



Kitty Hawk Wind



Construction and Operations Plan

**Appendix V - Benthic Resource
Characterization Reports**

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Appendix V – Benthic Resource Characterization Reports

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As of Q3 2022, the Company has updated the Project name from “Kitty Hawk Offshore Wind Project” to “Kitty Hawk North Wind Project”.

The technical content of this report has not been changed since the previous submission.

KITTY HAWK WIND PROJECT

Benthic Assessment Report – Phase 2 Reconnaissance

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Table of Abbreviations

ANOSIM	Analysis of Similarities
BOEM	Bureau of Ocean Energy Management
C	Celsius
cm	Centimeters
CMECS	Coastal and Marine Ecological Classifications Standards
EPA	United States Environmental Protection Agency
EST	Eastern Standard Time
GPS	Global Positioning System
FGDC	Federal Geographic Data Committee
kg	Kilogram
LPTL	Lowest Practical Taxonomic Level
m	Meters
mg	Milligrams
ml	Milliliters
mm	Millimeters
NMDS	Nonmetric Multidimensional Scaling
NMFS	National Marine Fisheries Service
SIMPER	Analysis of Similarity Percentages
TOC	Total Organic Carbon

1 INTRODUCTION

RPS was contracted by TerraSond to conduct benthic grab sampling; post-process the grab data and video collected in conjunction with grabs; and compile this benthic assessment report for the survey conducted within Lease OCS-A 0508 (Kitty Hawk Wind) offshore of North Carolina in February 2020. The grab sample data and video imagery data presented will support interpretation of geophysical data to characterize surficial sediment conditions and classify the benthic habitat according to the Coastal and Marine Ecological Classifications Standards (CMECS; FGDC 2012) in accordance with Bureau of Ocean Energy Management (BOEM) guidelines and according to National Marine Fisheries Service (NMFS 2020) modified CMECS. This report provides:

- A description of the benthic grab sampling methods, results, and analyses;
- A description and analysis of the video data collected;
- The analysis of benthic macroinvertebrate data from benthic grabs using summary statistics and metrics such as taxa richness, density, community composition, etc.; and
- CMECS substrate and biotic classifications of each sampling station based on imagery and grain size results.

2 METHODS

2.1 Field Survey

2.1.1 Drop-Down Video

Drop-down, plan-view video was taken in conjunction with 49 grab samples to aid in sample collection and visual habitat classification on February 4-5, 2020. The video camera was equipped with an altimeter to record altitude, temperature probe, scale lasers mounted in parallel 0.208 meters (m) apart, lights, and a 300-foot long cable that provided real-time viewing of images on the vessel. The video camera was affixed to the grab sampler which was deployed by the TerraSond crew. At each station, the equipment was lowered until positioned 2-3 meters (m) above the seafloor and stations were confirmed free of sensitive habitat and material prohibitive to sampling (e.g., boulders, large cobbles, other hard bottom, or debris). Once the station was cleared, the sampler was deployed then hauled on-deck for processing.

While viewing the video feed for sampling suitability (i.e., if the station could be sampled with a grab sampler or not due to presence of obstructions and/or sensitive habitat), the sample information (date, time, global positioning satellite [GPS] coordinates, station ID, depth, and video file name) and initial observations of sediment/seafloor characteristics were recorded to aid in post-processing of video data. During video review, presence of potentially sensitive benthic habitats (e.g., exposed hard bottom, seagrass/kelp/algal beds, coral species), macroinvertebrates, and other characteristics were recorded, as per BOEM's Guidelines for Providing Benthic Habitat Survey Information for Renewable Energy Development on the Atlantic Outer Continental Shelf Pursuant to 30 CFR Part 585 (BOEM, 2019).

2.1.2 Grab Sampling

Benthic grab samples were acquired using an Ocean Instruments Salish Grab Standard SG-20 sampler. This grab is a modified version of a standard Van Veen sampler with a stainless-steel weighted frame and release system ideal for collection of sediments in soft to hard substrates with a penetration depth up to 20 centimeters (cm) and sampling area of 0.10 square meters (m²). A beacon was affixed to the grab to obtain GPS coordinates in conjunction with a pole-mounted ultra-short baseline system.

Upon retrieval, the grab sampler was examined for sample acceptability. A sample was deemed acceptable if:

- Sample was more than 50% full;
- Sample was not over penetrated (i.e., not 100% full); and
- Surface structures were undisturbed and even (i.e., not slumped).

If a sample did not fulfil these requirements, the entire contents were returned to the water and another sampling attempt was made. The results of each attempted grab were recorded in field notes.

Once an acceptable sample was obtained, the following steps were taken:

1. Overlying water was drained using a siphon;
2. A photograph was taken of the sample next to an identification label containing the station identification number and a plastic ruler inserted to record sample depth; and
3. Field notes were taken including descriptions of physical features (i.e., apparent redox potential discontinuity depth, depth of penetration, sediment color, texture, odor, surface features) and surface macrofauna, which were then returned to the water.

The grab sample was then divided into two sections using a plexiglass divider. One half of the sample was processed for physical analysis (sediment grain size and total organic carbon [TOC]). For the TOC and grain size analysis, almost the entire top 2 cm of sediment on one half of the sample was collected using a stainless-steel spoon and placed in glass jars; this resulted in approximately 250 milliliters (ml) of sediment for the grain size sample and 200 ml for the TOC sample. The grain size and TOC samples were stored on ice and sent to Eurofin Test America lab (5575 8th St. East Tacoma, WA) for processing as described in Section 2.2.

The other half of the grab sample (i.e., on the other side of the plexiglass divider) was measured for volume and processed for biological community analysis. The sample was then loaded onto a processing table and material washed in a 0.5-mm sieve, using seawater under gentle pressure. The seawater used for sample processing was filtered through a 1-mm mesh to prevent planktonic organisms from mixing with the benthic samples.

Organisms, shell fragments, and other material remaining on sieve were placed into a plastic container using stainless-steel spoon and forceps as needed. The container was filled no more than one-half to two-thirds full with the sample and 0.5-mm filtered seawater. If the quantity of sample exceeded this volume, it was placed in a second container. The sample was fixed/preserved with 10% buffered formalin solution by filling the remaining space within the bottle with solution. Containers were tightly sealed with tape and stored in a cooler at ambient temperature (not frozen or refrigerated). Prior to sieving the next sample, the sieve was cleaned by scrubbing with a stiff brush and backwashing with pressurized water. The benthic macroinvertebrate community samples were sent to EcoAnalysts (1420 S Blaine St, Ste. 14, Moscow, ID 83843) for processing as described in Section 2.2.

2.2 Lab Analysis

2.2.1 Grain Size and TOC Analysis

Grain size and TOC samples were analyzed by TestAmerica using ASTM D 422-63 Standard Method for Particle-size Analysis of Soils (ASTM, 2007). The TOC content of sediment samples was analyzed using EPA Method 9060 Puget Sound Ecosystem Program (PSEP) with results reported in milligrams per kilogram (mg/kg) and percent (EPA, 1986).

2.2.2 Benthic Macroinvertebrate Analysis

The benthic macroinvertebrate analysis was conducted by EcoAnalysts according to the following steps:

1. Benthic invertebrate samples were catalogued and verified against the Chain of Custody to ensure samples received match those listed in the shipment.
2. Samples were rinsed with freshwater to remove the formalin and transferred to 70 percent ethanol alcohol for sorting and storage.
3. Organisms were identified to the lowest practical taxonomic level (LPTL) (at least to family) and counted by taxonomists using the most appropriate taxonomic references for the region (Bousfield, 1973; Cutler, 1994; Winston and Hayward, 2012).
4. Species classification and abundance were recorded in Project data sheets and summarized in both tabular and graphical formats.
5. Prior to performing the invertebrate data analyses, the overall dataset was scanned for non-benthic taxa (i.e., pelagic or planktonic organisms) that were excluded from all analyses; examples include chaetognaths, hyperiid amphipods, and decapod zoea/megalopae.
6. Calculations of abundance included all taxa occurring in each sample, whether those taxa were identified to species level or not.

2.3 Video Post-Processing

Post-processing of video data was conducted by RPS to provide:

- General characterization of substrate including bottom type, texture, micro-topography, and presence and approximate thickness (absent, light, moderate, or heavy) of sedimentation (“drape”) covering hard substrates;
- Evidence of benthic activity by organisms (burrows, trails, biogenic reefs);
- Identification of epibenthic macroinvertebrates (decapod crustaceans, mollusks [including squid mops], echinoderms, etc.) and habitat, benthic features (e.g., sand waves), and other important biogenic habitat (i.e., structure formed by organisms);
- Presence/evidence and general characterization of submerged aquatic vegetation (macroalgae, sea grass);
- Identification of fish and fish habitat (where feasible) as classified by Auster (1998);

- Identification of visible organisms to the lowest practical taxonomic level (at least to family) using standard taxonomic keys for the geographic area;
- Evidence of fishing activity, such as trawl scars, pots, and working nets; and
- Presence of derelict fishing gear, military expended materials, shipwrecks, cultural artifacts, or other marine debris.

The still imagery data were analyzed according to the following steps:

1. A single still image was analyzed from each station by selecting the first clear view of the seafloor from the video at each grab station, with camera positioned approximately 0.5 m above the seafloor.
2. The visible area of each still image was defined, measured, and reviewed for evidence of benthic species and activity, submerged aquatic vegetation (macroalgae, sea grass), fishing activity, derelict gear, military expended materials, shipwrecks, and other marine debris and presence/absence of these features were noted. In some instances of poor visibility, video was used in addition to still images to determine presence or absence.
3. Selected stills were broadly characterized by texture, microtopography, and presence of coral heads/reefs, rock outcroppings, and other shelter-forming features.

2.4 Benthic Community Data Post-Processing

The benthic community analysis was based on the benthic macroinvertebrate laboratory data from EcoAnalysts. Macroinvertebrate community statistics were calculated using family (or next lowest taxonomic level possible based on LPTL) abundance estimates in each sample, which were reported as count per 0.05 m² grab sample (i.e., the half of the grab sample processed for biological analysis). Community composition parameters included: total abundance, number of phyla, number of taxa, Margalef's Richness Index, Shannon Diversity Index, and Pielou's Index of Evenness for each station.

2.4.1 Taxonomic Composition

Benthic macroinvertebrate taxonomic composition was assessed to characterize the high-level trends in community data. Community composition summaries included summaries of each station and of the entire survey aggregated at both phylum-level and LTPL.

2.4.2 Richness, Diversity, and Evenness

Taxonomic richness, evenness, and diversity are common ecological parameters used to measure the overall biodiversity of a community or discrete unit. Taxonomic richness is the number of unique species or taxonomic groups represented in an area of interest. In this assessment, taxonomic richness was calculated using Margalef's Richness Index (Formula 1) for each station to acquire individual and average richness indices calculated using family (or next lowest taxonomic level possible based on LPTL) abundances.

Formula 1. Margalef's Richness Index (RI).

$$RI = \frac{(S - 1)}{\ln(N)}$$

Where:

S= the number of taxa

N = the total number of individuals in the sample

Interpretation: The higher the index, the greater the taxonomic richness.

The diversity index for a community considers taxonomic richness and the proportion of each unique taxa. The Shannon Diversity Index (H' ; Formula 2) was calculated using the number of each taxa (family or LPTL), the proportion of each taxa relative to the total number of individuals, and the sum of the proportions. This index was used to assess diversity of each station. The diversity index (H') increases with increasing taxonomic richness and evenness.

Formula 2. H' - Shannon Diversity Index.

$$H' = - \sum_{i=1}^N p_i \ln(p_i)$$

Where:

p_i is the proportion of individuals belonging to taxa i in the dataset of interest

Interpretation: The greater the H' , the greater the richness and evenness.

Evenness of a community refers to the similarity in abundances of different species comprising a community or sample. Pielou's Index of Evenness (J' ; Formula 3) includes H' (Shannon-Weiner Diversity Index) in its calculation.

Formula 3. J' - Pielou's Index of Evenness.

$$J' = \frac{H'}{H_{\text{Max}}}$$

Where:

H' is the Shannon-Weiner Diversity Index

H_{Max} is the maximum possible value of H' , where each species/taxa occurs in equal abundances.

$$H_{\text{Max}} = \ln(s)$$

Where: s = Number of species

Interpretation: J' is constrained between 0 and 1. The greater the value of J' , the more evenness in the sample.

2.4.3 Multivariate Analysis

Multivariate analyses were conducted in R (programming language) (Oksanen et al., 2019; R Core Team, 2020) to examine dissimilarity/similarity of stations based on the invertebrate assemblages (composition of all taxa and their abundances). These analyses included nonmetric multidimensional scaling (NMDS), analysis of similarities (ANOSIM), and analysis of similarity percentages (SIMPER; Clarke, 1993). All analyses were built on a Bray-Curtis Similarity Index, using a square-root transformation of the data to ensure all taxa (not just those that dominated samples) would contribute to similarity measures. As with the community indices, invertebrate data were limited to the family level or next lowest LPTL. Differences

in assemblages between stations were compared and assessed using NMFS (2020) modified CMECS substrate classifications.

Two dimensional NMDS was used to visually compare the ordinate distance (difference) between samples and evaluate the similarity of community assemblages. Samples were ordinated based on similarity to one another with samples of higher similarity appearing in closer proximity to one another in NMDS plots. Samples were also colored according to assigned NMFS (2020) modified CMECS classifications.

SIMPER was used to identify the percent dissimilarity between assemblages within NMFS (2020) modified CMECS substrate components and to identify taxa that were most responsible for that dissimilarity (i.e., the taxa with the largest differences in mean abundance). ANOSIM was used to help determine if season, depth, or substrate classifications were predictive of the invertebrate assemblage clusters. The test statistic (R values) calculated in the Global ANOSIM indicates whether samples within classification groups were more similar than samples between groups. R values closer to 1 with significance levels of $p < 0.05$ indicate that samples within a classification group are more similar to each other than to those in different groups. R values closer to 0 indicate samples are equally similar within a classification group as they are between different groups. Specifically, ANOSIM was used to test the null hypothesis:

H₀1: The similarity of invertebrate assemblages between NMFS CMECS groups is greater than or equal to the similarity within NMFS CMECS groups.

3 RESULTS

All samples were collected on February 4-5, 2020. Sampling stations were located in waters between 10 and 46 m deep with bottom temperatures between 7.9 and 10.8°C (Table 3-1, Figure 3-1). Note that latitude and longitude values may differ slightly (by a few meters at most) from those overlaid onto images due to a slight time lag associated with the video feed.

Table 3-1. Grab sample station locations and characteristics.

Station	Date	Time (EST)	Latitude (°N, NAD83 2011 UTM Zone 18)	Longitude (°W, NAD83 2011 UTM Zone 18)	Depth (m)	Temp. (°C)	Penetration Depth (mm)	Invertebrate Sample Volume (m ³)
1	02/04/20	16:21:00	36.29020	75.08876	N/A	10.16	70	0.0024
2	02/04/20	3:46:00	36.31163	75.00535	42	10.68	63	0.0021
3	02/04/20	4:07:00	36.29624	75.00798	43	10.49	89	0.0036
4	02/04/20	4:43:00	36.27485	75.01886	44	10.50	82	0.0042
5	02/04/20	5:13:00	36.24870	75.03309	44	10.14	52	0.0024
6	02/04/20	10:54:00	36.24472	75.00543	41	10.59	52	0.0024
7	02/04/20	10:00:00	36.22849	75.01916	42	10.31	55	0.0030
8	02/04/20	14:45:00	36.19218	75.03325	42	10.34	115	0.0036
9	02/04/20	9:04:00	36.19153	75.00487	44	10.38	86	0.0027
10	02/04/20	8:33:00	36.16116	75.00465	42	10.61	65	0.0024
11	02/04/20	13:52:00	36.23848	75.06060	N/A	10.27	90	0.0030
12	02/04/20	13:07:00	36.28860	75.06103	46	10.21	70	0.0024
13	02/04/20	2:03:00	36.37869	75.06080	39	10.78	62	0.0024
14	02/04/20	18:09:00	36.34120	75.14026	34	10.05	75	0.0018
15	02/04/20	0:39:00	36.41104	75.13129	32	10.06	75	0.0021
16	02/04/20	19:38:00	36.40878	75.18838	34	9.68	90	0.0027
17	02/04/20	19:00:00	36.36870	75.18809	37	9.86	70	0.0012
18	02/04/20	23:44:00	36.47621	75.33841	26	9.68	90	0.0024
19	02/05/20	0:39:00	36.49041	75.38307	23	9.59	65	0.0021
20	02/05/20	1:21:00	36.50718	75.43467	27	9.50	85	0.0030
21	02/05/20	2:12:00	36.52364	75.48689	29	9.30	90	0.0027
22	02/05/20	3:06:00	36.54006	75.53886	26	9.15	45	0.0018
23	02/05/20	4:41:00	36.57295	75.64201	24	8.48	60	0.0024
24	02/05/20	5:55:00	36.58973	75.69445	18	8.22	78	0.0024
25	02/05/20	6:37:00	36.60582	75.74686	22	8.26	47	0.0015

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Station	Date	Time (EST)	Latitude (°N, NAD83 2011 UTM Zone 18)	Longitude (°W, NAD83 2011 UTM Zone 18)	Depth (m)	Temp. (°C)	Penetration Depth (mm)	Invertebrate Sample Volume (m ³)
26	02/05/20	7:02:00	36.61665	75.77730	21	8.13	45	0.0015
27	02/05/20	7:46:00	36.64851	75.81702	18	8.10	61	0.0021
28	02/05/20	8:24:00	36.68048	75.85677	14	8.03	55	0.0012
29	02/05/20	9:23:00	36.70996	75.89754	14	8.22	85	0.0027
30	02/05/20	9:44:00	36.72397	75.91918	10	8.01	80	0.0021
31	02/05/20	0:04:00	36.48230	75.35740	30	9.61	90	0.0036
32	02/05/20	1:48:00	36.51537	75.46115	28	9.33	85	0.0027
33	02/05/20	3:37:00	36.54826	75.56480	23	8.76	78	0.0030
34	02/05/20	12:40:00	36.58161	75.66904	23	8.65	85	0.0012
35	02/05/20	7:24:00	36.63256	75.79711	17	8.13	95	0.0033
36	02/05/20	8:54:00	36.69544	75.87574	14	7.92	110	0.0024
37	02/04/20	21:29:00	36.42906	75.27438	35	9.50	77	0.0030
38	02/04/20	23:05:00	36.46603	75.30621	32	9.59	70	0.0024
39	02/04/20	17:14:00	36.29243	75.13117	39	10.10	55	0.0012
40	02/04/20	12:25:00	36.31884	75.06683	42	10.32	46	0.0015
41	02/04/20	2:54:00	36.35494	75.04731	37	N/A	77	0.0030
42	02/05/20	4:04:00	36.55741	75.59389	24	8.65	50	0.0024
43	02/04/20	11:45:00	36.29624	75.03638	N/A	10.45	45	0.0015
44	02/04/20	14:19:00	36.21216	75.04672	38	10.25	40	0.0012
45	02/04/20	22:41:00	36.45372	75.29028	31	9.50	50	0.0012
46	02/04/20	21:07:00	36.40869	75.27417	33	9.54	90	0.0027
47	02/04/20	19:58:00	36.41417	75.20985	35	9.76	80	0.0024
48	02/04/20	20:31:00	36.38614	75.23425	37	9.77	95	0.0030
49	02/04/20	22:12:00	36.43108	75.30845	29	9.51	70	0.0012

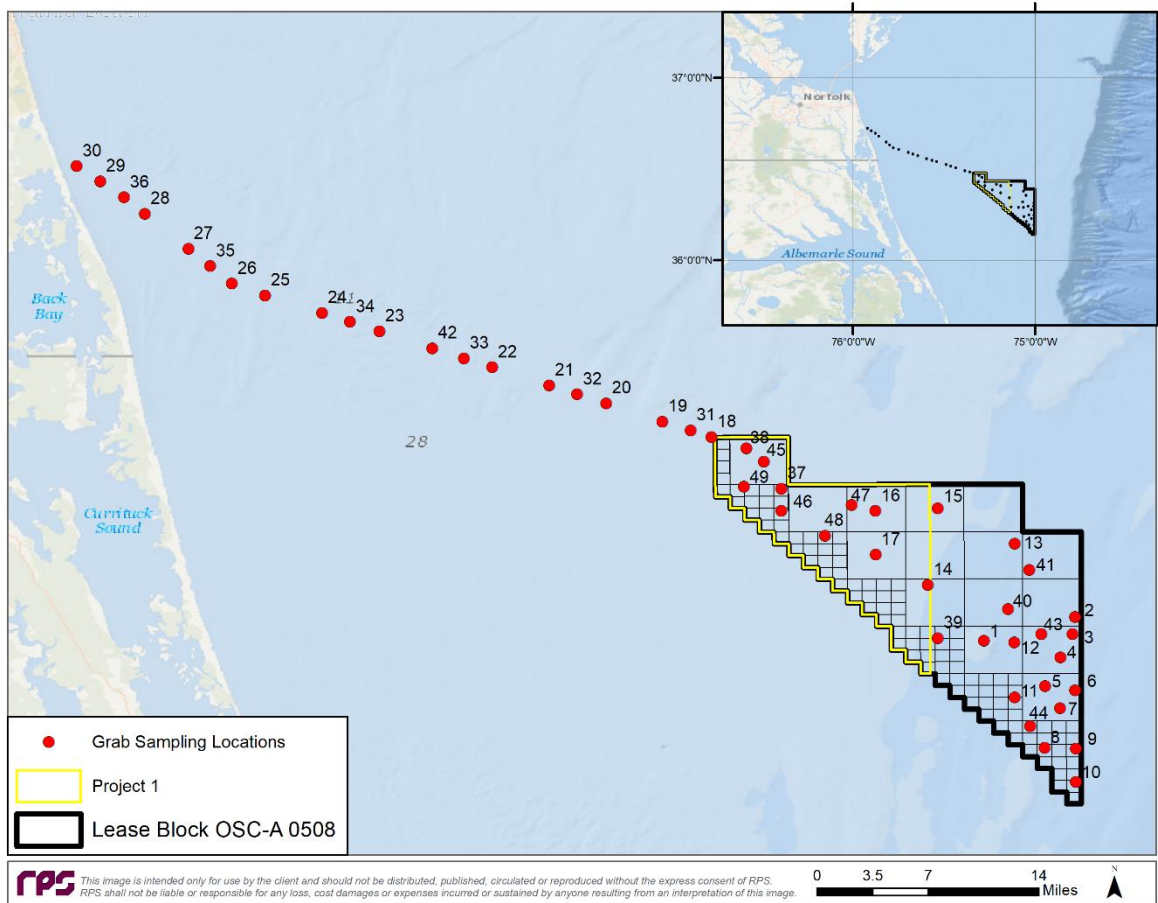


Figure 3-1. Grab sample station locations.

3.1 Visual Analysis

The following sections display and describe still images taken from a video camera affixed to the grab sampler. Note that Parallel-mounted lasers are 0.208 m apart.

Still images were successfully captured and analyzed for all 49 stations (Table 3-2 to Table 3-50). Small demersal fish (roughly 3-5 cm) were observed at multiple sampling stations. These fish often appeared to potentially be juvenile hake; however, this could not be confirmed due to their small size and quick movement. A few colonies of bushy plant-like organisms, likely hydrozoans or possibly bryozoans, were present at a few stations with hermit crabs also appearing multiple times throughout the sampling. Presence of benthic activity by organisms (burrows, trails, biogenic reefs) were limited to a few worm tubes and one small burrow or worm tube. There was no evidence of submerged aquatic vegetation (macroalgae, sea grass), fishing activity, derelict fishing gear, military expended materials, shipwrecks, important biogenic habitat, or other marine debris.

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Overall, the geologic origin substrate in most images was generally composed of sand that ranged in relief from flat to small sand waves with most images containing some degree of sand ripples. The majority of images contained some degree of shell hash or cobble from multiple species or origin with some samples containing primarily shell debris. Complex habitat, as defined by NMFS (2020), was either visually apparent or classified as complex based on grain size analyses at 22 sample stations in the form of gravel mixes (sandy gravel), gravelly (gravelly sand), and shell (>50%) substrate.

Table 3-2. Visual characterization of still image associated with Station GB01.

		Characteristic	Description
General Characterization: Light-colored flat sand with sparse shell hash			
		Biotic Benthic Activity	None detected
		Epibenthic Macroinvertebrates and Fishes	None detected
		Macroinvertebrate and Fish Habitat	Flat Sand
		Aquatic Vegetation	None detected
		Evidence of Fishing Activity	None detected
		Anthropogenic Debris	None detected
		Complex Habitat (NMFS 2020)	None detected
		Field of View	1,288 cm ²

Table 3-3. Visual characterization of still image associated with Station GB02.


		Characteristic	Description
General Characterization: gray-brown colored sand/silt with moderate shell hash and rubble			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	None detected	
	Macroinvertebrate and Fish Habitat	Shell aggregate	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	Yes – Gravelly Sand according to grain size, but appears to be shell substrate	
	Field of View	1,615 cm ²	

Table 3-4. Visual characterization of still image associated with Station GB03.


		Characteristic	Description
General Characterization: Light-colored sand with brown patches of finer substrate and sparse shell hash			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	None detected	
	Macroinvertebrate and Fish Habitat	Flat Sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	Yes – Gravelly Sand according to grain size, but appears to be sand with sparse shell hash	
	Field of View	1,578 cm ²	

Table 3-5. Visual characterization of still image associated with Station GB04.

		Characteristic	Description
General Characterization: Light-colored sand with brown patches of finer substrate and sparse shell hash			
		Biotic Benthic Activity	None detected
		Epibenthic Macroinvertebrates and Fishes	None detected
		Macroinvertebrate and Fish Habitat	Flat Sand
		Aquatic Vegetation	None detected
		Evidence of Fishing Activity	None detected
		Anthropogenic Debris	None detected
		Complex Habitat (NMFS 2020)	None detected
		Field of View	1,571 cm ²

Table 3-6. Visual characterization of still image associated with Station GB05.


		Characteristic	Description
General Characterization: Light-colored sand with slightly irregular relief (sand ripples less than a few cm) and trace shell hash			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	None detected	
	Macroinvertebrate and Fish Habitat	Flat Sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	Yes – Gravelly Sand according to grain size, but appears to be sand with sparse shell hash	
	Field of View	1,703 cm ²	

Table 3-7. Visual characterization of still image associated with Station GB06.

		Characteristic	Description
General Characterization: Shell hash and rubble with sparse light-colored sand			
		Biotic Benthic Activity	None detected
		Epibenthic Macroinvertebrates and Fishes	None detected
		Macroinvertebrate and Fish Habitat	Shell aggregate
		Aquatic Vegetation	None detected
		Evidence of Fishing Activity	None detected
		Anthropogenic Debris	None detected
		Complex Habitat (NMFS 2020)	Yes – Gravelly Sand according to grain size, but appears to be sand with moderate shell hash
		Field of View	1,646 cm ²

Table 3-8. Visual characterization of still image associated with Station GB07.


		Characteristic	Description
General Characterization: Light-colored sand and sparse shell hash			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	None detected	
	Macroinvertebrate and Fish Habitat	Flat Sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	Yes – Gravelly Sand according to grain size, but appears to be sand with sparse shell hash	
	Field of View	1,489 cm ²	

Table 3-9. Visual characterization of still image associated with Station GB08.


		Characteristic	Description
General Characterization: Shell hash with sparse gravel and sand arranged in waves (a few cm tall). Multiple worm tube openings visible.			
	Biotic Benthic Activity		Worm tubes
	Epibenthic Macroinvertebrates and Fishes		Grab collected a nudibranch (likely <i>Pleurobranchaea tarda</i>) – percent cover of ~1%
	Macroinvertebrate and Fish Habitat		Shell aggregate/sand waves
	Aquatic Vegetation		None detected
	Evidence of Fishing Activity		None detected
	Anthropogenic Debris		None detected
	Complex Habitat (NMFS 2020)		Yes – Sandy Gravel according to grain size, but appears to shell substrate
	Field of View		2,424 cm ²

Table 3-10. Visual characterization of still image associated with Station GB09.


		Characteristic	Description
<p>General Characterization: Light-colored sand with moderate shell hash. Note that video time, date, and location froze during sampling at values shown.</p> 		Biotic Benthic Activity	None detected
		Epibenthic Macroinvertebrates and Fishes	None detected
		Macroinvertebrate and Fish Habitat	Flat Sand
		Aquatic Vegetation	None detected
		Evidence of Fishing Activity	None detected
		Anthropogenic Debris	None detected
		Complex Habitat (NMFS 2020)	Yes – Sandy Gravel according to grain size, but appears to be Gravelly Sand with moderate shell hash
		Field of View	1,632 cm ²

Table 3-11. Visual characterization of still image associated with Station GB10.

		Characteristic	Description
General Characterization: Light-colored sand and sparse shell hash			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	None detected	
	Macroinvertebrate and Fish Habitat	Flat Sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	Yes – Gravelly Sand	
	Field of View	1,480 cm ²	

Table 3-12. Visual characterization of still image associated with Station GB11.

		Characteristic	Description
General Characterization: Shell hash and rubble with sparse light-colored sand			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	None detected	
	Macroinvertebrate and Fish Habitat	Shell Aggregate	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	Yes – Gravelly Sand according to grain size, but appears to be sand or gravelly sand with sparse to moderate shell hash	
	Field of View	1,925 cm ²	

Table 3-13. Visual characterization of still image associated with Station GB12.

		Characteristic	Description
General Characterization: Light-colored sand with brown patches of finer material and sparse shell rubble			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	None detected	
	Macroinvertebrate and Fish Habitat	Flat Sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	None detected	
	Field of View	1,247 cm ²	

Table 3-14. Visual characterization of still image associated with Station GB13.


		Characteristic	Description
General Characterization: Light-colored sand with slightly irregular relief (ripples less than a few cm) and sparse shell hash			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	None detected	
	Macroinvertebrate and Fish Habitat	Flat Sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	None detected	
	Field of View	1,613 cm ²	

Table 3-15. Visual characterization of still image associated with Station GB14.

		Characteristic	Description
General Characterization: Shell hash and rubble with trace sand/silt			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	None detected	
	Macroinvertebrate and Fish Habitat	Shell aggregate/flat sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	Yes – Gravelly Sand according to grain size, but appears to be sand or slightly gravelly sand with moderate shell hash	
	Field of View	1,738 cm ²	

Table 3-16. Visual characterization of still image associated with Station GB15.


		Characteristic	Description
<p>General Characterization: Light-colored sand with slightly irregular relief (less than a few cm) with suspended organic debris and trace shell hash</p> 			
		Biotic Benthic Activity	Small burrow or worm tube visible in center of image
		Epibenthic Macroinvertebrates and Fishes	~40 cm unidentified fish visible as bottom came into view.
		Macroinvertebrate and Fish Habitat	Flat Sand
		Aquatic Vegetation	None detected
		Evidence of Fishing Activity	None detected
		Anthropogenic Debris	None detected
		Complex Habitat (NMFS 2020)	None detected
		Field of View	NA

Table 3-17. Visual characterization of still image associated with Station GB16.

	Characteristic	Description
<p>General Characterization: Light-colored sand with slightly irregular relief (less than a few cm) with suspended organic debris and trace shell hash</p>		
	Biotic Benthic Activity	None detected
	Epibenthic Macroinvertebrates and Fishes	None detected
	Macroinvertebrate and Fish Habitat	Flat Sand
	Aquatic Vegetation	None detected
	Evidence of Fishing Activity	None detected
	Anthropogenic Debris	None detected
	Complex Habitat (NMFS 2020)	None detected
	Field of View	1,553 cm ²

Table 3-18. Visual characterization of still image associated with Station GB17.

	Characteristic	Description
<p>General Characterization: Light-colored sand with slightly irregular relief (less than a few cm) with suspended organic debris and trace shell hash</p>		
	Biotic Benthic Activity	None detected
	Epibenthic Macroinvertebrates and Fishes	None detected
	Macroinvertebrate and Fish Habitat	Flat Sand
	Aquatic Vegetation	None detected
	Evidence of Fishing Activity	None detected
	Anthropogenic Debris	None detected
	Complex Habitat (NMFS 2020)	None detected
	Field of View	1,604 cm ²

Table 3-19. Visual characterization of still image associated with Station GB18.


		Characteristic	Description
General Characterization: Light-colored sand with small sand ripples (less than a few cm) and sparse shell hash			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	None detected	
	Macroinvertebrate and Fish Habitat	Flat Sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	None detected	
	Field of View	1,581 cm ²	

Table 3-20. Visual characterization of still image associated with Station GB19.

		Characteristic	Description
<p>General Characterization: Light-colored sand with slightly irregular relief (less than a few cm) with suspended organic debris and trace shell hash</p>			
		Biotic Benthic Activity	None detected
		Epibenthic Macroinvertebrates and Fishes	None detected
		Macroinvertebrate and Fish Habitat	Flat Sand
		Aquatic Vegetation	None detected
		Evidence of Fishing Activity	None detected
		Anthropogenic Debris	None detected
		Complex Habitat (NMFS 2020)	None detected
		Field of View	1,513 cm ²

Table 3-21. Visual characterization of still image associated with Station GB20.

		Characteristic	Description
General Characterization: Light-colored sand with sand ripples (less than a few cm) and suspended organic debris and trace shell hash			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	Hermit crab – percent cover of ~1% and two 3 cm demersal fish (possible hake) visible	
	Macroinvertebrate and Fish Habitat	Flat Sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	None detected	
	Field of View	1,526 cm ²	

Table 3-22. Visual characterization of still image associated with Station GB21.


		Characteristic	Description
<p>General Characterization: Light-colored sand with slightly irregular relief (less than a few cm) with suspended organic debris and trace shell hash</p> 		Biotic Benthic Activity	None detected
		Epibenthic Macroinvertebrates and Fishes	Two 3 cm demersal fish (possible hake) visible
		Macroinvertebrate and Fish Habitat	Flat Sand
		Aquatic Vegetation	None detected
		Evidence of Fishing Activity	None detected
		Anthropogenic Debris	None detected
		Complex Habitat (NMFS 2020)	None detected
		Field of View	1,620 cm ²

Table 3-23. Visual characterization of still image associated with Station GB22.


		Characteristic	Description
<p>General Characterization: Light-colored sand with slightly irregular relief (less than a few cm) and suspended organic debris and trace shell hash</p> 		Biotic Benthic Activity	None detected
		Epibenthic Macroinvertebrates and Fishes	4 cm demersal fish visible as bottom came into view
		Macroinvertebrate and Fish Habitat	Flat Sand
		Aquatic Vegetation	None detected
		Evidence of Fishing Activity	None detected
		Anthropogenic Debris	None detected
		Complex Habitat (NMFS 2020)	Yes – Gravelly Sand according to grain size, but appears to be sand with sparse shell hash
		Field of View	1,546 cm ²

Table 3-24. Visual characterization of still image associated with Station GB23.


	Characteristic	Description
General Characterization: Light-colored sand with small sand ripples (less than a few cm) and suspended organic debris and trace shell hash		
	Biotic Benthic Activity	None detected
	Epibenthic Macroinvertebrates and Fishes	None detected
	Macroinvertebrate and Fish Habitat	Flat Sand
	Aquatic Vegetation	None detected
	Evidence of Fishing Activity	None detected
	Anthropogenic Debris	None detected
	Complex Habitat (NMFS 2020)	None detected
	Field of View	1,559 cm ²

Table 3-25. Visual characterization of still image associated with Station GB24.


		Characteristic	Description
General Characterization: Light-colored sand with dark patches and small sand ripples (less than a few cm) and trace shell hash			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	Bushy plant-like stalked organism (lower left corner of image) – percent cover of <1%	
	Macroinvertebrate and Fish Habitat	Flat Sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	None detected	
	Field of View	1,520 cm ²	

Table 3-26. Visual characterization of still image associated with Station GB25.

		Characteristic	Description
General Characterization: Light-colored sand with sand ripples (less than a few cm) and trace shell hash			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	Hermit crab (bottom of image) – percent cover of ~1%	
	Macroinvertebrate and Fish Habitat	Flat Sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	None detected	
	Field of View	1,624 cm ²	

Table 3-27. Visual characterization of still image associated with Station GB26.


		Characteristic	Description
General Characterization: Shell hash with gray/brown silt/sand and gravel.			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	Bushy hydrozoa/bryozoa present – percent cover of 10%	
	Macroinvertebrate and Fish Habitat	Shell aggregate/Flat sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	Yes – Sandy Gravel according to grain size, but may be gravelly sand with moderate shell hash	
	Field of View	2,368 cm ²	

Table 3-28. Visual characterization of still image associated with Station GB27.

		Characteristic	Description
General Characterization: Shell hash and cobble with light-colored sand			
		Biotic Benthic Activity	None detected
		Epibenthic Macroinvertebrates and Fishes	None detected
		Macroinvertebrate and Fish Habitat	Flat sand/shell aggregate
		Aquatic Vegetation	None detected
		Evidence of Fishing Activity	None detected
		Anthropogenic Debris	None detected
		Complex Habitat (NMFS 2020)	Yes – Sandy Gravel according to grain size
		Field of View	2,573 cm ²

Table 3-29. Visual characterization of still image associated with Station GB28.


		Characteristic	Description
General Characterization: Shell hash and cobble with light-colored sand/silt			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	Bushy hydrozoa/bryozoa present – percent cover of ~2%	
	Macroinvertebrate and Fish Habitat	Flat sand/shell aggregate	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	Yes – Gravelly Sand according to grain size, but may be sand with moderate shell hash based on appearance	
	Field of View	3,496 cm ²	

Table 3-30. Visual characterization of still image associated with Station GB29.

		Characteristic	Description
General Characterization: Light-colored sand with small sand waves and trace shell hash			
		Biotic Benthic Activity	None detected
		Epibenthic Macroinvertebrates and Fishes	None detected
		Macroinvertebrate and Fish Habitat	Sand waves
		Aquatic Vegetation	None detected
		Evidence of Fishing Activity	None detected
		Anthropogenic Debris	None detected
		Complex Habitat (NMFS 2020)	None detected
		Field of View	1,635 cm ²

Table 3-31. Visual characterization of still image associated with Station GB30.

		Characteristic	Description
General Characterization: Light-colored sand with small sand waves and trace shell hash			
		Biotic Benthic Activity	None detected
		Epibenthic Macroinvertebrates and Fishes	None detected
		Macroinvertebrate and Fish Habitat	Flat Sand
		Aquatic Vegetation	None detected
		Evidence of Fishing Activity	None detected
		Anthropogenic Debris	None detected
		Complex Habitat (NMFS 2020)	None detected
		Field of View	1,587 cm ²

Table 3-32. Visual characterization of still image associated with Station GB31.


		Characteristic	Description
General Characterization: Light-colored sand with sand ripples (less than a few cm) and suspended organic debris and trace shell hash			
	Biotic Benthic Activity		None detected
	Epibenthic Macroinvertebrates and Fishes		4 cm demersal fish (on right side of image)
	Macroinvertebrate and Fish Habitat		Flat Sand
	Aquatic Vegetation		None detected
	Evidence of Fishing Activity		None detected
	Anthropogenic Debris		None detected
	Complex Habitat (NMFS 2020)		None detected
	Field of View		1,593 cm ²

Table 3-33. Visual characterization of still image associated with Station GB32.

		Characteristic	Description
General Characterization: Light-colored sand with sand ripples (a few cm) and suspended organic debris and trace shell hash			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	Two <5 cm demersal fish (on right side of image)	
	Macroinvertebrate and Fish Habitat	Flat Sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	None detected	
	Field of View	1,638 cm ²	

Table 3-34. Visual characterization of still image associated with Station GB33.


		Characteristic	Description
<p>General Characterization: Light-colored sand with slightly irregular relief (less than a few cm) and suspended organic debris and trace shell hash</p> 		Biotic Benthic Activity	None detected
		Epibenthic Macroinvertebrates and Fishes	None detected
		Macroinvertebrate and Fish Habitat	Flat Sand
		Aquatic Vegetation	None detected
		Evidence of Fishing Activity	None detected
		Anthropogenic Debris	None detected
		Complex Habitat (NMFS 2020)	None detected
		Field of View	1,576 cm ²

Table 3-35. Visual characterization of still image associated with Station GB34.

		Characteristic	Description
General Characterization: Light-colored sand with slightly irregular relief (less than a few cm) and trace shell hash			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	None detected	
	Macroinvertebrate and Fish Habitat	Flat Sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	None detected	
	Field of View	1,723 cm ²	

Table 3-36. Visual characterization of still image associated with Station GB35.

		Characteristic	Description
General Characterization: Light-colored small sand waves with sparse shell hash			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	None detected	
	Macroinvertebrate and Fish Habitat	Sand waves	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	Yes – Gravelly Sand according to grain size, but appears to be sand with sparse-moderate shell hash	
	Field of View	1,419 cm ²	

Table 3-37. Visual characterization of still image associated with Station GB36.


		Characteristic	Description
General Characterization: Light-colored small sand waves with sparse shell hash			
	Biotic Benthic Activity		None detected
	Epibenthic Macroinvertebrates and Fishes		None detected
	Macroinvertebrate and Fish Habitat		Sand waves
	Aquatic Vegetation		None detected
	Evidence of Fishing Activity		None detected
	Anthropogenic Debris		None detected
	Complex Habitat (NMFS 2020)		None detected
	Field of View		1,563 cm ²

Table 3-38. Visual characterization of still image associated with Station GB37.


		Characteristic	Description
General Characterization: Light-colored sand with slightly irregular relief (less than a few cm) and sparse shell hash			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	None detected	
	Macroinvertebrate and Fish Habitat	Flat Sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	Yes – Gravelly Sand according to grain size	
	Field of View	2,029 cm ²	

Table 3-39. Visual characterization of still image associated with Station GB38.


		Characteristic	Description
General Characterization: Light-colored sand with slightly irregular relief (less than a few cm) and sparse shell hash and rubble			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	None detected	
	Macroinvertebrate and Fish Habitat	Flat Sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	Yes – Gravelly Sand according to grain size, but appears to be sand with sparse shell hash	
	Field of View	1,890 cm ²	

Table 3-40. Visual characterization of still image associated with Station GB39.

		Characteristic	Description
<p>General Characterization: Light-colored sand with slightly irregular relief (less than a few cm) and suspended organic debris and trace shell hash</p>			
		Biotic Benthic Activity	None detected
		Epibenthic Macroinvertebrates and Fishes	None detected
		Macroinvertebrate and Fish Habitat	Flat Sand
		Aquatic Vegetation	None detected
		Evidence of Fishing Activity	None detected
		Anthropogenic Debris	None detected
		Complex Habitat (NMFS 2020)	None detected
		Field of View	1,913 cm ²

Table 3-41. Visual characterization of still image associated with Station GB40.


		Characteristic	Description
General Characterization: Shell hash with light/brown colored sand/silt			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	None detected	
	Macroinvertebrate and Fish Habitat	Flat Sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	Yes – Gravelly Sand according to grain size, but appears to be sand with moderate shell hash	
	Field of View	1,598 cm ²	

Table 3-42. Visual characterization of still image associated with Station GB41.


		Characteristic	Description
<p>General Characterization: Light-colored sand with slightly irregular relief (less than a few cm) and suspended organic debris and trace shell hash</p> 			
		Biotic Benthic Activity	None detected
		Epibenthic Macroinvertebrates and Fishes	None detected
		Macroinvertebrate and Fish Habitat	Flat Sand
		Aquatic Vegetation	None detected
		Evidence of Fishing Activity	None detected
		Anthropogenic Debris	None detected
		Complex Habitat (NMFS 2020)	None detected
		Field of View	2,074 cm ²

Table 3-43. Visual characterization of still image associated with Station GB42.

