounder	1188
24F4	22 August 2024	Reference Area	Deep (>35 m)	117	39.94	31.56	9.34	Windowpane_flounder	671
24F5	28 August 2024	Reference Area	Deep (>35 m)	076	34.52	31.45	10.92	Windowpane_flounder	1108

Survey ID	Survey Date	Area	Depth Strata	Station	Bottom Depth (m)	Bottom Salinity (psu)	Bottom Temperature (°C)	ASV Common Name	No. of reads
24F5	28 August 2024	Reference Area	Deep (>35 m)	106	39.47	31.52	9.99	Windowpane_flounder	100
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Windowpane_flounder	1260
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Windowpane_flounder	351
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Windowpane_flounder	1080
24F4	22 August 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	31.65	9.30	Winter_or_Yellowtail_flounder	2754
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	020	35.81	31.54	9.04	Winter_or_Yellowtail_flounder	980
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Winter_or_Yellowtail_flounder	64
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Winter_or_Yellowtail_flounder	272
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Winter_or_Yellowtail_flounder	194
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	31.62	8.18	Winter_or_Yellowtail_flounder	3058
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	051	38.98	31.60	8.27	Winter_or_Yellowtail_flounder	694
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Winter_or_Yellowtail_flounder	111
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Winter_or_Yellowtail_flounder	547
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Winter_or_Yellowtail_flounder	320
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Winter_or_Yellowtail_flounder	109
24F4	22 August 2024	Reference Area	Shallow (<35 m)	082	25.17	31.24	12.75	Winter_or_Yellowtail_flounder	140
24F5	28 August 2024	Reference Area	Shallow (<35 m)	073	29.08	31.24	12.55	Winter_or_Yellowtail_flounder	4749
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Winter_or_Yellowtail_flounder	76
24F4	22 August 2024	Reference Area	Deep (>35 m)	079	39.06	31.52	9.83	Winter_or_Yellowtail_flounder	916
24F4	22 August 2024	Reference Area	Deep (>35 m)	117	39.94	31.56	9.34	Winter_or_Yellowtail_flounder	415
24F5	28 August 2024	Reference Area	Deep (>35 m)	076	34.52	31.45	10.92	Winter_or_Yellowtail_flounder	2395
24F5	28 August 2024	Reference Area	Deep (>35 m)	106	39.47	31.52	9.99	Winter_or_Yellowtail_flounder	398
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Winter_or_Yellowtail_flounder	81
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Winter_or_Yellowtail_flounder	84
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Winter_or_Yellowtail_flounder	62
24F4	22 August 2024	Empire Wind Farm	Shallow (<35 m)	007	29.86	31.46	11.82	Winter_skate_or_Little_skate	4326
24F4	22 August 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	31.65	9.30	Winter_skate_or_Little_skate	13066
24F5	28 August 2024	Empire Wind Farm	Shallow (<35 m)	017	34.12	31.48	9.48	Winter_skate_or_Little_skate	114
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	003	27.04	31.09	19.33	Winter_skate_or_Little_skate	909
24F7	4 October 2024	Empire Wind Farm	Shallow (<35 m)	023	32.83	NA	NA	Winter_skate_or_Little_skate	88
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	010	31.09	32.10	18.60	Winter_skate_or_Little_skate	10992
24F8	9 October 2024	Empire Wind Farm	Shallow (<35 m)	018	33.15	32.31	18.00	Winter_skate_or_Little_skate	5653
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	31.62	8.18	Winter_skate_or_Little_skate	1051
24F4	22 August 2024	Empire Wind Farm	Deep (>35 m)	051	38.98	31.60	8.27	Winter_skate_or_Little_skate	1858
24F5	28 August 2024	Empire Wind Farm	Deep (>35 m)	020	35.81	31.54	9.04	Winter_skate_or_Little_skate	2646
24F5	28 August 2024	Empire Wind Farm	Deep (>35 m)	047	37.33	31.57	8.58	Winter_skate_or_Little_skate	331
24F5	28 August 2024	Empire Wind Farm	Deep (>35 m)	059	40.24	31.59	8.32	Winter_skate_or_Little_skate	36243
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	031	39.09	32.30	18.51	Winter_skate_or_Little_skate	11221
24F7	4 October 2024	Empire Wind Farm	Deep (>35 m)	046	35.57	32.06	18.73	Winter_skate_or_Little_skate	1097
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	045	40.50	32.12	17.54	Winter_skate_or_Little_skate	18540
24F8	9 October 2024	Empire Wind Farm	Deep (>35 m)	057	40.17	32.42	18.00	Winter_skate_or_Little_skate	8611
24F4	22 August 2024	Reference Area	Shallow (<35 m)	082	25.17	31.24	12.75	Winter_skate_or_Little_skate	22764

Survey ID	Survey Date	Area	Depth Strata	Station	Bottom Depth (m)	Bottom Salinity (psu)	Bottom Temperature (°C)	ASV Common Name	No. of reads
24F4	22 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.59	Winter_skate_or_Little_skate	4724
24F5	28 August 2024	Reference Area	Shallow (<35 m)	073	29.08	31.24	12.55	Winter_skate_or_Little_skate	8096
24F5	28 August 2024	Reference Area	Shallow (<35 m)	112	34.01	31.46	10.83	Winter_skate_or_Little_skate	4692
24F7	4 October 2024	Reference Area	Shallow (<35 m)	063	26.87	31.33	18.75	Winter_skate_or_Little_skate	13223
24F7	4 October 2024	Reference Area	Shallow (<35 m)	083	33.94	31.39	18.58	Winter_skate_or_Little_skate	976
24F8	9 October 2024	Reference Area	Shallow (<35 m)	081	25.23	31.42	18.33	Winter_skate_or_Little_skate	7127
24F8	9 October 2024	Reference Area	Shallow (<35 m)	093	30.32	31.44	18.17	Winter_skate_or_Little_skate	3590
24F4	22 August 2024	Reference Area	Deep (>35 m)	079	39.06	31.52	9.83	Winter_skate_or_Little_skate	28680
24F4	22 August 2024	Reference Area	Deep (>35 m)	117	39.94	31.56	9.34	Winter_skate_or_Little_skate	6477
24F5	28 August 2024	Reference Area	Deep (>35 m)	076	34.52	31.45	10.92	Winter_skate_or_Little_skate	1251
24F5	28 August 2024	Reference Area	Deep (>35 m)	106	39.47	31.52	9.99	Winter_skate_or_Little_skate	6159
24F7	4 October 2024	Reference Area	Deep (>35 m)	080	39.31	32.53	18.22	Winter_skate_or_Little_skate	5004
24F7	4 October 2024	Reference Area	Deep (>35 m)	107	39.47	31.33	18.57	Winter_skate_or_Little_skate	7392
24F8	9 October 2024	Reference Area	Deep (>35 m)	088	38.97	32.68	18.25	Winter_skate_or_Little_skate	4279
24F8	9 October 2024	Reference Area	Deep (>35 m)	100	39.91	32.75	18.23	Winter_skate_or_Little_skate	4383