		Characteristic	Description
General Characterization: Shell hash and gray/brown sand with slightly irregular relief (less than a few cm)			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	None detected	
	Macroinvertebrate and Fish Habitat	Flat sand/Shell aggregate	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	Yes – Sandy Gravel according to grain size, but appears to be sand with sparse shell hash and rubble	
	Field of View	1,526 cm ²	

Table 3-44. Visual characterization of still image associated with Station GB43.

		Characteristic	Description
General Characterization: Light-colored sand with slightly irregular relief (less than a few cm) and trace shell hash			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	Some small demersal fish visible as bottom came into focus, Bushy plant-like organism in bottom right corner of image – percent cover of ~1%	
	Macroinvertebrate and Fish Habitat	Flat Sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	None detected	
	Field of View	1,620 cm ²	

Table 3-45. Visual characterization of still image associated with Station GB44.


		Characteristic	Description
General Characterization: Light-colored sand with slightly irregular relief (less than a few cm) and moderate shell hash			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	Grab collected a nudibranch (likely <i>Pleurobranchaea tarda</i>) – percent cover of ~1%	
	Macroinvertebrate and Fish Habitat	Flat sand/Shell aggregate	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	Yes – Gravelly Sand according to grain size, but appears to be sand with sparse shell hash and rubble	
	Field of View	1,461 cm ²	

Table 3-46. Visual characterization of still image associated with Station GB45.

		Characteristic	Description
General Characterization: Light-colored sand with slightly irregular relief (less than a few cm) and trace shell hash			
	Biotic Benthic Activity		None detected
	Epibenthic Macroinvertebrates and Fishes		5 cm demersal fish in center of screen
	Macroinvertebrate and Fish Habitat		Flat Sand
	Aquatic Vegetation		None detected
	Evidence of Fishing Activity		None detected
	Anthropogenic Debris		None detected
	Complex Habitat (NMFS 2020)		None detected
	Field of View		1,409 cm ²

Table 3-47. Visual characterization of still image associated with Station GB46.

		Characteristic	Description
General Characterization: Light-colored sand ripples and trace shell hash			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	None detected	
	Macroinvertebrate and Fish Habitat	Flat Sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	None detected	
	Field of View	1,609 cm ²	

Table 3-48. Visual characterization of still image associated with Station GB47.

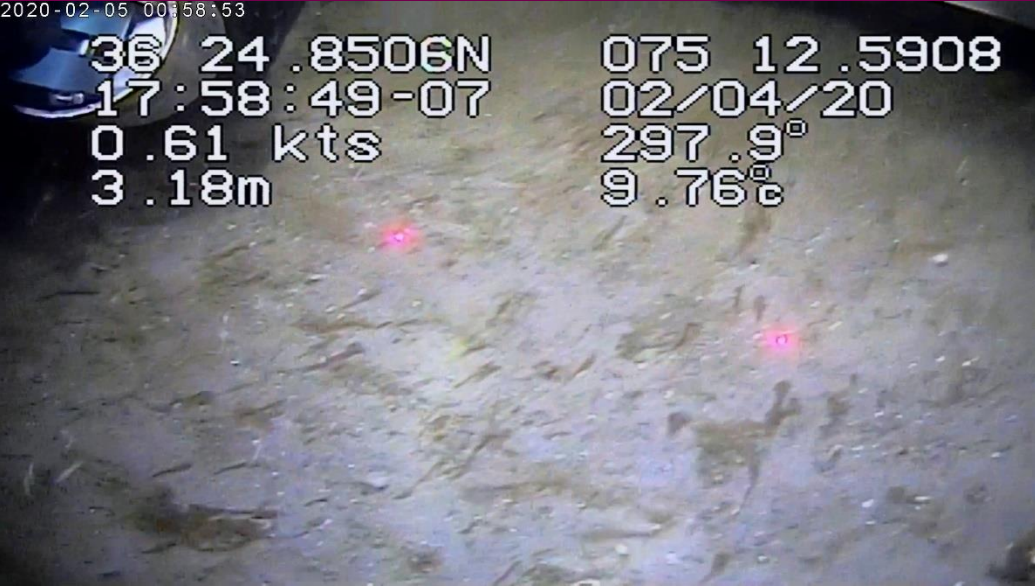
	Characteristic	Description
<p>General Characterization: Light-colored sand with slightly irregular relief (less than a few cm) and suspended organic debris and trace shell hash</p>		
	<p>Biotic Benthic Activity</p>	<p>None detected</p>
	<p>Epibenthic Macroinvertebrates and Fishes</p>	<p>None detected</p>
	<p>Macroinvertebrate and Fish Habitat</p>	<p>Flat Sand</p>
	<p>Aquatic Vegetation</p>	<p>None detected</p>
	<p>Evidence of Fishing Activity</p>	<p>None detected</p>
	<p>Anthropogenic Debris</p>	<p>None detected</p>
	<p>Complex Habitat (NMFS 2020)</p>	<p>None detected</p>
	<p>Field of View</p>	<p>1,489 cm²</p>

Table 3-49. Visual characterization of still image associated with Station GB48.



		Characteristic	Description
General Characterization: Light-colored sand with slightly irregular relief (less than a few cm) and sparse shell hash			
	Biotic Benthic Activity		None detected
	Epibenthic Macroinvertebrates and Fishes		None detected
	Macroinvertebrate and Fish Habitat		Flat Sand
	Aquatic Vegetation		None detected
	Evidence of Fishing Activity		None detected
	Anthropogenic Debris		None detected
	Complex Habitat (NMFS 2020)		Yes – Gravelly Sand according to grain size
	Field of View		1,568 cm ²

Table 3-50. Visual characterization of still image associated with Station GB49.

		Characteristic	Description
General Characterization: Shell hash and rubble with gray/brown-colored sand			
	Biotic Benthic Activity	None detected	
	Epibenthic Macroinvertebrates and Fishes	None detected	
	Macroinvertebrate and Fish Habitat	Flat Sand	
	Aquatic Vegetation	None detected	
	Evidence of Fishing Activity	None detected	
	Anthropogenic Debris	None detected	
	Complex Habitat (NMFS 2020)	Yes – Gravelly Sand according to grain size	
	Field of View	1,862 cm ²	

3.2 Sediment Analysis

The following section presents grain size composition, moisture content, and concentration of TOC (Table 3-51 and Figure 3-2), which were provided from the TestAmerica analyses. Samples were generally sandy with an average of 92.6% sand. Silt/sand made up an average of 2.5% of samples by weight with a maximum of 12.6% at grab station GB29. Gravel constituted an average of 4.8% of samples and ranged between 0.0 and 50.0% of samples. Based on visual analysis, shell debris (i.e., shell hash and rubble) from multiple species including Atlantic surf clams (*Spisula solidissima*), Atlantic jackknife clams (*Ensis leei*), and blue mussels (*Mytilus edulis*) was present in many samples with densities ranging from trace to dense and accounted for most of the gravel-sized grain components reported in the much of the grain size results. Grab stations GB02, GB08, GB09, GB10, GB11, GB14, GB26, GB27, GB28, and GB35 contained visually confirmed gravel substrate of geologic origin. Organic carbon content was generally low in all samples with 24 of the 49 samples containing levels of TOC below the reporting limit of 2,000 mg/kg and a maximum reported content of 83,000 mg/kg at station GB42. Higher TOC was generally observed in grabs with more shell debris.

Table 3-51. Grain size composition, moisture content, and total organic carbon content of grab samples.

Station	> 4.75 mm (%)	2 – 4.75 mm (%)	0.425 – 2 mm (%)	0.075 – 0.425 mm (%)	< 0.075 mm (%)	Moisture Content (%)	Solids Content (%)	Total Organic Carbon (mg/kg)
GB01	0.0	0.1	0.7	96.6	2.7	24.3	75.7	ND
GB02	2.8	10.5	66.4	18.7	1.6	16.0	84.0	3,100
GB03	5.0	1.8	54.4	37.2	1.6	16.6	83.4	13,000
GB04	0.0	1.6	59.1	36.9	2.4	16.7	83.3	ND
GB05	2.6	3.6	47.2	44.9	1.8	19.3	80.7	ND
GB06	9.3	8.2	57.0	23.2	2.3	13.7	86.3	2,700
GB07	2.2	5.7	46.8	43.6	1.6	16.9	83.1	3,000
GB08	24.2	27.7	38.5	7.4	2.2	17.1	82.9	28,000
GB09	10.5	31.7	45.4	9.3	3.1	10.4	89.6	20,000
GB10	4.2	13.6	63.2	15.9	3.1	19.7	80.3	14,000
GB11	2.0	7.0	52.2	36.1	2.5	24.3	75.7	32,000
GB12	0.0	0.0	0.1	96.0	3.8	25.9	74.1	ND
GB13	0.0	0.7	10.9	86.6	1.7	22.7	77.3	ND
GB14	13.7	14.2	51.5	18.2	2.3	21.6	78.4	25,000
GB15	0.0	0.0	0.5	97.1	2.4	24.4	75.6	ND
GB16	0.0	0.2	0.8	96.3	2.6	26.9	73.1	ND
GB17	0.0	0.0	0.3	96.9	2.7	24.6	75.4	ND
GB18	0.3	0.8	49.5	46.9	2.5	18.5	81.5	ND
GB19	0.2	0.5	10.8	86.7	1.7	21.5	78.5	ND

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Station	> 4.75 mm (%)	2 – 4.75 mm (%)	0.425 – 2 mm (%)	0.075 – 0.425 mm (%)	< 0.075 mm (%)	Moisture Content (%)	Solids Content (%)	Total Organic Carbon (mg/kg)
GB20	0.0	0.0	0.6	97.2	2.1	26.6	73.4	ND
GB21	0.0	0.0	0.1	95.9	4.0	29.3	70.7	2,200
GB22	5.1	3.3	11.1	78.3	2.3	27.8	72.2	ND
GB23	0.0	0.2	4.2	93.8	1.8	24.8	75.2	3,200
GB24	0.3	0.2	1.5	97.1	0.9	24.0	76.0	ND
GB25	0.0	0.9	3.8	92.6	2.7	26.7	73.3	ND
GB26	50.0	9.4	9.8	29.1	1.7	16.6	83.4	38,000
GB27	22.2	23.1	44.1	5.9	4.6	11.2	88.8	19,000
GB28	7.3	4.6	33.6	52.7	1.8	22.4	77.6	2,200
GB29	0.0	0.0	0.2	87.2	12.6	43.5	56.5	5,200
GB30	0.0	0.0	0.4	94.9	4.7	24.2	75.8	ND
GB31	0.0	0.3	2.8	94.9	2.0	24.9	75.1	ND
GB32	0.0	0.0	0.2	96.9	2.9	21.7	78.3	ND
GB33	0.0	0.0	0.5	97.8	1.8	21.3	78.7	ND
GB34	0.8	0.5	0.7	95.2	2.7	25.4	74.6	ND
GB35	1.5	6.0	61.8	29.0	1.8	17.0	83.0	5,200
GB36	0.3	0.8	58.7	38.5	1.7	22.6	77.4	ND
GB37	10.9	13.7	57.1	16.8	1.5	18.3	81.7	15,000
GB38	3.8	4.0	68.8	21.8	1.7	22.6	77.4	5,400
GB39	0.2	0.7	5.0	92.3	1.7	22.1	77.9	ND
GB40	10.6	8.6	26.5	51.8	2.5	22.0	78.0	28,000
GB41	0.0	0.1	2.4	95.7	1.7	23.6	76.4	ND
GB42	16.1	10.2	45.6	25.3	2.8	25.5	74.5	83,000
GB43	2.7	1.0	1.8	92.7	1.8	12.6	87.4	3,100
GB44	8.2	5.3	62.1	21.9	2.5	20.8	79.2	16,000
GB45	0.0	0.3	22.9	75.0	1.7	21.3	78.7	ND
GB46	0.0	0.6	18.5	78.0	2.9	23.4	76.6	2,000
GB47	0.0	0.1	0.9	96.6	2.4	25.1	74.9	ND
GB48	9.3	8.7	61.2	19.2	1.7	17.8	82.2	12,000
GB49	10.0	12.1	49.5	25.8	2.7	16.9	83.1	27,000

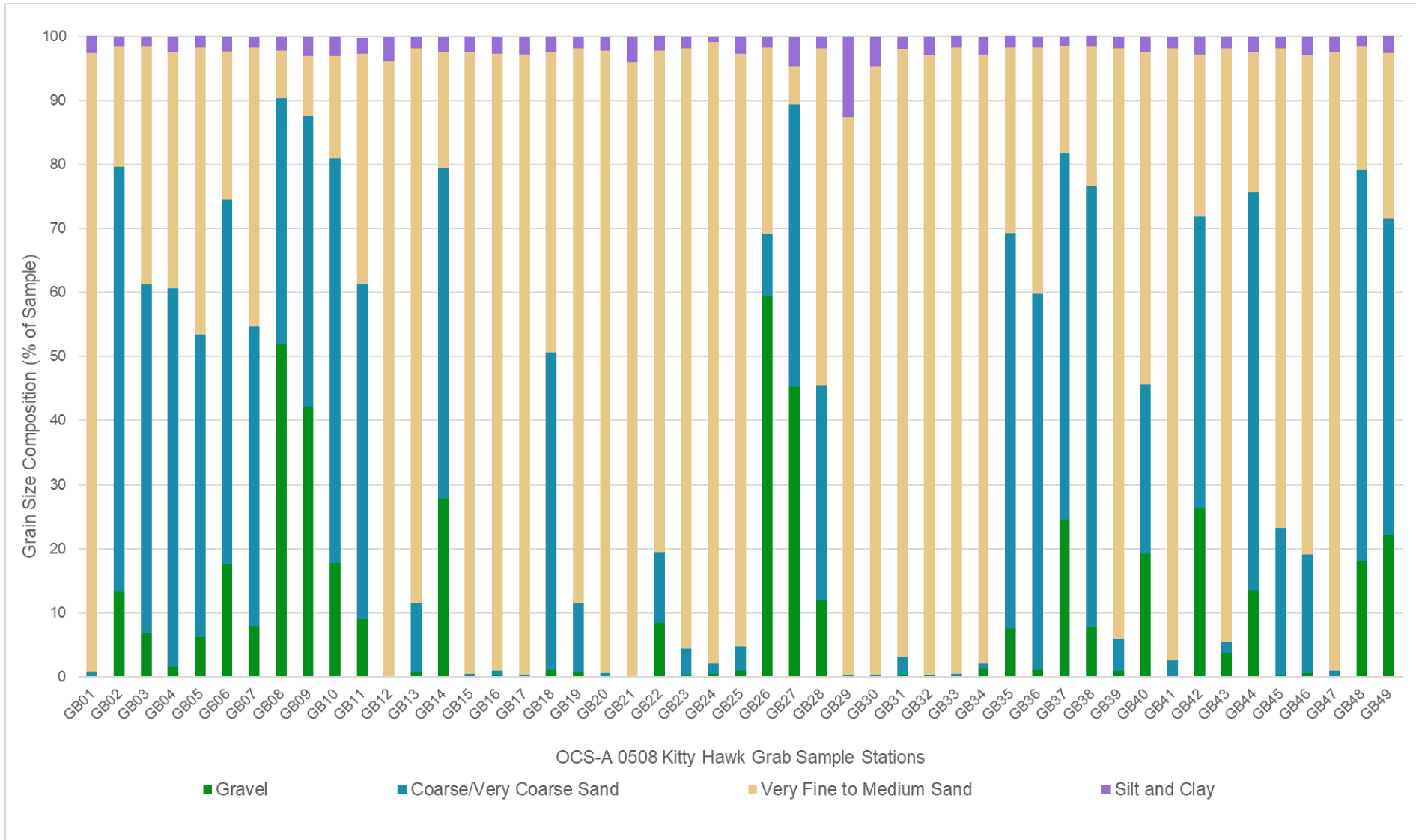


Figure 3-2. Grain size composition at each sample station.

3.3 Benthic Community Analysis

3.3.1 Taxonomic Composition

Grab samples were processed and analyzed for benthic macroinvertebrate communities from all stations except for station GB15 (invertebrate sample was deemed biased after large wave disrupted sieving). The 48 benthic grab samples collected in this survey yielded a total of 6,447 individual benthic macrofaunal organisms from 11 unique phyla and 109 families (or next lowest LPTL; Table 3-52). The phyla Annelida and Arthropoda dominated the samples in both abundance and number unique of taxa, representing 70.0% of all organisms and 67.9% of all unique taxa (Figure 3-3).

Table 3-52. Phyla composition of all 48 benthic grab samples combined.

Phyla	Abundant Taxonomic Groups (common names)	Abundance ¹	Number of LPTL
Annelida	Polychaete worms, Oligochaete worms	2,665	103
Arthropoda	Amphipods, Isopods, Tanaids, Decapods	1,845	52
Nematoda	Nematodes	782	1
Mollusca	Bivalves (clams, etc.), Gastropods (snails and slugs)	584	46
Echinodermata	Sand dollars, Brittle stars	398	4
Chordata	Lancelets, sea squirts	89	2
Nemertea	Ribbon or proboscis worms	60	12
Ectoprocta	Bryozoans	17	4
Cnidaria	Hydrozoa, sea anemones	5	2
Brachiopoda	“Lamp shells”	1	1
Foraminifera	Forams	1	1
Total		6,447	228

¹ Abundance reported as count in all 48 0.05 m² grab samples

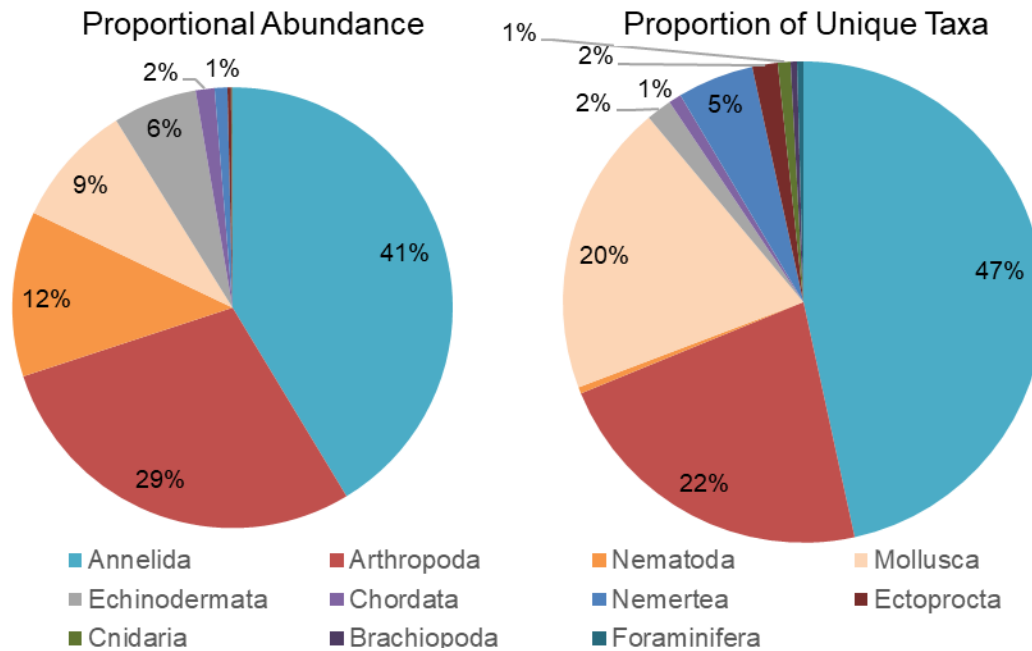


Figure 3-3. Abundance and number of unique taxa (species or LPTL) for each phylum collected in all benthic grab samples. Results presented as percentage of total.

Density across the 48 benthic grab stations ranged from 6 organisms at Station GB26 to 453 at Station GB27, with a mean density of 134 organisms per station across all stations (Table 3-53, Appendix B). Nematoda was the most abundant LPTL with 782 individuals identified to phyla level, while *Byblis serrata*, an amphipod species, was the most abundant LPTL identified to below Phyla level with 608 total individuals (Table 3-54). The most common LPTLs according to frequency of occurrence were Echinoidea (33 samples), *Rhepoxynius epistomus* (an amphipod, 32 samples), Nematoda (31 samples), and Ostracoda (30 samples). Observed species of direct commercial or recreational importance included Atlantic rock crab (*Cancer irroratus*), Atlantic jackknife clam (*Ensis leei*), scallop family (Pectinidae), ocean quahog (*Arctica islandica*), Atlantic surf clam (*Spisula solidissima*), lady crab (*Ovalipes ocellatus*). Sample stations with living bivalve species of commercial importance are presented in Figure 3-4. Note that most of the observed bivalves of commercial importance were very young (i.e. recently post-larval) life stages, with relatively high probability of mortality before reaching harvestable size. The full list of observed taxa is presented in Table 3-54 with multiple taxa were listed in the same row if they shared a mean density value.

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Table 3-53. Abundance of each Phylum counted within each grab sample with total abundance for each grab and phyla.

Station	Annelida	Arthropoda	Brachiopoda	Chordata	Cnidaria	Echinodermata	Ectoprocta	Foraminifera	Mollusca	Nemato-da	Nemertea	Total Abundance
GB01	12	44		2		2			29			89
GB02	110	64		3					14	12	4	207
GB03	21	4				6			10	16	2	59
GB04	26	25		8		8			4	6	1	78
GB05	5	5							1			11
GB06	28	30		1						4	4	67
GB07	9	12				1			1	3	1	27
GB08	71	25		2		2			6	83	2	191
GB09	81	21		4					6	58	2	172
GB10	57	20		5	2	4			11	91	1	191
GB11	69	57				6			15	16		163
GB12	58	24	1	1		32		1	7	2		126
GB13	6	13				42			1			62
GB14	21	33		1		7			2	29	5	98
GB16	60	308				13			31		1	413
GB17	5	31			1	77	1		21			136
GB18	23	15		1		19				1		59
GB19	5	44				4			22			75
GB20	46	109					1		13	2	4	175
GB21	29	45		1		2			80	1	1	159
GB22	30	33		2		1			25		3	94
GB23	9	33				9			20	4		75
GB24	6	17				8			2			33
GB25	7	6				3			3		1	20
GB26		1							5			6
GB27	341	20		4					3	81	4	453
GB28	216	2					1		3	19	4	245
GB29	20	4							16			40
GB30	105	5							11	1		122
GB31	8	122				1			6			137
GB32	22	135							25	1		183
GB33	5	63				1			18		1	88
GB34	40	7			1	6			28			82
GB35	173	4		24					4	102	6	313
GB36	336	17		8					10	37	2	410
GB37	15	14		4		2			2	10	1	48
GB38	123	20		4		29	3		9	23	1	212
GB39	10	15				4			3		1	33
GB40	39	32				7			7			85
GB41	4	55				9	1		4	1		74
GB42	93	40		4			3		9	75	1	225
GB43	1	24			1	1			2	2		31
GB44	22	10		3		18	2		19	34	2	110
GB45	3	29		1		10			22	1		66
GB46	18	77				3			12	4		114
GB47	37	88				31			23			179
GB48	49	30		4		22			15	61	5	186
GB49	191	13		2		8	5		4	2		225
Total	2665	1845	1	89	5	398	17	1	584	782	60	6,447

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Figure 3-4. Presence of living bivalves of commercial importance.

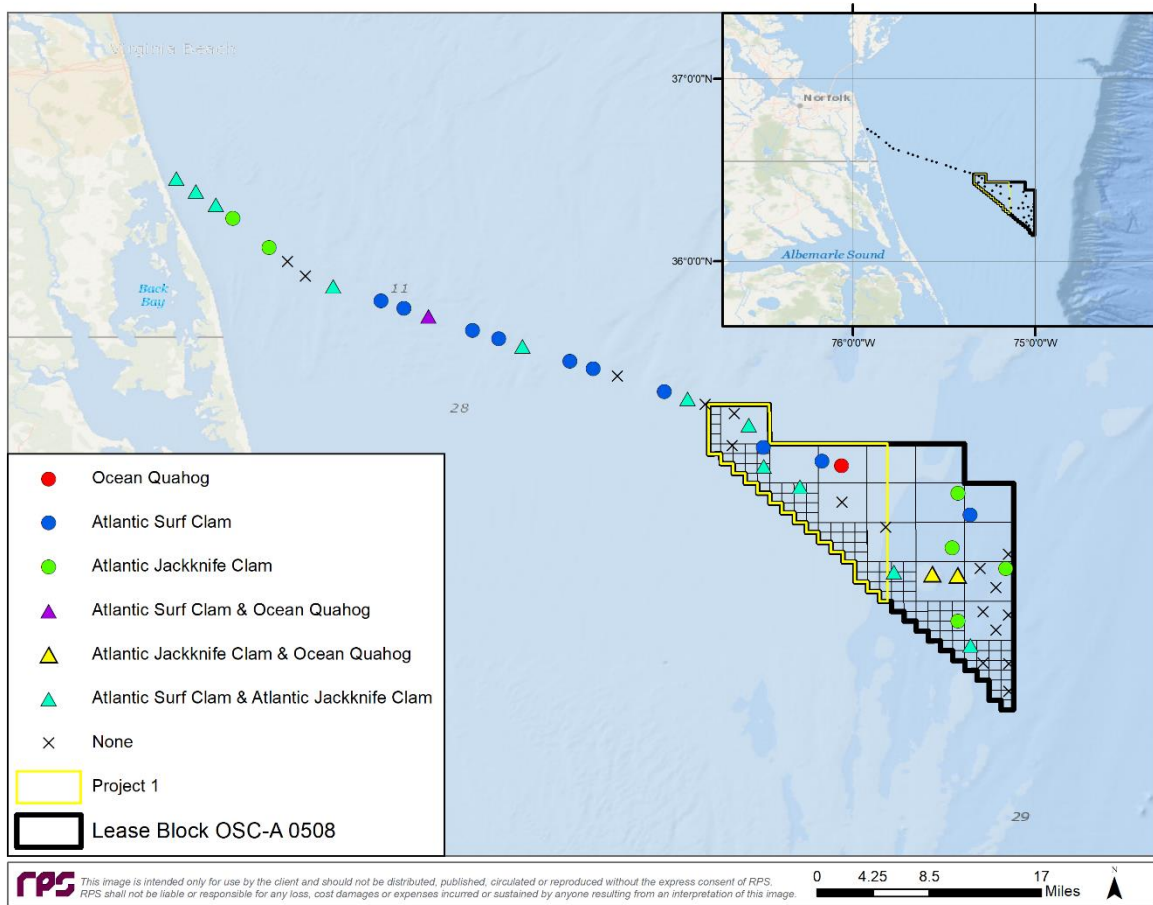


Table 3-54. Mean density of each phyla and taxa (species or LPTL) collected across the 48 grab stations.

Phyla	Taxa (LPTL)	Mean Density (# / 0.05 m ²)
Annelida	Oligochaeta	8.1
	Aricidea (Acmira catherinae)	5.8
	Polygordius jouinae	5.6
	Cirratulidae	3.7
	Parapionosyllis longicirrata	3.1
	Prionospio sp.	2.4
	Eusyllis lamelligera, Scalibregma inflatum	1.7
	Aricidea (Aricidea wassi, Lumbrineris tenuis)	1.6
	Protodorvillea kefersteini	1.5
	Aricidea (Acmira cerrutii, Lumbrineris fragilis)	1.1
	Caulleriella venefica, Hemipodia simplex	1
	Polycirrus eximius	0.9
	Goniadella gracilis, Mediomastus ambiseta, Nephtyidae, Nephtys picta, Onuphis eremita	0.6
	Eumida sanguinea, Lumbrinerides acuta, Spiophanes bombyx Complex	0.5

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Phyla	Taxa (LPTL)	Mean Density (# / 0.05 m ²)
	Aphelochaeta marioni, Clymenella zonalis, Prionospio pygmaeus, Scoloplos acmeceps, Spio filicornis, Tharyx sp. A sensu MWRA 2007, Trivisia parva	0.4
	Clymenella mucosa, Onuphidae, Sphaerosyllis taylori	0.3
	Armandia maculata, Exogone dispar, Hesionura elongata, Kirkegaardia baptistae, Maldanidae, Marphysa bellii, Notomastus sp., Paradoneis lyra, Pettiboneia duofurca, Pisione remota, Sthenelais limicola, Streptosyllis websteri	0.2
	Aglaophamus verrilli, Ampharete oculata, Cirrophorus furcatus, Dipolydora socialis, Drilonereis longa, Glycera americana, Kirkegaardia cf. dorsobranchialis, Leitoscoloplos fragilis, Microphthalmus sp., Notomastus hemipodus, Ophelia bicornis, Orbinidae, Owenia fusiformis, Paraonis fulgens, Paraonis pygoenigmatica, Phyllodoce mucosa, Phyllofelia, Phyllofelia sp., Polycirrus sp., Scoletoma tenuis, Scoletoma verrilli, Syllidae, Tharyx acutus	0.1
	Aglaophamus circinata, Ampharete finmarchica, Arabella iricolor, Brania wellfleetensis, Clymenella torquata, Diopatra cuprea, Exogone hebes, Glycera capitata, Harmothoe extenuata, Harmothoe imbricata, Leitoscoloplos sp., Loimia medusa, Magelona papillicornis, Mediomastus sp., Microspio pigmentata, Nephtys sp., Notomastus latericeus, Orbinia sp., Paleanotus heteroseta, Paraonidae, Paraprionospio pinnata, Parougia caeca, Piscicolidae, Polydora cornuta, Prionospio perkinsi, Prionospio steenstrupi, Scolelepis (Parascolelepis texana, Scoloplos rubra, Sigalion arenicola, Sigambra tentaculata, Sphaerodoropsis corrugata, Spiochaetopterus oculatus, Streptosyllis arenae, Syllides fulvus, Terebellidae	<0.1
	Mean Annelida	55.5
	Byblis serrata	12.7
	Rhepoxynius epistomus	5.1
	Ostracoda	4.1
	Rhepoxynius hudsoni	2.9
	Liljeborgia sp.	2.4
	Unciola serrata	1.9
	Ampelisca verrilli, Protohaustorius deichmannae, Protohaustorius wigleyi, Rhepoxynius sp.	0.9
	Tanaissus psammophilus	0.8
Arthropoda	Acanthohaustorius millsii, Americhelidium americanum	0.5
	Jassa marmorata	0.4
	Ampelisca vadorum, Bathyporeia parkeri, Maeridae	0.3
	Apocorophium simile, Edotea triloba, Idunella barnardi, Pagurus arcuatus, Ptilanthura tenuis	0.2
	Batea catharinensis, Chiridotea tuftsii, Cyathura burbanki, Cyclaspis varians, Harpacticoida, Microprotopus raneyi, Oxyurostylis smithi, Paguridae, Pagurus politus, Pagurus sp., Phoxocephalus holbolli, Tiron spiniferus, Unciola irrorata	0.1
	Acanthohaustorius sp., Amakusanthura magnifica, Ampelisca sp., Argissa hamatipes, Cancer irroratus, Cyclaspis pustulata, Gammaropsis cf. nitida, Hutchinsoniella macracantha, Mysidae, Ogyrides alphaerostris, Ovalipes ocellatus, Panopeidae, Parahaustorius holmesi, Pinnixa lunzi, Politolana polita, Processa hemphilli, Unciola sp.	<0.1
	Mean Arthropoda	38.4
Nematoda	Nematoda (LPTL)	16.3
	Mean Nematoda	16.3
	Solenioidea	2.2
	Spisula solidissima	2.0
	Pandora sp.	1.2
Mollusca	Ensis leei	0.9
	Nucula proxima	0.8
	Bivalvia, Trivia trivittata	0.7
	Mactridae, Periploma sp.	0.3

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Phyla	Taxa (LPTL)	Mean Density (# / 0.05 m ²)
	Solenioidea, Spisula solidissima, Pandora sp.ensis leei, Nucula proximaBivalvia, Tritia trivittata, Mactridae, Periploma sp.Angulus versicolor, Arctica islandicaEratoidea hematita, MytilidaePectinidae, Tellinidae, Turbonilla sp.	0.2
	Caecum johnsoniCotonopsis lafresnayi, Crassinella lunulataCyclocardia borealis, Cylichnella bidentataDiplodonta punctata, Diplodonta sp.Ervilia concentrica, Mysella planulataParvanachis obesa, Prunum roscidum, Veneridae	0.1
	Angulus tenellus, Astarte castanea, Astarte sp., Cardiidae, Cephalaspidea, Crenella decussata, Crepidula planaCrepidula sp., Cryoturris cerinellaLunarca ovalis, Macoma balthicaMarginellidae, Mercenaria sp.Neverita duplicata, Parvilucina crenellaPitar morrhuanus, Pleurobranchaea tarda, Pyrunculus caelatus	<0.1
Mean Mollusca		12.2
Echinodermata	Echinoidea	8.1
	Amphiuridae	0.1
	Asteroidea, Echinarachnius parma	<0.1
Mean Echinodermata		8.3
Chordata	Branchiostoma virginiae	1.5
	Ascidiacea	0.4
Mean Chordata		1.9
Nemertea	Nemertea	0.5
	Tubulanidae	0.2
	Nematoda, NemerteaTubulanidae, Carinomella lacteaCephalothricidae, Kirsteueriella biocellatusLineidae, Micrura sp., Tubulanus pellucidus	0.1
	Amphiporus ochraceusAmphiporus sp., Cerebratulus sp., Tetrastemma sp.	<0.1
Mean Nemertea		1.3
Ectoprocta	Reussirella doma	0.2
	Cribrilina macropunctata	0.1
	Electra monostachys, Biflustra tenuis	<0.1
Mean Ectoprocta		0.4
Cnidaria	Hydrozoa	0.1
	Actiniaria	<0.1
Mean Cnidaria		0.1
Brachiopoda	Glottidia pyramidata	<0.1
Mean Brachiopoda		<0.1
Foraminifera	Astrorhiza sp.	<0.1
Mean Foraminifera		<0.1

3.3.2 Richness, Diversity, and Evenness

Taxonomic richness ranged from 0.6 at station GB26 to 7.0 at station GB10 with a mean richness of 4.3 (Table 3-55 and Figure 3-5). Station GB26 also exhibited the lowest diversity (0.5), well below the mean of 2.2, while station GB22 had the highest diversity (2.9). Evenness ranged from 0.4 at station GB30 to 1.0 at stations GB05 and GB39 with a mean evenness of 0.7.

Table 3-55. Community composition parameters calculated for each grab sample station.

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Station	Abundance (# of individuals per 0.5 m ²)	# of LPTLs	Ecological Indices		
			Richness	Diversity	Evenness
GB01	89	29	6.0	2.9	0.9
GB02	202	39	6.0	2.7	0.8
GB03	59	21	4.7	2.6	0.9
GB04	79	28	6.0	2.8	0.8
GB05	11	9	3.3	2.1	1.0
GB06	67	22	4.3	2.7	0.9
GB07	27	12	3.3	2.1	0.8
GB08	191	31	5.1	2.3	0.7
GB09	172	40	6.4	2.6	0.7
GB10	183	45	7.0	2.4	0.7
GB11	165	34	5.5	2.7	0.8
GB12	126	31	5.6	2.6	0.8
GB13	62	14	2.7	1.3	0.5
GB14	98	27	5.2	2.4	0.8
GB16	413	35	4.3	1.9	0.6
GB17	136	24	4.5	1.9	0.6
GB18	59	20	3.9	2.3	0.8
GB19	75	20	3.5	2.2	0.8
GB20	175	24	3.9	1.9	0.6
GB21	159	31	5.3	2.3	0.7
GB22	97	30	5.9	2.9	0.9
GB23	77	19	3.9	2.5	0.9
GB24	33	14	3.1	2.1	0.9
GB25	20	12	3.7	2.3	0.9
GB26	6	2	0.6	0.5	0.7
GB27	453	37	4.3	2.3	0.7
GB28	245	29	3.3	2.1	0.7
GB29	40	19	3.8	2.4	0.9
GB30	122	19	2.7	1.1	0.4
GB31	137	17	2.6	1.3	0.5
GB32	183	25	4.2	1.9	0.6
GB33	88	18	2.7	2.0	0.8
GB34	82	26	4.5	2.5	0.8
GB35	313	35	4.2	2.3	0.7
GB36	410	28	3.3	2.0	0.7
GB37	48	22	4.4	2.4	0.8
GB38	212	39	6.0	2.7	0.8
GB39	33	18	4.0	2.6	1.0
GB40	85	24	4.3	2.7	0.9
GB41	74	19	3.7	2.0	0.7
GB42	225	22	3.9	1.9	0.6

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Station	Abundance (# of individuals per 0.5 m ²)	# of LPTLs	Ecological Indices		
			Richness	Diversity	Evenness
GB43	31	13	2.6	2.0	0.9
GB44	110	32	6.4	2.7	0.8
GB45	66	20	4.3	2.6	0.9
GB46	114	23	4.4	2.0	0.6
GB47	179	31	4.6	2.4	0.7
GB48	186	30	5.0	2.5	0.8
GB49	225	25	3.7	1.4	0.5

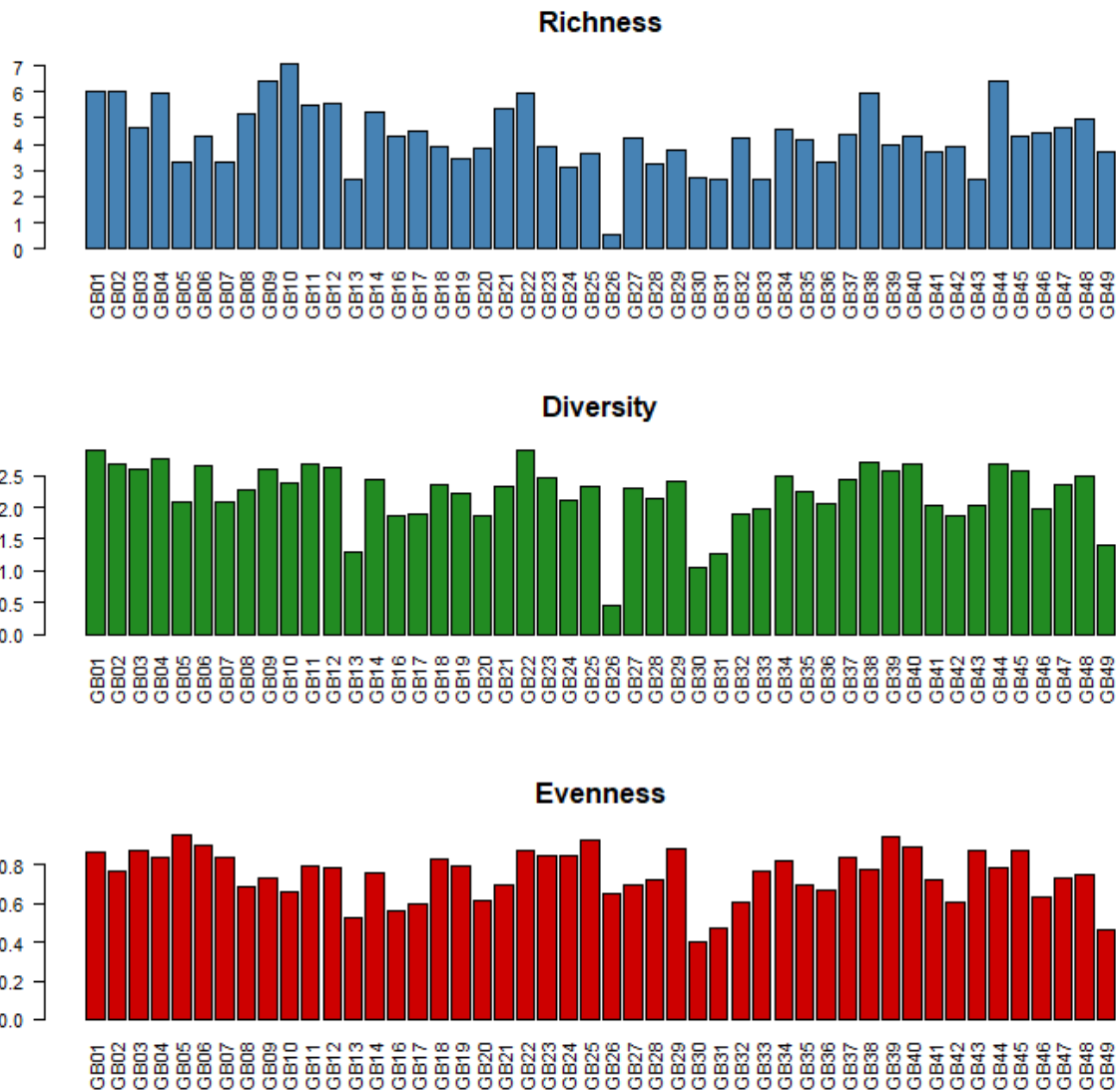


Figure 3-5. Ecological index values calculated for each sample station.

3.4 CMECS Classifications

3.4.1 Substrate Component







CMECS substrate classifications of each grab sample were assigned based on two variations of CMECS. One variation was the full CMECS classification as described in FGDC (2012) and the other variation was the NMFS modified CMECS (2020). The FGDC classification is more detailed and was based on visual observations of the grab samples as they were collected and after they were brought aboard in addition to the grain size composition from the sediment analysis (Section 3.2). In contrast, the NMFS modified CMECS classifications were based solely on the physical grain size composition unless it appeared that the substrate was more than 50% shell debris. Both classifications are provided because NMFS (2020) recommendations suggest the use of their CMECS variation for habitat mapping, whereas BOEM may require the more in-depth classifications for the sake of assessing benthic resources and monitoring impacts. In addition, it is apparent from visual analysis of samples that many samples with gravel-sized components according to physical grain size analysis alone (i.e., without looking at the contents of the grab) are composed of sand-substrates of geologic origin with the gravel-sized components only or mostly composed of shell debris of biogenic origin. This is important because the presence of gravel substrate dictates the resolution of acoustic imaging for the sake of habitat mapping. Results are presented as image captions Table 3-56; as a color-coded map (Figure 3-6); as hierarchies in Table 3-57; and as geolocated sites (Table A - 1).

When classified using the NMFS modified (2020) CMECS, the most common habitat type was fine/very fine sand (23 grabs) followed by gravelly sand (17 grabs). The remaining 9 samples were sandy gravel (6 grabs), very coarse/coarse sand (3 grabs), and muddy sand (1 grab).






When classified using the FGDC (2012) CMECS, the most common habitat type was finer sand with trace shell hash (17 grabs). Note that the category “finer sand” is a modifier we created that composed very fine, fine, and medium sand. In addition, “coarser sand” was a modifier that composed coarse and very coarse sand. Overall, fewer samples were classified as gravel than the NMFS variation because shells appeared to comprise the gravel component and ranged from trace to moderate presence in all but 2 grabs.

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Table 3-56. Images of grab samples immediately after recovery and draining, along with both NMFS (2020) Modified CMECS and FGDC (2012) CMECS substrate classifications.

Station	Image and Description	Image and Description
1-2	 <p>NMFS CMECS: fine/very fine sand CMECS: fine sand with trace shell hash</p>	 <p>NMFS CMECS: gravelly sand CMECS: slightly gravelly sand with sparse shell hash</p>
3-4	 <p>NMFS CMECS: gravelly sand CMECS: slightly gravelly sand with sparse shell hash</p>	 <p>NMFS CMECS: very coarse/coarse sand CMECS: coarse sand with sparse shell hash</p>
5-6	 <p>NMFS CMECS: gravelly sand CMECS: slightly gravelly sand with sparse shell hash</p>	 <p>NMFS CMECS: gravelly sand CMECS: slightly gravelly sand with moderate shell hash</p>







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<p>7-8</p>	 <p>07 WEA</p> <p>NMFS CMECS: gravelly sand CMECS: slightly gravelly sand with sparse shell hash</p>	 <p>08 WEA</p> <p>NMFS CMECS: sandy gravel CMECS: sandy gravel with moderate shell hash and sparse worm tubes</p>
<p>9-10</p>	 <p>09 WEA</p> <p>NMFS CMECS: sandy gravel CMECS: gravelly sand with moderate shell hash</p>	 <p>10 WEA</p> <p>NMFS CMECS: gravelly sand CMECS: gravelly sand with sparse shell hash and sparse worm tubes</p>
<p>11-12</p>	 <p>11 WEA</p> <p>NMFS CMECS: gravelly sand CMECS: slightly gravelly sand with sparse shell hash</p>	 <p>12 WEA</p> <p>NMFS CMECS: fine/very fine sand CMECS: fine sand with trace shell hash</p>







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13-14	 <p>NMFS CMECS: fine/very fine sand CMECS: fine sand with trace shell hash</p>	 <p>gravelly sand slightly gravelly sand with moderate shell hash</p>
15-16	 <p>NMFS CMECS: fine/very fine sand CMECS: fine sand with trace shell hash</p>	 <p>fine/very fine sand fine sand with trace shell hash</p>
17-18	 <p>NMFS CMECS: fine/very fine sand CMECS: fine sand with trace shell hash</p>	 <p>very coarse/coarse sand coarse sand with trace shell hash</p>


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19-20	 <p>NMFS CMECS: fine/very fine sand CMECS: fine sand with trace shell hash</p>	 <p>fine/very fine sand fine sand with trace shell hash</p>
21-22	 <p>NMFS CMECS: fine/very fine sand CMECS: very fine sand with trace shell hash</p>	 <p>gravelly sand slightly gravelly sand with sparse shell hash</p>
23-24	 <p>NMFS CMECS: fine/very fine sand CMECS: fine sand with trace shell hash</p>	 <p>fine/very fine sand fine sand with trace shell hash</p>





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25-26	 <p>NMFS CMECS: fine/very fine sand CMECS: fine sand with sparse shell hash</p>	 <p>sandy gravel sandy gravel with moderate shell cobble</p>
27-28	 <p>NMFS CMECS: sandy gravel CMECS: gravelly sand with moderate shell hash</p>	 <p>gravelly sand slightly gravelly sand with moderate shell hash</p>
29-30	 <p>NMFS CMECS: muddy sand CMECS: muddy sand</p>	 <p>fine/very fine sand very fine sand with trace shell hash</p>

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31-32	 NMFS CMECS: fine/very fine sand CMECS: fine sand with trace shell hash	 NMFS CMECS: fine/very fine sand CMECS: fine sand
33-34	 NMFS CMECS: fine/very fine sand CMECS: fine sand with trace shell hash	 NMFS CMECS: fine/very fine sand CMECS: fine sand with trace shell hash
35-36	 NMFS CMECS: gravelly sand CMECS: slightly gravelly sand with sparse shell hash	 NMFS CMECS: fine/very fine sand CMECS: slightly gravelly sand with sparse shell hash

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37-38	 <p>NMFS CMECS: gravelly sand CMECS: gravelly sand with sparse shell hash</p>	 <p>gravelly sand slightly gravelly sand with sparse shell hash</p>
39-40	 <p>NMFS CMECS: fine/very fine sand CMECS: fine sand with sparse shell hash</p>	 <p>gravelly sand slightly gravelly sand with moderate shell hash</p>
41-42	 <p>NMFS CMECS: fine/very fine sand CMECS: fine sand with trace shell hash</p>	 <p>gravelly sand slightly gravelly sand with moderate shell hash</p>

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43-44	 <p>NMFS CMECS: fine/very fine sand CMECS: fine sand with sparse shell hash</p>	 <p>gravelly sand slightly gravelly sand with sparse shell hash and rubble</p>
45-46	 <p>NMFS CMECS: fine/very fine sand CMECS: medium sand with sparse shell hash</p>	 <p>fine/very fine sand medium sand with sparse shell hash</p>
47-48	 <p>NMFS CMECS: fine/very fine sand CMECS: fine sand with trace shell hash</p>	 <p>gravelly sand gravelly sand with sparse shell hash</p>

49



NMFS CMECS: gravelly sand

CMECS: gravelly sand with sparse shell hash

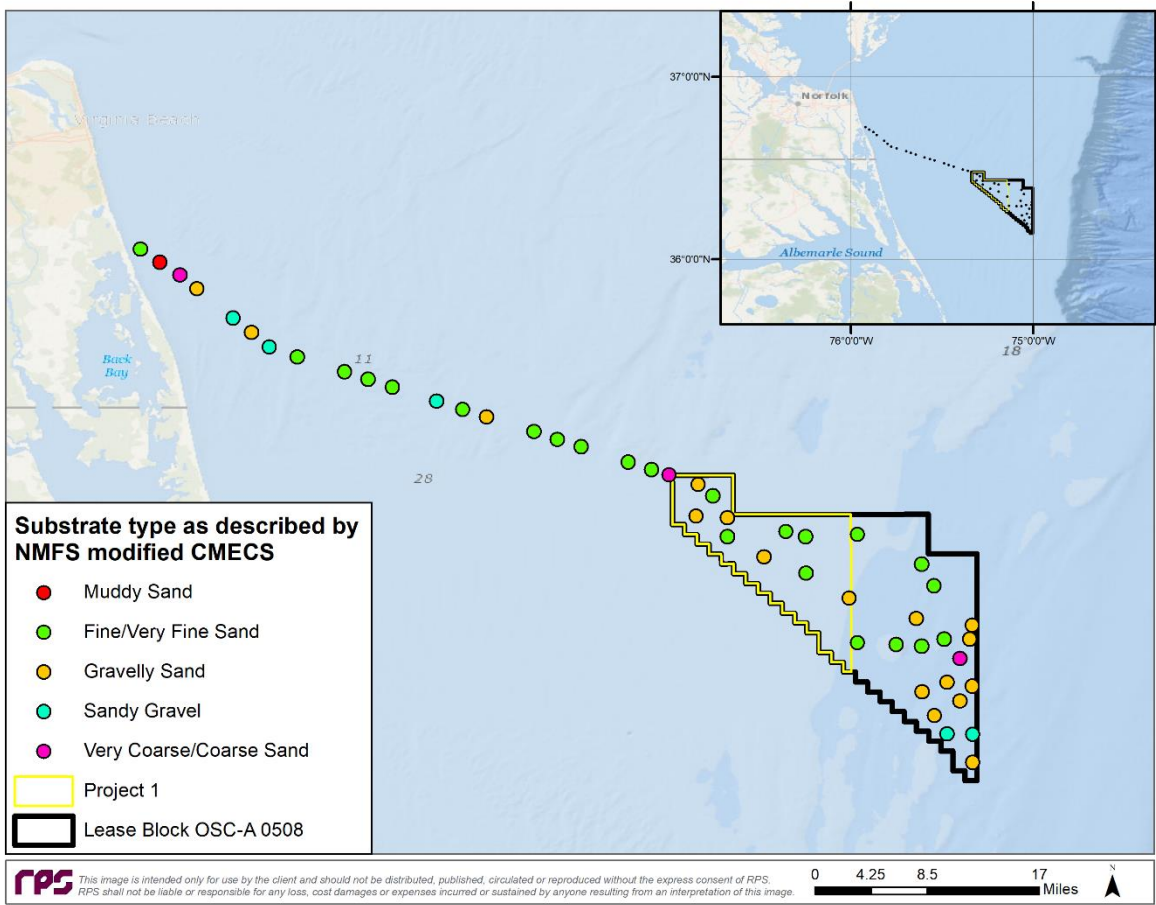


Figure 3-6. NMFS (2020) modified CMECS substrate classifications of grab sample station locations.

Table 3-57. NMFS (2020) modified CMECS hierarchical classification of substrates collected at each grab sample station.

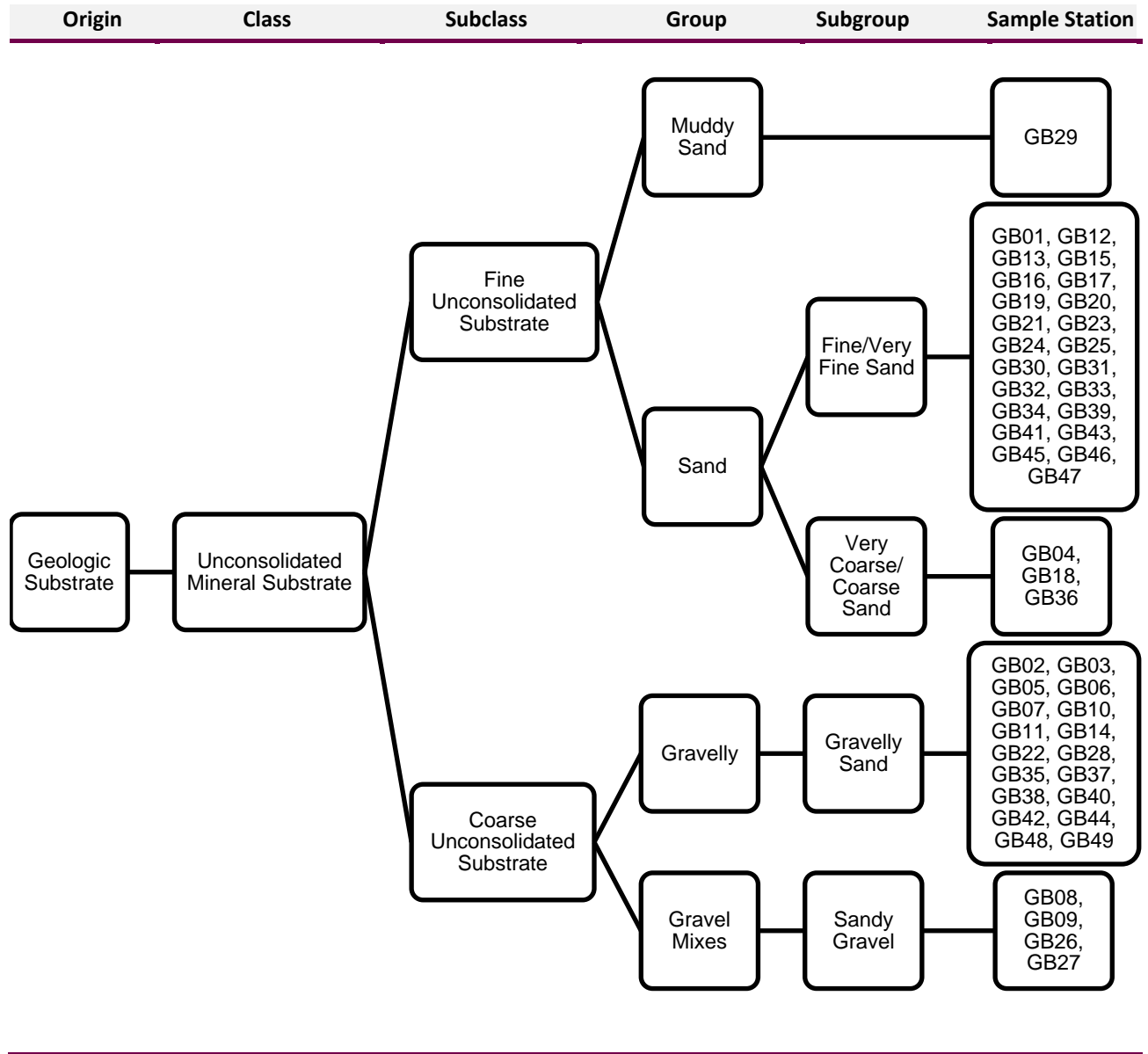
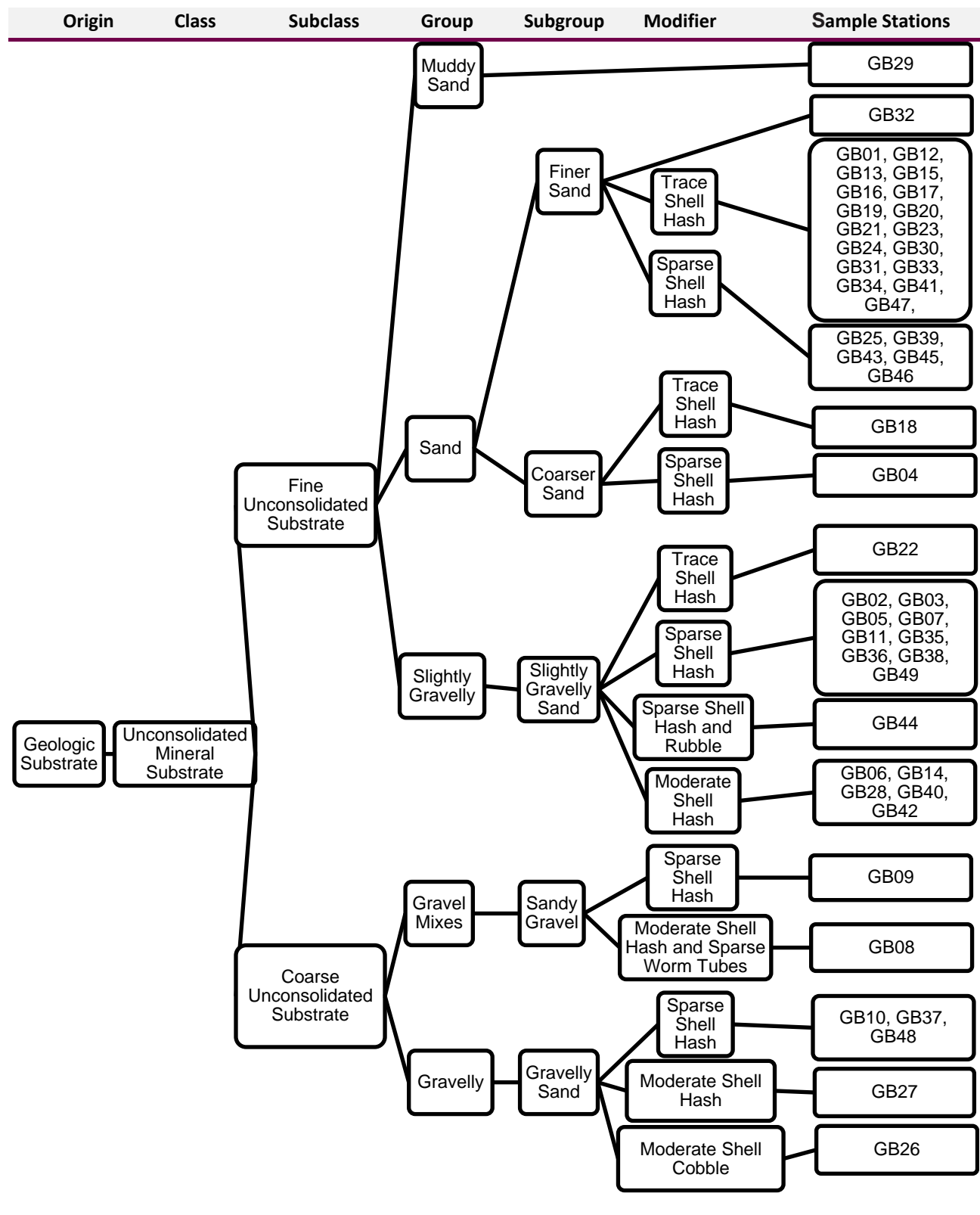


Table 3-58. FGDC (2012) CMECS hierarchical classification of substrates collected at each grab sample station. “Finer sand” includes very fine, fine and medium sand while “coarser sand” includes coarse and very coarse sand.



3.4.2 Biotic Component

The first and second most dominant taxa for each station was used to apply a FGDC (2012) CMECS biological component classification down to the group level with descriptive modifiers (Table 3-59). All samples consisted of soft sediment fauna, with most stations dominated by or containing small surface-burrowing fauna. The remaining stations were dominated by Echinoidea (sand dollars or urchins), bivalves, or mobile mollusks. Echinoidea were present in many of the samples, however, adult abundance was relatively low, with most samples containing early life stages that could not be identified below the level of class. Many of these early juveniles would be expected to die before reaching maturity under normal mortality rates so classifying habitats as Echinoidea beds (or in some cases clam beds under similar circumstances) is a little misleading because these individuals are potentially vagrant members of the population and may only dominate seasonally and in terms of abundance rather than biomass.

Table 3-59. CMECS hierarchical classification of the biotic component of the seabed and the dominant taxa as derived from the lab analysis at each station.

Biotic Setting	Class	Subclass	Group	Additional taxa	Sample Stations	
Benthic Biota	Faunal Bed	Soft Sediment Fauna	Small Surface-Burrowing Fauna	with Bivalves (clams)	GB01, GB23	
				with Small Tube Building Fauna	GB32	
				with Mobile Mollusks	GB29, GB34	
					GB02, GB05, GB06, GB07, GB08, GB09, GB10, GB11, GB14, GB16, GB20, GB22, GB27, GB28, GB30, GB31, GB33, GB35, GB36, GB37, GB40, GB41, GB42, GB43, GB46	
				with Echinoidea	GB03, GB04, GB24, GB25, GB38, GB39, GB44, GB47, GB48, GB49	
				Mobile Mollusks	GB26	
				Matricidae (clam) bed	with Small Surface-Burrowing Fauna	GB21
				Solenioidea (clam) bed	with Small Surface-Burrowing Fauna	GB19
				Echinoidea (urchin or sand dollar) bed	with Small Surface-Burrowing Fauna	GB12, GB13, GB17, GB18
					with Bivaves (clams)	GB45

3.5 Multivariate Analysis

The NMDS analysis and Bray-Curtis Similarity Index produced a stress value of 0.15, indicating a moderate fit. After color-coding sample stations based on NMFS (2020) modified CMECS classifications, sample stations formed apparent loose groupings corresponding to CMECS classifications with the most overlap between very coarse/coarse sand and a few other substrate components including sand gravel and gravelly sand (Figure 3-7).

The single station containing sandy mud (station GB29) was removed from SIMPER and ANOSIM results because it inherently contained no intragroup variability. Based on ANOSIM global test results, the null hypothesis that similarity of invertebrate assemblages between NMFS CMECS groups is greater than or equal to the similarity within NMFS CMECS groups was rejected (R value = 0.37 and significance level $p = 0.001$). In other words, there is evidence that the assemblages within samples are more similar to other samples within the same NMFS CMECS substrate component than to other substrate components. Although the model indicated significance, the within vs. between group relationships are only moderate in strength as indicated by the mid-range R value of 0.37. Therefore, NMFS CMECS grouping can only explain a portion of the variance of assemblages displayed between sites.

The SIMPER analysis provided pairwise insight as to which NMFS CMECS groups are more dissimilar to each other. According to the SIMPER results, sandy gravel and fine/very fine sand are the substrate component pair with the least similar invertebrate assemblages, largely because of differences in Nematoda, Ampeliscidae, and Oligochaeta abundances (Table 3-60). The remaining pairwise comparisons had dissimilarities of 73-84% with gravelly sand and very coarse/coarse sand containing the most similar assemblages. Nematode abundances tended to be one of the largest drivers of dissimilarity between pairs of CMECS substrate components.

To briefly summarize the multivariate results, it appears that the NMFS CMECS substrate component classifications are a reasonable grouping system for predicting what invertebrate assemblages may be present at a given station. However, some components, such as sandy gravel and very coarse/coarse sand, contain less dissimilar assemblages than other pairs of components based on the samples collected.

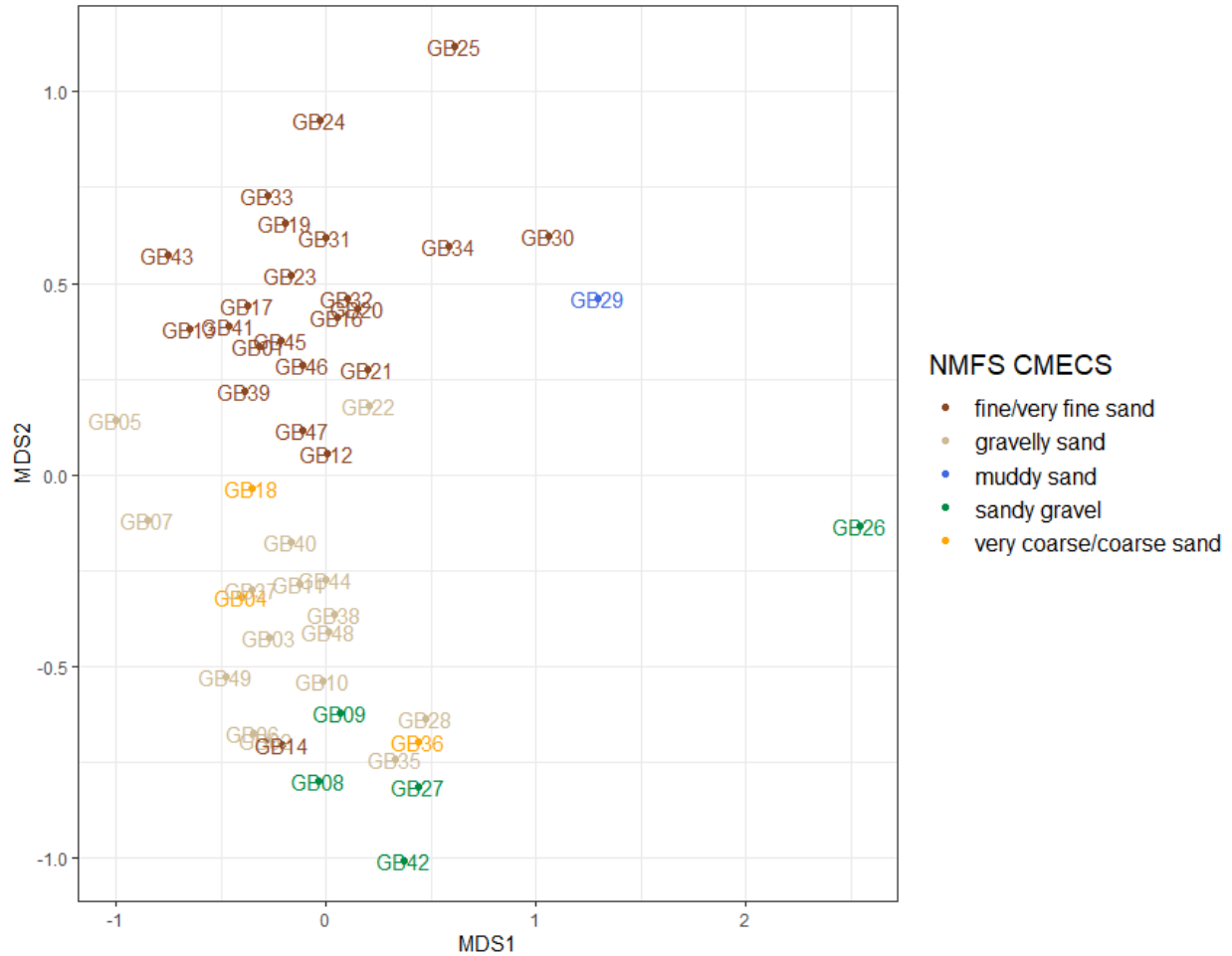


Figure 3-7. NMDS plot of Bray-Curtis similarities of square-root transformed taxonomic abundances at each sample station. Points are color-coded based on NMFS (2020) modified CMECS substrate component types.

Table 3-60. SIMPER results presenting the dissimilarity of community compositions between NMFS (2020) modified CMECS substrate types.

Substrate Type (A)	Substrate Type (B)	Bray-Curtis Dissimilarity	Dissimilar Taxa ¹	% Contribution
Sandy Gravel	Fine/Very Fine Sand	94%	Nematoda	19%
			Ampeliscidae	8%
			Oligochaeta	7%
Gravelly Sand	Fine/Very Fine Sand	84%	Ampeliscidae	11%
			Nematoda	10%
			Echinoidea	7%
Sandy Gravel	Very Coarse/Coarse Sand	83%	Nematoda	18%
			Syllidae	9%
			Paraonidae	8%
Very Coarse/Coarse Sand	Fine/Very Fine Sand	81%	Ampeliscidae	10%
			Paraonidae	10%
			Syllidae	8%
Gravelly Sand	Sandy Gravel	78%	Nematoda	20%
			Oligochaeta	8%
			Polygordiidae	5%
Gravelly Sand	Very Coarse/Coarse Sand	73%	Nematoda	11%
			Paraonidae	10%
			Syllidae	10%

4 REFERENCES

- ASTM D422-63(2007) e2, Standard Test Method for Particle-Size Analysis of Soils (Withdrawn 2016). ASTM International. West Conshohocken, PA, 2007. www.astm.org.
- Auster, P.J. 1998. A conceptual model of the impacts of fishing gear on the integrity of fish habitats. *Conservation Biology*. 12(6):1198-1203.
- Bousfield, E.L. 1973. *Shallow-Water Gammaridean Amphipoda of New England*. Cornell University Press, xii + 312pp.
- Bureau of Ocean Energy Management (BOEM). 2019. Guidelines for Providing Benthic Habitat Survey Information for Renewable Energy Development on the Atlantic Outer Continental Shelf Pursuant to 30 CFR Part 585. June 2019. BOEM Office of Renewable Energy Programs, US Department of the Interior. 9pp.
- Clarke, K.R. (1993). Non-parametric multivariate analyses of changes in community structure. *Australian Journal of Ecology*, 18: 117-143.
- Cutler, E.B. 1994. *The Sipuncula: Their Systematics, Biology, and Evolution*. Cornell University Press, xvii + 453pp.
- Federal Geographic Data Committee (FGDC). 2012. Coastal and Marine Ecological Classification Standard, June 2012. FGDC-STD-018-2012. 353pp.
- National Marine Fisheries Service (NMFS). 2020. Recommendations for Mapping Fish Habitat. NMFS GARFO Habitat Conservation and Ecosystem Services Division. May 2020. 9 pp.
- Oksanen, J., Blanchet, F. G., Friendly, M., Kindt, R., Legendre, P., McGlenn, D., Minchin, P.R., O'Hara, R. B., Simpson, G. L., Solymos, P., Henry, M., Stevens, H., Szoecs, E., and Wagner, H. 2019. vegan: Community Ecology Package. R package version 2.5-6. <https://CRAN.R-project.org/package=vegan>
- R Core Team (2020). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.
- U.S. Environmental Protection Agency (EPA). 1986. Method 9060 Total Organic Carbon. SW-846: Hazardous Waste Test Methods, Ch 5.
- Winston, J.E. and P.J Hayward. 2012. *The Marine Bryozoans of the Northeast Coast of the United States: Maine to Virginia*. Virginia Museum of Natural History Memoir 11, xii + 180pp.

APPENDIX A

Table A - 1. Locations and CMECS classifications for each grab sample. CMECS classifications are provided using the NMFS (2020) recommendations and FGDC (2012) procedure. Finer sand includes very fine, fine and medium sand while coarser sand includes coarse and very coarse sand.

Station	Latitude (°N)	Longitude (°W)	NMFS modified CMECS	FGDC CMECS
1	36.29020	75.08876	fine/very fine sand	finer sand with trace shell hash
2	36.31163	75.00535	gravelly sand	slightly gravelly sand with sparse shell hash
3	36.29624	75.00798	gravelly sand	slightly gravelly sand with sparse shell hash
4	36.27485	75.01886	very coarse/coarse sand	coarse sand with sparse shell hash
5	36.24870	75.03309	gravelly sand	slightly gravelly sand with sparse shell hash
6	36.24472	75.00543	gravelly sand	slightly gravelly sand with moderate shell hash
7	36.22849	75.01916	gravelly sand	slightly gravelly sand with sparse shell hash
8	36.19218	75.03325	sandy gravel	sandy gravel with moderate shell hash and sparse worm tubes
9	36.19153	75.00487	sandy gravel	sandy gravel with sparse shell hash
10	36.16116	75.00465	gravelly sand	gravelly sand with sparse shell hash
11	36.23848	75.06060	gravelly sand	slightly gravelly sand with sparse shell hash
12	36.28860	75.06103	fine/very fine sand	finer sand with trace shell hash
13	36.37869	75.06080	fine/very fine sand	finer sand with trace shell hash
14	36.34120	75.14026	gravelly sand	slightly gravelly sand with moderate shell hash
15	36.41104	75.13129	fine/very fine sand	finer sand with trace shell hash
16	36.40878	75.18838	fine/very fine sand	finer sand with trace shell hash
17	36.36870	75.18809	fine/very fine sand	finer sand with trace shell hash
18	36.47621	75.33841	very coarse/coarse sand	coarser sand with trace shell hash
19	36.49041	75.38307	fine/very fine sand	finer sand with trace shell hash
20	36.50718	75.43467	fine/very fine sand	finer sand with trace shell hash
21	36.52364	75.48689	fine/very fine sand	finer sand with trace shell hash
22	36.54006	75.53886	gravelly sand	slightly gravelly sand with trace shell hash
23	36.57295	75.64201	fine/very fine sand	finer sand with trace shell hash
24	36.58973	75.69445	fine/very fine sand	finer sand with trace shell hash
25	36.60582	75.74686	fine/very fine sand	finer sand with sparse shell hash
26	36.61665	75.77730	sandy gravel	gravelly sand with moderate shell cobble
27	36.64851	75.81702	sandy gravel	gravelly sand with moderate shell hash
28	36.68048	75.85677	gravelly sand	slightly gravelly sand with moderate shell hash
29	36.70996	75.89754	Muddy sand	muddy sand
30	36.72397	75.91918	fine/very fine sand	finer sand with trace shell hash
31	36.48230	75.35740	fine/very fine sand	finer sand with trace shell hash
32	36.51537	75.46115	fine/very fine sand	finer sand
33	36.54826	75.56480	fine/very fine sand	finer sand with trace shell hash

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Station	Latitude (°N)	Longitude (°W)	NMFS modified CMECS	FGDC CMECS
34	36.58161	75.66904	fine/very fine sand	finer sand with trace shell hash
35	36.63256	75.79711	gravelly sand	slightly gravelly sand with sparse shell hash
36	36.69544	75.87574	very coarse/coarse sand	slightly gravelly sand with sparse shell hash
37	36.42906	75.27438	gravelly sand	gravelly sand with sparse shell hash
38	36.46603	75.30621	gravelly sand	slightly gravelly sand with sparse shell hash
39	36.29243	75.13117	fine/very fine sand	finer sand with sparse shell hash
40	36.31884	75.06683	gravelly sand	slightly gravelly sand with moderate shell hash
41	36.35494	75.04731	fine/very fine sand	finer sand with trace shell hash
42	36.55741	75.59389	sandy gravel	slightly gravelly sand with moderate shell hash
43	36.29624	75.03638	fine/very fine sand	finer sand with sparse shell hash
44	36.21216	75.04672	gravelly sand	slightly gravelly sand with sparse shell hash and rubble
45	36.45372	75.29028	fine/very fine sand	finer sand with sparse shell hash
46	36.40869	75.27417	fine/very fine sand	finer sand with sparse shell hash
47	36.41417	75.20985	fine/very fine sand	finer sand with trace shell hash
48	36.38614	75.23425	gravelly sand	gravelly sand with sparse shell hash
49	36.43108	75.30845	gravelly sand	slightly gravelly sand with sparse shell hash

APPENDIX B

Table A - 2. Benthic macroinvertebrates identified to LPTL in each grab sample.

Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB01	2	Animalia	Chordata	Tunicata	Ascidiacea										
GB01	2	Animalia	Mollusca		Bivalvia										
GB01	4	Animalia	Mollusca		Bivalvia			Anomalodesmata			Pandoridae		Pandora		sp.
GB01	8	Animalia	Mollusca		Bivalvia	Protobranchia		Nuculoidea			Nuculidae		Nucula		Nucula proxima
GB01	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenioidea					
GB01	3	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Arcticoidea	Arcticidae		Arctica		Arctica islandica
GB01	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenioidea	Pharidae		Ensis		Ensis leei
GB01	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Semelidae		Ervilia		Ervilia concentrica
GB01	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Lucinoidea	Ungulinidae		Diplodonta		sp.
GB01	2	Animalia	Echinodermata		Echinoidea										
GB01	5	Animalia	Mollusca		Gastropoda			Neogastropoda			Marginellidae		Eratoidea		Eratoidea hematita
GB01	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB01	5	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Protohaustorius		Protohaustorius wigleyi
GB01	4	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ischyroceridae		Jassa		Jassa marmorata
GB01	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Oedicerotidae		Americhelidium		Americhelidium americanum
GB01	21	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB01	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Cumacea			Diastylidae		Oxyurostylis		Oxyurostylis smithi
GB01	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda	Anthuridea		Anthuridae		Ptilanthura		Ptilanthura tenuis
GB01	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda	Flabellifera		Cirolanidae		Politolana		Politolana polita
GB01	7	Animalia	Arthropoda	Crustacea	Ostracoda										
GB01	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Glycera		Glycera americana
GB01	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris tenuis
GB01	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae				

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB01	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllococida		Nephtyidae		Nephtys		Nephtys picta
GB01	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Onuphidae				
GB01	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllococida		Phyllococidae		Phyllodoce		Phyllodoce mucosa
GB01	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllococida		Sigalionidae		Sthenelais		Sthenelais limicola
GB01	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Orbiniidae		Scoloplos		Scoloplos acmeceps
GB01	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Aricidea)	Aricidea (Aricidea) wassi
GB02	12	Animalia	Nematoda												
GB02	4	Animalia	Nemertea		Anopla			Paleonemertea			Carinomidae		Carinomella		Carinomella lactea
GB02	3	Animalia	Chordata	Tunicata	Ascidacea										
GB02	2	Animalia	Mollusca		Bivalvia			Anomalodesmata			Periplomatidae		Periploma		sp.
GB02	1	Animalia	Mollusca		Bivalvia			Mytiloidea			Mytilidae		Crenella		Crenella decussata
GB02	3	Animalia	Mollusca		Bivalvia	Pteriomorphia		Ostreoida			Pectinidae				
GB02	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Carditoidea	Carditidae		Cyclocardia		Cyclocardia borealis
GB02	3	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Galeommatoidae	Montacutidae		Mysella		Mysella planulata
GB02	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Lucinoidea	Ungulinidae		Diplodonta		sp.
GB02	6	Animalia	Annelida		Clitellata	Oligochaeta									
GB02	2	Animalia	Mollusca		Gastropoda			Neogastropoda			MargineUllidae		Prunum		Prunum roscidum
GB02	6	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Ampelisca		Ampelisca vadorum
GB02	32	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		Unciola serrata
GB02	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ischyroceridae		Jassa		Jassa marmorata
GB02	12	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Liljeborgiidae		Liljeborgia		sp.
GB02	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda		Hadzioidae	Maeridae				
GB02	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Phoxocephalus		Phoxocephalus holbolli
GB02	6	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB02	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Mysida			Mysidae				
GB02	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Tanaidacea	Tanaidomorpha	Paratanaoidea	Tanaissuidae		Tanaissus		Tanaissus psammophilus

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB02	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Maldanidae		Clymenella		Clymenella mucosa
GB02	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Opheliidae		Armandia		Armandia maculata
GB02	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Pettiboneia		Pettiboneia duofurca
GB02	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Protodorvillea		Protodorvillea kefersteini
GB02	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB02	8	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Goniadidae		Goniadella		Goniadella gracilis
GB02	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrinerides		Lumbrinerides acuta
GB02	20	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris fragilis
GB02	7	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris tenuis
GB02	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae				
GB02	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae		Nephtys		sp.
GB02	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Onuphidae				
GB02	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Phyllodocidae		Eumida		Eumida sanguinea
GB02	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Polynoidea		Harmothoe		Harmothoe imbricata
GB02	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Parapionosyllis		Parapionosyllis longicirrata
GB02	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Syllides		Syllides fulvus
GB02	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Ampharetidae		Ampharete		Ampharete finmarchica
GB02	49	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB02	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Acmira	Aricidea (Acmira)	Acmira catherinae
GB03	2	Animalia	Nemertea												
GB03	16	Animalia	Nematoda												
GB03	1	Animalia	Mollusca		Bivalvia										
GB03	4	Animalia	Mollusca		Bivalvia			Anomalodesmata			Pandoridae		Pandora		sp.
GB03	3	Animalia	Mollusca		Bivalvia			Anomalodesmata			Periplomatidae		Periploma		sp.
GB03	1	Animalia	Mollusca		Bivalvia			Mytiloida			Mytilidae				
GB03	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroida		Solenioidea	Pharidae		Ensis		Ensis leei

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB03	3	Animalia	Annelida		Clitellata	Oligochaeta									
GB03	6	Animalia	Echinodermata		Echinoidea										
GB03	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		Unciola serrata
GB03	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB03	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Protodorvillea		Protodorvillea kefersteini
GB03	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB03	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Goniadidae		Goniadella		Goniadella gracilis
GB03	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrinerides		Lumbrinerides acuta
GB03	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris tenuis
GB03	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Phyllodocidae		Hesionura		Hesionura elongata
GB03	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Brania		Brania wellfleetensis
GB03	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Cauleriella		Cauleriella venefica
GB03	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB03	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Acmira)	Aricidea (Acmira) cerrutii
GB04	6	Animalia	Nematoda												
GB04	7	Animalia	Chordata	Tunicata	Ascidiacea										
GB04	1	Animalia	Mollusca		Bivalvia										
GB04	1	Animalia	Mollusca		Bivalvia			Anomalodesmata			Pandoridae		Pandora		sp.
GB04	1	Animalia	Mollusca		Bivalvia			Anomalodesmata			Periplomatidae		Periploma		sp.
GB04	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea			Astartidae		Astarte		Astarte castanea
GB04	1	Animalia	Chordata		Cephalochordata			Amphioxiformes			Branchiostomata		Branchiostoma		Branchiostoma virginiae
GB04	6	Animalia	Annelida		Clitellata	Oligochaeta									
GB04	8	Animalia	Echinodermata		Echinoidea										
GB04	1	Animalia	Nemertea		Enopla			Hoplonemertea	Monostilifera		Amphiporidae		Amphiporus		Amphiporus ochraceus
GB04	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB04	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		Unciola serrata

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB04	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ischyroceridae		Jassa		Jassa marmorata
GB04	19	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB04	3	Animalia	Arthropoda	Crustacea	Ostracoda										
GB04	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Capitellidae		Notomastus		Notomastus hemipodus
GB04	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Maldanidae		Clymenella		Clymenella mucosa
GB04	4	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Protodorvillea		Protodorvillea kefersteini
GB04	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Glycera		Glycera americana
GB04	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Goniadidae		Goniadella		Goniadella gracilis
GB04	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris fragilis
GB04	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Oeonidae		Arabella		Arabella iricolor
GB04	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Onuphidae		Onuphis		Onuphis eremita
GB04	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Streptosyllis		Streptosyllis websteri
GB04	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Caulleriella		Caulleriella venefica
GB04	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB04	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Terebellidae		Loimia		Loimia medusa
GB04	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Terebellidae		Polycirrus		Polycirrus eximius
GB05	1	Animalia	Mollusca		Gastropoda			Neogastropoda			Marginellidae		Prunum		Prunum roscidum
GB05	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB05	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB05	1	Animalia	Arthropoda	Crustacea	Ostracoda										
GB05	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Protodorvillea		Protodorvillea kefersteini
GB05	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris fragilis
GB05	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Onuphidae		Onuphis		Onuphis eremita
GB05	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Caulleriella		Caulleriella venefica
GB05	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Aricidea)	Aricidea (Aricidea) wassi
GB06	4	Animalia	Nematoda												

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB06	4	Animalia	Nemertea		Anopla			Paleonemertea			Cephalothricidae				
GB06	1	Animalia	Chordata		Cephalochordata			Amphioxiformes			Branchiostomidae		Branchiostoma		Branchiostoma virginiae
GB06	4	Animalia	Annelida		Clitellata	Oligochaeta									
GB06	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Ampelisca		sp.
GB06	10	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		Unciola serrata
GB06	8	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Liljeborgiidae		Liljeborgia		sp.
GB06	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda		Hadzioidea	Maeridae				
GB06	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB06	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Cumacea			Bodotriidae		Cyclaspis		Cyclaspis varians
GB06	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda	Valvifera		Idoteidae		Edotea		Edotea triloba
GB06	4	Animalia	Arthropoda	Crustacea	Ostracoda										
GB06	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Protodorvillea		Protodorvillea kefersteini
GB06	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Glycera		Glycera americana
GB06	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB06	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Goniadidae		Goniadella		Goniadella gracilis
GB06	6	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris fragilis
GB06	5	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris tenuis
GB06	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae				
GB06	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae		Nephtys		Nephtys picta
GB06	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB06	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Terebellidae		Polycirrus		Polycirrus eximius
GB07	3	Animalia	Nematoda												
GB07	1	Animalia	Nemertea		Anopla			Paleonemertea			Carinomidae		Carinomella		Carinomella lactea
GB07	1	Animalia	Mollusca		Bivalvia										
GB07	1	Animalia	Echinodermata		Echinoidea										
GB07	10	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB07	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Tanaidacea	Tanaidomorpha	Paratanaoidea	Tanaissuidae		Tanaissus		Tanaissus psammophilus
GB07	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Capitellidae		Notomastus		Notomastus latericeus
GB07	3	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Maldanidae		Clymenella		Clymenella mucosa
GB07	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrinerides		Lumbrinerides acuta
GB07	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Onuphidae				
GB07	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Parapionosyllis		Parapionosyllis longicirrata
GB07	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Paraonis		Paraonis pygoenigmatica
GB08	1	Animalia	Nemertea												
GB08	83	Animalia	Nematoda												
GB08	1	Animalia	Nemertea		Anopla			Paleonemertea			Carinomidae		Carinomella		Carinomella lactea
GB08	1	Animalia	Mollusca		Bivalvia	Pteriomorpha		Ostreoida			Pectinidae				
GB08	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroida		Cardioidea	Cardiidae				
GB08	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroida		Lucinoidea	Ungulinidae		Diplodonta		sp.
GB08	2	Animalia	Chordata		Cephalochordata			Amphioxiformes			Branchiostomidae		Branchiostoma		Branchiostoma virginiae
GB08	19	Animalia	Annelida		Clitellata	Oligochaeta									
GB08	2	Animalia	Mollusca		Gastropoda			Neogastropoda			Marginellidae		Prunum		Prunum roscidum
GB08	1	Animalia	Mollusca		Gastropoda			Notaspidea			Pleurobranchidae		Pleurobranchaea		Pleurobranchaea tarda
GB08	5	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		Unciola serrata
GB08	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ischyroceridae		Jassa		Jassa marmorata
GB08	10	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Liljeborgiidae		Liljeborgia		sp.
GB08	5	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB08	2	Animalia	Echinodermata	Asterozoa	Ophiuroidea			Ophiurida			Amphiuridae				
GB08	2	Animalia	Arthropoda	Crustacea	Ostracoda										
GB08	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Capitellidae		Notomastus		sp.
GB08	9	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Maldanidae		Clymenella		Clymenella zonalis
GB08	5	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Eunicidae		Marphysa		Marphysa bellii

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB08	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB08	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris fragilis
GB08	6	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris tenuis
GB08	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Phyllodocidae		Eumida		Eumida sanguinea
GB08	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Sigalionidae		Pisione		Pisione remota
GB08	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Eusyllis		Eusyllis lamelligera
GB08	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Parapionosyllis		Parapionosyllis longicirrata
GB08	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Kirkegaardia		Kirkegaardia cf. dorsobranchialis
GB08	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB08	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Prionospio		sp.
GB08	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Terebellidae				
GB08	13	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Terebellidae		Polycirrus		Polycirrus eximius
GB09	58	Animalia	Nematoda												
GB09	1	Animalia	Nemertea		Anopla			Heteronemertea			Lineidae		Micrura		sp.
GB09	1	Animalia	Mollusca		Bivalvia										
GB09	1	Animalia	Mollusca		Bivalvia			Mytiloidea			Mytilidae				
GB09	1	Animalia	Mollusca		Bivalvia	Pteriomorphia		Ostreoida			Pectinidae				
GB09	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroida		Carditoidea	Carditidae		Cyclocardia		Cyclocardia borealis
GB09	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroida		Lucinoidea	Ungulinidae		Diplodonta		Diplodonta punctata
GB09	4	Animalia	Chordata		Cephalochordata			Amphioxiformes			Branchiostomidae		Branchiostoma		Branchiostoma virginiae
GB09	17	Animalia	Annelida		Clitellata	Oligochaeta									
GB09	1	Animalia	Nemertea		Enopla			Hoplonemertea	Monostilifera		Tetrastemmatidae		Tetrastemma		sp.
GB09	1	Animalia	Mollusca		Gastropoda			Cephalaspidea			Retusidae		Pyrunculus		Pyrunculus caelatus
GB09	5	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Ampelisca		Ampelisca vadorum
GB09	4	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		Unciola serrata
GB09	6	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Liljeborgiidae		Liljeborgia		sp.

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB09	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda		Hadzioidea	Maeridae				
GB09	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB09	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Cumacea			Bodotriidae		Cyclaspis		Cyclaspis varians
GB09	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Eucarida	Decapoda	Pleocyemata	Xanthoidea	Panopeidae				
GB09	2	Animalia	Arthropoda	Crustacea	Ostracoda										
GB09	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Capitellidae		Notomastus		Notomastus latericeus
GB09	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Capitellidae		Notomastus		sp.
GB09	7	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Maldanidae		Clymenella		Clymenella zonalis
GB09	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Opheliidae		Armandia		Armandia maculata
GB09	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Opheliidae		Travisia		Travisia parva
GB09	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB09	4	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrinerides		Lumbrinerides acuta
GB09	5	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris fragilis
GB09	12	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris tenuis
GB09	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae		Aglaophamus		Aglaophamus circinata
GB09	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Onuphidae		Onuphis		Onuphis eremita
GB09	5	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Phyllodocidae		Eumida		Eumida sanguinea
GB09	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Phyllodocidae		Phyllodoce		Phyllodoce mucosa
GB09	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Sigalionidae		Pisione		Pisione remota
GB09	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Eusyllis		Eusyllis lamelligera
GB09	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Parapionosyllis		Parapionosyllis longicirrata
GB09	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				
GB09	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB09	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Spiophanes		Spiophanes bombyx Complex
GB09	9	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Terebellidae		Polycirrus		Polycirrus eximius
GB09	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Acmira	Aricidea (Acmira)	Acmira catherinae

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial	
GB10	91	Animalia	Nematoda													
GB10	1	Animalia	Nemertea													
GB10	1	Animalia	Cnidaria		Anthozoa			Actiniaria								
GB10	2	Animalia	Chordata	Tunicata	Ascidiacea											
GB10	2	Animalia	Mollusca		Bivalvia		Anomalodesmata			Periplomatidae			Periploma		sp.	
GB10	1	Animalia	Mollusca		Bivalvia			Mytiloidea			Mytilidae					
GB10	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea			Astartidae		Astarte		Astarte castanea	
GB10	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Cardioidea	Cardiidae					
GB10	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Crassatelloidea	Crassatellidae		Crassinella		Crassinella lunulata	
GB10	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Mactroidea	Mactridae					
GB10	3	Animalia	Chordata		Cephalochordata			Amphioxiformes			Branchiostomidae		Branchiostoma		Branchiostoma virginiae	
GB10	9	Animalia	Annelida		Clitellata	Oligochaeta										
GB10	3	Animalia	Echinodermata		Echinoidea											
GB10	3	Animalia	Mollusca		Gastropoda				Neotaenioglossa			Caecidae		Caecum		Caecum johnsoni
GB10	1	Animalia	Cnidaria		Hydrozoa											
GB10	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Ampelisca		Ampelisca vadorum	
GB10	5	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		Unciola serrata	
GB10	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Liljeborgiidae		Liljeborgia		sp.	
GB10	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda		Hadzioidea	Maeridae					
GB10	8	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus	
GB10	1	Animalia	Arthropoda	Crustacea	Maxillopoda	Copepoda		Harpacticoida								
GB10	1	Animalia	Echinodermata	Asterozoa	Ophiuroidea			Ophiurida			Amphiuridae					
GB10	1	Animalia	Arthropoda	Crustacea	Ostracoda											
GB10	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Maldanidae		Clymenella		Clymenella zonalis	
GB10	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Opheliidae		Armandia		Armandia maculata	
GB10	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Protodorvillea		Protodorvillea kefersteini	

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB10	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Eunicidae		Marphysa		Marphysa bellii
GB10	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB10	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Goniadidae		Goniadella		Goniadella gracilis
GB10	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrinerides		Lumbrinerides acuta
GB10	5	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris fragilis
GB10	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Onuphidae				
GB10	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Onuphidae		Diopatra		Diopatra cuprea
GB10	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Onuphidae		Onuphis		Onuphis eremita
GB10	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Phyllodocidae		Eumida		Eumida sanguinea
GB10	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Phyllodocidae		Hesionura		Hesionura elongata
GB10	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Sigalionidae		Pisione		Pisione remota
GB10	4	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae				
GB10	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Exogone		Exogone hebes
GB10	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Parapionosyllis		Parapionosyllis longicirrata
GB10	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Prionospio		sp.
GB10	9	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Terebellidae		Polycirrus		Polycirrus eximius
GB10	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Terebellidae		Polycirrus		sp.
GB10	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Orbiniidae		Scoloplos		Scoloplos acmeceps
GB10	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Acmira)	Aricidea (Acmira) cerrutii
GB11	16	Animalia	Nematoda												
GB11	1	Animalia	Mollusca		Bivalvia										
GB11	5	Animalia	Mollusca		Bivalvia			Anomalodesmata			Pandoridae		Pandora		sp.
GB11	1	Animalia	Mollusca		Bivalvia	Pteriomorphia		Ostreoida			Pectinidae				
GB11	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroida		Mactroidea	Mactridae				
GB11	7	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroida		Solenioidea	Pharidae		Ensis		Ensis leei
GB11	30	Animalia	Annelida		Clitellata	Oligochaeta									

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB11	6	Animalia	Echinodermata		Echinozoa										
GB11	4	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB11	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Argissidae		Argissa		Argissa hamatipes
GB11	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ischyroceridae		Jassa		Jassa marmorata
GB11	5	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Liljeborgiidae		Liljeborgia		sp.
GB11	39	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB11	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Synopiidae		Tiron		Tiron spiniferus
GB11	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Eucarida	Decapoda	Pleocyemata	Cancroidea	Cancridae		Cancer		Cancer irroratus
GB11	2	Animalia	Arthropoda	Crustacea	Ostracoda										
GB11	4	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Maldanidae		Clymenella		Clymenella mucosa
GB11	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Pettiboneia		Pettiboneia duofurca
GB11	6	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Protodorvillea		Protodorvillea kefersteini
GB11	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Eunicidae		Marphysa		Marphysa bellii
GB11	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Glycera		Glycera americana
GB11	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB11	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris fragilis
GB11	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Onuphidae				
GB11	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Onuphidae		Onuphis		Onuphis eremita
GB11	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Sigalionidae		Sthenelais		Sthenelais limicola
GB11	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Parapionosyllis		Parapionosyllis longicirrata
GB11	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Caulleriella		Caulleriella venefica
GB11	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Kirkegaardia		Kirkegaardia cf. dorsobranchialis
GB11	8	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB11	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Microspio		Microspio pigmentata
GB11	4	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Terebellidae		Polycirrus		Polycirrus eximius
GB11	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea (Acmira)		Aricidea (Acmira) cerrutii

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB11	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Aricidea)	Aricidea (Aricidea) wassi
GB12	2	Animalia	Nematoda												
GB12	1	Animalia	Chordata	Tunicata	Ascidiacea										
GB12	1	Animalia	Mollusca		Bivalvia			Anomalodesmata			Pandoridae		Pandora		sp.
GB12	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Arcticoidea	Arcticidae		Arctica		Arctica islandica
GB12	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Lucinoidea	Lucinidae		Parvilucina		Parvilucina crenella
GB12	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenoidea	Pharidae		Ensis		Ensis leei
GB12	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Tellinidae		Angulus		Angulus versicolor
GB12	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Lucinoidea	Ungulinidae		Diplodonta		Diplodonta punctata
GB12	5	Animalia	Annelida		Clitellata	Oligochaeta									
GB12	32	Animalia	Echinodermata		Echinoidea										
GB12	1	Animalia	Brachiopoda	Linguliformea	Lingulata			Lingulida			Lingulidae		Glottidia		Glottidia pyramidata
GB12	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscaidae		Byblis		Byblis serrata
GB12	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Oedicerotidae		Americhelidium		Americhelidium americanum
GB12	10	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius hudsoni
GB12	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda	Anthuridea		Anthuridae		Ptilanthura		Ptilanthura tenuis
GB12	1	Protozoa	Foraminifera		Monothalamea			Astrorhizida			Astrorhizidae		Astrorhiza		sp.
GB12	9	Animalia	Arthropoda	Crustacea	Ostracoda										
GB12	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Maldanidae		Clymenella		Clymenella zonalis
GB12	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Scalibregmatidae		Scalibregma		Scalibregma inflatum
GB12	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Glycera		Glycera americana
GB12	11	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae				
GB12	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae		Nephtys		Nephtys picta
GB12	10	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Onuphidae		Onuphis		Onuphis eremita
GB12	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Sigalionidae		Sthenelais		Sthenelais limicola
GB12	7	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB12	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Tharyx		Tharyx sp. A sensu MWRA 2007
GB12	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Sabellida		Oweniidae		Owenia		Owenia fusiformis
GB12	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Terebellidae		Polycirrus		Polycirrus eximius
GB12	3	Animalia	Annelida	Aclitellata	Polychaeta		Scolecida		Orbiniida		Orbiniidae				
GB12	9	Animalia	Annelida	Aclitellata	Polychaeta		Scolecida		Orbiniida		Orbiniidae		Scoloplos		Scoloplos acmeceps
GB12	1	Animalia	Annelida	Aclitellata	Polychaeta		Scolecida		Orbiniida		Paraonidae			Acmira	Aricidea (Acmira) catherinae
GB13	1	Animalia	Mollusca		Bivalvia		Heterodonta		Veneroidea		Solenioidea		Pharidae		Ensis leei
GB13	42	Animalia	Echinodermata		Echinoidea										
GB13	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		Unciola serrata
GB13	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Parahaustorius		Parahaustorius holmesi
GB13	7	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB13	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda	Anthuridea		Anthuridae		Ptilanthura		Ptilanthura tenuis
GB13	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda	Valvifera		Chaetiliidae		Chiridotea		Chiridotea tuftsii
GB13	1	Animalia	Arthropoda	Crustacea	Ostracoda										
GB13	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				
GB13	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Caulleriella		Caulleriella venefica
GB13	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Magelonidae		Magelona		Magelona papillicornis
GB13	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB13	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Aricidea)	Aricidea (Aricidea) wassi
GB13	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Paraonis		Paraonis pygoenigmatica
GB14	4	Animalia	Nemertea												
GB14	29	Animalia	Nematoda												
GB14	1	Animalia	Nemertea		Anopla		Palaeonemertea				Tubulanidae		Tubulanus		Tubulanus pellucidus
GB14	1	Animalia	Chordata	Tunicata	Ascidacea										
GB14	1	Animalia	Mollusca		Bivalvia			Anomalodesmata			Periplomatidae		Periploma		sp.
GB14	7	Animalia	Echinodermata		Echinoidea										

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB14	1	Animalia	Mollusca		Gastropoda			Cephalaspidea							
GB14	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Ampelisca		Ampelisca vadorum
GB14	4	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB14	22	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		Unciola serrata
GB14	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Liljeborgiidae		Liljeborgia		sp.
GB14	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda		Hadzioidea	Maeridae				
GB14	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB14	1	Animalia	Annelida	Aclitellata	Polychaeta		Scolecida				Maldanidae		Clymenella		Clymenella zonalis
GB14	1	Animalia	Annelida	Aclitellata	Polychaeta		Scolecida				Opheliidae		Armandia		Armandia maculata
GB14	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Eunicidae		Marphysa		Marphysa bellii
GB14	4	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB14	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Goniadidae		Goniadella		Goniadella gracilis
GB14	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Hesionidae		Microphthalmus		sp.
GB14	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris fragilis
GB14	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris tenuis
GB14	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Phyllodocidae		Eumida		Eumida sanguinea
GB14	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Polynoidae		Harmothoe		Harmothoe imbricata
GB14	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Sigalionidae		Pisione		Pisione remota
GB14	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				
GB14	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB14	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Terebellidae		Polycirrus		Polycirrus eximius
GB16	16	Animalia	Mollusca		Bivalvia			Anomalodesmata			Pandoridae		Pandora		sp.
GB16	3	Animalia	Mollusca		Bivalvia	Protobranchia		Nuculoidea			Nuculidae		Nucula		Nucula proxima
GB16	4	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Arcticoidea	Arcticidae		Arctica		Arctica islandica
GB16	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Carditoidea	Carditidae		Cyclocardia		Cyclocardia borealis
GB16	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Semelidae		Ervilia		Ervilia concentrica

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB16	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Tellinidae				
GB16	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Tellinidae		Angulus		Angulus versicolor
GB16	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Veneroidea	Veneridae				
GB16	13	Animalia	Echinodermata												
GB16	1	Animalia	Nemertea		Enopla			Hoplonemertea	Monostilifera		Emplectonematae		Kirsteueriella		Kirsteueriella biocellatus
GB16	2	Animalia	Mollusca		Gastropoda			Neogastropoda			Marginebellidae		Eratoidea		Eratoidea hematita
GB16	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscaidae		Ampelisca		Ampelisca verrilli
GB16	210	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscaidae		Byblis		Byblis serrata
GB16	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		Unciola irrorata
GB16	9	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Protohaustorius		Protohaustorius deichmannae
GB16	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Liljeborgiidae		Listriella		Idunella barnardi
GB16	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Oedicerotidae		Americhelidium		Americhelidium americanum
GB16	46	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius hudsoni
GB16	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Cumacea			Bodotriidae		Cyclaspis		Cyclaspis varians
GB16	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda	Anthuridea		Anthuridae		Ptilanthura		Ptilanthura tenuis
GB16	34	Animalia	Arthropoda	Crustacea	Ostracoda										
GB16	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris fragilis
GB16	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris tenuis
GB16	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae				
GB16	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae		Nephtys		Nephtys picta
GB16	4	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Onuphidae		Onuphis		Onuphis eremita
GB16	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Sigalionidae		Sthenelais		Sthenelais limicola
GB16	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				
GB16	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Caulleriella		Caulleriella venefica
GB16	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Prionospio		sp.
GB16	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Orbiniidae		Leitoscoloplos		sp.

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB16	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Orbiniidae		Phylo		Phylo felix
GB16	3	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Orbiniidae		Scoloplos		Scoloplos acmeceps
GB16	9	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae			Acmira	Aricidea (Acmira) catherinae
GB16	29	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Aricidea)	Aricidea (Aricidea) wassi
GB17	4	Animalia	Mollusca		Bivalvia										
GB17	2	Animalia	Mollusca		Bivalvia			Anomalodesmata			Pandoridae		Pandora		sp.
GB17	5	Animalia	Mollusca		Bivalvia	Protobranchia		Nuculoidea			Nuculidae		Nucula		Nucula proxima
GB17	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Mactroidea	Mactridae				
GB17	3	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Tellinidae		Angulus		Angulus versicolor
GB17	3	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Veneroidea	Veneridae				
GB17	77	Animalia	Echinodermata		Echinoidea										
GB17	2	Animalia	Mollusca		Gastropoda			Neogastropoda			Marginellidae		Eratoidea		Eratoidea hematita
GB17	1	Animalia	Ectoprocta		Gymnolaemata			Cheilostomatida			Cupuladriidae		Reussirella		Reussirella doma
GB17	1	Animalia	Cnidaria		Hydrozoa										
GB17	7	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB17	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		Unciola irrorata
GB17	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ischyroceridae		Jassa		Jassa marmorata
GB17	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Oedicerotidae		Americhelidium		Americhelidium americanum
GB17	7	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB17	5	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius hudsoni
GB17	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Pontoporeiidae		Bathyporeia		Bathyporeia parkeri
GB17	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Eucarida	Decapoda	Pleocyemata	Processoidea	Processidae		Processa		Processa hemphilli
GB17	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda	Valvifera		Idoteidae		Edotea		Edotea triloba
GB17	3	Animalia	Arthropoda	Crustacea	Ostracoda										
GB17	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris tenuis
GB17	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Sigalionidae		Sthenelais		Sthenelais limicola

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial	
GB17	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Orbiniidae		Scoloplos		Scoloplos rubra	
GB17	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae			Acmira	Aricidea (Acmira) catherinae	
GB18	1	Animalia	Nematoda													
GB18	1	Animalia	Chordata		Cephalochordata			Amphioxiformes			Branchiostomidae		Branchiostoma		Branchiostoma virginiae	
GB18	4	Animalia	Annelida		Clitellata	Oligochaeta										
GB18	19	Animalia	Echinodermata		Echinoidea											
GB18	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata	
GB18	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Protohaustorius		Protohaustorius wigleyi	
GB18	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Oedicerotidae		Americhelidium		Americhelidium americanum	
GB18	8	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus	
GB18	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda	Flabellifera		Cirolanidae		Politolana		Politolana polita	
GB18	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Tanaidacea	Tanaidomorpha	Paratanaoidea	Tanaissuidae		Tanaissus		Tanaissus psammophilus	
GB18	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Parougia		Parougia caeca	
GB18	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Protodorvillea		Protodorvillea kefersteini	
GB18	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrinerides		Lumbrinerides acuta	
GB18	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Phyllodocidae		Hesionura		Hesionura elongata	
GB18	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae					
GB18	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Streptosyllis		Streptosyllis websteri	
GB18	5	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Cauleriella		Cauleriella venefica	
GB18	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae	
GB18	3	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Acmira)	Aricidea (Acmira) cerrutii	
GB18	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Aricidea)	Aricidea (Aricidea) wassi	
GB19	2	Animalia	Mollusca		Bivalvia											
GB19	12	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Mactroidea	Mactridae					
GB19	6	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Mactroidea	Mactridae		Spisula		Spisula solidissima	
GB19	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Tellinidae					

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB19	4	Animalia	Echinodermata		Echinozoa										
GB19	1	Animalia	Mollusca		Gastropoda			Neogastropoda			Nassariidae		Tritia		Tritia trivittata
GB19	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Ampelisca		Ampelisca verrilli
GB19	7	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB19	9	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Corophiidae		Apocorophium		Apocorophium simile
GB19	6	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Acanthohaustorius		Acanthohaustorius millsii
GB19	10	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Protohaustorius		Protohaustorius wigleyi
GB19	8	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB19	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Pontoporeiidae		Bathyporeia		Bathyporeia parkeri
GB19	1	Animalia	Arthropoda	Crustacea	Maxillopoda	Copepoda		Harpacticoida							
GB19	1	Animalia	Arthropoda	Crustacea	Ostracoda										
GB19	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllococida		Nephtyidae		Nephtys		Nephtys picta
GB19	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB19	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Orbiniidae		Orbinia		sp.
GB19	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Acmira	Aricidea (Acmira)	Aricidea (Acmira) catherinae
GB19	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Aricidea)	Aricidea (Aricidea) wassi
GB20	2	Animalia	Nematoda												
GB20	4	Animalia	Nemertea												
GB20	8	Animalia	Mollusca		Bivalvia										
GB20	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenioidea					
GB20	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Veneroidea	Veneridae		Pitar		Pitar morrhuanus
GB20	1	Animalia	Mollusca		Gastropoda			Heterostrophoidea			Pyramidellidae		Turbonilla		sp.
GB20	2	Animalia	Mollusca		Gastropoda			Neogastropoda			Nassariidae		Tritia		Tritia trivittata
GB20	1	Animalia	Ectoprocta		Gymnolaemata			Cheilostomatida			Cribrillinae		Cribrillina		Cribrillina macropunctata
GB20	8	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Ampelisca		Ampelisca verrilli
GB20	68	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB20	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		Unciola irrorata
GB20	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Corophiidae		Apocorophium		Apocorophium simile
GB20	16	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Protohaustorius		Protohaustorius deichmannae
GB20	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Oedicerotidae		Americhelidium		Americhelidium americanum
GB20	8	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius hudsoni
GB20	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Eucarida	Decapoda	Pleocyemata	Paguroidea	Paguridae				
GB20	3	Animalia	Arthropoda	Crustacea	Ostracoda										
GB20	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris fragilis
GB20	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae		Nephtys		Nephtys picta
GB20	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				
GB20	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Orbiniidae		Phylo		Phylo felix
GB20	23	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Acmira		Aricidea (Acmira) catherinae
GB20	17	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea (Aricidea)		Aricidea (Aricidea) wassi
GB20	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Paraonis		Paraonis fulgens
GB21	1	Animalia	Nematoda												
GB21	1	Animalia	Nemertea		Anopla	Palaeonemertea					Tubulanidae				
GB21	1	Animalia	Mollusca		Bivalvia			Mytiloidea			Mytilidae				
GB21	4	Animalia	Mollusca		Bivalvia	Protobranchia		Nuculoidea			Nuculidae		Nucula		Nucula proxima
GB21	64	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenoidea					
GB21	8	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Mactroidea	Mactridae		Spisula		Spisula solidissima
GB21	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Tellinidae		Angulus		Angulus versicolor
GB21	1	Animalia	Chordata		Cephalochordata			Amphioxiformes			Branchiostomidae		Branchiostoma		Branchiostoma virginiae
GB21	1	Animalia	Annelida		Clitellata	Oligochaeta									
GB21	2	Animalia	Echinodermata		Echinoidea										
GB21	1	Animalia	Mollusca		Gastropoda			Cephalaspidea			Cylichnidae		Cylichnella		Cylichnella bidentata
GB21	1	Animalia	Mollusca		Gastropoda			Neogastropoda			Nassariidae		Tritia		Tritia trivittata

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB21	11	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Ampelisca		Ampelisca verrilli
GB21	5	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB21	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		Unciola irrorata
GB21	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Protohaustorius		Protohaustorius deichmannae
GB21	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Oedicerotidae		Americhelidium		Americhelidium americanum
GB21	10	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius hudsoni
GB21	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda	Anthuridea		Anthuridae		Ptilanthura		Ptilanthura tenuis
GB21	13	Animalia	Arthropoda	Crustacea	Ostracoda										
GB21	5	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Scalibregmatidae		Scalibregma		Scalibregma inflatum
GB21	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris tenuis
GB21	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae		Nephtys		Nephtys picta
GB21	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Oeonidae		Drilonereis		Drilonereis longa
GB21	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Sigalionidae		Sthenelais		Sthenelais limicola
GB21	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Chaetopteridae		Spiochaetopterus		Spiochaetopterus oculus
GB21	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				
GB21	10	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Prionospio		Prionospio pygmaeus
GB21	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Spiophanes		Spiophanes bombyx Complex
GB21	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Orbiniidae		Scoloplos		Scoloplos acmeceps
GB21	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Orbiniidae		Scoloplos		Scoloplos rubra
GB22	2	Animalia	Nemertea												
GB22	1	Animalia	Nemertea		Anopla			Heteronemertea			Lineidae				
GB22	11	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenioidea					
GB22	6	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Mactroidea	Mactridae		Spisula		Spisula solidissima
GB22	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenioidea	Pharidae		Ensis		Ensis leei
GB22	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Tellinidae				
GB22	2	Animalia	Chordata		Cephalochordata			Amphioxiformes			Branchiostomidae		Branchiostoma		Branchiostoma virginiae

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB22	2	Animalia	Annelida		Clitellata	Oligochaeta									
GB22	1	Animalia	Echinodermata		Echinoidea										
GB22	2	Animalia	Mollusca		Gastropoda			Heterostropha			Pyramidellidae		Turbonilla		sp.
GB22	3	Animalia	Mollusca		Gastropoda			Neogastropoda			Nassariidae		Tritia		Tritia trivittata
GB22	13	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB22	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Oedicerotidae		Americhelidium		Americhelidium americanum
GB22	7	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius hudsoni
GB22	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Pontoporeiidae		Bathyporeia		Bathyporeia parkeri
GB22	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Synopiidae		Tiron		Tiron spiniferus
GB22	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda	Anthuridea		Anthuridae		Amakusanthura		Amakusanthura magnifica
GB22	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda	Valvifera		Idoteidae		Edotea		Edotea triloba
GB22	2	Animalia	Arthropoda	Crustacea	Ostracoda										
GB22	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Protodorvillea		Protodorvillea kefersteini
GB22	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris tenuis
GB22	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae		Nephtys		Nephtys picta
GB22	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Oeonidae		Drilonereis		Drilonereis longa
GB22	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Sigalionidae		Sthenelais		Sthenelais limicola
GB22	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				
GB22	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Cauleriella		Cauleriella venefica
GB22	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Prionospio		Prionospio pygmaeus
GB22	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Orbiniidae		Leitoscoloplos		Leitoscoloplos fragilis
GB22	11	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Acmira	Aricidea (Acmira)	Aricidea (Acmira) catherinae
GB22	4	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Aricidea)	Aricidea (Aricidea) wassi
GB23	4	Animalia	Nematoda												
GB23	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Arcticoidea	Arcticidae		Arctica		Arctica islandica
GB23	13	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Mactroidea	Mactridae		Spisula		Spisula solidissima

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB23	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Semelidae		Ervilia		Ervilia concentrica
GB23	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Tellinidae		Angulus		Angulus versicolor
GB23	9	Animalia	Echinodermata		Echinoidea										
GB23	4	Animalia	Mollusca		Gastropoda			Neogastropoda			Nassariidae		Tritia		Tritia trivittata
GB23	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Ampelisca		Ampelisca verrilli
GB23	6	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Protohaustorius		Protohaustorius wigleyi
GB23	15	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB23	6	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Pontoporeiidae		Bathyporeia		Bathyporeia parkeri
GB23	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Cumacea			Bodotriidae		Cyclaspis		Cyclaspis pustulata
GB23	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Eucarida	Decapoda	Pleocyemata	Paguroidea	Paguridae				
GB23	1	Animalia	Arthropoda	Crustacea	Ostracoda										
GB23	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Capitellidae		Notomastus		Notomastus hemipodus
GB23	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Oeonidae		Drilonereis		Drilonereis longa
GB23	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Onuphidae		Onuphis		Onuphis eremita
GB23	3	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Aricidea)	Aricidea (Aricidea) wassi
GB23	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Cirrophorus		Cirrophorus furcatus
GB24	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Mactroidea	Mactridae		Spisula		Spisula solidissima
GB24	6	Animalia	Echinodermata		Echinoidea										
GB24	2	Animalia	Echinodermata		Echinoidea			Clypeasteroidea			Echinarachniidae		Echinarachnius		Echinarachnius parma
GB24	1	Animalia	Mollusca		Gastropoda			Neogastropoda			Nassariidae		Tritia		Tritia trivittata
GB24	5	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Acanthohaustorius		Acanthohaustorius millsi
GB24	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Protohaustorius		Protohaustorius wigleyi
GB24	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Oedicerotidae		Americhelidium		Americhelidium americanum
GB24	9	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Tanaidacea	Tanaidomorpha	Paratanaoidea	Tanaissuidae		Tanaissus		Tanaissus psammophilus
GB24	1	Animalia	Arthropoda	Crustacea	Ostracoda										
GB24	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllococida		Nephtyidae		Nephtys		Nephtys picta

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB24	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Caulleriella		Caulleriella venefica
GB24	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Spiophanes		Spiophanes bombyx Complex
GB24	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Aricidea)	Aricidea (Aricidea) wassi
GB24	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Cirrophorus		Cirrophorus furcatus
GB25	1	Animalia	Nemertea		Anopla	Palaeonemertea					Tubulanidae		Tubulanus		Tubulanus pellucidus
GB25	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Macroidea	Mactridae		Spisula		Spisula solidissima
GB25	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenoidea	Pharidae		Ensis		Ensis leei
GB25	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Tellinidae				
GB25	1	Animalia	Arthropoda	Crustacea	Cephalocarida						Hutchinsoniellidae		Hutchinsoniella		Hutchinsoniella macracantha
GB25	3	Animalia	Echinodermata		Echinoidea										
GB25	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda					Acanthohaustorius		sp.
GB25	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Oedicerotidae		Americhelidium		Americhelidium americanum
GB25	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Synopiidae		Tiron		Tiron spiniferus
GB25	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Cumacea			Diastylidae		Oxyurostylis		Oxyurostylis smithi
GB25	4	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Opheliidae		Travisia		Travisia parva
GB25	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae				
GB26	5	Animalia	Mollusca		Gastropoda			Neogastropoda			Columbellidae		Anachis		Cotonopsis lafresnayi
GB26	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Eucarida	Decapoda	Pleocyemata	Paguroidea	Paguridae				
GB27	81	Animalia	Nematoda												
GB27	3	Animalia	Nemertea		Anopla	Palaeonemertea					Tubulanidae				
GB27	1	Animalia	Nemertea		Anopla			Heteronemertea			Lineidae				
GB27	1	Animalia	Mollusca		Bivalvia										
GB27	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenoidea	Pharidae		Ensis		Ensis leei
GB27	4	Animalia	Chordata		Cephalochordata			Amphioxiformes			Branchiostomata		Branchiostoma		Branchiostoma virginiae
GB27	79	Animalia	Annelida		Clitellata	Oligochaeta									
GB27	1	Animalia	Mollusca		Gastropoda			Neotaenioglossa			Calyptraeidae		Crepidula		sp.

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB27	6	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		Unciola serrata
GB27	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Bateidae		Batea		Batea catharinensis
GB27	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Liljeborgiidae		Listriella		Idunella barnardi
GB27	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Eucarida	Decapoda	Pleocyemata	Paguroidea	Paguridae		Pagurus		Pagurus arcuatus
GB27	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Eucarida	Decapoda	Pleocyemata	Paguroidea	Paguridae		Pagurus		sp.
GB27	6	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda					Cyathura		Cyathura burbanki
GB27	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Capitellidae		Mediomastus		Mediomastus ambiseta
GB27	5	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Capitellidae		Notomastus		sp.
GB27	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Maldanidae		Clymenella		Clymenella mucosa
GB27	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Chrysopetalidae		Paleanotus		Paleanotus heteroseta
GB27	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB27	17	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris tenuis
GB27	6	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Phyllodocidae		Eumida		Eumida sanguinea
GB27	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Sigalionidae		Pisione		Pisione remota
GB27	11	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Eusyllis		Eusyllis lamelligera
GB27	10	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Exogone		Exogone dispar
GB27	60	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Parapionosyllis		Parapionosyllis longicirrata
GB27	5	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Sphaerosyllis		Sphaerosyllis taylori
GB27	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Ampharetidae		Asabellides		Ampharete oculata
GB27	51	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				
GB27	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Kirkegaardia		Kirkegaardia baptisteeae
GB27	14	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Tharyx		Tharyx sp. A sensu MWRA 2007
GB27	9	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB27	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Polydora		Polydora cornuta
GB27	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Prionospio		Prionospio perkinsi
GB27	8	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Spio		Spio filicornis

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB27	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Terebellidae		Polycirrus		Polycirrus eximius
GB27	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Terebellidae		Polycirrus		sp.
GB27	51	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Acmira	Aricidea (Acmira)	catherinae
GB28	19	Animalia	Nematoda												
GB28	1	Animalia	Nemertea												
GB28	1	Animalia	Nemertea		Anopla			Heteronemertea			Lineidae		Cerebratulus		sp.
GB28	2	Animalia	Nemertea		Anopla			Heteronemertea			Lineidae		Micrura		sp.
GB28	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Crassatelloidea	Crassatellidae		Crassinella		Crassinella lunulata
GB28	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenioidea	Pharidae		Ensis		Ensis leei
GB28	36	Animalia	Annelida		Clitellata	Oligochaeta									
GB28	1	Animalia	Ectoprocta		Gymnolaemata			Cheilostomatida			Electridae		Electra		Electra monostachys
GB28	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius hudsoni
GB28	30	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Capitellidae		Mediomastus		Mediomastus ambiseta
GB28	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Chrysopetalidae		Paleanotus		Paleanotus heteroseta
GB28	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB28	7	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris tenuis
GB28	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Oeonidae		Drilonereis		Drilonereis longa
GB28	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Pilargidae		Sigambra		Sigambra tentaculata
GB28	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Eusyllis		Eusyllis lamelligera
GB28	4	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Parapionosyllis		Parapionosyllis longicirrata
GB28	23	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				
GB28	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Aphelochaeta		Aphelochaeta marioni
GB28	16	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Caulleriella		Caulleriella venefica
GB28	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Kirkegaardia		Kirkegaardia baptistae
GB28	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Kirkegaardia		Kirkegaardia cf. dorsobranchialis
GB28	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Tharyx		Tharyx sp. A sensu MWRA 2007

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB28	5	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB28	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Prionospio		Prionospio perkinsi
GB28	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Prionospio		sp.
GB28	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Spio		Spio filicornis
GB28	9	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Spiophanes		Spiophanes bombyx Complex
GB28	69	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Acmira	Aricidea (Acmira)	Acmira catherinae
GB29	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Mactroidea	Mactridae		Spisula		Spisula solidissima
GB29	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenioidea	Pharidae		Ensis		Ensis leei
GB29	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Tellinidae				
GB29	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Tellinidae		Macoma		Macoma balthica
GB29	2	Animalia	Mollusca		Gastropoda			Cephalaspidea			Cylichnidae		Cylichnella		Cylichnella bidentata
GB29	1	Animalia	Mollusca		Gastropoda			Heterostropha			Pyramidellidae		Turbonilla		sp.
GB29	4	Animalia	Mollusca		Gastropoda			Neogastropoda			Columbellidae		Parvanachis		Parvanachis obesa
GB29	1	Animalia	Mollusca		Gastropoda			Neogastropoda			Nassariidae		Tritia		Tritia trivittata
GB29	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Microprotopidae		Microprotopus		Microprotopus raneyi
GB29	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda	Valvifera		Idoteidae		Edotea		Edotea triloba
GB29	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Capitellidae		Mediomastus		sp.
GB29	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Glycera		Glycera capitata
GB29	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae				
GB29	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae		Aglaophamus		Aglaophamus verrilli
GB29	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae		Nephtys		Nephtys picta
GB29	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Ampharetidae		Asabellides		Ampharete oculata
GB29	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Sabellida		Oweniidae		Owenia		Owenia fusiformis
GB29	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Prionospio		Prionospio pygmaeus
GB29	10	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Prionospio		sp.
GB30	1	Animalia	Nematoda												

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB30	1	Animalia	Mollusca		Bivalvia	Pteriomorpha		Arcoida			Arcidae		Anadara		Lunarca ovalis
GB30	6	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Mactroidea	Mactridae		Spisula		Spisula solidissima
GB30	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenoidea	Pharidae		Ensis		Ensis leei
GB30	3	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Tellinidae				
GB30	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Microprotopidae		Microprotopus		Microprotopus raneyi
GB30	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Oedicerotidae		Americhelidium		Americhelidium americanum
GB30	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Cumacea			Diastylidae		Oxyurostylis		Oxyurostylis smithi
GB30	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Eucarida	Decapoda	Pleocyemata	Pinnotheroidea	Pinnotheridae		Pinnixa		Pinnixa lunzi
GB30	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Capitellidae		Mediomastus		sp.
GB30	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae				
GB30	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae		Aglaophamus		Aglaophamus verilli
GB30	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae		Nephtys		Nephtys picta
GB30	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Sabellida		Oweniidae		Owenia		Owenia fusiformis
GB30	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Prionospio		Prionospio pygmaeus
GB30	79	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Prionospio		sp.
GB30	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Scolecopsis		Scolecopsis (Parascolecopsis) texana
GB30	11	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Spiophanes		Spiophanes bombyx Complex
GB30	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Acmira	Aricidea (Acmira)	Acmira catherinae
GB31	1	Animalia	Mollusca		Bivalvia			Mytiloidea			Mytilidae				
GB31	3	Animalia	Mollusca		Bivalvia	Protobranchia		Nuculoidea			Nuculidae		Nucula		Nucula proxima
GB31	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Mactroidea	Mactridae		Spisula		Spisula solidissima
GB31	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenoidea	Pharidae		Ensis		Ensis leei
GB31	1	Animalia	Echinodermata		Echinozoa										
GB31	82	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB31	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Protohaustorius		Protohaustorius deichmannae
GB31	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB31	4	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius hudsoni
GB31	31	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		sp.
GB31	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Eucarida	Decapoda	Pleocyemata	Paguroidea	Paguridae		Pagurus		sp.
GB31	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris fragilis
GB31	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae		Nephtys		Nephtys picta
GB31	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Ampharetidae		Asabellides		Ampharete oculata
GB31	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Caulleriella		Caulleriella venefica
GB31	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Acmira	Aricidea	(Acmira) catherinae
GB31	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Aricidea)	Aricidea (Aricidea) wassi
GB32	1	Animalia	Nematoda												
GB32	1	Animalia	Mollusca		Bivalvia										
GB32	3	Animalia	Mollusca		Bivalvia	Protobranchia		Nuculoida			Nuculidae		Nucula		Nucula proxima
GB32	9	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroida		Solenioidea					
GB32	11	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroida		Mactroidea	Mactridae		Spisula		Spisula solidissima
GB32	1	Animalia	Mollusca		Gastropoda			Neogastropoda			Nassariidae		Tritia		Tritia trivittata
GB32	14	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Ampelisca		Ampelisca verrilli
GB32	88	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB32	7	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Protohaustorius		Protohaustorius deichmannae
GB32	6	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Liljeborgiidae		Listriella		Idunella barnardi
GB32	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Oedicerotidae		Americhelidium		Americhelidium americanum
GB32	10	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius hudsoni
GB32	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Pontoporeiidae		Bathyporeia		Bathyporeia parkeri
GB32	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Eucarida	Decapoda	Pleocyemata		Ogyrididae		Ogyrides		Ogyrides alphaerostris
GB32	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Eucarida	Decapoda	Pleocyemata	Portunoidea	Polybiidae		Ovalipes		Ovalipes ocellatus
GB32	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda	Anthuridea		Anthuridae		Ptilanthura		Ptilanthura tenuis
GB32	4	Animalia	Arthropoda	Crustacea	Ostracoda										

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB32	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Scalibregmatidae		Scalibregma		Scalibregma inflatum
GB32	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae				
GB32	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Onuphidae		Onuphis		Onuphis eremita
GB32	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Sigalionidae		Sthenelais		Sthenelais limicola
GB32	4	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				
GB32	4	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Prionospio		sp.
GB32	5	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida			Orbiniida		Paraonidae			Acmira	Aricidea (Acmira) catherinae
GB32	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida			Orbiniida		Paraonidae		Aricidea	(Aricidea)	Aricidea (Aricidea) wassi
GB33	1	Animalia	Nemertea		Anopla			Heteronemerta			Lineidae				
GB33	4	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenioidea					
GB33	9	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Mactroidea	Mactridae		Spisula		Spisula solidissima
GB33	1	Animalia	Echinodermata		Echinoidea										
GB33	5	Animalia	Mollusca		Gastropoda			Neogastropoda			Nassariidae		Tritia		Tritia trivittata
GB33	4	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Ampelisca		Ampelisca verrilli
GB33	32	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB33	5	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Acanthohaustorius		Acanthohaustorius millsii
GB33	4	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Protohaustorius		Protohaustorius deichmannae
GB33	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB33	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius hudsoni
GB33	9	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		sp.
GB33	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Pontoporeiidae		Bathyporeia		Bathyporeia parkeri
GB33	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda	Valvifera		Idoteidae		Edotea		Edotea triloba
GB33	4	Animalia	Arthropoda	Crustacea	Ostracoda										
GB33	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Sigalionidae		Sthenelais		Sthenelais limicola
GB33	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				
GB33	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Cauleriella		Cauleriella venefica

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB34	4	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Mactroidea	Mactridae		Spisula		Spisula solidissima
GB34	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Tellinidae				
GB34	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Veneroidea	Veneridae		Mercenaria		sp.
GB34	6	Animalia	Echinodermata												
GB34	2	Animalia	Mollusca		Gastropoda		Caenogastropoda			Conoidea	Mangeliidae		Cryoturris		Cryoturris cerinella
GB34	5	Animalia	Mollusca		Gastropoda			Heterostropha			Pyramidellidae		Turbonilla		sp.
GB34	14	Animalia	Mollusca		Gastropoda			Neogastropoda			Nassariidae		Tritia		Tritia trivittata
GB34	1	Animalia	Mollusca		Gastropoda			Neotaenioglossa			Calyptraeidae		Crepidula		Crepidula plana
GB34	1	Animalia	Cnidaria					Hydrozoa							
GB34	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Ampelisca		Ampelisca verrilli
GB34	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Protohaustorius		Protohaustorius deichmannae
GB34	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Oedicerotidae		Americhelidium		Americhelidium americanum
GB34	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Eucarida	Decapoda	Pleocyemata		Ogyrididae		Ogyrides		Ogyrides alphaerostris
GB34	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Eucarida	Decapoda	Pleocyemata	Paguroidea	Paguridae		Pagurus		Pagurus politus
GB34	1	Animalia	Annelida	Aclitellata	Polychaeta		Scolecida				Scalibregmatidae		Scalibregma		Scalibregma inflatum
GB34	2	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Aciculata	Phyllodocida		Nephtyidae				
GB34	4	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Aciculata	Phyllodocida		Nephtyidae		Nephtys		Nephtys picta
GB34	1	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Aciculata	Phyllodocida		Phyllodocidae		Phyllodoce		Phyllodoce mucosa
GB34	1	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Canalipalpata	Terebellida		Ampharetidae		Asabellides		Ampharete oculata
GB34	1	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Canalipalpata	Terebellida		Cirratulidae				
GB34	2	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Canalipalpata	Terebellida		Cirratulidae		Caulleriella		Caulleriella venefica
GB34	1	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Canalipalpata	Spionida		Spionidae		Prionospio		Prionospio pygmaeus
GB34	16	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Canalipalpata	Spionida		Spionidae		Prionospio		sp.
GB34	3	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Canalipalpata	Spionida		Spionidae		Spiophanes		Spiophanes bombyx Complex
GB34	7	Animalia	Annelida	Aclitellata	Polychaeta		Scolecida		Orbiniida		Paraonidae		Acmira		Aricidea (Acmira) catherinae
GB34	1	Animalia	Annelida	Aclitellata	Polychaeta		Scolecida		Orbiniida		Paraonidae		Aricidea	(Aricidea)	Aricidea (Aricidea) wassi

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB35	4	Animalia	Nemertea												
GB35	102	Animalia	Nematoda												
GB35	1	Animalia	Nemertea		Anopla	Palaeonemertea					Tubulanidae		Tubulanus		Tubulanus pellucidus
GB35	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenioidea					
GB35	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Tellinidae				
GB35	24	Animalia	Chordata		Cephalochordata			Amphioxiformes			Branchiostomidae		Branchiostoma		Branchiostoma virginiae
GB35	35	Animalia	Annelida		Clitellata	Oligochaeta									
GB35	1	Animalia	Annelida		Clitellata	Hirudinida		Rhynchobdellida			Piscicolidae				
GB35	1	Animalia	Nemertea		Enopla			Hoplonemertea	Monostilifera		Amphiporidae		Amphiporus		sp.
GB35	1	Animalia	Mollusca		Gastropoda			Neotaenioglossa			Naticidae		Neverita		Neverita duplicata
GB35	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Corophiidea		Photidae		Gammaropsis		Gammaropsis cf. nitida
GB35	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB35	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Maldanidae				
GB35	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Maldanidae		Clymenella		Clymenella zonalis
GB35	4	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Opheliidae		Ophelia		Ophelia bicornis
GB35	12	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Opheliidae		Travisia		Travisia parva
GB35	10	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB35	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrinerides		Lumbrinerides acuta
GB35	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris tenuis
GB35	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Oeonidae		Drilonereis		Drilonereis longa
GB35	7	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Phyllodocidae		Eumida		Eumida sanguinea
GB35	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Sigalionidae		Pisione		Pisione remota
GB35	12	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Eusyllis		Eusyllis lamelligera
GB35	34	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Parapionosyllis		Parapionosyllis longicirrata
GB35	9	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Sphaerosyllis		Sphaerosyllis taylori
GB35	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Streptosyllis		Streptosyllis websteri

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB35	8	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				
GB35	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Kirkegaardia		Kirkegaardia baptisteae
GB35	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Tharyx		Tharyx acutus
GB35	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB35	5	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Spio		Spio filicornis
GB35	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Terebellidae		Polycirrus		Polycirrus eximius
GB35	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Terebellidae		Polycirrus		sp.
GB35	13	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Acmira	Aricidea (Acmira)	Aricidea (Acmira) catherinae
GB35	3	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Acmira)	Aricidea (Acmira) cerrutii
GB36	1	Animalia	Nemertea												
GB36	37	Animalia	Nematoda												
GB36	1	Animalia	Nemertea		Anopla	Palaeonemertea					Tubulanidae		Tubulanus		Tubulanus pellucidus
GB36	1	Animalia	Mollusca		Bivalvia	Protobranchia		Nuculoida			Nuculidae		Nucula		Nucula proxima
GB36	3	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroida		Mactroidea	Mactridae		Spisula		Spisula solidissima
GB36	5	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroida		Solenioidea	Pharidae		Ensis		Ensis leei
GB36	8	Animalia	Chordata		Cephalochordata			Amphioxiformes			Branchiostomidae		Branchiostoma		Branchiostoma virginiae
GB36	56	Animalia	Annelida		Clitellata	Oligochaeta									
GB36	1	Animalia	Annelida		Clitellata	Hirudinida		Rhynchobdellida			Piscicolidae				
GB36	1	Animalia	Mollusca		Gastropoda			Neogastropoda			Marginellidae				
GB36	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		Unciola serrata
GB36	14	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Tanaidacea	Tanaidomorpha	Paratanaoidea	Tanaissuidae		Tanaissus		Tanaissus psammophilus
GB36	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Opheliidae		Ophelia		Ophelia bicornis
GB36	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Protodorvillea		Protodorvillea kefersteini
GB36	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB36	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrinerides		Lumbrinerides acuta
GB36	10	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris tenuis

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB36	50	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Eusyllis		Eusyllis lamelligera
GB36	39	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Parapionosyllis		Parapionosyllis longicirrata
GB36	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Streptosyllis		Streptosyllis websteri
GB36	58	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				
GB36	12	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Aphelochaeta		Aphelochaeta marioni
GB36	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Tharyx		Tharyx sp. A sensu MWRA 2007
GB36	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB36	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Orbiniidae		Scoloplos		Scoloplos acmeceps
GB36	70	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Acmira	Aricidea (Acmira)	Acmira catherinae
GB36	26	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Acmira)	Aricidea (Acmira) cerrutii
GB36	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Paradoneis		Paradoneis lyra
GB37	10	Animalia	Nematoda												
GB37	1	Animalia	Nemertea		Anopla	Palaeonemertea					Tubulanidae				
GB37	1	Animalia	Echinodermata		Asterozoa										
GB37	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Macrozoidea	Macruridae		Spisula		Spisula solidissima
GB37	4	Animalia	Chordata		Cephalochordata			Amphioxiformes			Branchiostomidae		Branchiostoma		Branchiostoma virginiae
GB37	2	Animalia	Annelida		Clitellata	Oligochaeta									
GB37	1	Animalia	Echinodermata		Echinozoa										
GB37	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB37	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ischyroceridae		Jassa		Jassa marmorata
GB37	6	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB37	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius hudsoni
GB37	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		sp.
GB37	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Eucarida	Decapoda	Pleocyemata	Cancrozoidea	Cancridae		Cancer		Cancer irroratus
GB37	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB37	4	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Goniadidae		Goniadella		Goniadella gracilis

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB37	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris fragilis
GB37	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Parapionosyllis		Parapionosyllis longicirrata
GB37	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				
GB37	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Aphelochaeta		Aphelochaeta marioni
GB37	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Caulleriella		Caulleriella venefica
GB37	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB37	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Orbiniidae		Scoloplos		Scoloplos acmeiceps
GB38	23	Animalia	Nematoda												
GB38	1	Animalia	Nemertea												
GB38	2	Animalia	Mollusca		Bivalvia										
GB38	5	Animalia	Mollusca		Bivalvia			Anomalodesmata			Pandoridae		Pandora		sp.
GB38	2	Animalia	Mollusca		Bivalvia			Anomalodesmata			Periplomatidae		Periploma		sp.
GB38	4	Animalia	Chordata		Cephalochordata			Amphioxiformes			Branchiostomidae		Branchiostoma		Branchiostoma virginiae
GB38	22	Animalia	Annelida		Clitellata	Oligochaeta									
GB38	29	Animalia	Echinodermata		Echinoidea										
GB38	1	Animalia	Ectoprocta		Gymnolaemata			Cheilostomatida			Cribrulinidae		Cribrilina		Cribrilina macropunctata
GB38	2	Animalia	Ectoprocta		Gymnolaemata			Cheilostomatida			Cupuladriidae		Reussirella		Reussirella doma
GB38	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB38	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		Unciola serrata
GB38	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Hadzioidea		Maeridae				
GB38	11	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB38	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Cumacea			Bodotriidae		Cyclaspis		Cyclaspis varians
GB38	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Eucarida	Decapoda	Pleocyemata	Paguroidea	Paguridae		Pagurus		sp.
GB38	1	Animalia	Arthropoda	Crustacea	Maxillopoda	Copepoda		Harpacticoida							
GB38	1	Animalia	Arthropoda	Crustacea	Ostracoda										
GB38	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Maldanidae				

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB38	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Pettiboneia		Pettiboneia duofurca
GB38	38	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Protodorvillea		Protodorvillea kefersteini
GB38	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB38	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Goniadidae		Goniadella		Goniadella gracilis
GB38	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Hesionidae		Microphthalmus		sp.
GB38	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrinerides		Lumbrinerides acuta
GB38	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae		Nephtys		Nephtys picta
GB38	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Phyllodocidae		Hesionura		Hesionura elongata
GB38	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Polynoidea		Harmothoe		Harmothoe extenuata
GB38	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Sphaerodoridae		Sphaerodoropsis		Sphaerodoropsis corrugata
GB38	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Eusyllis		Eusyllis lamelligera
GB38	5	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Parapionosyllis		Parapionosyllis longicirrata
GB38	4	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				
GB38	5	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Aphelochaeta		Aphelochaeta marioni
GB38	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Cauleriella		Cauleriella venefica
GB38	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB38	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Dipolydora		Dipolydora socialis
GB38	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Paraonidae		Acmira	Aricidea (Acmira)	Acmira catherinae
GB38	14	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Paraonidae		Aricidea	(Acmira)	Aricidea (Acmira) cerrutii
GB38	7	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Paraonidae		Paradoneis		Paradoneis lyra
GB39	1	Animalia	Nemertea		Anopla			Paleonemertea			Carinomidae		Carinomella		Carinomella lactea
GB39	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroida		Mactroidea	Mactridae		Spisula		Spisula solidissima
GB39	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroida		Solenioidea	Pharidae		Ensis		Ensis leei
GB39	3	Animalia	Annelida		Clitellata	Oligochaeta									
GB39	4	Animalia	Echinodermata		Echinoidea										
GB39	1	Animalia	Arthropoda	Crustacea	Malacostraca		Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae	Byblis		Byblis serrata

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB39	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Acanthohaustorius		Acanthohaustorius millsi
GB39	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Protohaustorius		Protohaustorius deichmannae
GB39	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Protohaustorius		Protohaustorius wigleyi
GB39	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ischyroceridae		Jassa		Jassa marmorata
GB39	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Oedicerotidae		Americhelidium		Americhelidium americanum
GB39	5	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB39	2	Animalia	Arthropoda	Crustacea	Ostracoda										
GB39	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Glycera		Glycera capitata
GB39	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB39	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Onuphidae				
GB39	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Caulleriella		Caulleriella venefica
GB39	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Acmira	Aricidea (Acmira)	Acmira catherinae
GB40	2	Animalia	Mollusca		Bivalvia	Pteriomorpha		Ostreoida			Pectinidae				
GB40	5	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroida		Solenioidea	Pharidae		Ensis		Ensis leei
GB40	11	Animalia	Annelida		Clitellata	Oligochaeta									
GB40	7	Animalia	Echinodermata		Echinoidea										
GB40	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Ampelisca		Ampelisca vadorum
GB40	8	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB40	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		sp.
GB40	11	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Liljeborgiidae		Liljeborgia		sp.
GB40	9	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB40	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Cumacea			Bodotriidae		Cyclaspis		Cyclaspis varians
GB40	1	Animalia	Arthropoda	Crustacea	Ostracoda										
GB40	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Maldanidae				
GB40	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Opheliidae		Armandia		Armandia maculata
GB40	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Pettiboneia		Pettiboneia duofurca

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB40	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Protodorvillea		Protodorvillea kefersteini
GB40	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Goniadidae		Goniadella		Goniadella gracilis
GB40	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris fragilis
GB40	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				
GB40	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Caulleriella		Caulleriella venefica
GB40	8	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB40	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Dipolydora		Dipolydora socialis
GB40	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Orbiniidae		Scoloplos		Scoloplos acmeceps
GB40	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae				
GB40	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Acmira	Aricidea (Acmira)	Acmira catherinae
GB41	1	Animalia	Nematoda												
GB41	1	Animalia	Mollusca		Bivalvia	Protobranchia		Nuculoida			Nuculidae		Nucula		Nucula proxima
GB41	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroida		Mactroidea	Mactridae		Spisula		Spisula solidissima
GB41	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroida		Tellinoidea	Semelidae		Ervilia		Ervilia concentrica
GB41	9	Animalia	Echinodermata	Echinoidea											
GB41	1	Animalia	Mollusca		Gastropoda			Neogastropoda			Marginellidae		Eratoidea		Eratoidea hematita
GB41	1	Animalia	Ectoprocta		Gymnolaemata			Cheilostomatida			Cupuladriidae		Reussirella		Reussirella doma
GB41	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB41	5	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Acanthohaustorius		Acanthohaustorius millsi
GB41	6	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Protohaustorius		Protohaustorius wigleyi
GB41	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Liljeborgiidae		Liljeborgia		sp.
GB41	12	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB41	10	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius hudsoni
GB41	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda	Valvifera		Chaetiliidae		Chiridotea		Chiridotea tuftsii
GB41	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda	Valvifera		Idoteidae		Edotea		Edotea triloba
GB41	18	Animalia	Arthropoda	Crustacea	Ostracoda										

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB41	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Streptosyllis		Streptosyllis arenae
GB41	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Caulleriella		Caulleriella venefica
GB41	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Aricidea)	Aricidea (Aricidea) wassi
GB42	75	Animalia	Nematoda												
GB42	1	Animalia	Nemertea		Anopla	Palaeonemertea					Tubulanidae				
GB42	7	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenioidea					
GB42	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Mactroidea	Mactridae		Spisula		Spisula solidissima
GB42	4	Animalia	Chordata		Cephalochordata			Amphioxiformes			Branchiostomidae		Branchiostoma		Branchiostoma virginiae
GB42	14	Animalia	Annelida		Clitellata	Oligochaeta									
GB42	1	Animalia	Mollusca		Gastropoda			Neotaenioglossa			Caecidae		Caecum		Caecum johnsoni
GB42	1	Animalia	Ectoprocta		Gymnolaemata			Cheilostomatida			Cribrilineidae		Cribrilina		Cribrilina macropunctata
GB42	1	Animalia	Ectoprocta		Gymnolaemata			Cheilostomatida			Electridae		Electra		Electra monostachys
GB42	1	Animalia	Ectoprocta		Gymnolaemata			Cheilostomatida			Membraniporidae		Biflustra		Biflustra tenuis
GB42	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ischyroceridae		Jassa		Jassa marmorata
GB42	29	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Liljeborgiidae		Liljeborgia		sp.
GB42	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB42	7	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Eucarida	Decapoda	Pleocyemata	Paguroidea	Paguridae		Pagurus		Pagurus arcuatus
GB42	2	Animalia	Arthropoda	Crustacea	Maxillopoda	Copepoda		Harpacticoida							
GB42	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Maldanidae		Clymenella		Clymenella mucosa
GB42	71	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Scalibregmatidae		Scalibregma		Scalibregma inflatum
GB42	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB42	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Polynoidea		Harmothoe		Harmothoe extenuata
GB42	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB42	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Spio		Spio filicornis
GB42	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Orbiniidae		Leitoscoloplos		Leitoscoloplos fragilis
GB43	2	Animalia	Nematoda												

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB43	2	Animalia	Mollusca		Bivalvia			Anomalodesmata			Pandoridae		Pandora		sp.
GB43	1	Animalia	Echinodermata		Echinoidea										
GB43	1	Animalia	Cnidaria		Hydrozoa										
GB43	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Acanthohaustorius		Acanthohaustorius millsii
GB43	4	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Protohaustorius		Protohaustorius wigleyi
GB43	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB43	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius hudsoni
GB43	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		sp.
GB43	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Isopoda	Valvifera		Chaetiliidae		Chiridotea		Chiridotea tuftsii
GB43	4	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Tanaidacea	Tanaidomorpha	Paratanaoidea	Tanaissuidae		Tanaissus		Tanaissus psammophilus
GB43	8	Animalia	Arthropoda	Crustacea	Ostracoda										
GB43	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Aricidea)	Aricidea (Aricidea) wassii
GB44	2	Animalia	Nemertea												
GB44	34	Animalia	Nematoda												
GB44	2	Animalia	Chordata	Tunicata	Ascidiacea										
GB44	4	Animalia	Mollusca		Bivalvia										
GB44	4	Animalia	Mollusca		Bivalvia			Anomalodesmata			Pandoridae		Pandora		sp.
GB44	2	Animalia	Mollusca		Bivalvia			Anomalodesmata			Periplomatidae		Periploma		sp.
GB44	1	Animalia	Mollusca		Bivalvia			Mytiloidea			Mytilidae				
GB44	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenoidea					
GB44	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Mactroidea	Mactridae		Spisula		Spisula solidissima
GB44	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenoidea	Pharidae		Ensis		Ensis leei
GB44	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Semelidae		Ervilia		Ervilia concentrica
GB44	1	Animalia	Chordata		Cephalochordata			Amphioxiformes			Branchiostomata		Branchiostoma		Branchiostoma virginiae
GB44	4	Animalia	Annelida		Clitellata	Oligochaeta									
GB44	18	Animalia	Echinodermata		Echinoidea										

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Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB44	2	Animalia	Mollusca		Gastropoda			Neotaenioglossa			Caecidae		Caecum		Caecum johnsoni
GB44	2	Animalia	Ectoprocta		Gymnolaemata			Cheilostomatida			Cupuladriidae		Reussirella		Reussirella doma
GB44	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Liljeborgiidae		Liljeborgia		sp.
GB44	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda		Hadzioidea	Maeridae				
GB44	4	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB44	1	Animalia	Arthropoda	Crustacea	Maxillopoda	Copepoda		Harpacticoida							
GB44	2	Animalia	Arthropoda	Crustacea	Ostracoda										
GB44	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Opheliidae		Armandia		Armandia maculata
GB44	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB44	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrinerides		Lumbrinerides acuta
GB44	5	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Onuphidae				
GB44	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Phyllodocidae		Hesionura		Hesionura elongata
GB44	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Sigalionidae		Sigalion		Sigalion arenicola
GB44	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Ampharetidae		Asabellides		Ampharete oculata
GB44	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Cauleriella		Cauleriella venefica
GB44	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Paraprionospio		Paraprionospio pinnata
GB44	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Spio		Spio filicornis
GB44	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Acmira	Aricidea (Acmira)	Acmira catherinae
GB45	1	Animalia	Nematoda												
GB45	8	Animalia	Mollusca		Bivalvia			Anomalodesmata			Pandoridae		Pandora		sp.
GB45	3	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenioidea					
GB45	9	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Mactroidea	Mactridae		Spisula		Spisula solidissima
GB45	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenioidea	Pharidae		Ensis		Ensis leei
GB45	1	Animalia	Chordata		Cephalochordata			Amphioxiformes			Branchiostomidae		Branchiostoma		Branchiostoma virginiae
GB45	1	Animalia	Annelida		Clitellata	Oligochaeta									
GB45	10	Animalia	Echinodermata		Echinozoa										

KITTY HAWK BENTHIC ASSESSMENT REPORT

Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB45	1	Animalia	Mollusca		Gastropoda			Neogastropoda			Marginellidae		Eratoidea		Eratoidea hematita
GB45	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB45	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Acanthohaustorius		Acanthohaustorius millsii
GB45	7	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Protohaustorius		Protohaustorius wigleyi
GB45	2	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Oedicerotidae		Americhelidium		Americhelidium americanum
GB45	7	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB45	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Pontoporeiidae		Bathyporeia		Bathyporeia parkeri
GB45	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Eucarida	Decapoda	Pleocyemata	Paguroidea	Paguridae		Pagurus		Pagurus arcuatus
GB45	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Tanaidacea	Tanaidomorpha	Paratanaoidea	Tanaissuidae		Tanaissus		Tanaissus psammophilus
GB45	2	Animalia	Arthropoda	Crustacea	Ostracoda										
GB45	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB45	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Aricidea)	Aricidea (Aricidea) wassi
GB46	4	Animalia	Nematoda												
GB46	2	Animalia	Mollusca		Bivalvia			Anomalodesmata			Pandoridae		Pandora		sp.
GB46	3	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenioidea					
GB46	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Mactroidea	Mactridae		Spisula		Spisula solidissima
GB46	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Solenioidea	Pharidae		Ensis		Ensis leei
GB46	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Tellinoidea	Tellinidae		Angulus		Angulus tenellus
GB46	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Lucinoidea	Ungulinidae		Diplodonta		Diplodonta punctata
GB46	3	Animalia	Echinodermata		Echinoidea										
GB46	1	Animalia	Mollusca		Gastropoda			Neogastropoda			Marginellidae		Eratoidea		Eratoidea hematita
GB46	1	Animalia	Mollusca		Gastropoda			Neogastropoda			Nassariidae		Tritia		Tritia trivittata
GB46	59	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB46	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Haustoriidae		Protohaustorius		Protohaustorius wigleyi
GB46	13	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB46	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Tanaidacea	Tanaidomorpha	Paratanaoidea	Tanaissuidae		Tanaissus		Tanaissus psammophilus

KITTY HAWK BENTHIC ASSESSMENT REPORT

Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB46	1	Animalia	Arthropoda	Crustacea	Ostracoda										
GB46	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Protodorvillea		Protodorvillea kefersteini
GB46	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris fragilis
GB46	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae		Nephtys		Nephtys picta
GB46	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Syllidae		Streptosyllis		Streptosyllis websteri
GB46	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Caulleriella		Caulleriella venefica
GB46	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Magelonidae		Magelona		Magelona papillicornis
GB46	8	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea (Aricidea)		Aricidea (Aricidea) wassi
GB46	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Paraonis		Paraonis pygoenigmatica
GB47	2	Animalia	Mollusca		Bivalvia			Anomalodesmata			Pandoridae		Pandora		sp.
GB47	1	Animalia	Mollusca		Bivalvia			Mytiloidea			Mytilidae				
GB47	9	Animalia	Mollusca		Bivalvia	Protobranchia		Nuculoidea			Nuculidae		Nucula		Nucula proxima
GB47	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea			Astartidae		Astarte		sp.
GB47	2	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Carditoidea	Carditidae		Cyclocardia		Cyclocardia borealis
GB47	6	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Mactroidea	Mactridae		Spisula		Spisula solidissima
GB47	1	Animalia	Mollusca		Bivalvia	Heterodonta		Veneroidea		Lucinoidea	Ungulinidae		Diplodonta		Diplodonta punctata
GB47	1	Animalia	Annelida		Clitellata	Oligochaeta									
GB47	31	Animalia	Echinodermata		Echinoidea										
GB47	1	Animalia	Mollusca		Gastropoda			Neogastropoda			Nassariidae		Tritia		Tritia trivittata
GB47	8	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ampeliscidae		Byblis		Byblis serrata
GB47	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		Unciola irrorata
GB47	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Oedicerotidae		Americhelidium		Americhelidium americanum
GB47	18	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius hudsoni
GB47	60	Animalia	Arthropoda	Crustacea	Ostracoda										
GB47	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Maldanidae				
GB47	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida					Maldanidae		Clymenella		Clymenella torquata

KITTY HAWK BENTHIC ASSESSMENT REPORT

Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB47	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris fragilis
GB47	6	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Scoletoma		Scoletoma verrilli
GB47	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Nephtyidae		Nephtys		Nephtys picta
GB47	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Onuphidae		Onuphis		Onuphis eremita
GB47	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Phyllodoceae		Phyllodoce		Phyllodoce mucosa
GB47	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Sigalionidae		Sthenelais		Sthenelais limicola
GB47	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				
GB47	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Caulleriella		Caulleriella venefica
GB47	2	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae		Kirkegaardia		Kirkegaardia baptisteeae
GB47	5	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB47	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Orbiniidae		Leitoscoloplos		Leitoscoloplos fragilis
GB47	1	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Orbiniidae		Scoloplos		Scoloplos acmeceps
GB47	5	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Acmira	Aricidea (Acmira)	Aricidea (Acmira) catherinae
GB47	2	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Aricidea	(Aricidea)	Aricidea (Aricidea) wassi
GB48	61	Animalia	Nematoda												
GB48	1	Animalia	Nemertea												
GB48	2	Animalia	Nemertea		Anopla	Palaeonemertea					Tubulanidae				
GB48	1	Animalia	Echinodermata			Asterozoa									
GB48	1	Animalia	Mollusca			Bivalvia		Anomalodesmata			Pandoridae		Pandora		sp.
GB48	1	Animalia	Mollusca			Bivalvia		Mytiloida			Mytilidae				
GB48	5	Animalia	Mollusca			Bivalvia	Heterodonta	Veneroidea		Mactroidea	Mactridae		Spisula		Spisula solidissima
GB48	7	Animalia	Mollusca			Bivalvia	Heterodonta	Veneroidea		Solenioidea	Pharidae		Ensis		Ensis leei
GB48	4	Animalia	Chordata			Cephalochordata		Amphioxiformes			Branchiostomata		Branchiostoma		Branchiostoma virginiae
GB48	19	Animalia	Annelida			Clitellata		Oligochaeta							
GB48	21	Animalia	Echinodermata			Echinozoa									
GB48	2	Animalia	Nemertea			Enopla		Hoplonemertea	Monostilifera		Emplectonemata		Kirsteueriella		Kirsteueriella biocellatus

KITTY HAWK BENTHIC ASSESSMENT REPORT

Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB48	1	Animalia	Mollusca		Gastropoda			Neotaenioglossa			Caecidae		Caecum		Caecum johnsoni
GB48	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Aoridae		Unciola		Unciola serrata
GB48	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Ischyroceridae		Jassa		Jassa marmorata
GB48	20	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Liljeborgiidae		Liljeborgia		sp.
GB48	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB48	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius hudsoni
GB48	4	Animalia	Arthropoda	Crustacea	Ostracoda										
GB48	4	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Dorvilleidae		Protodorvillea		Protodorvillea kefersteini
GB48	4	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB48	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Goniadidae		Goniadella		Goniadella gracilis
GB48	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Lumbrinerides		Lumbrinerides acuta
GB48	4	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Eunicida		Lumbrineridae		Scoletoma		Scoletoma tenuis
GB48	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Aciculata	Phyllodocida		Phyllodocidae		Hesionura		Hesionura elongata
GB48	3	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Terebellida		Cirratulidae				
GB48	5	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB48	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Prionospio		Prionospio steenstrupi
GB48	1	Animalia	Annelida	Aclitellata	Polychaeta	Palpata		Canalipalpata	Spionida		Spionidae		Spio		Spio filicornis
GB48	3	Animalia	Annelida	Aclitellata	Polychaeta	Scolecida		Orbiniida			Paraonidae		Paraonis		Paraonis fulgens
GB49	2	Animalia	Nematoda												
GB49	4	Animalia	Mollusca		Bivalvia										
GB49	2	Animalia	Chordata		Cephalochordata			Amphioxiformes			Branchiostomidae		Branchiostoma		Branchiostoma virginiae
GB49	1	Animalia	Annelida		Clitellata	Oligochaeta									
GB49	8	Animalia	Echinodermata		Echinoidea										
GB49	1	Animalia	Ectoprocta		Gymnolaemata			Cheilostomatida			Cribrillinae		Cribrillina		Cribrillina macropunctata
GB49	4	Animalia	Ectoprocta		Gymnolaemata			Cheilostomatida			Cupuladriidae		Reussirella		Reussirella doma
GB49	5	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Liljeborgiidae		Liljeborgia		sp.

KITTY HAWK BENTHIC ASSESSMENT REPORT

Grab Sample ID	Count	Kingdom	Phylum	Subphylum	Class	Subclass	Superorder	Order	Suborder	Superfamily	Family	Subtribe	Genus	Subgenus	Binomial
GB49	3	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda		Hadzioidea	Maeridae				
GB49	1	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda	Gammaridea		Oedicerotidae		Americhelidium		Americhelidium americanum
GB49	4	Animalia	Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Peracarida	Amphipoda			Phoxocephalidae		Rhepoxynius		Rhepoxynius epistomus
GB49	3	Animalia	Annelida	Aclitellata	Polychaeta		Scolecida				Maldanidae				
GB49	6	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Aciculata	Eunicida		Dorvilleidae		Pettiboneia		Pettiboneia duofurca
GB49	7	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Aciculata	Eunicida		Dorvilleidae		Protodorvillea		Protodorvillea kefersteini
GB49	1	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Aciculata	Phyllodocida		Glyceridae		Hemipodia		Hemipodia simplex
GB49	2	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Aciculata	Phyllodocida		Hesionidae		Microphthalmus		sp.
GB49	1	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Aciculata	Eunicida		Lumbrineridae		Lumbrinerides		Lumbrinerides acuta
GB49	4	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Aciculata	Eunicida		Lumbrineridae		Lumbrineris		Lumbrineris fragilis
GB49	1	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Aciculata	Phyllodocida		Syllidae		Streptosyllis		Streptosyllis websteri
GB49	1	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Canalipalpata	Terebellida		Cirratulidae				
GB49	1	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Canalipalpata	Terebellida		Cirratulidae		Caulleriella		Caulleriella venefica
GB49	158	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Canalipalpata			Polygordiidae		Polygordius		Polygordius jouinae
GB49	1	Animalia	Annelida	Aclitellata	Polychaeta		Palpata	Canalipalpata	Terebellida		Terebellidae		Polycirrus		sp.
GB49	2	Animalia	Annelida	Aclitellata	Polychaeta		Scolecida	Orbiniida			Paraonidae		Acmira	Aricidea (Acmira)	Aricidea (Acmira) catherinae
GB49	2	Animalia	Annelida	Aclitellata	Polychaeta		Scolecida	Orbiniida			Paraonidae		Aricidea	(Acmira)	Aricidea (Acmira) cerrutii

KITTY HAWK WIND PROJECT

Benthic Assessment Report – Phase 3

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ACRONYM LIST

ANOSIM	Analysis of Similarities
BOEM	Bureau of Ocean Energy Management
CFR	Code of Federal Regulations
CMECS	Coastal and Marine Ecological Classifications Standards
ECC	Export Cable Corridor
EPA	Environmental Protection Agency
GPS	Global Positioning System
LPTL	Lowest Practical Taxonomic Level
m	Meter
mg/kg	Milligrams per Kilogram
mm	Millimeter
NMDS	Nonmetric Multidimensional Scaling
NMFS	National Marine Fisheries Services
NLPTL	Next-lowest Practical Taxonomic Level
SIMPER	Similarity Percentages
TOC	Total Organic Carbon
USBL	Ultra-short Baseline
UTC	Coordinated Universal Time
WEA	Wind Energy Area

1 INTRODUCTION

RPS was contracted by Terrasond to collect, process, analyze, and compile benthic data collected with a towed video sled and grab sampler in the export cable corridors and wind energy area associated with Avangrid Renewable's Lease Area OCS-A 0508, offshore of North Carolina. Sampling occurred in the wind energy area (sites and samples labeled WEA or WH) and in the export cable corridor (sites and samples labelled ECC or EH; Figure 1-1). The grab samples and video imagery data conclusions presented in this document will support interpretation of geophysical data to characterize surficial sediment conditions and classify the benthic habitat according to the Coastal and Marine Ecological Classifications Standards (CMECS; FGDC, 2012) and recent guidance for mapping fish habitat from National Marine Fisheries Service (NMFS, 2021) for inclusion in permitting documentation required by Bureau of Ocean Energy Management (BOEM). This report provides:

- A description of the benthic grab sampling methods, results, and analysis;
- The analysis of benthic grab sampling results using key statistical analyses such as taxa diversity, richness, and density;
- A description and analysis of abundance of benthic organisms observed in the video data collected; and
- CMECS classifications of each grab sample site and survey transect based on the video, grain size, and benthic community lab results.

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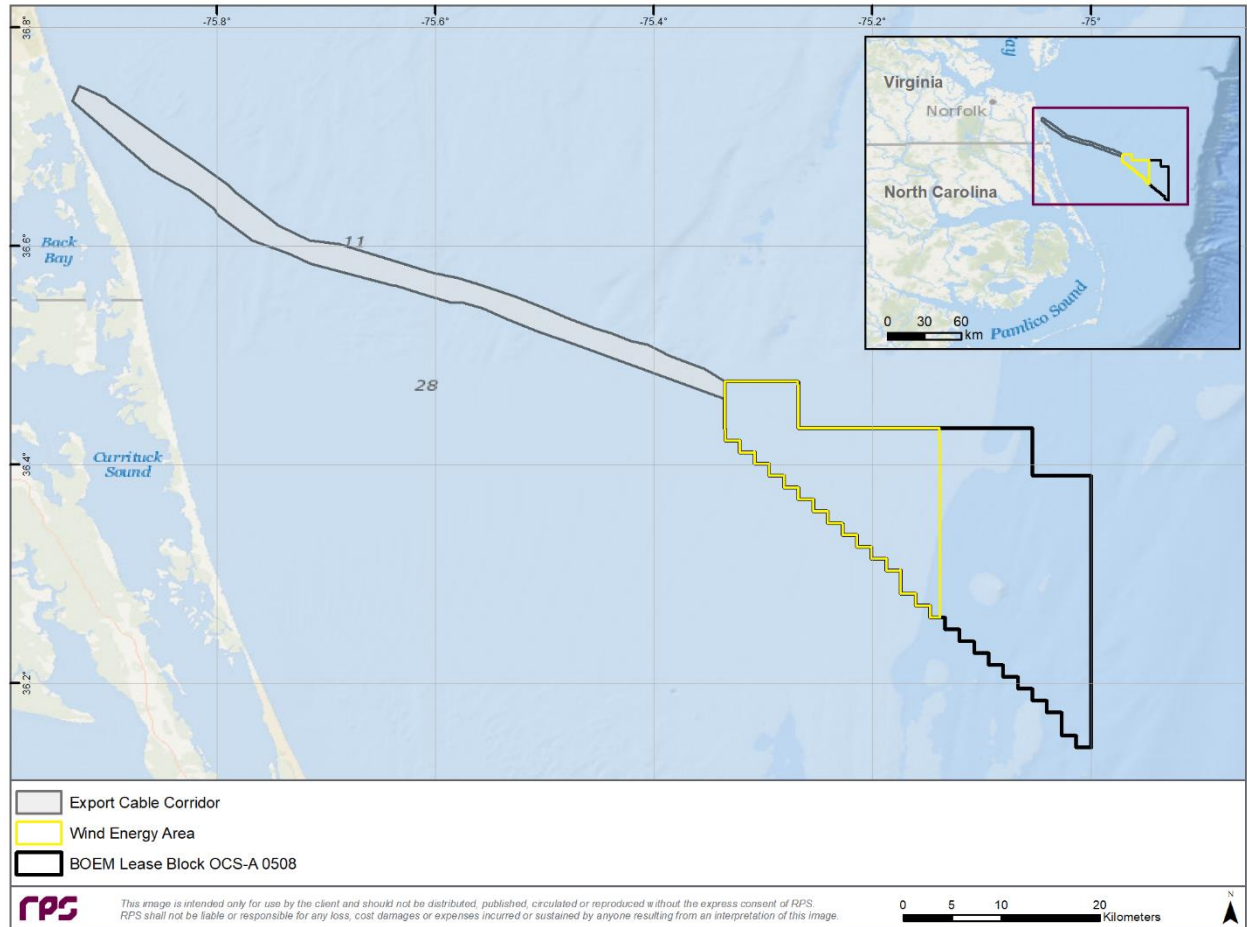


Figure 1-1. Location of the 2020 benthic survey area.

2 METHODS

2.1 Field Survey

2.1.1 Towed Camera Sled

Underwater video transects were taken in conjunction with grab samples for visual classification of the seafloor in the fall (October-November) of 2020. The survey was completed on the motor/merchant vessel: M/V Gerry Bordelon. The camera sled was equipped with parallel-mounted lasers 2.5 centimeters (cm) apart and a cable that transmitted real-time viewing of images to the vessel. For sampling aboard the Gerry Bordelon, an ultra-short baseline (USBL) beacon was fixed to the camera sled to obtain GPS coordinates in conjunction with a pole-mounted USBL system. The video sled was deployed from a stern A-frame by the RPS and Terrasond crews and lowered until positioned 0.5-1 meters (m) above the seafloor. Distance of camera to the seafloor varied along each transect due to differences in sediment type, vessel speed, swells, and low visibility/high turbidity.

Video transects approximately 600 m in length were recorded in accordance with procedures following BOEM's Guidelines for Providing Benthic Habitat Survey Information for Renewable Energy Development on the Atlantic Outer Continental Shelf Pursuant to 30 CFR Part 585 (BOEM, 2019) and approved by Terrasond and Avangrid Renewables. The aim was to keep vessel speed to 1 knot or lower to accommodate the tow sled. Direction was given from the video operator to the winch operator to raise and lower the towed camera sled as needed to maintain proximity to the seafloor. While recording, field notes were taken containing sample information (date, time, global positioning satellite [GPS] coordinates, station ID, depth, and video file name) and observations of sediment/seafloor characteristics of note to aid in post-processing of video data. Special notes were made for the beginning and end of the transect as well as any changes in weather or visibility conditions, sediment, or species. During video recording, attention was given to note if potentially sensitive benthic habitats (e.g., exposed hard bottom, seagrass/kelp/algal beds, coral species) were present, as per BOEM's guidelines (BOEM, 2019).

2.1.2 Grab Sampling

Benthic grab samples were acquired using an Ocean Instruments Salish Grab Standard SG-20 sampler. This grab is a modified version of a standard Van Veen sampler with a stainless-steel weighted frame and release system ideal for collection of sediments in soft to hard substrates with a penetration depth up to 20 centimeters (cm) and sampling area of 0.10 square meters (m²). For sampling aboard the Gerry Bordelon, an ultra-short baseline (USBL) beacon was fixed to the grab sampler to obtain GPS coordinates in conjunction with a pole-mounted USBL transceiver. An attached video camera was equipped with parallel-mounted scale lasers, and lights provided real-time viewing of the bottom from the vessel. This video was recorded and used to collect additional information concerning the area surrounding the grab sample site.

Upon retrieval, the grab sampler was examined for sample acceptability. A sample was initially deemed acceptable only if the bucket was more than 50% full, the sample was not over penetrated (i.e., not full to the top), and sample surface structures were undisturbed and even (i.e., not slumped). If a sample did not fulfil these requirements, the entire contents were returned to the water and another sample attempt was made. Due to dense shells keeping the jaws of the grab sampler from fully closing there were a few instances where the Client Representative approved samples from a 4th attempt, even though it did not meet the above listed qualifications. A photograph and/or results from each attempt were collected as the grab was brought on board. If more than three failed sample attempts occurred at one station, sampling moved on to the next station, and no sediment samples were sent for further analyses (except in the few instances described above). Failed attempts due to grab sampler malfunction (not habitat/sediment related), were not included in the total count of attempts or the decision to move on from a station. The results of each attempted grab were recorded in field notes.

Once an acceptable sample was obtained, the following steps were taken:

1. Overlying water was drained using a siphon.
2. A photograph was taken of the sample next to an identification label containing sample identification number and date.
3. Field notes were taken, including descriptions of physical features (depth of penetration, sediment color, texture, surface features) and surface megafauna; large surface fauna were returned to the water immediately.
4. The grab sample was then divided into two samples, with a plexiglass divider, based on the bucket design which was accessed via two hinged doors divided by a central support bar.
5. Half the sample was entirely scooped out and placed in a marked bucket to measure depth and then sieved, jarred and fixed in formalin and seawater for macroinvertebrate analysis
6. The other half of the sample had the top 2 cm of sediment collected for Total Organic Carbon (TOC) and sediment grain size. Samples were double bagged and stored on ice.

After collection, the macroinvertebrate portion of the grab was photographed, described more thoroughly (grain size and characteristics at depth), and loaded onto a processing table and material washed through a 500- μ m sieve using seawater under gentle pressure.

Organisms, shell fragments, and other remaining material were placed into a plastic container using stainless steel forceps, as needed. The container was filled no more than two-thirds full of sample and seawater. If the quantity of sample exceeded this volume, it was placed in a second container. The sample was fixed/preserved with 10% buffered formalin solution by filling the remaining space within the bottle with solution. Containers were tightly sealed with electrical tape and stored in a cooler at ambient temperature (not frozen or refrigerated). Prior to sieving the next sample, the sieve was cleaned by backwashing with

pressurized water. The macroinvertebrate benthic community samples were sent to EcoAnalysts Inc. (Moscow, IA). The grain size samples were processed by GeoTesting Express (Acton, MA).

2.2 Grab Sample Analysis

2.2.1 Grain Size Analysis and TOC

Grain size samples were analyzed by GeoTesting Express (125 Nagog Park, Acton, MA) using the American Society for Testing and Materials (ASTM) soil classification system standards D6913/D7928 (sieve and hydrometer) to obtain particle size distributions by weight (ASTM, 2017a;b). An additional analysis step further classified sediment using the Wentworth scale to be 100% CMECS compatible. A total of 200 sediment samples were sent for grain size analysis.

TOC samples were analyzed by GeoTesting Express. TOC content of sediment samples was determined using U.S. Environmental Protection Agency (EPA) Method 9060A with results reported in milligrams per kilogram (mg/kg).

2.2.1.1 Image Analysis

For failed grab sample stations with three unsuccessful grabs an image analysis is required due to a lack of sediment lab data, but there were no failed grab sample locations in any of the sampling areas. However, because GeoEnvironmental/Geotesting Express did not discern between biogenic and geologic origin of the substrate samples that were sieved, all underwater video and associated bottom images were reviewed to determine origin of substrate. If the sample was reported by the lab as a gravel mix ($\geq 30\%$ gravel) and the grab sample image (Appendix B, Column B) appeared to have $\sim 50\%$ or more shell, a point count analysis of 50 points was done in photoQuad (Trygonis and Sini, 2012). The grab sampler image was used for the point counts because that is the sediment that gets sent to the GeoTesting lab compared to a benthic image that is directly adjacent to the grab sampler as it contacts the benthos. If over 50% of the points were confirmed as shell then the grab sample was classified as biogenic shell, instead of the gravel/gravel mix that the lab data would show.

2.2.2 Benthic Macroinvertebrate Analysis

The benthic macroinvertebrate analysis was conducted by EcoAnalysts according to the following steps:

1. Benthic invertebrate samples were catalogued and verified against the Chain of Custody to ensure samples received match those listed in the shipment.
2. Samples were rinsed with freshwater to remove the formalin and transferred to 70 percent ethanol alcohol for sorting and storage.
3. Organisms were identified to the lowest practical taxonomic level (LPTL) (at least to family) and counted by taxonomists using the most appropriate taxonomic references for the region (Bousfield, 1973; Cutler, 1994; Winston and Hayward, 2012).

4. Species classification and abundance were recorded in Project data sheets and summarized in both tabular and graphical formats.
5. Prior to performing the invertebrate data analyses, the overall dataset was scanned for non-benthic taxa (i.e., pelagic or planktonic organisms) that were excluded from all analyses; examples include chaetognaths, hyperiid amphipods, and decapod zoea/megalopae.
6. Calculations of abundance included all taxa occurring in each sample, whether those taxa were identified to species level or not.

2.3 Video Data Post-Processing

2.3.1 Objectives

Post-processing and analysis of video transect data were conducted by RPS to provide:

- General characterization of substrate including bottom type, texture, micro-topography.
- Evidence of benthic activity by organisms (burrows, trails, infaunal structures);
- Identification of epibenthic macroinvertebrates and benthic habitat;
- Presence/evidence and general characterization of submerged aquatic vegetation (macroalgae, sea grass);
- Identification of organisms to the lowest practical taxonomic level (generally to Order or Family) using standard taxonomic keys for the geographic area;
- Evidence of fishing activity, such as trawl scars, pots, and working nets; and
- Presence of derelict fishing gear, military expended materials, shipwrecks, cultural artifacts, or other anthropogenic marine debris.

All suitable still images from videos were classified according to NMFS-modified CMECS substrate component categories (FGDC, 2012; NMFS, 2021), which focuses closely on details of grain size and composition to describe benthic habitats and is being used to define complex and potentially valuable fish habitats. The BOEM Benthic Habitat Survey guidelines (BOEM, 2019) also require that the developer characterize the benthic community composition which includes documentation of abundance, diversity, percent cover, and community structure. The following were recorded when present and identifiable:

- Characterization and delineation of any submerged aquatic vegetation (seagrass or macroalgae) that occurs within the project area;
- Characterization and delineation of any hard-bottom gradients of low to high relief such as coral (heads/reefs), rock or clay outcroppings, or other shelter-forming features; and
- Identification of communities of sessile and slow-moving marine invertebrates (clams, mussels, polychaete worms, anemones, sponges, echinoderms) that may be within the project area.

2.3.2 Methods

Transect videos were reviewed and analyzed in two separate steps. First, each video was reviewed in its entirety and any notable seafloor features or epifaunal/benthic/demersal species greater than 4 cm in size (roughly equal to 1.5 times the distance between the laser points) were recorded. When a feature or species was identified, the reviewer recorded the time, rated video visibility at that time, categorized the bottom, and recorded the lowest practical taxonomic level (LPTL) of the feature. Some features were enumerated whereas others were marked as present or absent and further quantified in the subsequent percent cover analysis (see next paragraph). The abundances of enumerable megafauna were recorded along with presence/absence of benthic biotic activity, submerged aquatic vegetation (macroalgae, sea grass), fishing activity, derelict gear, military expended materials, shipwrecks, coral heads/reefs, rock outcroppings, other shelter features, and other marine debris. Specifically, algae (macroalgae, submerged aquatic vegetation), bushy plant-like organisms (i.e., presumably hydrozoa or bryozoa but potentially macroalgae), eelgrass, blue mussels, oysters, sand dollars (*Echinarachnius parma*), sponges, encrusting organisms (i.e., encrusting tunicates, sponges, and northern star coral (*Astrangia poculata*)), were marked as present or absent while other qualifying features were enumerated. A subsampling method was developed for Atlantic silversides (*Menidia menidia*), a small forage fish that tended to follow the video sled causing them to remain in view for long periods and in high numbers. Their abundance was reported as the maximum number of individuals captured by any one still image during a transect. Most portions of the videos were reviewed multiple times using slower playback speeds and replay functions.

Second, each video was subsampled to create still images that were analyzed for percent cover of different bottom types. Still images were obtained at increments equivalent to approximately one image every 8 to 10 m distance based on the length of the transect, the frame rate, and duration of the video. Metadata were recorded for each still image including latitude and longitude, time, transect, and ID number. The quality of each image was assessed with a categorical scale of visibility from 0 to 4. Still images with quality scores of “moderate” (2 or greater) were considered passing and analyzed with seabed image processing software photoQuad (Trygonis and Sini, 2012). Each image was calibrated for scale using the reference laser points and the area (cm²) of the visible portion was recorded, with poorly lit or blurry edges of passing images excluded from the area of analysis.

To inform the classification of bottom habitat, 50 points were distributed uniformly across the visible portion of each passing still image using photoQuad. Percent cover data were recorded as the number of points under which different substrate types were visible: boulder, cobble, pebble/granule, sand/mud, or biogenic-origin shells (see particle size definitions in Table 2-1). In cases where it was difficult to discern whether small particles were either gravel or shell (i.e., geologic or biogenic in origin), gravel was assigned as a default based on guidance in the CMECS standards (FGDC, 2012). In addition, other “biological elements” were recorded if any of the 50 points landed on them in each image, including infaunal structures (e.g.,

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small worm or amphipod tubes), burrows (e.g., crab depressions or clam siphon holes), mobile megafauna (e.g., Cancer crabs, hermit crabs, benthic or demersal fish), Codium or other algae, encrusting organisms (e.g., sponges or corals), sand dollars, mussel beds, eelgrass, and bushy plant-like organisms that were grouped together for identification purposes (e.g., hydrozoa, bryozoa, branching algae). In instances where biological elements such as algae were observed growing atop substrates, point counts characterized the visible algae rather than assuming the substrate type beneath.

These point counts approximated percent cover of each substrate type in the still image, which was used to assign the appropriate substrate classifications of the habitat to the furthest extent possible under a NMFS-modified (NMFS, 2021) version of CMECS standards (FGDC, 2012). This system discerns substrate components by origin (e.g., geologic mineral, biogenic material, or anthropogenic material) and size groups, based primarily on the percent cover of coarse, gravel-sized particles (pebble/granule, cobble, and boulder) versus fine sand/mud, or the size category of shells (reef, rubble, and hash). Some images had a substantial amount of biological element cover (also referred to as flora/fauna throughout this report) that was removed from the percent cover calculations in order to accurately determine the percent of visible substrate composing gravel, sand, shells, etc. After the main CMECS classification for the substrate component in each image was defined, a secondary or co-occurring substrate type was defined to provide further detail and delineate between habitats. For example, if the main CMECS classification defined the dominant substrate type as geologic origin, then the secondary CMECS classification would contain information about substrates of biogenic or anthropogenic origin if they were also present. These classifications were assigned for the visible surface area of each image and then summarized at the transect level.

Table 2-1. CMECS geologic sediment size, biogenic or anthropogenic size, and percent cover categories (*from FGDC, 2012).

Geologic Sediment Category	Definition	Biogenic or Anthro Size Category	Definition	Biogenic Cover Density	Adapted Definition*
Bedrock	> 4,096 mm	Reef	> 4,096 mm	Trace	≤ 2%
Boulder	256 – 4,096 mm	Rubble	64 – 4,096 mm	Sparse	> 2 – < 30%
Cobble	64 – 256 mm			Moderate	30 – < 70%
Pebble / Granule	2 – 64 mm	Hash	2 – 64 mm	Dense	70 – < 90%
Sand / Mud	< 2 mm	Sand or Bits	< 2 mm	Complete	≥ 90%

2.4 Benthic Macroinvertebrate Data Post-Processing

Benthic macroinvertebrate community statistics were calculated using family or next-lowest practical taxonomic level (NLPTL) abundance estimates in each sample, which were reported as count per 0.05 m² (area of benthic macroinvertebrate sample). Community composition parameters included: total abundance, number of phyla, number of taxa, Margalef's Richness Index, Shannon Diversity Index, and Pielou's Index of Evenness for each station in the sampling area.

2.4.1 Taxonomic Composition

Benthic macroinvertebrate taxonomic composition was assessed to characterize the high-level trends in taxa data. Community composition includes the relative proportions of taxonomic groups by number of identifiable taxa and number of individuals and was used to evaluate dominance of common phyla across all samples. Taxonomic composition was summarized for each station across the sampling area, aggregated at both phylum-level and family or NLPTL.

2.4.2 Richness, Diversity, and Evenness

Taxonomic richness, evenness, and diversity are common ecological parameters used to measure the overall biodiversity of a community or discrete unit. Taxonomic richness is the number of unique species or taxonomic groups represented in an area of interest. In this assessment, taxonomic richness was calculated using Margalef's Richness Index (Formula 1) for each station.

Formula 1. Margalef's Richness Index (RI).

$$RI = \frac{(S - 1)}{\ln(N)}$$

Where:

S= the number of unique taxa

N= the total number of individuals in the sample

Interpretation: The higher the index, the greater the richness.

The diversity index for a community considers taxonomic richness and the proportion of each unique taxa. The Shannon Diversity Index (H'; Formula 2) was calculated using the number of each taxa (family or NLPTL), the proportional abundance of each taxa relative to the total number of individuals, and the sum of the proportions. This index was used to assess diversity of each station. The diversity index (H') increases with increasing taxonomic richness and evenness.

Formula 2. H'- Shannon Diversity Index.

$$H' = - \sum_{i=1}^R p_i \ln(p_i)$$

Where:

p_i = the proportion of individuals belonging to the taxa i in the dataset of interest

Interpretation: The greater the H' , the greater the richness and evenness.

Evenness of a community refers to the similarity in abundances of different taxa comprising a population or sample. Pielou's Index of Evenness (J' ; Formula 3) includes H' (Shannon-Weiner Diversity Index) in its calculation.

Formula 3. J' - Pielou's Index of Evenness.

$$J' = \frac{H'}{H_{Max}}$$

Where:

H' = the Shannon- Weiner Diversity Index

H_{Max} = the maximum possible value of H' , where each taxon occurs in equal abundances.

$$H_{Max} = \ln(s)$$

Where: s = Number of taxa

Interpretation: J' is constrained between 0 and 1. The greater the value of J' , the more evenness in the sample.

The Shannon-Weiner Diversity index was also applied to the enumerated species from the video review on a per-transect basis with observations recorded to the level of phylum or NLPTL.

2.4.3 Multivariate Analysis

Multivariate analyses were conducted with R software (Oksanen et al., 2019; R Core Team, 2020) to examine dissimilarity/similarity of samples based on the invertebrate assemblages (composition of all taxa and their abundances). These analyses included nonmetric multidimensional scaling (NMDS), analysis of similarities (ANOSIM), and analysis of similarity percentages (SIMPER; Clarke, 1993). All analyses were built on a Bray-Curtis Similarity Index, using a square-root transformation of the data to ensure all taxa (not just those that dominated samples) would contribute to similarity measures. As with the community indices, invertebrate data were limited to the family level or NLPTL. Differences in assemblages between stations

were compared and assessed using NMFS (2021) modified CMECS substrate classifications or location of sample in the WEA and ECC.

Two-dimensional NMDS was used to visually compare the ordinate distance (difference) between samples and evaluate the similarity of community assemblages. Samples were ordinated based on similarity to one another with samples of higher similarity appearing in closer proximity to one another in NMDS plots. Samples were also colored according to assigned NMFS (2021) modified CMECS classifications or sample location.

SIMPER was used to identify the percent dissimilarity between assemblages within NMFS (2021) modified CMECS substrate components and sample location and to identify taxa that were most responsible for that dissimilarity (i.e., the taxa with the largest differences in mean abundance). ANOSIM was used to help determine if substrate classifications or location were predictive of the invertebrate assemblage clusters. The test statistic (R values) calculated in the Global ANOSIM indicates whether samples within classification groups were more similar than samples between groups. R values closer to 1 with significance levels of $p < 0.05$ indicate that samples within a classification group are more similar to each other than to those in different groups. R values closer to 0 indicate samples are equally similar within a classification group as they are between different groups. Specifically, ANOSIM was used to test the null hypotheses:

H₀1: The similarity of invertebrate assemblages between NMFS CMECS groups is greater than or equal to the similarity within NMFS CMECS groups;

H₀2: The similarity of invertebrate assemblages between sample location groups is greater than or equal to the similarity within location groups.

3 RESULTS

3.1 Video Analysis

In the export cable corridor (ECC) project area, 70 video transects were completed (30 labeled ECC and 40 labeled EH). In the wind energy area (WEA) project area, 128 video transects were completed (62 labeled WEA and 67 labeled WH). All video transects were 600 m in length.

3.1.1 Wind Energy Area

The characteristics and locations of the 128 underwater video transects within the WEA project area are described in Table 3-1 and locations are shown in Figure 3-1. Section 3.1.1.1 below describes presence and abundance of megafauna observed in video transects collected in the WEA. Abundance data are displayed in Table 3-2 with additional visualizations in Figure 3-2 through Figure 3-7. Images of representative megafauna are displayed in Table 3-9. Section 3.1.1.2 summarizes results of the point count analysis to quantify observed substrate along video transects. Area and composition of the substrate for each transect is presented in Table 3-10 with additional data on flora and fauna observed presented in Table 3-11.

Table 3-1. Underwater video transect locations in the project area.

Transect	Date (UTC)	Recorded Duration (min:sec)	Start Latitude (°N)	Start Longitude (°W)	End Latitude (°N)	End Longitude (°W)	Total # Stills	# Analyzed Stills
WEA_001	11/7/2020	24:59	36.468606	-75.315955	36.468991	-75.309017	67	65
WEA_002	11/7/2020	20:37	36.468423	-75.29365	36.469453	-75.286792	76	55
WEA_003	11/6/2020	25:16	36.46703	-75.270401	36.471003	-75.265489	67	56
WEA_004	11/7/2020	24:56	36.450107	-75.337961	36.451496	-75.331501	77	55
WEA_005	11/7/2020	26:27	36.449775	-75.315476	36.452073	-75.309452	79	52
WEA_006	11/7/2020	30:23	36.448119	-75.291105	36.453378	-75.289382	75	61
WEA_007	11/6/2020	27:59	36.449235	-75.270527	36.452526	-75.264944	100	37
WEA_008	11/6/2020	30:13	36.433189	-75.337892	36.432258	-75.331299	77	56
WEA_009	11/6/2020	21:33	36.434723	-75.314647	36.430961	-75.309834	74	48
WEA_010	11/5/2020	19:56	36.434137	-75.293108	36.431257	-75.287236	82	42
WEA_011	11/5/2020	23:21	36.433367	-75.271147	36.432434	-75.264352	64	61
WEA_012	11/5/2020	23:02	36.433129	-75.248759	36.432684	-75.242067	64	60
WEA_013	11/3/2020	20:10	36.43399	-75.220347	36.432150	-75.226360	68	54
WEA_014	11/4/2020	20:34	36.435663	-75.199552	36.430578	-75.202511	60	60
WEA_015	11/4/2020	24:48	36.435785	-75.17771	36.430391	-75.179444	58	57
WEA_016	10/29/2020	27:12	36.435836	-75.15432	36.430620	-75.158188	71	50
WEA_017	11/5/2020	26:08	36.412355	-75.313797	36.417257	-75.310914	49	46

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Transect	Date (UTC)	Recorded Duration (min:sec)	Start Latitude (°N)	Start Longitude (°W)	End Latitude (°N)	End Longitude (°W)	Total # Stills	# Analyzed Stills
WEA_018	11/5/2020	24:54	36.412162	-75.29064	36.417525	-75.289499	62	58
WEA_019	11/5/2020	25:13	36.413373	-75.270427	36.416502	-75.264951	58	57
WEA_020	11/4/2020	21:36	36.412342	-75.246633	36.417455	-75.243932	67	54
WEA_021	11/4/2020	23:42	36.41713	-75.225329	36.412891	-75.220978	61	59
WEA_022	10/24/2020	27:54	36.41738	-75.198885	36.412545	-75.202335	104	37
WEA_023	11/4/2020	25:07	36.418	-75.177673	36.412372	-75.179385	85	45
WEA_024	11/4/2020	25:26	36.417797	-75.155232	36.412460	-75.157054	67	66
WEA_025	11/4/2020	23:05	36.417684	-75.138325	36.412281	-75.138876	71	60
WEA_026	11/5/2020	25:53	36.394262	-75.291376	36.399099	-75.288399	67	66
WEA_027	11/5/2020	20:15	36.394318	-75.269021	36.399345	-75.266112	69	62
WEA_028	11/5/2020	22:03	36.394417	-75.246658	36.399317	-75.243588	84	48
WEA_029	11/4/2020	23:48	36.398829	-75.225361	36.394982	-75.220638	78	53
WEA_030	11/4/2020	25:39	36.397013	-75.200678	36.394461	-75.199343	66	65
WEA_031	10/29/2020	20:27	36.400025	-75.178492	36.394805	-75.178416	75	55
WEA_032	10/23/2020	26:10	36.395563	-75.159102	36.398346	-75.152987	117	36
WEA_033	11/4/2020	23:18	36.399633	-75.137482	36.394519	-75.139550	57	57
WEA_034	11/5/2020	21:09	36.376622	-75.269701	36.380951	-75.265190	67	63
WEA_035	10/22/2020	31:58	36.379347	-75.249074	36.378221	-75.241393	92	42
WEA_036	10/22/2020	32:31	36.37951	-75.226677	36.378433	-75.219430	103	39
WEA_037	10/29/2020	21:04	36.381362	-75.199218	36.376577	-75.202541	81	35
WEA_038	10/22/2020	22:54	36.379506	-75.181821	36.378493	-75.174969	103	35
WEA_039	10/22/2020	18:57	36.378895	-75.159576	36.378901	-75.152576	115	37
WEA_040	10/29/2020	18:07	36.377229	-75.140866	36.381185	-75.136106	89	42
WEA_041	10/21/2020	21:43	36.361696	-75.248679	36.360012	-75.241866	75	56
WEA_042	10/21/2020	34:35	36.36191	-75.227644	36.360190	-75.219399	80	40
WEA_043	10/22/2020	24:52	36.361973	-75.204524	36.360158	-75.197267	70	57
WEA_044	10/22/2020	25:45	36.361216	-75.181834	36.360808	-75.174861	93	39
WEA_045	10/22/2020	26:05	36.36123	-75.159401	36.360784	-75.152631	90	42
WEA_046	10/21/2020	26:50	36.361179	-75.141926	36.360693	-75.134913	81	51
WEA_047	10/21/2020	26:37	36.343888	-75.226259	36.342015	-75.219600	120	32
WEA_048	10/21/2020	23:01	36.343794	-75.204776	36.342193	-75.197078	80	48
WEA_049	10/21/2020	25:29	36.342933	-75.182245	36.343015	-75.174812	71	52
WEA_050	10/20/2020	42:49	36.342548	-75.159666	36.343231	-75.152578	98	38
WEA_051	10/20/2020	24:39	36.343332	-75.141855	36.342476	-75.134876	77	46
WEA_052	10/11/2020	24:09	36.327518	-75.199888	36.322127	-75.201210	68	56
WEA_053	10/11/2020	23:08	36.327459	-75.177256	36.322170	-75.179118	65	35

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Transect	Date (UTC)	Recorded Duration (min:sec)	Start Latitude (°N)	Start Longitude (°W)	End Latitude (°N)	End Longitude (°W)	Total # Stills	# Analyzed Stills
WEA_054	10/20/2020	26:45	36.322793	-75.158036	36.327042	-75.153680	72	54
WEA_055	10/20/2020	34:08	36.322985	-75.140845	36.326932	-75.135836	79	35
WEA_056	10/11/2020	25:27	36.309684	-75.177556	36.304082	-75.178743	66	50
WEA_057	10/11/2020	26:27	36.309839	-75.155187	36.304067	-75.156504	63	62
WEA_058	10/10/2020	25:08	36.308739	-75.135679	36.305070	-75.140906	71	54
WEA_059	10/10/2020	23:57	36.291004	-75.15383	36.286631	-75.158091	114	35
WEA_060	10/10/2020	24:36	36.291021	-75.136048	36.286676	-75.140355	90	36
WEA_061	10/21/2020	23:50	36.271685	-75.159261	36.270125	-75.152509	84	41
WEA_062	10/21/2020	22:57	36.272121	-75.141336	36.269370	-75.135253	73	53
WH_001	11/6/2020	23:36	36.473061	-75.274704	36.476949	-75.269688	70	52
WH_002	11/6/2020	21:55	36.471984	-75.302914	36.474831	-75.296930	71	54
WH_003	11/7/2020	24:22	36.468427	-75.324063	36.471308	-75.318120	73	51
WH_004	11/7/2020	21:36	36.46827	-75.326727	36.468842	-75.320055	64	61
WH_005	11/7/2020	19:32	36.463662	-75.282611	36.462861	-75.275743	64	60
WH_006	11/7/2020	24:46	36.463486	-75.311883	36.462685	-75.305556	63	59
WH_007	11/7/2020	21:49	36.463361	-75.334297	36.461413	-75.327735	71	53
WH_008	11/7/2020	23:40	36.46049	-75.329027	36.461466	-75.322231	75	49
WH_009	11/7/2020	20:13	36.461436	-75.290886	36.460402	-75.283935	62	62
WH_010	11/7/2020	24:13	36.458985	-75.331575	36.459898	-75.324982	98	35
WH_011	11/7/2020	31:48	36.457935	-75.303263	36.460234	-75.297298	63	62
WH_012	11/7/2020	27:58	36.450825	-75.295453	36.455981	-75.293531	59	59
WH_013	11/7/2020	28:57	36.446486	-75.29585	36.450564	-75.291610	67	58
WH_014	11/6/2020	23:21	36.443697	-75.305396	36.442214	-75.298902	86	39
WH_015	11/6/2020	22:27	36.440406	-75.296569	36.439466	-75.289935	66	57
WH_016	11/5/2020	23:31	36.438807	-75.272757	36.437831	-75.265911	62	62
WH_017	11/6/2020	23:14	36.438331	-75.328186	36.437915	-75.321502	81	42
WH_018	11/5/2020	22:38	36.431653	-75.288283	36.432381	-75.281518	64	61
WH_019	11/5/2020	22:11	36.431294	-75.297375	36.430587	-75.290407	71	53
WH_020	11/6/2020	22:02	36.431884	-75.295916	36.428538	-75.290345	57	57
WH_021	11/4/2020	25:23	36.431912	-75.173975	36.426510	-75.175802	65	58
WH_022	11/4/2020	19:49	36.429206	-75.209543	36.427256	-75.216235	63	60
WH_024	11/6/2020	23:54	36.427455	-75.320148	36.422740	-75.316914	78	47
WH_025	10/25/2020	25:31	36.423015	-75.141348	36.427341	-75.138124	110	36
WH_026	11/5/2020	24:03	36.422282	-75.257599	36.424552	-75.251520	62	62
WH_027	11/5/2020	24:25	36.413848	-75.285254	36.419246	-75.284710	63	63
WH_028	11/5/2020	23:31	36.413761	-75.306793	36.418111	-75.302356	65	52

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Transect	Date (UTC)	Recorded Duration (min:sec)	Start Latitude (°N)	Start Longitude (°W)	End Latitude (°N)	End Longitude (°W)	Total # Stills	# Analyzed Stills
WH_029	11/5/2020	21:33	36.408687	-75.283504	36.414082	-75.282911	58	58
WH_030	10/25/2020	25:44	36.411177	-75.169476	36.407807	-75.173378	82	35
WH_031	11/5/2020	23:42	36.407137	-75.284296	36.412442	-75.283080	57	57
WH_032	11/4/2020	23:09	36.41055	-75.159565	36.405330	-75.161714	61	58
WH_033	11/4/2020	24:21	36.409064	-75.227282	36.404818	-75.222860	58	57
WH_034	11/5/2020	22:27	36.400548	-75.28328	36.405814	-75.281551	61	61
WH_035	10/29/2020	27:12	36.399727	-75.143704	36.401196	-75.137292	61	56
WH_036	10/29/2020	26:04	36.400533	-75.186592	36.394847	-75.187172	60	59
WH_037	10/29/2020	25:33	36.400139	-75.204196	36.394758	-75.204652	60	60
WH_038	11/4/2020	20:25	36.398773	-75.210793	36.394381	-75.206887	60	60
WH_039	11/4/2020	23:36	36.397475	-75.208248	36.393203	-75.205785	61	61
WH_040	10/29/2020	24:59	36.397618	-75.182019	36.392057	-75.182652	64	64
WH_041	10/29/2020	23:14	36.397991	-75.181505	36.392126	-75.181868	64	57
WH_042	11/4/2020	22:52	36.395417	-75.231362	36.391943	-75.226218	62	60
WH_043	11/5/2020	25:37	36.387998	-75.279814	36.392981	-75.276939	63	58
WH_044	11/4/2020	24:06	36.390152	-75.23621	36.388663	-75.229486	63	62
WH_045	11/4/2020	25:28	36.389384	-75.234684	36.387991	-75.228182	63	55
WH_046	11/4/2020	21:23	36.388443	-75.228981	36.384030	-75.224432	69	53
WH_047	11/5/2020	23:09	36.383447	-75.261894	36.387665	-75.257444	65	60
WH_048	11/5/2020	20:26	36.382157	-75.274412	36.387128	-75.271504	64	62
WH_049	10/29/2020	33:37	36.380921	-75.144932	36.385854	-75.141392	71	53
WH_050	10/22/2020	24:21	36.375729	-75.250878	36.374576	-75.242994	80	45
WH_051	10/22/2020	21:48	36.367816	-75.214288	36.366168	-75.207000	74	50
WH_052	10/22/2020	27:31	36.365151	-75.19047	36.364706	-75.183657	75	48
WH_053	10/21/2020	29:29	36.365229	-75.228181	36.363580	-75.220582	73	52
WH_054	10/21/2020	26:09	36.362844	-75.214244	36.361207	-75.206767	76	50
WH_055	10/21/2020	25:07	36.361858	-75.211073	36.360377	-75.204198	82	45
WH_056	10/22/2020	21:41	36.361229	-75.215628	36.359525	-75.207915	69	58
WH_057	10/22/2020	20:40	36.359464	-75.207609	36.357937	-75.200784	80	41
WH_058	10/22/2020	23:53	36.358496	-75.204829	36.356949	-75.197651	73	52
WH_059	10/21/2020	25:36	36.355251	-75.238937	36.353173	-75.231503	71	56
WH_060	10/21/2020	22:48	36.351485	-75.169498	36.351934	-75.162765	81	43
WH_061	10/21/2020	23:16	36.35118	-75.198265	36.349902	-75.191034	71	43
WH_062	10/21/2020	32:11	36.348195	-75.195047	36.347331	-75.188297	84	42
WH_063	10/20/2020	25:42	36.319332	-75.146642	36.323762	-75.142133	104	38
WH_064	10/20/2020	21:33	36.317663	-75.173317	36.319544	-75.166898	77	44

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Transect	Date (UTC)	Recorded Duration (min:sec)	Start Latitude (°N)	Start Longitude (°W)	End Latitude (°N)	End Longitude (°W)	Total # Stills	# Analyzed Stills
WH_065	10/20/2020	29:06	36.313219	-75.151596	36.317580	-75.147081	78	53
WH_066	10/20/2020	26:26	36.294312	-75.167052	36.297768	-75.161009	83	43
WH_067	10/20/2020	29:45	36.280256	-75.142608	36.285251	-75.137438	74	55

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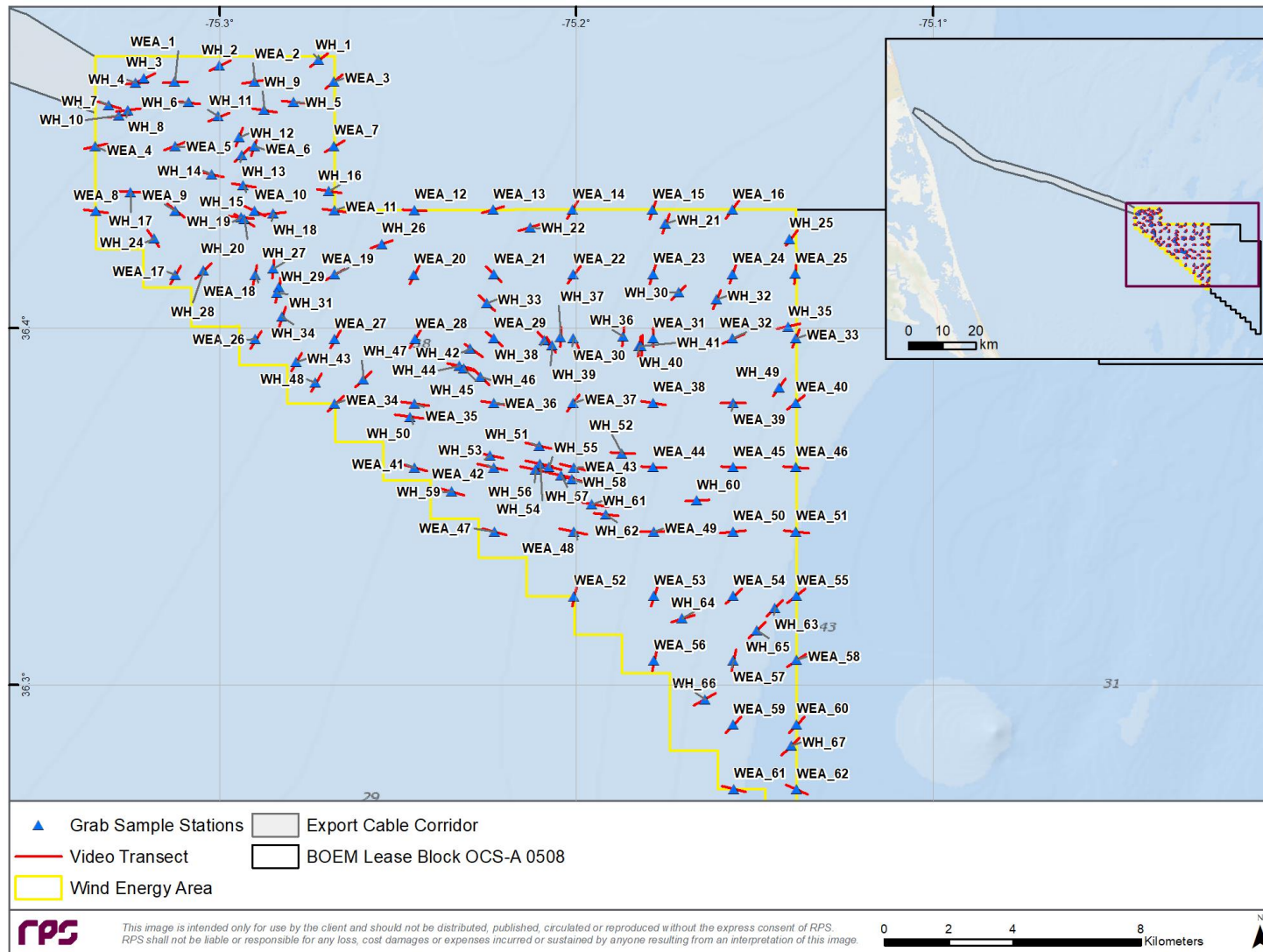


Figure 3-1. Map of video transects (red) and grab sample sites (blue) in the WEA project area (yellow).

3.1.1.1 Organisms and Features

The abundances of enumerable features greater than 4 cm were recorded during the video review process. Organisms were identified to the LPTL, usually to order or family. A total of 1,992 features, including 1,923 organisms from 6 phyla were identified and recorded within the 128 WEA and WH transects (Table 3-2 through Table 3-7, Figure 3-2 through Figure 3-4). The most numerous organisms were sea robins, unidentified fish, squid, and skate eggs comprising 43%, 9%, 6% and 6% of all organisms, respectively. Of the 826 individual sea robins observed, 135 were observed within transect WEA_006, the highest single transect abundance of any feature. Diversity ranged from 0 when a single LPTL was observed (12 transects) to 2.15 (WH_061; Table 3-8).

The total observed organisms comprised 1,334 vertebrates from 31 unique LPTLs in 10 orders (Figure 3-5) and 589 invertebrates from 27 unique LPTLs in 10 classes (Figure 3-6). An additional 69 other observations were recorded: 10 instances of anthropogenic debris and 59 instances of unidentified organisms and unidentified objects (unclear if living). Some organisms and objects were not identifiable due to high turbidity, distance from seafloor, angle, or lighting conditions.

The presence or absence of other qualifying features (i.e., habitat features of note or species that were quantified by their percent cover of the sea floor rather than through enumeration [see Section 2.3.2 for full list]) ranged from being absent in all WEA and WH transects (e.g., eelgrass, blue mussel, oyster) to present in 42 transects (bushy plant-like organisms; Figure 3-7). There were no noted observations of potential invasive species.

For representative images of some observed species see Table 3-9 and for complete reviewer notes see Appendix C.

KITTY HAWK PHASE 3 BENTHIC ASSESSMENT REPORT

Table 3-2. Megafauna and other enumerated features observed during review of the WEA (001-024) video transects (continued next page).

Common Name	Lowest Taxonomic Level	Counts per WEA Transect																										
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
Vertebrate																												
Angelshark, common	Squatina squatina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Butterfish	Peprilus triacanthus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Croaker, Atlantic	Micropogonias undulatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Drum, black	Pogonias cromis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eel, unidentified	Anguilliformes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Filefish, planehead	Stephanolepis hispidus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Fish, unidentified (bony)	Teleostei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fish, unidentified (demersal)	Chordata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
Flounder, fourspot	Hippoglossina oblongus	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flounder, southern	Paralichthys lethostigma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flounder, unidentified	Pleuronectiformes	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kingfish, northern	Menticirrhus saxatilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kingfish, southern	Menticirrhus americanus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Largehead hairtail	Trichiurus lepturus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lizardfish, inshore	Synodus foetens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lizardfish, unidentified	Synodontidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Northern puffer	Sphoeroides maculatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pigfish	Orthopristis chrysoptera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pinfish	Lagodon rhomboides	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ray, cownose	Rhinoptera bonasus	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Remora	Remora remora	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roundfish, unidentified	Teleostei	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sea bass, black	Centropristis striata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Sea robin, unidentified	Prionotus	29	35	1	19	-	135	-	3	67	1	2	4	5	1	2	-	13	7	11	-	-	-	-	-	2	4	
Sheepshead	Archosargus probatocephalus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
Silverside, Atlantic	Menidia menidia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Skate	Rajidae	-	3	-	-	-	-	-	-	3	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
Skate, clearnose	Raja eglanteria	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-
Skate, egg case	Rajidae	-	8	-	-	-	-	-	-	1	-	1	-	-	2	1	2	-	-	1	2	1	1	-	-	-	-	2
Stingray, Atlantic	Dasyatis sabina	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stingray, southern	Dasyatis americana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Invertebrate																												
Anemone, burrowing	Anthozoa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clam, razor	Ensis leei	-	-	-	-	2	-	2	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

KITTY HAWK PHASE 3 BENTHIC ASSESSMENT REPORT

Common Name	Lowest Taxonomic Level	Counts per WEA Transect																							
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Clam, surf	Spisula solidissima	7	-	-	-	1	3	1	-	-	-	-	-	-	1	-	-	10	-	-	-	-	2	2	
Crab, cancer	Cancer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Crab, hermit	Pagurus	-	-	-	-	-	-	-	-	1	-	-	-	1	3	1	-	-	-	-	-	-	-	-	
Crab, horseshoe	Limulus polyphemus	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Crab, lady	Ovalipes ocellatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Crab, portunid	Portunidae	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	1	-	-	-	-	-	-	-	
Crab, spider	Libinia	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	
Crab, unidentified	Decapoda	-	-	-	-	-	-	-	2	-	-	-	-	1	-	-	-	-	1	-	-	-	4	-	
Mollusc, unidentified	Mollusca	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	
Moon snail	Naticidae	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Moon snail, egg case	Naticidae	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Octopus, unidentified	Octopodidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sea star, blood	Henricia sanguinolenta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sea star, common	Asterias rubens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sea star, gray	Ludia clathrata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sea star, unidentified	Asteroidea	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sea Urchin	Echinoidea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
Shrimp	Decapoda	-	1	-	-	-	-	-	-	1	-	-	-	10	11	1	-	-	-	-	-	-	-	-	
Shrimp, mantis	Squilla empusa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	
Solitary Hydroid	Hydrozoa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Squid, unidentified	Cephalopoda	-	1	-	-	-	-	-	10	-	-	-	-	13	2	-	-	16	-	-	-	-	-	-	
Whelk eggs	Melongenidae	1	-	-	-	-	1	-	-	1	-	2	-	-	-	1	-	-	-	-	-	3	2	-	
Whelk, unidentified	Melongenidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Worm, Polychaete	Polychaeta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Worm, unidentified	Polychaeta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Other																									
Debris, anthropogenic	Debris, anthropogenic	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	
Object, unidentified	Object, unidentified	-	-	-	-	1	-	1	-	-	-	-	2	-	-	-	-	-	-	-	-	-	1	-	
Organism, unidentified	Organism, unidentified	-	-	-	-	4	-	-	4	2	-	-	1	1	1	-	-	-	-	-	-	-	-	-	
Unidentified	Unidentified	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	
Total Organisms		37	48	2	19	5	141	5	15	77	2	7	5	32	20	22	4	32	18	13	2	7	3	9	10
Total Observations		37	48	2	19	10	141	6	19	79	2	7	8	33	22	23	4	32	18	13	2	8	3	10	10

KITTY HAWK PHASE 3 BENTHIC ASSESSMENT REPORT

Table 3-3. Megafauna and other enumerated features observed during review of the WEA (025-048) video transects (continued next page).

Common Name	Lowest Taxonomic Level	Counts per WEA Transect																							
		25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Vertebrate																									
Angelshark, common	Squatina squatina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Butterfish	Peprilus triacanthus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Croaker, Atlantic	Micropogonias undulatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Drum, black	Pogonias cromis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eel, unidentified	Anguilliformes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Filefish, planehead	Stephanolepis hispidus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fish, unidentified (bony)	Teleostei	-	-	4	-	2	-	1	-	-	-	-	-	-	-	-	-	1	-	-	1	1	-	-	-
Fish, unidentified (demersal)	Chordata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flounder, fourspot	Hippoglossina oblongus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flounder, southern	Paralichthys lethostigma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flounder, unidentified	Pleuronectiformes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Kingfish, northern	Menticirrhus saxatilis	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kingfish, southern	Menticirrhus americanus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Largehead hairtail	Trichiurus lepturus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lizardfish, inshore	Synodus foetens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lizardfish, unidentified	Synodontidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Northern puffer	Sphoeroides maculatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pigfish	Orthopristis chrysoptera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pinfish	Lagodon rhomboides	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ray, cownose	Rhinoptera bonasus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Remora	Remora remora	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roundfish, unidentified	Teleostei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Sea bass, black	Centropristis striata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sea robin, unidentified	Prionotus	2	6	-	5	-	1	-	3	-	3	-	1	4	-	-	-	1	4	2	-	2	1	3	-
Sheepshead	Archosargus probatocephalus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silverside, Atlantic	Menidia menidia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Skate	Rajidae	-	2	-	-	-	-	-	-	-	-	-	3	-	-	1	-	-	-	-	1	-	-	-	-
Skate, clearnose	Raja eglanteria	-	-	-	-	-	1	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Skate, egg case	Rajidae	-	-	2	2	2	-	3	-	-	1	2	-	-	2	-	2	-	1	-	-	-	1	1	1
Stingray, Atlantic	Dasyatis sabina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	1	-	-	-	-	-	-
Stingray, southern	Dasyatis americana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Invertebrate																									
Anemone, burrowing	Anthozoa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

KITTY HAWK PHASE 3 BENTHIC ASSESSMENT REPORT

Common Name	Lowest Taxonomic Level	Counts per WEA Transect																							
		25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Clam, razor	Ensis leei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clam, surf	Spisula solidissima	-	-	-	-	-	2	-	-	-	-	1	-	1	-	1	-	-	-	-	1	-	-	-	-
Crab, cancer	Cancer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
Crab, hermit	Pagurus	-	-	3	-	-	-	1	2	-	-	-	-	-	-	1	-	-	-	-	5	-	-	1	-
Crab, horseshoe	Limulus polyphemus	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-
Crab, lady	Ovalipes ocellatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crab, portunid	Portunidae	-	-	4	4	-	-	-	-	-	1	-	1	-	-	-	-	-	2	-	4	-	1	-	-
Crab, spider	Libinia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Crab, unidentified	Decapoda	1	2	4	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Mollusc, unidentified	Mollusca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Moon snail	Naticidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Moon snail, egg case	Naticidae	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	1	-	-
Octopus, unidentified	Octopodidae	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sea star, blood	Henricia sanguinolenta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sea star, common	Asterias rubens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sea star, gray	Ludia clathrata	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sea star, unidentified	Asteroidea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Sea urchin	Echinoidea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
Shrimp	Decapoda	-	2	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shrimp, mantis	Squilla empusa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solitary hydroid	Hydrozoa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Squid, unidentified	Cephalopoda	2	-	1	2	-	2	-	-	1	1	-	-	-	-	1	1	-	1	-	-	-	-	-	-
Whelk eggs	Melongenidae	-	1	-	-	-	-	2	-	1	1	-	1	-	1	3	-	1	1	1	1	-	-	-	-
Whelk, unidentified	Melongenidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Worm, Polychaete	Polychaeta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Worm, unidentified	Polychaeta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other																									
Debris, anthropogenic	Debris, anthropogenic	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Object, unidentified	Object, unidentified	-	-	-	-	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organism, unidentified	Organism, unidentified	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified	Unidentified	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Total Organisms		5	13	25	14	4	7	8	5	3	8	3	3	9	2	2	9	5	5	12	4	14	5	6	9
Total Observations		5	14	25	16	6	7	9	5	3	8	3	3	9	2	2	9	5	5	13	4	14	5	7	9

KITTY HAWK PHASE 3 BENTHIC ASSESSMENT REPORT

Table 3-4. Megafauna and other enumerated features observed during review of the WEA (049-062) and WH (001-010) video transects (continued next page).

Common Name	Lowest Taxonomic Level	Counts per WEA & WH Transects																							
		49	50	51	52	53	54	55	56	57	58	59	60	61	62	1	2	3	4	5	6	7	8	9	10
Vertebrate																									
Angelshark, common	Squatina squatina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Butterfish	Peprilus triacanthus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Croaker, Atlantic	Micropogonias undulatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Drum, black	Pogonias cromis	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eel, unidentified	Anguilliformes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Filefish, planehead	Stephanolepis hispidus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fish, unidentified (bony)	Teleostei	-	-	-	29	-	-	-	4	22	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-
Fish, unidentified (demersal)	Chordata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flounder, fourspot	Hippoglossina oblongus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Flounder, southern	Paralichthys lethostigma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Flounder, unidentified	Pleuronectiformes	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Kingfish, northern	Menticirrhus saxatilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kingfish, southern	Menticirrhus americanus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Largehead hairtail	Trichiurus lepturus	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lizardfish, inshore	Synodus foetens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Lizardfish, unidentified	Synodontidae	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Northern puffer	Sphoeroides maculatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Pigfish	Orthopristis chrysoptera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Pinfish	Lagodon rhomboides	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ray, cownose	Rhinoptera bonasus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Remora	Remora remora	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roundfish, unidentified	Teleostei	-	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sea bass, black	Centropristis striata	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sea robin, unidentified	Prionotus	-	-	1	10	-	-	-	-	1	-	-	-	-	-	3	7	36	25	8	23	6	11	48	34
Sheepshead	Archosargus probatocephalus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silverside, Atlantic	Menidia menidia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Skate	Rajidae	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-	-	-	-	-	1	-	1	2	-
Skate, clearnose	Raja eglanteria	-	-	-	1	-	-	-	-	-	-	-	-	-	1	2	2	1	1	-	-	-	-	-	-
Skate, egg case	Rajidae	-	4	2	2	-	1	4	-	-	-	1	3	1	1	4	-	-	-	-	-	-	2	5	-
Stingray, Atlantic	Dasyatis sabina	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	2	-	-	1	-	-	-	-	-
Stingray, southern	Dasyatis americana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Invertebrate																									

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Common Name	Lowest Taxonomic Level	Counts per WEA & WH Transects																							
		49	50	51	52	53	54	55	56	57	58	59	60	61	62	1	2	3	4	5	6	7	8	9	10
Anemone, burrowing	Anthozoa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Clam, razor	Ensis leei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Clam, surf	Spisula solidissima	-	2	-	1	-	-	-	-	-	-	1	-	1	1	1	-	-	-	-	2	-	-	-	
Crab, cancer	Cancer	-	1	-	-	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	
Crab, hermit	Pagurus	-	2	-	-	-	-	-	3	2	2	-	-	-	-	-	-	-	-	-	-	-	1	2	
Crab, horseshoe	Limulus polyphemus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Crab, lady	Ovalipes ocellatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Crab, portunid	Portunidae	5	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	
Crab, spider	Libinia	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	
Crab, unidentified	Decapoda	-	-	-	-	-	-	-	1	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	
Mollusc, unidentified	Mollusca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Moon snail	Naticidae	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Moon snail, egg case	Naticidae	1	2	-	-	-	1	-	-	-	-	5	-	-	-	-	-	-	-	-	2	-	-	-	
Octopus, unidentified	Octopodidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sea star, blood	Henricia sanguinolenta	-	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-	-	-	-	-	
Sea star, common	Asterias rubens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sea star, gray	Ludia clathrata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sea star, unidentified	Asteroidea	-	-	-	-	-	-	1	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	
Sea urchin	Echinoidea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	
Shrimp	Decapoda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	
Shrimp, mantis	Squilla empusa	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Solitary hydroid	Hydrozoa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Squid, unidentified	Cephalopoda	-	1	-	1	1	-	-	5	1	-	-	-	-	-	2	-	-	-	1	-	-	2	-	
Whelk eggs	Melongenidae	-	-	-	-	1	-	-	-	-	-	1	-	-	-	1	2	1	-	1	1	-	1	1	
Whelk, unidentified	Melongenidae	-	-	-	2	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Worm, Polychaete	Polychaeta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Worm, unidentified	Polychaeta	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Other																									
Debris, anthropogenic	Debris, anthropogenic	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Object, unidentified	Object, unidentified	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Organism, unidentified	Organism, unidentified	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	
Unidentified	Unidentified	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	
Total Organisms		6	13	4	49	12	2	7	28	33	2	23	10	2	2	10	14	45	27	9	29	13	15	63	37
Total Observations		6	14	4	51	12	2	7	28	34	2	23	10	2	2	11	14	45	27	9	29	13	16	63	37

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Table 3-5. Megafauna and other enumerated features observed during review of the WH (011-035) video transects (continued next page).

Common Name	Lowest Taxonomic Level	Counts per WH Transect																																				
		11	12	13	14	15	16	17	18	19	20	21	22	24	25	26	27	28	29	30	31	32	33	34	35													
Vertebrate																																						
Angelshark, common	Squatina squatina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Butterfish	Peprilus triacanthus	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Croaker, Atlantic	Micropogonias undulatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Drum, black	Pogonias cromis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Eel, unidentified	Anguilliformes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Filefish, planehead	Stephanolepis hispidus	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Fish, unidentified (bony)	Teleostei	-	-	1	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	40	-	5	2	-	1	-	-	-	-	-	-	-	-	-	-	-		
Fish, unidentified (demersal)	Chordata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Flounder, fourspot	Hippoglossina oblongus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Flounder, southern	Paralichthys lethostigma	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Flounder, unidentified	Pleuronectiformes	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Kingfish, northern	Menticirrhus saxatilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Kingfish, southern	Menticirrhus americanus	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Largehead hairtail	Trichiurus lepturus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lizardfish, inshore	Synodus foetens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lizardfish, unidentified	Synodontidae	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Northern puffer	Sphoeroides maculatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Pigfish	Orthopristis chrysoptera	-	-	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Pinfish	Lagodon rhomboides	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ray, cownose	Rhinoptera bonasus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	
Remora	Remora remora	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Roundfish, unidentified	Teleostei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	-	-	-
Sea bass, black	Centropristis striata	-	-	-	-	-	-	-	-	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	-	-	-
Sea robin, unidentified	Prionotus	11	22	44	2	-	5	3	13	9	15	-	4	41	1	-	2	-	1	2	12	2	-	10	1	-	-	-	-	-	-	-	-	-	-	-	-	
Sheepshead	Archosargus probatocephalus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silverside, Atlantic	Menidia menidia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Skate	Rajidae	-	-	-	-	-	-	-	1	-	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	
Skate, clearnose	Raja eglanteria	4	2	-	-	-	-	-	-	1	3	-	-	4	-	-	1	-	-	-	1	-	-	1	-	-	1	-	-	-	-	-	-	1	-	1	1	
Skate, egg case	Rajidae	-	-	-	1	-	-	-	-	-	-	1	3	1	-	2	-	-	-	-	-	-	-	1	-	1	-	1	-	-	-	-	-	-	-	-	-	
Stingray, Atlantic	Dasyatis sabina	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Stingray, southern	Dasyatis americana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Invertebrate																																						
Anemone, burrowing	Anthozoa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

KITTY HAWK PHASE 3 BENTHIC ASSESSMENT REPORT

Common Name	Lowest Taxonomic Level	Counts per WH Transect																																				
		11	12	13	14	15	16	17	18	19	20	21	22	24	25	26	27	28	29	30	31	32	33	34	35													
Clam, razor	Ensis leei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Clam, surf	Spisula solidissima	-	1	-	-	2	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
Crab, cancer	Cancer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Crab, hermit	Pagurus	-	-	2	1	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	-	
Crab, horseshoe	Limulus polyphemus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Crab, lady	Ovalipes ocellatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Crab, portunid	Portunidae	-	-	1	-	-	-	-	-	1	1	-	1	-	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Crab, spider	Libinia	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Crab, unidentified	Decapoda	-	1	-	-	-	-	-	-	-	-	2	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	
Mollusc, unidentified	Mollusca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Moon snail	Naticidae	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-		
Moon snail, egg case	Naticidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Octopus, unidentified	Octopodidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sea star, blood	Henricia sanguinolenta	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sea star, common	Asterias rubens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sea star, gray	Ludia clathrata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sea star, unidentified	Asteroidea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sea urchin	Echinoidea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Shrimp	Decapoda	-	-	-	-	-	-	-	-	-	-	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Shrimp, mantis	Squilla empusa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Solitary hydroid	Hydrozoa	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Squid, unidentified	Cephalopoda	1	1	-	-	-	-	-	2	-	1	-	-	-	-	-	-	-	3	-	7	2	-	13	1	-	-	-	-	-	-	-	-	-	-	-	-	
Whelk eggs	Melongenidae	-	-	-	-	1	-	-	-	-	-	1	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	
Whelk, unidentified	Melongenidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Worm, Polychaete	Polychaeta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Worm, unidentified	Polychaeta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Other																																						
Debris, anthropogenic	Debris, anthropogenic	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Object, unidentified	Object, unidentified	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	6	1	-	
Organism, unidentified	Organism, unidentified	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	
Unidentified	Unidentified	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total Organisms		18	29	48	4	3	5	3	17	29	25	9	32	47	3	4	8	1	55	2	48	9	2	27	8	-	-	-	-	-	-	-	-	-	-	-	-	
Total Observations		18	31	48	4	3	5	3	18	29	25	9	33	47	3	5	8	1	55	2	48	11	2	33	9	-	-	-	-	-	-	-	-	-	-	-	-	-

KITTY HAWK PHASE 3 BENTHIC ASSESSMENT REPORT

Table 3-6. Megafauna and other enumerated features observed during review of the WH (036-059) video transects (continued next page).

Common Name	Lowest Taxonomic Level	Counts per WH_ Transect																											
		36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59				
Vertebrate																													
Angelshark, common	Squatina squatina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Butterfish	Peprilus triacanthus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Croaker, Atlantic	Micropogonias undulatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Drum, black	Pogonias cromis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Eel, unidentified	Anguilliformes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
Filefish, planehead	Stephanolepis hispidus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Fish, unidentified (bony)	Teleostei	11	-	-	1	-	-	3	5	1	1	4	4	7	-	1	2	2	3	1	1	1	-	-	-	-	1		
Fish, unidentified (demersal)	Chordata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Flounder, fourspot	Hippoglossina oblongus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Flounder, southern	Paralichthys lethostigma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Flounder, unidentified	Pleuronectiformes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Kingfish, northern	Menticirrhus saxatilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Kingfish, southern	Menticirrhus americanus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Largehead hairtail	Trichiurus lepturus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	
Lizardfish, inshore	Synodus foetens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lizardfish, unidentified	Synodontidae	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Northern puffer	Sphoeroides maculatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Pigfish	Orthopristis chrysoptera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	
Pinfish	Lagodon rhomboides	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ray, cownose	Rhinoptera bonasus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Remora	Remora remora	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Roundfish, unidentified	Teleostei	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sea bass, black	Centropristis striata	-	-	-	-	-	1	-	1	-	-	-	-	9	-	-	1	-	-	1	-	-	-	-	-	-	-	-	
Sea robin, unidentified	Prionotus	1	1	1	3	3	2	-	-	-	1	-	1	4	1	-	3	-	4	-	2	4	-	-	-	-	2	-	
Sheepshead	Archosargus probatocephalus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silverside, Atlantic	Menidia menidia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	
Skate	Rajidae	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	2	-	-	-	-	-	-	-	-	-	-	1	
Skate, clearnose	Raja eglanteria	-	-	-	-	-	1	-	-	-	-	-	-	2	-	-	-	-	1	-	-	-	-	-	-	-	1	-	
Skate, egg case	Rajidae	2	1	-	-	-	1	2	-	2	3	-	2	1	2	4	-	-	2	-	-	-	-	-	-	-	-	-	
Stingray, Atlantic	Dasyatis sabina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	
Stingray, southern	Dasyatis americana	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	
Invertebrate																													

KITTY HAWK PHASE 3 BENTHIC ASSESSMENT REPORT

Common Name	Lowest Taxonomic Level	Counts per WH_ Transect																							
		36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
Anemone, burrowing	Anthozoa	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clam, razor	Ensis leei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clam, surf	Spisula solidissima	-	-	-	-	16	1	-	-	-	-	1	-	5	-	-	-	-	-	-	-	-	-	-	-
Crab, cancer	Cancer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crab, hermit	Pagurus	1	-	-	-	-	-	-	-	-	-	2	1	-	-	-	1	-	-	-	-	-	-	-	-
Crab, horseshoe	Limulus polyphemus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crab, lady	Ovalipes ocellatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crab, portunid	Portunidae	-	-	-	-	-	4	-	-	-	-	-	1	1	-	-	-	-	-	1	-	1	-	-	-
Crab, spider	Libinia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crab, unidentified	Decapoda	-	-	-	1	-	-	-	4	-	-	-	1	-	-	1	2	2	-	-	-	2	1	-	1
Mollusc, unidentified	Mollusca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Moon snail	Naticidae	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Moon snail, egg case	Naticidae	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
Octopus, unidentified	Octopodidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sea star, blood	Henricia sanguinolenta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sea star, common	Asterias rubens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sea star, gray	Ludia clathrata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sea star, unidentified	Asteroidea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sea urchin	Echinoidea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shrimp	Decapoda	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	2	-	-	-	-	-	-	-	-
Shrimp, mantis	Squilla empusa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solitary hydroid	Hydrozoa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Squid, unidentified	Cephalopoda	-	-	-	-	-	10	2	2	-	-	-	2	-	-	1	-	-	-	-	2	-	-	-	-
Whelk eggs	Melongenidae	2	-	-	-	-	-	3	-	1	-	-	-	-	-	1	1	-	1	-	-	1	-	-	-
Whelk, unidentified	Melongenidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	1	-	-	2	-
Worm, Polychaete	Polychaeta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Worm, unidentified	Polychaeta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Other																									
Debris, anthropogenic	Debris, anthropogenic	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Object, unidentified	Object, unidentified	-	-	1	-	-	-	-	4	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Organism, unidentified	Organism, unidentified	-	-	-	-	-	7	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unidentified	Unidentified	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organisms		17	5	1	5	19	20	10	12	6	6	4	12	27	11	9	13	9	10	6	4	10	5	1	8
Total Observations		17	5	2	5	19	27	10	18	9	6	4	13	27	11	9	13	9	10	6	4	10	5	1	8

KITTY HAWK PHASE 3 BENTHIC ASSESSMENT REPORT

Table 3-7. Megafauna and other enumerated features observed during review of the WH (060-066) video transects (continued next page).

Common Name	Lowest Taxonomic Level	Counts per WH Transect								WEA/WH Total
		60	61	62	63	64	65	66	67	
Vertebrate										
Angelshark, common	Squatina squatina	-	-	-	-	-	-	-	-	1
Butterfish	Peprilus triacanthus	-	-	-	-	-	-	-	-	3
Croaker, Atlantic	Micropogonias undulatus	-	-	-	-	-	-	-	-	1
Drum, black	Pogonias cromis	-	-	-	-	-	-	-	-	1
Eel, unidentified	Anguilliformes	-	-	-	-	-	-	-	-	1
Filefish, planehead	Stephanolepis hispidus	-	-	-	-	-	-	-	-	6
Fish, unidentified (bony)	Teleostei	-	2	3	3	-	-	-	3	178
Fish, unidentified (demersal)	Chordata	-	-	-	-	-	-	-	-	2
Flounder, fourspot	Hippoglossina oblongus	-	-	-	-	-	-	-	-	1
Flounder, southern	Paralichthys lethostigma	-	-	-	-	-	-	-	-	2
Flounder, unidentified	Pleuronectiformes	-	-	-	-	-	-	-	-	5
Kingfish, northern	Menticirrhus saxatilis	-	-	-	-	-	-	-	-	1
Kingfish, southern	Menticirrhus americanus	-	-	-	-	-	-	-	-	2
Largehead hairtail	Trichiurus lepturus	-	-	-	-	-	-	-	-	2
Lizardfish, inshore	Synodus foetens	-	-	-	-	-	-	-	-	1
Lizardfish, unidentified	Synodontidae	-	-	-	-	-	-	-	-	5
Northern puffer	Sphoeroides maculatus	-	-	-	-	-	-	-	-	2
Pigfish	Orthopristis chrysoptera	-	-	-	-	-	-	-	-	5
Pinfish	Lagodon rhomboides	-	-	-	-	-	-	-	-	11
Ray, cownose	Rhinoptera bonasus	-	-	-	-	-	-	-	-	2
Remora	Remora remora	-	-	-	-	-	-	-	-	1
Roundfish, unidentified	Teleostei	-	-	-	-	-	-	-	-	23
Sea bass, black	Centropristis striata	-	1	2	1	-	-	-	-	46
Sea robin, unidentified	Prionotus	-	-	1	-	-	-	-	-	826
Sheepshead	Archosargus probatocephalus	-	-	-	-	-	-	-	-	4
Silverside, Atlantic	Menidia menidia	-	-	-	-	-	-	-	-	1
Skate	Rajidae	1	2	-	-	-	-	-	-	38
Skate, clearnose	Raja eglanteria	-	-	-	-	-	-	-	-	38
Skate, egg case	Rajidae	-	-	1	-	2	-	1	2	111
Stingray, Atlantic	Dasyatis sabina	-	-	-	-	-	-	-	-	11
Stingray, southern	Dasyatis americana	-	-	-	-	-	-	-	-	3
Invertebrate										
Anemone, burrowing	Anthozoa	-	3	-	-	-	-	-	-	5
Clam, razor	Ensis leei	-	-	-	-	-	-	-	-	5

KITTY HAWK PHASE 3 BENTHIC ASSESSMENT REPORT

Common Name	Lowest Taxonomic Level	Counts per WH Transect								WEA/WH Total
		60	61	62	63	64	65	66	67	
Clam, surf	Spisula solidissima	2	-	-	-	-	-	-	1	74
Crab, cancer	Cancer	-	-	1	-	-	-	-	-	9
Crab, hermit	Pagurus	2	2	-	-	-	-	-	-	48
Crab, horseshoe	Limulus polyphemus	-	2	-	-	-	-	-	-	6
Crab, lady	Ovalipes ocellatus	1	-	-	-	-	-	-	-	1
Crab, portunid	Portunidae	-	-	-	-	-	-	-	-	43
Crab, spider	Libinia	-	-	-	-	-	-	-	-	5
Crab, unidentified	Decapoda	4	5	1	-	-	-	-	-	50
Mollusc, unidentified	Mollusca	-	-	-	-	-	-	-	-	1
Moon snail	Naticidae	-	-	1	-	-	-	-	-	8
Moon snail, egg case	Naticidae	1	1	4	-	3	-	-	4	30
Octopus, unidentified	Octopodidae	-	-	-	-	-	-	-	-	1
Sea star, blood	Henricia sanguinolenta	-	-	-	4	-	-	-	-	21
Sea star, common	Asterias rubens	-	-	-	1	-	-	-	-	1
Sea star, gray	Ludia clathrata	-	-	-	-	-	9	1	-	11
Sea star, unidentified	Asteroidea	-	-	-	1	-	-	-	1	12
Sea urchin	Echinoidea	-	-	-	-	-	-	-	-	5
Shrimp	Decapoda	-	-	-	-	-	-	-	-	54
Shrimp, mantis	Squilla empusa	-	-	-	-	-	-	-	-	2
Solitary hydroid	Hydrozoa	-	-	-	-	-	-	-	-	1
Squid, unidentified	Cephalopoda	-	1	1	-	-	-	-	-	120
Whelk eggs	Melongenidae	-	-	-	-	-	-	-	-	52
Whelk, unidentified	Melongenidae	-	1	2	2	-	-	-	-	15
Worm, Polychaete	Polychaeta	-	-	-	-	-	-	-	-	1
Worm, unidentified	Polychaeta	-	-	-	-	-	-	-	-	8
Other										
Debris, anthropogenic	Debris, anthropogenic	-	-	-	-	-	-	-	-	10
Object, unidentified	Object, unidentified	-	-	-	-	-	-	-	1	28
Organism, unidentified	Organism, unidentified	1	-	-	-	-	-	-	-	28
Unidentified	Unidentified	-	-	-	-	-	-	-	-	3
Total Organisms		11	20	17	12	5	9	2	11	1,923
Total Observations		12	20	17	12	5	9	2	12	1,992

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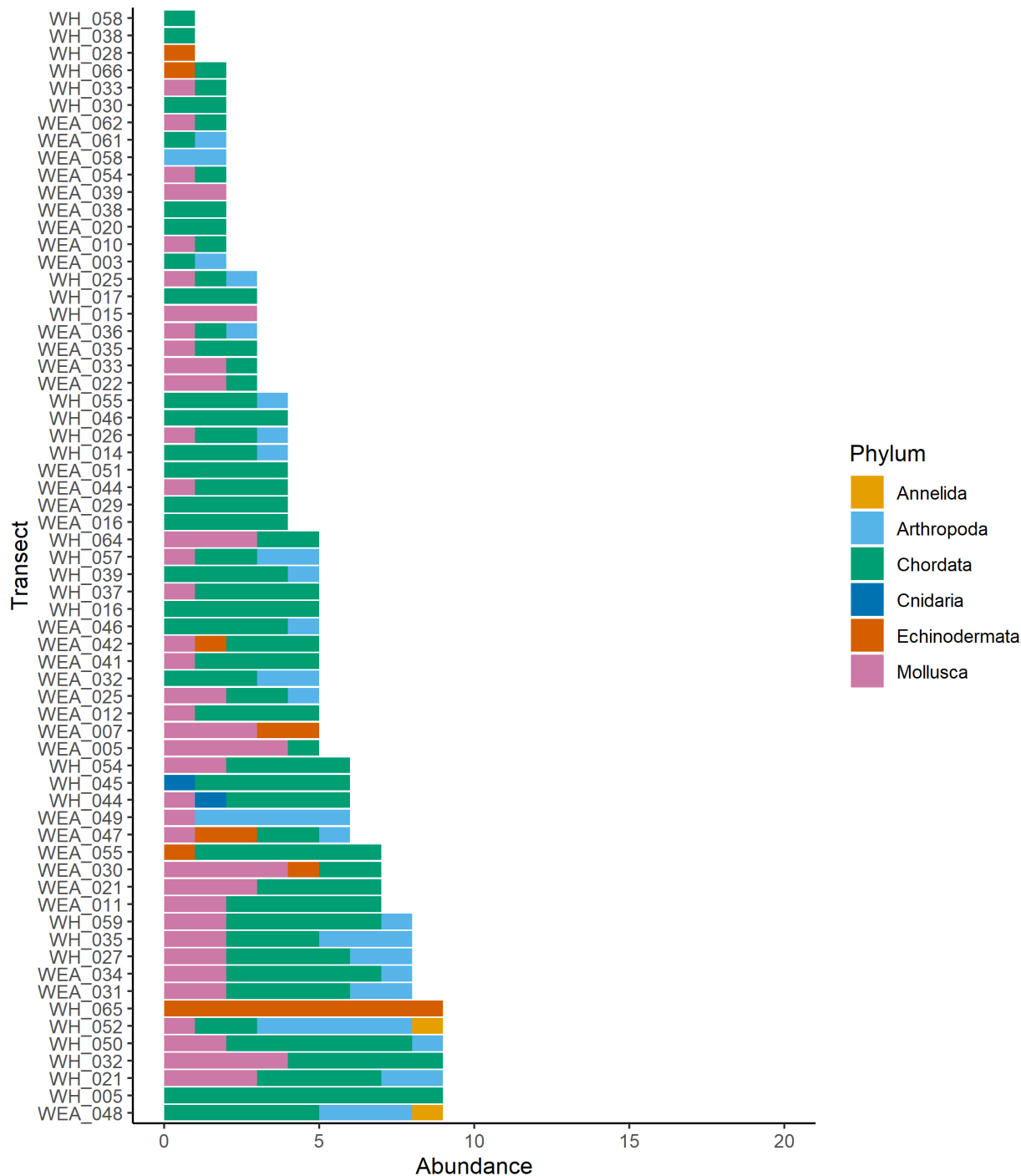


Figure 3-2. Distribution of enumerated organisms larger than 4 cm aggregated by phylum in each video transect within the WEA. Organisms not identified to the level of phylum were excluded. See text for complete explanation of which species were quantified by enumeration versus by percent of bottom cover. (Continued on next page, please note the different x-axis scale)

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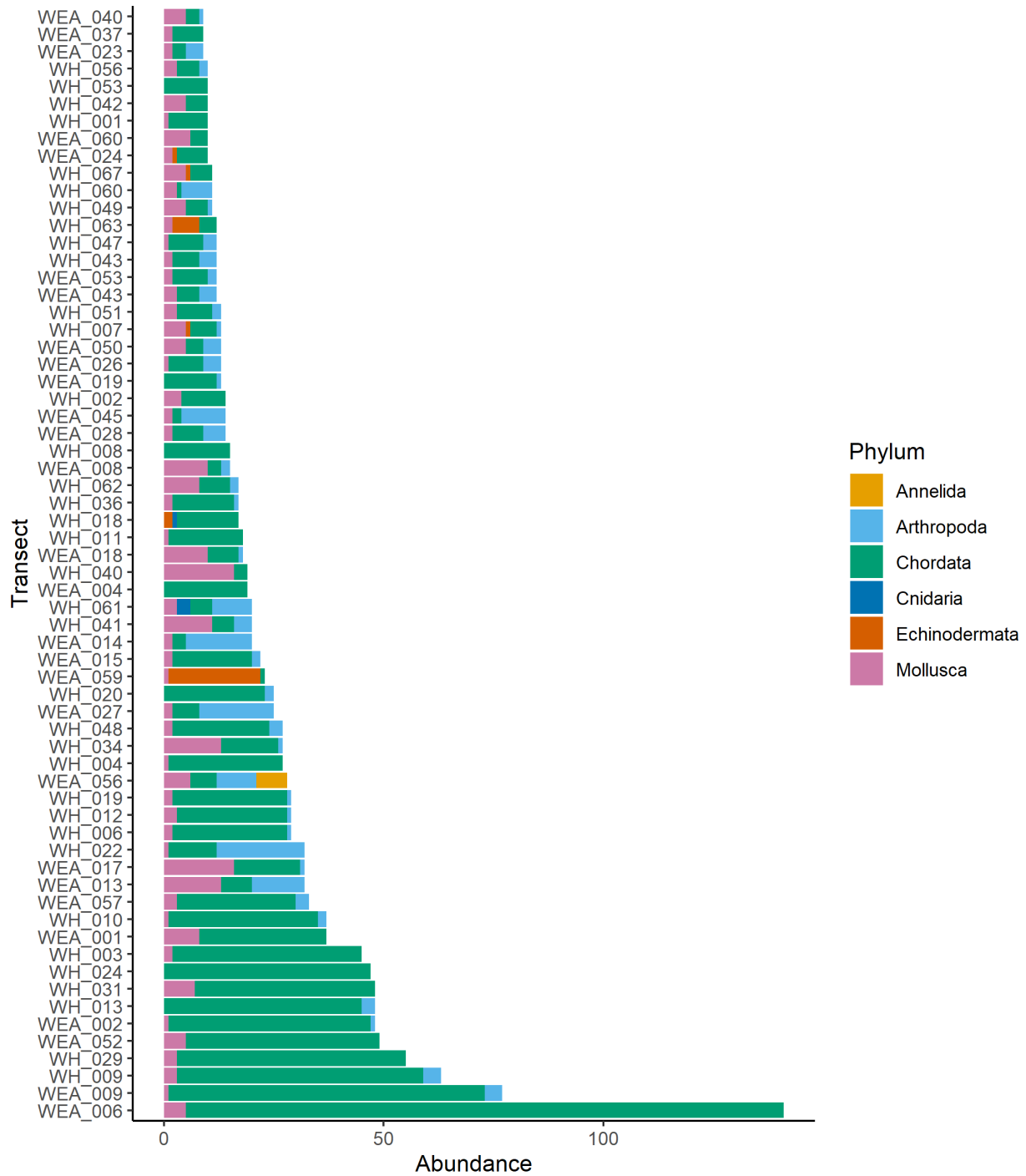


Figure 3-2. Continued.

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Table 3-8 Shannon-Weiner diversity index values for each video transect within the WEA based on observations to the level of family (or LTPL).

Transect	Shannon-Weiner Diversity	Transect	Shannon-Weiner Diversity	Transect	Shannon-Weiner Diversity	Transect	Shannon-Weiner Diversity
WEA_001	0.604	WEA_032	0.673	WH_001	1.367	WH_035	1.889
WEA_002	0.729	WEA_033	1.099	WH_002	1.468	WH_036	1.119
WEA_003	0.693	WEA_034	1.494	WH_003	0.847	WH_037	1.332
WEA_004	0	WEA_035	0.637	WH_004	0.315	WH_038	0.693
WEA_005	1.609	WEA_036	1.099	WH_005	0.349	WH_039	0.95
WEA_006	0.229	WEA_037	1.215	WH_006	0.881	WH_040	0.436
WEA_007	1.33	WEA_038	0	WH_007	1.525	WH_041	1.63
WEA_008	1.194	WEA_039	0.693	WH_008	0.918	WH_042	1.366
WEA_009	0.666	WEA_040	1.465	WH_009	0.933	WH_043	1.673
WEA_010	0.693	WEA_041	1.332	WH_010	0.333	WH_044	1.889
WEA_011	1.55	WEA_042	1.609	WH_011	1.117	WH_045	1.242
WEA_012	1.213	WEA_043	1.925	WH_012	1.151	WH_046	0
WEA_013	1.544	WEA_044	1.04	WH_013	0.373	WH_047	1.778
WEA_014	1.46	WEA_045	1.668	WH_014	1.04	WH_048	1.691
WEA_015	1.968	WEA_046	1.332	WH_015	0.637	WH_049	1.162
WEA_016	0	WEA_047	1.748	WH_016	0	WH_050	1.427
WEA_017	0.994	WEA_048	1.677	WH_017	0	WH_051	1.885
WEA_018	0.854	WEA_049	0.451	WH_018	0.961	WH_052	1.427
WEA_019	0.536	WEA_050	1.946	WH_019	1.632	WH_053	1.28
WEA_020	0	WEA_051	1.04	WH_020	1.407	WH_054	1.561
WEA_021	1.494	WEA_052	1.474	WH_021	1.677	WH_055	1.04
WEA_022	0.637	WEA_053	1.35	WH_022	1.501	WH_056	1.471
WEA_023	1.471	WEA_054	0.693	WH_024	0.439	WH_057	1.609
WEA_024	1.471	WEA_055	1.154	WH_025	1.099	WH_058	0
WEA_025	1.055	WEA_056	2.075	WH_026	1.332	WH_059	1.733
WEA_026	1.376	WEA_057	1.348	WH_027	1.733	WH_060	1.792
WEA_027	1.797	WEA_058	0	WH_028	0	WH_061	2.151
WEA_028	1.663	WEA_059	0.902	WH_029	0.785	WH_062	2.003
WEA_029	1.099	WEA_060	1.168	WH_030	0	WH_063	1.633
WEA_030	1.55	WEA_061	0.693	WH_031	1.441	WH_064	0.673
WEA_031	1.677	WEA_062	0.693	WH_032	2.02	WH_065	0
				WH_033	0.693	WH_066	0.693
				WH_034	1.421	WH_067	1.633

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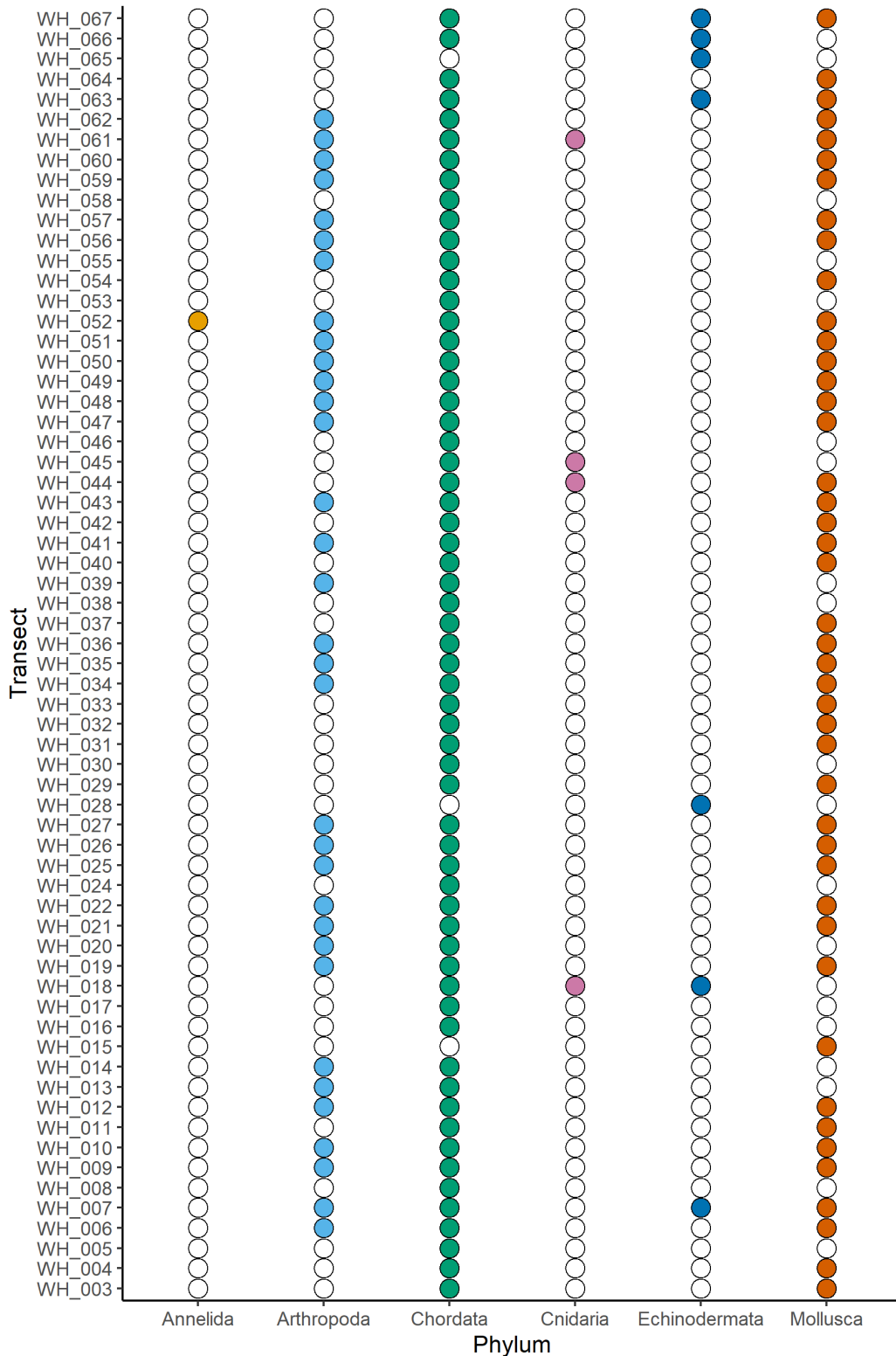


Figure 3-3. Presence (colored) or absence (white) of phyla in each video transect within the WEA. These data include only enumerated species larger than 4 cm. See text for complete explanation of which species were quantified by enumeration versus by percent of bottom cover. (Continued on next page)

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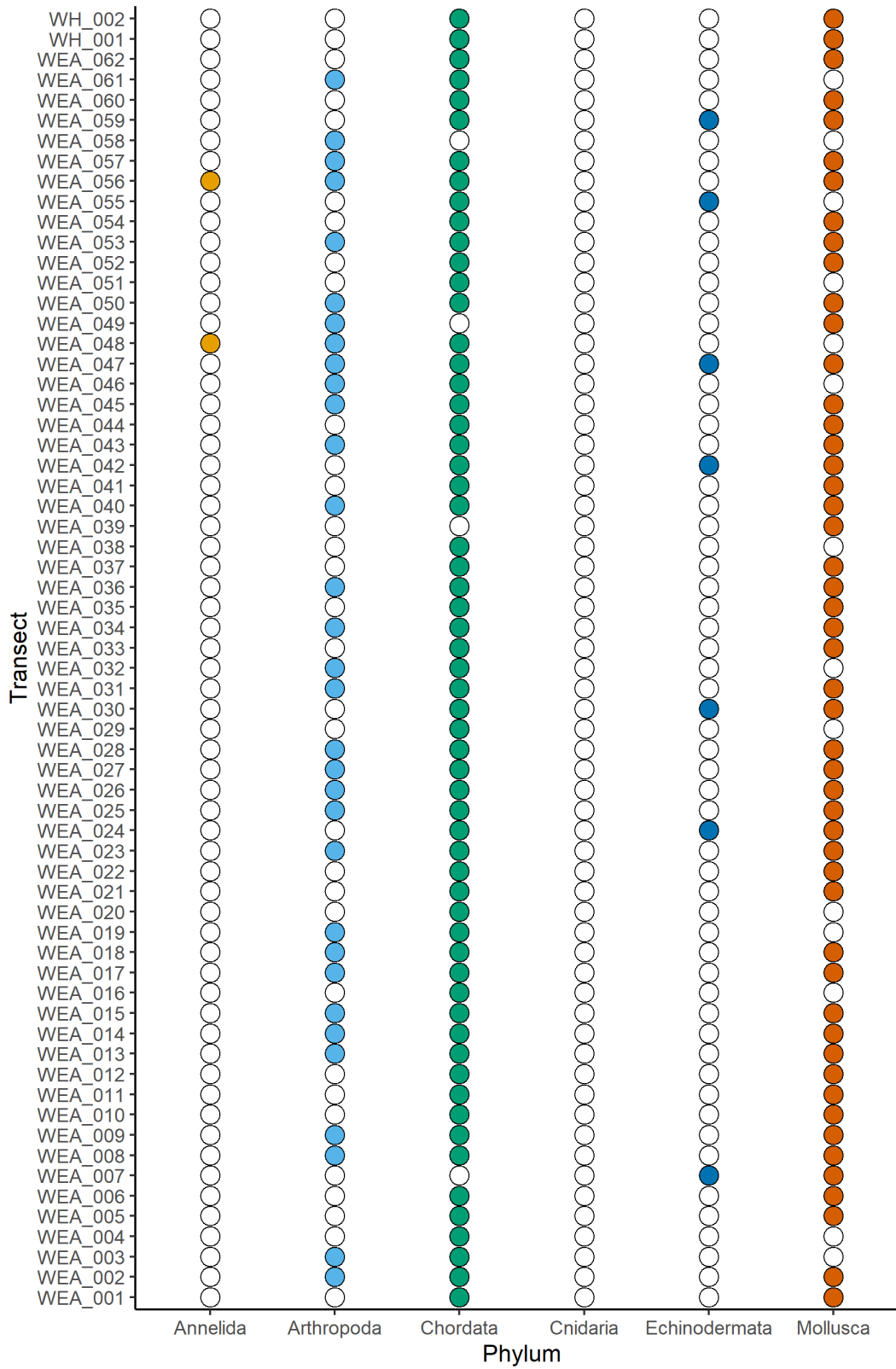


Figure 3-3. Continued.

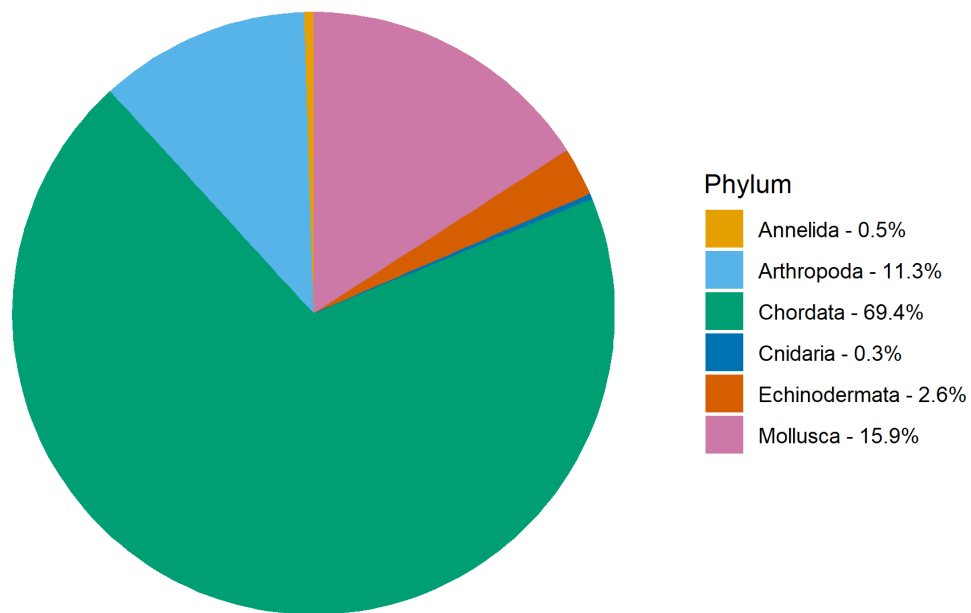


Figure 3-4. Percent composition of enumerated organisms larger than 4 cm aggregated by phyla in all video transects within the WEA. Organisms not identified to the level of Phylum were excluded.

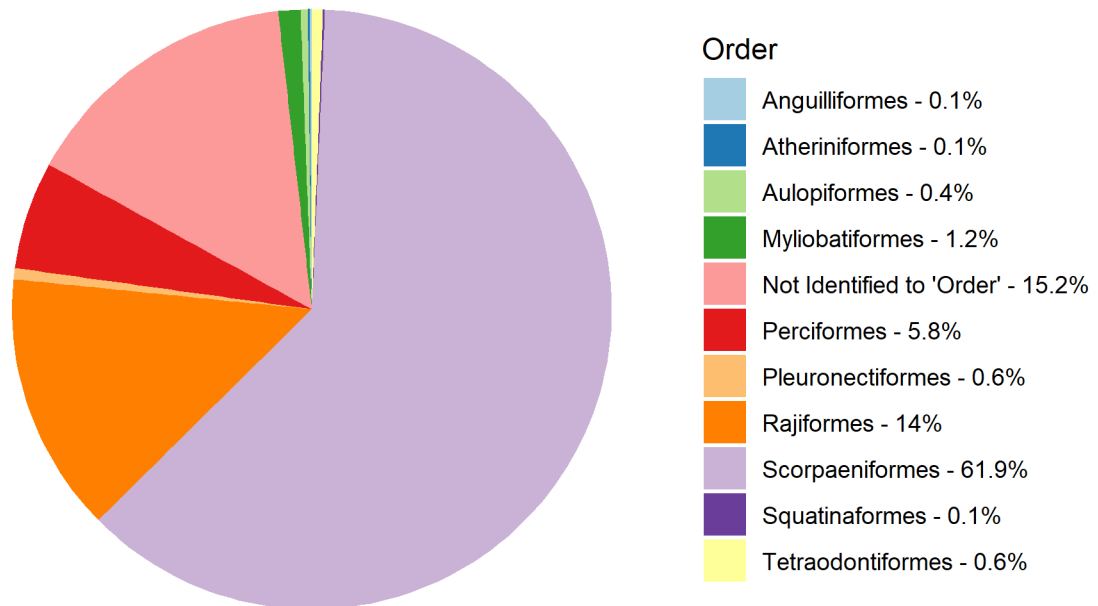


Figure 3-5. Percent composition of enumerated vertebrates (phylum Chordata) larger than 4 cm aggregated by taxonomic level "order" in all video transects within the WEA. Organisms not identified to the level of order were excluded.

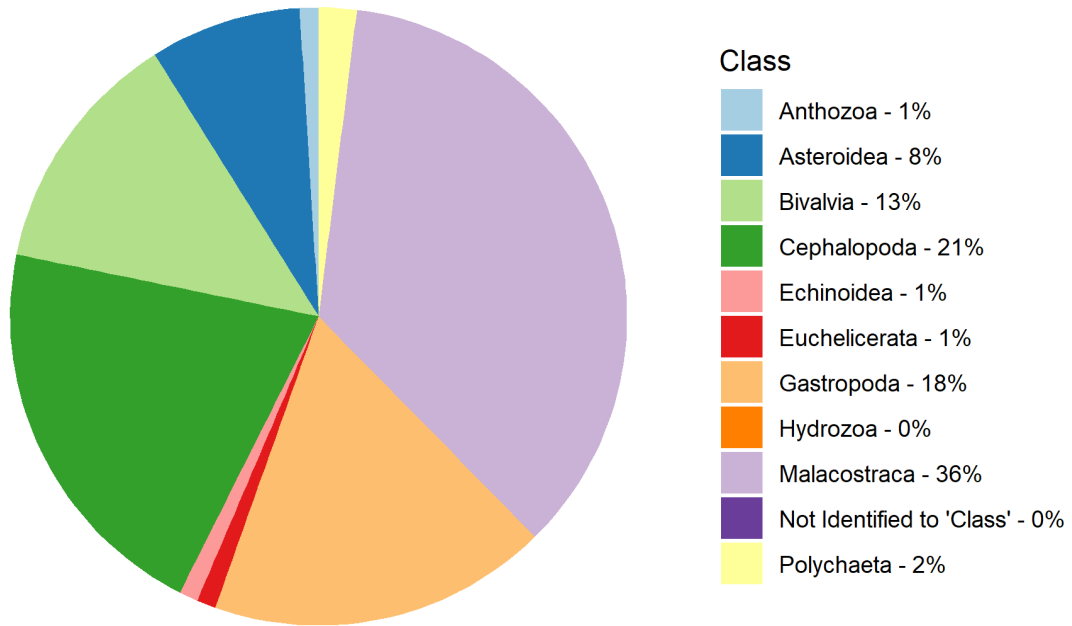


Figure 3-6. Percent composition of enumerated invertebrates larger than 4 cm aggregated by taxonomic level “class” in all video transects within the WEA. Organisms not identified to the level of class were excluded.

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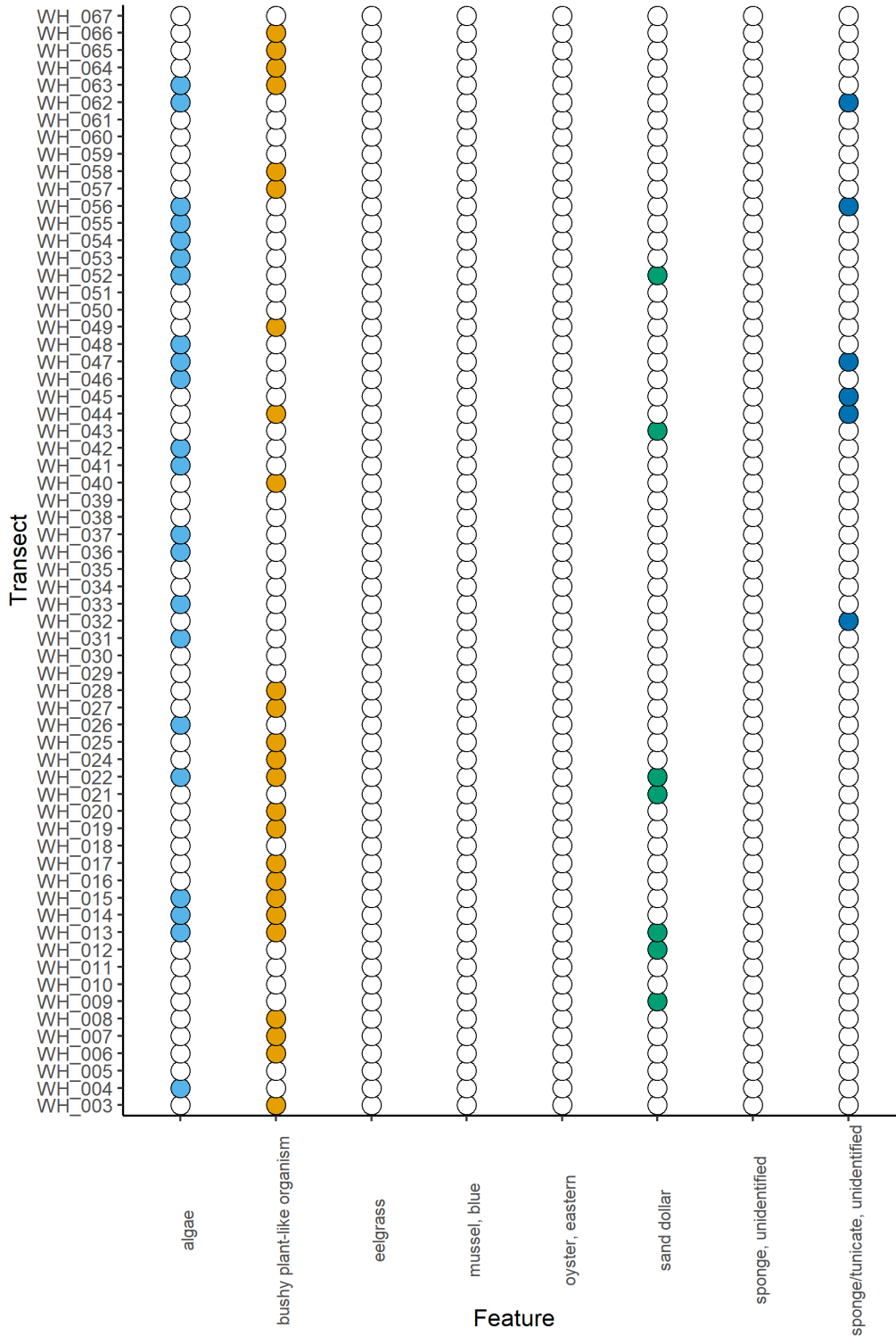


Figure 3-7. Presence (colored) or absence (white) of important features in each video transect within the WEA. These data only include features that were marked as present or absent and not enumerated. See text for complete explanation of which species were quantified by enumeration versus by percent of bottom cover. (Continued on next page)

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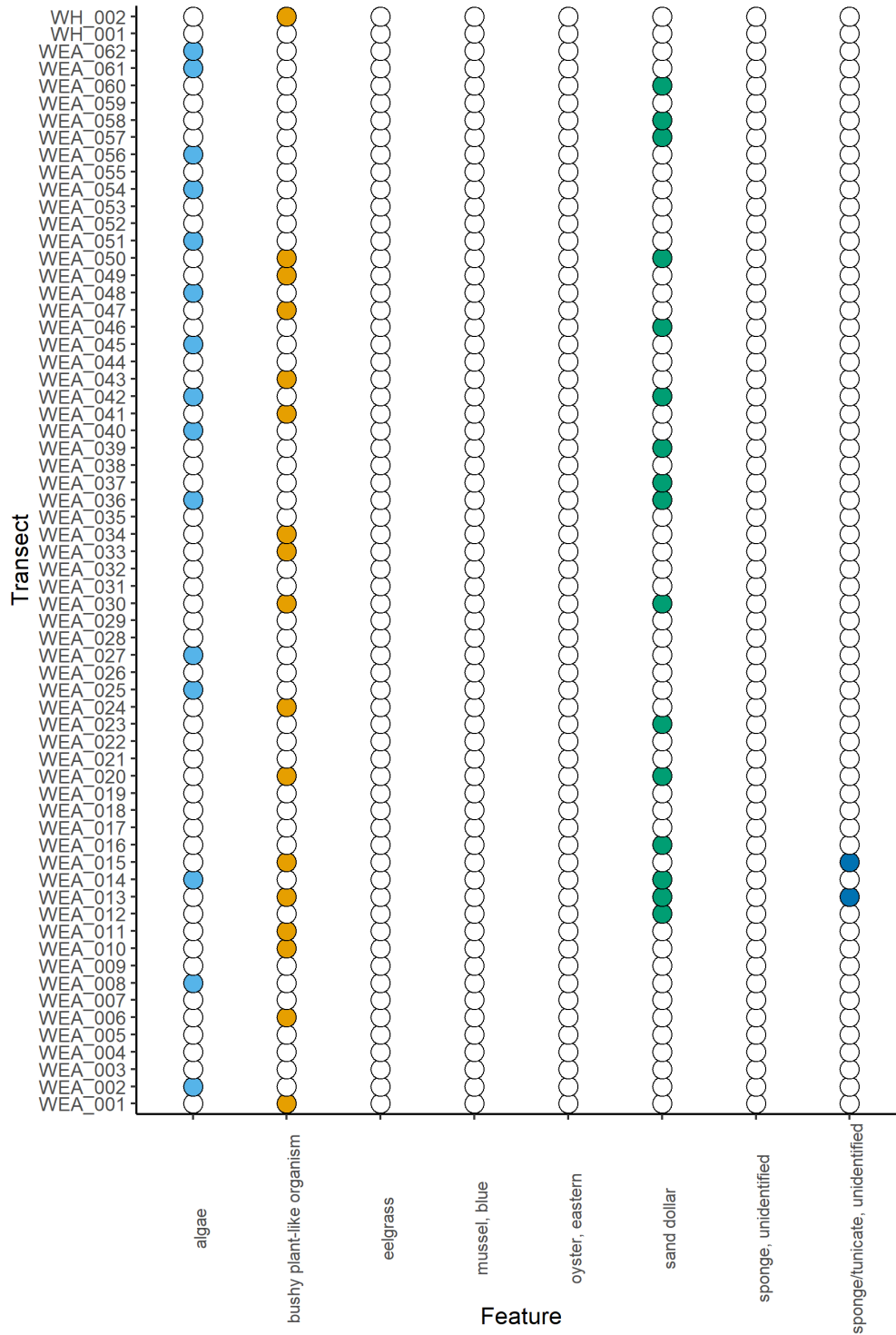





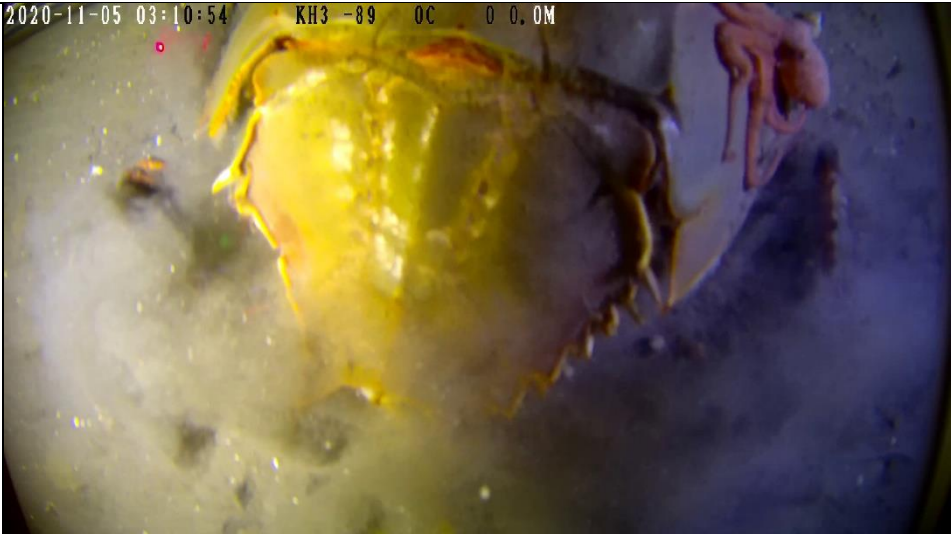

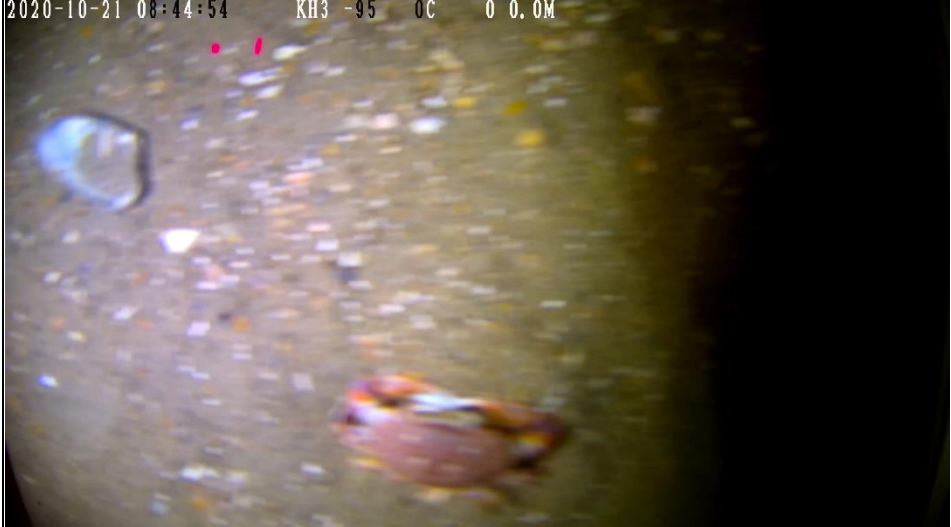
Figure 3-7. Continued.

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Table 3-9. Representative images of megafauna and debris observed and identified in the videos collected in the WEA. (Continued on next pages)

<p>Sea Robin (<i>Prionotus evolans</i>) WH_047</p>	<p>2020-11-05 00:48:19 KH3 -91 0C 0 0.0M</p> 
<p>Southern Stingray (<i>Dasyatis americana</i>) WH_037</p>	<p>2020-10-29 13:22:13 KH3 -89 0C 0 0.0M</p> 
<p>Cownose Ray (<i>Rhinoptera bonasus</i>) WEA_005</p>	<p>2020-11-07 13:50:43 KH3 -90 0C 0 0.0M</p> 




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<p>Octopus (Octopodidae) and Horseshoe Crab (<i>Limulus polyphemus</i>) WEA_027</p>	<p>2020-11-05 03:10:54 KH3 -89 OC 0 0.0M</p>  An underwater video frame showing a large, yellowish-orange horseshoe crab (Limulus polyphemus) in the center. To its right, a pinkish octopus is visible. The seabed is sandy and slightly turbid. The video timestamp is 2020-11-05 03:10:54, KH3 -89 OC 0 0.0M.
<p>Squid (Cephalopoda) WEA_025</p>	<p>2020-11-04 08:35:08 KH3 -90 OC 0 0.0M</p>  An underwater video frame showing a squid on the seabed. The squid is brownish and appears to be resting or moving slowly. The seabed is sandy and somewhat dark. The video timestamp is 2020-11-04 08:35:08, KH3 -90 OC 0 0.0M.
<p>Lady Crab (<i>Ovalipes ocellatus</i>) WH_059</p>	<p>2020-10-21 08:44:54 KH3 -95 OC 0 0.0M</p>  An underwater video frame showing a lady crab (Ovalipes ocellatus) on the seabed. The crab is reddish-brown and is positioned in the lower right. The seabed is sandy and covered with small, light-colored particles. The video timestamp is 2020-10-21 08:44:54, KH3 -95 OC 0 0.0M.

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<p>Lizardfish (<i>Synodus foetens</i>) WH_011</p>	<p>2020-11-07 07:31:59 KH3 -91 0C 0 0.0M</p> 
<p>Skate Egg Case (Rajidae) WH_047</p>	<p>2020-11-05 00:42:35 KH3 -91 0C 0 0.0M</p> 
<p>Sea Star (<i>Asterias rubens</i>) WEA_055</p>	<p>2020-10-20 20:25:09 KH3 -10 0C 0 0.0M</p> 

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<p>Whelk Egg Case (Melongenidae) WEA_015</p>	<p>2020-11-04 02:20:45 KH3 -96 OC 0 0.0M</p> 
<p>Moon Snail Egg Case (Naticidae) WH_067</p>	<p>2020-10-20 12:55:46 KH3 -91 OC 0 0.0M</p> 
<p>Anthropogenic Debris (drink can) and Black Sea Bass (<i>Centropristis striata</i>) WEA_052</p>	<p>2020-10-11 23:11:07 KH3 -93 OC 0 0.0M</p> 

3.1.1.2 Percent Cover

The following section summarizes the results of the percent cover analysis of still images derived from underwater video transects in the WEA project area. Percent cover of various bottom substrates and features within a measured surface area of each image were recorded and used to define the NMFS-modified (NMFS, 2021) CMECS substrate classification that was most suitable for the sampled area (Table 3-10). In addition to percent cover of different sediment grain sizes (boulder, cobble, pebble/granule, or sand/mud), the presence of biogenic shell or worm tube substrate, anthropogenic materials, and other biological elements were additionally recorded (Table 3-11). Examples of the biological elements include flora (e.g., algae or seagrass), fauna (e.g., mobile megafauna, encrusting species, sand dollars), and evidence of biological activity (e.g., burrows, infaunal structures). Thus, in addition to CMECS classification of the main substrate, the density of co-occurring shell and flora/fauna cover were calculated to illustrate these aspects of habitat complexity. Visual examples of habitat types defined using the still images are presented in the CMECS Classifications section (Section 3.2.2).

A total of 9,645 m² of seafloor was analyzed in the WEA region. The geologic substrate group with the highest percent cover across all transects was fine sand/mud, composing 93% (9,016 m²) of the surface area analyzed through still images for the transects. Transect WEA_032 contained 100% (16 m²) sand/mud cover, with the smallest sand/mud cover occurring at transect WEA_042 (45% or 36 m²). The transect with the highest area sampled, 287 m², was WH_067 which contained 99% sand/mud substrate (Table 3-10).

Gravel cover (boulder, cobble, and pebble/granule sizes combined) composed > 5% of the substrate in only 3 out of 128 transects. Transect WEA_042 had the highest percent of gravel cover at 43% (34 m²), while WH_047 had 9% (3 m²), and WEA_041 had 6% (7 m²). Over 99% of the gravel analyzed was pebble/granule sized (2 – 64 mm), with cobbles (64 – 256 mm) in 4 transects and no boulders (>256 mm).

Biogenic shell cover was the second most abundant substrate type, accounting for 6% (567 m²) of the substrate within the WEA transects. The average biogenic cover across all transects in the WEA was 5%, with the most occurring at WEA_047 (25%) and none in WEA_032 (0%). Anthropogenic substrates were only found at two transects, WEA_015 and WH_042, and included a metal pole, possibly as part of a ladder which fish were observed gathered around, and a piece of plastic trash.

The total area of biological elements (i.e., flora or fauna) sampled in the WEA was 4 m² and accounts for less than 0.1% of the bottom cover (Table 3-11). The most common elements were megafauna, which made up 43% of the total flora/fauna, although they only account for 2 m² of the bottom cover. Megafauna included mainly sea robins, unidentified fish, squid, and skate eggs. The second most common element was infaunal structures which comprised 35% of the total flora/fauna and accounted for 1 m² of bottom cover. These structures were typically amphipod tubes. Transect WH_004 had the highest amount of infaunal structures observed, while infaunal structures were not detected for the majority of transects (110

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of 128). Sand dollars composed 0.4 m² of the bottom cover and were found in 7 transects. No encrusting organisms (e.g., sponge, coral, tunicate) were found in the WEA project area.

Table 3-10. Area and percent coverage of different substrates summarized from still images taken from each of the 128 video transects in the WEA project area. The values presented in this table represent percent of each substrate type per total area analyzed for that transect. The total area analyzed per transect is provided in the Total Area Analyzed (m²) column.

Transect	Total Area Analyzed (m ²)	Percent of Area – Gravel Substrates				Fine Sand/Mud Substrate (%)	Biogenic Shell Cover (%) ¹	Anthropogenic Cover (%) ²	Flora/Fauna Cover (%) ³
		Boulder (%)	Cobble (%)	Pebble/Granule (%)	All Gravel Combined (%)				
WEA_001	87.17	0	0	0	0	99.16	0.81	0	0.03
WEA_002	82.17	0	0	0	0	94.43	5.36	0	0.20
WEA_003	144.07	0	0	0	0	99.46	0.54	0	0
WEA_004	59.96	0	0	0	0	98.22	1.78	0	0
WEA_005	70.92	0	0	0	0	98.65	1.35	0	0
WEA_006	114.19	0	0	0.01	0.01	93.45	6.17	0	0.36
WEA_007	47.41	0	0	0	0	99.85	0.15	0	0
WEA_008	70.19	0	0	<0.01	<0.01	99.00	0.89	0	0.11
WEA_009	74.46	0	0	0	0	98.95	1.02	0	0.03
WEA_010	33.12	0	0	0	0	96.41	3.58	0	0.02
WEA_011	30.01	0	0	0	0	98.07	1.93	0	0
WEA_012	34.91	0	0	0	0	99.66	0.29	0	0.05
WEA_013	17.58	0	0	0	0	99.61	0.18	0	0.22
WEA_014	12.1	0	0	0.17	0.17	98.78	0.97	0	0.08
WEA_015	24.34	0	0	0	0	79.93	20.02	0.06	0
WEA_016	70.03	0	0	0	0	97.41	2.25	0	0.33
WEA_017	40.56	0	0	0	0	99.70	0.20	0	0.10
WEA_018	57.32	0	0	0	0	99.81	0.19	0	0
WEA_019	63.29	0	0	1.68	1.68	72.41	25.81	0	0.11
WEA_020	31.19	0	0	0	0	99.54	0.40	0	0.06
WEA_021	25.57	0	0	0	0	99.44	0.44	0	0.12
WEA_022	14.86	0	0	0.02	0.02	97.56	2.42	0	0
WEA_023	11.01	0	0	0	0	98.88	0.95	0	0.16
WEA_024	51.19	0	0	0	0	80.17	19.80	0	0.03
WEA_025	51.11	0	0	0	0	98.90	1.10	0	0
WEA_026	89.09	0	0	0	0	99.57	0.40	0	0.02
WEA_027	47.62	0	0	0	0	79.02	20.97	0	0.01
WEA_028	22.14	0	0	0	0	99.72	0.28	0	0
WEA_029	52.13	0	0	0.05	0.05	92.50	7.46	0	0
WEA_030	75.94	0	0	0	0	99.88	0.12	0	0
WEA_031	105.81	0	0	0	0	99.67	0.33	0	0
WEA_032	15.71	0	0	0	0	100.00	0.00	0	0
WEA_033	53.33	0	0	0	0	98.93	1.07	0	0
WEA_034	68.07	0	0	0.45	0.45	93.40	6.16	0	0
WEA_035	57.8	0	0	0	0	68.63	31.37	0	0
WEA_036	110.85	0	0.03	0.03	0.06	95.60	4.34	0	0

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Transect	Total Area Analyzed (m ²)	Percent of Area – Gravel Substrates				Fine Sand/Mud Substrate (%)	Biogenic Shell Cover (%) ¹	Anthropogenic Cover (%) ²	Flora/Fauna Cover (%) ³
		Boulder (%)	Cobble (%)	Pebble/Granule (%)	All Gravel Combined (%)				
WEA_037	26.37	0	0	0	0	98.99	1.00	0	0.01
WEA_038	32.24	0	0	0	0	98.92	1.08	0	0
WEA_039	49.22	0	0	0	0	99.87	0.13	0	0
WEA_040	56.48	0	0	0	0	99.22	0.78	0	0
WEA_041	103.24	0	0	6.38	6.38	71.52	22.10	0	0
WEA_042	79.18	0	0.13	42.72	42.84	45.41	11.74	0	0
WEA_043	129.97	0	0	1.64	1.64	92.07	6.29	0	0
WEA_044	27.49	0	0	<0.01	<0.01	94.11	5.89	0	0
WEA_045	23.17	0	0	0	0	99.14	0.86	0	0
WEA_046	88.09	0	0	0	0	91.82	8.18	0	0
WEA_047	58.16	0	0	0	0	74.84	25.16	0	0
WEA_048	204.74	0	0	0	0	95.41	4.59	0	0
WEA_049	65.2	0	0	0	0	99.80	0.19	0	0.01
WEA_050	25.64	0	0	0	0	96.58	3.41	0	0.01
WEA_051	56.63	0	0	0	0	68.83	31.16	0	0.01
WEA_052	95.87	0	0	<0.01	<0.01	92.18	7.81	0	0
WEA_053	110.25	0	0	0	0	99.98	0.02	0	0
WEA_054	87.6	0	0	0	0	99.37	0.62	0	<0.01
WEA_055	23.9	0	0	0	0	99.37	0.60	0	0.03
WEA_056	58.06	0	0	0	0	97.24	2.76	0	0
WEA_057	83.91	0	0	0	0	98.25	1.39	0	0.36
WEA_058	69.59	0	0	0	0	97.11	2.89	0	0
WEA_059	56.94	0	0	0.03	0.03	99.23	0.57	0	0.17
WEA_060	54.87	0	0	0	0	99.39	0.61	0	0
WEA_061	180.77	0	0	0	0	99.70	0.30	0	0
WEA_062	203.49	0	0	0.01	0.01	91.32	8.67	0	0
WH_001	114.40	0	0	0	0	99.01	0.99	0	0
WH_002	141.05	0	0	0.01	0.01	97.75	2.22	0	0.02
WH_003	48.18	0	0	0.64	0.64	86.20	12.97	0	0.19
WH_004	115.73	0	0	0	0	96.21	3.08	0	0.72
WH_005	90.47	0	0	0	0	98.61	1.39	0	0
WH_006	86.53	0	0	0	0	97.67	2.33	0	<0.01
WH_007	122.09	0	0	0.15	0.15	97.14	2.71	0	0
WH_008	106.71	0	0	0	0	96.62	3.38	0	0
WH_009	139.96	0	0	0	0	97.14	2.73	0	0.13
WH_010	59.03	0	0	0.61	0.61	95.04	4.24	0	0.11
WH_011	75.53	0	0	0.39	0.39	89.86	9.76	0	0
WH_012	64.02	0	0	0	0	98.42	1.58	0	0
WH_013	149.50	0	0	0.09	0.09	93.71	6.20	0	<0.01
WH_014	49.26	0	0	0	0	99.37	0.63	0	0
WH_015	120.37	0	0	0.33	0.33	98.29	1.39	0	0
WH_016	53.15	0	0	0	0	97.81	2.19	0	0
WH_017	60.37	0	0	0.19	0.19	94.04	5.71	0	0.05

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Transect	Total Area Analyzed (m ²)	Percent of Area – Gravel Substrates				Fine Sand/Mud Substrate (%)	Biogenic Shell Cover (%) ¹	Anthropogenic Cover (%) ²	Flora/Fauna Cover (%) ³
		Boulder (%)	Cobble (%)	Pebble/Granule (%)	All Gravel Combined (%)				
WH_018	48.98	0	0	0	0	99.72	0.28	0	0
WH_019	60.30	0	0	0.01	0.01	94.75	5.09	0	0.15
WH_020	77.35	0	0	0.14	0.14	93.59	6.27	0	<0.01
WH_021	13.61	0	0	0	0	98.53	1.47	0	0
WH_022	13.51	0	0	0	0	99.54	0.37	0	0.09
WH_024	69.65	0	0	<0.01	<0.01	97.99	1.94	0	0.06
WH_025	24.32	0	0	0.02	0.02	99.71	0.21	0	0.05
WH_026	70.90	0	0	0	0	99.68	0.32	0	0
WH_027	67.02	0	0	0	0	98.80	1.20	0	0
WH_028	41.32	0	0	0	0	99.29	0.71	0	0
WH_029	71.71	0	0	0	0	84.45	15.47	0	0.08
WH_030	16.73	0	0	0	0	99.02	0.98	0	0
WH_031	87.23	0	0	0	0	90.58	9.42	0	0
WH_032	61.23	0	0	0	0	87.34	12.66	0	0
WH_033	18.91	0	0	0	0	99.75	0.21	0	0.03
WH_034	58.93	0	0	0	0	99.64	0.34	0	0.02
WH_035	102.38	0	0	0	0	81.36	18.64	0	0
WH_036	108.47	0	0	0.01	0.01	96.08	3.91	0	0
WH_037	108.49	0	0	0	0	98.45	1.55	0	0
WH_038	47.91	0	0	0	0	92.05	7.90	0	0.04
WH_039	90.56	0	0	0.08	0.08	89.91	10.01	0	0
WH_040	88.90	0	0	0	0	97.97	2.03	0	0
WH_041	90.42	0	0	0	0	97.32	2.64	0	0.04
WH_042	53.87	0	0	0.06	0.06	94.02	5.78	0.02	0.13
WH_043	18.67	0	0	0	0	99.43	0.57	0	0
WH_044	47.84	0	0	0	0	85.89	14.11	0	0
WH_045	49.12	0	0.03	0.06	0.09	81.97	17.94	0	0
WH_046	35.38	0	0	0	0	99.18	0.82	0	0
WH_047	29.08	0	0	8.69	8.69	81.71	9.27	0	0.33
WH_048	32.08	0	0	0	0	91.97	7.93	0	0.10
WH_049	121.63	0	0	0	0	98.86	0.98	0	0.17
WH_050	55.35	0	0	0	0	83.72	16.28	0	0
WH_051	71.28	0	0	2.12	2.12	82.54	15.33	0	<0.01
WH_052	58.46	0	0	0	0	99.76	0.23	0	0.01
WH_053	199.91	0	0	2.56	2.56	78.47	18.88	0	0.09
WH_054	150.98	0	0	0.29	0.29	89.21	10.50	0	0
WH_055	105.89	0	0	0.50	0.50	86.39	13.11	0	0
WH_056	150.73	0	0	0.20	0.20	89.48	10.25	0	0.07
WH_057	91.96	0	0	1.20	1.20	91.09	7.60	0	0.12
WH_058	90.31	0	0	0.14	0.14	93.05	6.81	0	0
WH_059	179.75	0	0	0.01	0.01	87.83	12.16	0	0
WH_060	53.06	0	0	0	0	99.05	0.80	0	0.15
WH_061	143.05	0	0	0	0	88.58	11.41	0	0.01

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Transect	Total Area Analyzed (m ²)	Percent of Area – Gravel Substrates				Fine Sand/Mud Substrate (%)	Biogenic Shell Cover (%) ¹	Anthropogenic Cover (%) ²	Flora/Fauna Cover (%) ³
		Boulder (%)	Cobble (%)	Pebble/Granule (%)	All Gravel Combined (%)				
WH_062	56.47	0	0.11	0	0.11	90.94	8.95	0	0
WH_063	78.22	0	0	0	0	81.16	18.84	0	0
WH_064	97.20	0	0	0	0	97.86	2.14	0	0
WH_065	148.33	0	0	0	0	99.78	0.22	0	<0.01
WH_066	133.57	0	0	0.23	0.23	95.05	4.70	0	0.01
WH_067	289.68	0	0	0	0	99.17	0.83	0	0
Total Percentage in WEA (%)⁴	100	0	<0.1	.60	.60	93.37	6.00	<0.01	.04
Total Area in WEA (m²)⁵	9,645.31	0	0.21	58.09	58.30	9,016.20	566.70	0.02	4.09

¹ Biogenic shell cover includes fragments of shell or empty shell of once living organism.

² Anthropogenic material includes rock, wood, construction materials, metal, and trash.

³ Biological elements (i.e. flora/fauna) includes burrows, infaunal structures, megafauna, encrusting organisms, sand dollars, eelgrass, algae-codium, and bushy plant-like organisms.

⁴ Total Percentage in WEA (%) provides a summary of the total percent cover of each substrate type across all transects.

⁵ Total Area in WEA (m²) provides a summary of the total area of each substrate type across all transects.

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Table 3-11. Area and percent coverage of different biological elements (i.e., flora/fauna) observed within still images taken from each of the 128 video transects in the WEA project area. The percent cover of each biological element type per total area analyzed is provided in the corresponding biological element rows within the table. The total biological element area analyzed per transect is provided in the Flora/Fauna Area (m²) column.

Transect	Flora/ Fauna Area (m ²)	Burrows (%)	Infaunal Structures (%)	Megafauna (%)	Encrusting Orgs. (%)	Sand Dollars (%)	Eelgrass (%)	Algae – Codium (%)	Bushy Plant-like Orgs. (%)
WEA_001	0.02	0	0	0.03	0	0	0	0	0
WEA_002	0.17	0	0	0.20	0	0	0	0	<0.01
WEA_003	0	0	0	0	0	0	0	0	0
WEA_004	0	0	0	0	0	0	0	0	0
WEA_005	0	0	0	0	0	0	0	0	0
WEA_006	0.41	0	0	0.36	0	0	0	0	0
WEA_007	0	0	0	0	0	0	0	0	0
WEA_008	0.08	0	0	0.08	0	0	0	0	0.02
WEA_009	0.02	0	0	0.03	0	0	0	0	0
WEA_010	0.01	0	0.02	0	0	0	0	0	0
WEA_011	0	0	0	0	0	0	0	0	0
WEA_012	0.02	0	0	0.05	0	0	0	0	0
WEA_013	0.04	0	0.01	0	0	0.21	0	0	0
WEA_014	0.01	0	0	0.05	0	0.03	0	0	0
WEA_015	0	0	0	0	0	0	0	0	0
WEA_016	0.23	0	0	0	0	0.33	0	0	0
WEA_017	0.04	0	0	0.10	0	0	0	0	0
WEA_018	0	0	0	0	0	0	0	0	0
WEA_019	0.07	0	0.10	0.01	0	0	0	0	0
WEA_020	0.02	0	0	0	0	0.06	0	0	0
WEA_021	0.03	0	0.05	0.08	0	0	0	0	0
WEA_022	0	0	0	0	0	0	0	0	0
WEA_023	0.02	0	0.11	0.02	0	0	0	0	0.03
WEA_024	0.01	0	0	0.03	0	0	0	0	0
WEA_025	0	0	0	0	0	0	0	0	0
WEA_026	0.02	0	0.02	0	0	0	0	0	0
WEA_027	<0.01	0	0	0.01	0	0	0	0	0
WEA_028	0	0	0	0	0	0	0	0	0
WEA_029	0	0	0	0	0	0	0	0	0
WEA_030	0	0	0	0	0	0	0	0	0
WEA_031	0	0	0	0	0	0	0	0	0
WEA_032	0	0	0	0	0	0	0	0	0
WEA_033	0	0	0	0	0	0	0	0	0
WEA_034	0	0	0	0	0	0	0	0	0
WEA_035	0	0	0	0	0	0	0	0	0
WEA_036	0	0	0	0	0	0	0	0	0
WEA_037	<0.01	0	0	0.01	0	0	0	0	0
WEA_038	0	0	0	0	0	0	0	0	0
WEA_039	0	0	0	0	0	0	0	0	0
WEA_040	0	0	0	0	0	0	0	0	0
WEA_041	0	0	0	0	0	0	0	0	0
WEA_042	0	0	0	0	0	0	0	0	0
WEA_043	0	0	0	0	0	0	0	0	0
WEA_044	0	0	0	0	0	0	0	0	0
WEA_045	0	0	0	0	0	0	0	0	0
WEA_046	0	0	0	0	0	0	0	0	0

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Transect	Flora/ Fauna Area (m ²)	Burrows (%)	Infaunal Structures (%)	Megafauna (%)	Encrusting Orgs. (%)	Sand Dollars (%)	Eelgrass (%)	Algae – Codium (%)	Bushy Plant-like Orgs. (%)
WEA_047	0	0	0	0	0	0	0	0	0
WEA_048	0	0	0	0	0	0	0	0	0
WEA_049	<0.01	0	0.01	0	0	0	0	0	0
WEA_050	<0.01	0	0.01	0	0	0	0	0	0
WEA_051	0.01	0	0.01	0	0	0	0	0	0
WEA_052	0	0	0	0	0	0	0	0	0
WEA_053	0	0	0	0	0	0	0	0	0
WEA_054	<0.01	0	<0.01	0	0	0	0	0	0
WEA_055	0.01	0	0.03	0	0	0	0	0	0
WEA_056	0	0	0	0	0	0	0	0	0
WEA_057	0.30	0	0.36	0	0	0	0	0	0
WEA_058	0	0	0	0	0	0	0	0	0
WEA_059	0.09	0	0.13	0.04	0	0	0	0	0
WEA_060	0	0	0	0	0	0	0	0	0
WEA_061	0	0	0	0	0	0	0	0	0
WEA_062	0	0	0	0	0	0	0	0	0
WH_001	0	0	0	0	0	0	0	0	0
WH_002	0.03	0	0	0.02	0	0	0	0	0
WH_003	0.09	0	0	0.19	0	0	0	0	0
WH_004	0.83	0	0.72	0	0	0	0	0	0
WH_005	0	0	0	0	0	0	0	0	0
WH_006	<0.01	0	0	<0.01	0	0	0	0	0
WH_007	0	0	0	0	0	0	0	0	0
WH_008	0	0	0	0	0	0	0	0	0
WH_009	0.18	0	0	0.10	0	0.03	0	0	0
WH_010	0.07	0	0	0.08	0	0	0	0	0.03
WH_011	0	0	0	0	0	0	0	0	0
WH_012	0	0	0	0	0	0	0	0	0
WH_013	<0.01	0	<0.01	0	0	0	0	0	0
WH_014	0	0	0	0	0	0	0	0	0
WH_015	0	0	0	0	0	0	0	0	0
WH_016	0	0	0	0	0	0	0	0	0
WH_017	0.03	0	0	0	0	0	0	0.05	0
WH_018	0	0	0	0	0	0	0	0	0
WH_019	0.09	0	0	0.09	0	0	0	0	0.06
WH_020	<0.01	0	0	0	0	0	<0.01	0	0
WH_021	0	0	0	0	0	0	0	0	0
WH_022	0.01	0	0	0.05	0	0.03	0	0	0
WH_024	0.04	0	0	0.06	0	0	0	0	0
WH_025	0.01	0	0	0.05	0	0	0	0	0
WH_026	0	0	0	0	0	0	0	0	0
WH_027	0	0	0	0	0	0	0	0	0
WH_028	0	0	0	0	0	0	0	0	0
WH_029	0.06	0	0	0.08	0	0	0	0	0
WH_030	0	0	0	0	0	0	0	0	0
WH_031	0	0	0	0	0	0	0	0	0
WH_032	0	0	0	0	0	0	0	0	0
WH_033	0.01	0	0.02	0.01	0	0	0	0	0
WH_034	0.01	0	0	0.02	0	0	0	0	0
WH_035	0	0	0	0	0	0	0	0	0
WH_036	0	0	0	0	0	0	0	0	0

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Transect	Flora/ Fauna Area (m ²)	Burrows (%)	Infaunal Structures (%)	Megafauna (%)	Encrusting Orgs. (%)	Sand Dollars (%)	Eelgrass (%)	Algae – Codium (%)	Bushy Plant-like Orgs. (%)
WH_037	0	0	0	0	0	0	0	0	0
WH_038	0.02	0	0	0	0	0	0	0	0.04
WH_039	0	0	0	0	0	0	0	0	0
WH_040	0	0	0	0	0	0	0	0	0
WH_041	0.04	0	0.04	0	0	0	0	0	0
WH_042	0.07	0	<0.01	0.07	0	0	0	0	0.05
WH_043	0	0	0	0	0	0	0	0	0
WH_044	0	0	0	0	0	0	0	0	0
WH_045	0	0	0	0	0	0	0	0	0
WH_046	0	0	0	0	0	0	0	0	0
WH_047	0.10	0.15	0	0.18	0	0	0	0	0
WH_048	0.03	0	0	0.10	0	0	0	0	0
WH_049	0.20	0	0	0.17	0	0	0	0	0
WH_050	0	0	0	0	0	0	0	0	0
WH_051	<0.01	0	0	<0.01	0	0	0	0	0
WH_052	0.01	0	<0.01	0	0	0	0	0.01	0
WH_053	0.18	0	0	0	0	0	0	0	0.09
WH_054	0	0	0	0	0	0	0	0	0
WH_055	0	0	0	0	0	0	0	0	0
WH_056	0.10	0	0	0.07	0	0	0	0	0
WH_057	0.11	0	0.02	0	0	0.10	0	0	0
WH_058	0	0	0	0	0	0	0	0	0
WH_059	0	0	0	0	0	0	0	0	0
WH_060	0.08	0.12	0.02	0	0	0	0	0	0
WH_061	0.01	0	0	0.01	0	0	0	0	0
WH_062	0	0	0	0	0	0	0	0	0
WH_063	0	0	0	0	0	0	0	0	0
WH_064	0	0	0	0	0	0	0	0	0
WH_065	<0.01	0	<0.01	0	0	0	0	0	0
WH_066	0.02	0	0.01	0	0	0	0	0	0
WH_067	0	0	0	0	0	0	0	0	0
Total Flora/Fauna Percentage in WEA (%)¹	100	2.93	35.45	43.03	0.00	10.51	0.05	0.98	7.33
Total Flora/ Fauna Area in WEA (m²)¹	4.09	0.12	1.45	1.76	0.00	0.43	<0.01	0.04	0.30

¹ Total Flora/Fauna Percentage in WEA (%) provides a summary of the total percent cover per each biological element type in the Flora/Fauna area.

² Total Area in WEA (m²) provides a summary of the total area per each biological element type in the Flora/Fauna area.

3.1.2 Export Cable Corridor

The characteristics and locations of the 70 underwater video transects within the ECC project area are described in Table 3-12 and locations are shown in Figure 3-8. Two nearshore underwater video transect stations (ECC_031 and EH_001) were failed due to continuous low visibility and unusable video after multiple survey attempts. Section 3.1.1.1 below describes presence and abundance of megafauna observed in video transects collected in the ECC. Abundance data are displayed in Table 3-13 through Table 3-15 with additional visualizations in Figure 3-9 through Figure 3-15. Images of representative megafauna are displayed in Table 3-17. Section 3.1.1.2 summarizes results of the point count analysis to quantify observed substrate along video transects. Area and composition of the substrate for each transect is presented in Table 3-18 with additional data on flora and fauna observed presented in Table 3-19.

Table 3-12. Underwater video transect locations in the ECC project area.

Transect	Date (UTC)	Recorded Duration (min:sec)	Start Latitude (°N)	Start Longitude (°W)	End Latitude (°N)	End Longitude (°W)	Total # Stills	# Analyzed Stills
ECC_001	10/16/2020	26:06	36.471293	-75.334929	36.465527	-75.334335	76	51
ECC_002	10/16/2020	25:44	36.478476	-75.357988	36.473726	-75.352613	63	58
ECC_003	10/16/2020	24:20	36.486465	-75.374288	36.480555	-75.376573	61	60
ECC_004	10/16/2020	27:55	36.493365	-75.395194	36.487977	-75.396279	64	60
ECC_005	10/15/2020	26:52	36.496555	-75.418963	36.499844	-75.413257	119	35
ECC_006	10/15/2020	21:23	36.504611	-75.438967	36.507492	-75.433600	66	46
ECC_007	10/15/2020	23:38	36.51339	-75.461106	36.513335	-75.453299	80	42
ECC_008	10/15/2020	23:47	36.523996	-75.478821	36.517913	-75.475471	78	45
ECC_009	10/15/2020	29:26	36.532338	-75.49827	36.525250	-75.496803	78	45
ECC_010	10/14/2020	28:00	36.536126	-75.521559	36.535159	-75.514441	106	35
ECC_011	10/15/2020	23:46	36.545829	-75.538953	36.540165	-75.537630	65	48
ECC_012	10/16/2020	28:16	36.553048	-75.558889	36.547660	-75.558047	105	36
ECC_013	11/8/2020	25:27	36.559264	-75.581845	36.556396	-75.575908	63	60
ECC_014	11/8/2020	24:56	36.565547	-75.602523	36.565080	-75.595852	64	63
ECC_015	11/8/2020	25:28	36.571931	-75.622694	36.571492	-75.615965	57	56
ECC_016	11/8/2020	25:17	36.576496	-75.644328	36.575719	-75.637697	65	45
ECC_017	11/8/2020	22:55	36.580619	-75.665985	36.580596	-75.659278	78	45
ECC_018	11/8/2020	21:52	36.585137	-75.687774	36.584653	-75.680891	69	57
ECC_019	11/14/2020	26:10	36.586739	-75.706996	36.591963	-75.705238	66	60
ECC_020	11/14/2020	24:51	36.590777	-75.72872	36.596382	-75.726768	66	59
ECC_021	11/14/2020	22:24	36.600693	-75.747177	36.605887	-75.745593	73	52
ECC_022	11/14/2020	24:46	36.61289	-75.763741	36.618039	-75.761822	72	54
ECC_023	11/15/2020	20:41	36.625345	-75.781129	36.629663	-75.777247	65	61
ECC_024	11/15/2020	26:57	36.637135	-75.795763	36.642492	-75.795784	69	58
ECC_025	11/15/2020	26:25	36.649255	-75.812264	36.654570	-75.812326	72	56
ECC_026	11/15/2020	19:53	36.661547	-75.829486	36.666880	-75.828392	64	60
ECC_027	11/15/2020	23:35	36.67748	-75.848353	36.675274	-75.842219	58	53
ECC_028	11/15/2020	29:33	36.690592	-75.863924	36.686310	-75.859813	72	50
ECC_029	11/15/2020	23:52	36.702779	-75.880212	36.698455	-75.876419	64	62
ECC_030	11/15/2020	24:48	36.715537	-75.895581	36.710194	-75.894099	94	36
ECC_031	11/16/2020	Fail	-	-	-	-	-	-

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Transect	Date (UTC)	Recorded Duration (min:sec)	Start Latitude (°N)	Start Longitude (°W)	End Latitude (°N)	End Longitude (°W)	Total # Stills	# Analyzed Stills
EH_001	11/16/2020	Fail	-	-	-	-	-	-
EH_002	11/15/2020	24:45	36.711419	-75.886379	36.706343	-75.884519	74	52
EH_003	11/15/2020	27:09	36.697808	-75.885417	36.693359	-75.881536	80	47
EH_004	11/15/2020	25:38	36.710609	-75.874896	36.705717	-75.872112	64	64
EH_005	11/15/2020	22:40	36.701689	-75.869282	36.697250	-75.865405	66	59
EH_006	11/15/2020	23:15	36.671558	-75.854697	36.670609	-75.848089	65	52
EH_007	11/15/2020	22:59	36.685869	-75.8478	36.682524	-75.842634	63	59
EH_008	11/15/2020	23:51	36.663922	-75.818431	36.669357	-75.818539	64	61
EH_009	11/15/2020	24:25	36.659039	-75.812528	36.664454	-75.812619	70	51
EH_010	11/15/2020	26:24	36.646143	-75.802689	36.651590	-75.802849	83	43
EH_011	11/15/2020	24:54	36.634289	-75.787843	36.639517	-75.786203	68	55
EH_012	11/15/2020	19:51	36.625144	-75.783809	36.629002	-75.779543	69	54
EH_013	11/14/2020	22:31	36.624323	-75.786881	36.628056	-75.781993	54	47
EH_014	11/14/2020	26:13	36.614454	-75.774283	36.619803	-75.772249	67	56
EH_015	11/15/2020	24:00	36.627074	-75.773701	36.632148	-75.770993	69	64
EH_016	11/14/2020	23:49	36.616833	-75.761114	36.622187	-75.759163	72	59
EH_017	11/14/2020	17:39	36.614101	-75.756798	36.608325	-75.757266	89	42
EH_018	11/14/2020	17:54	36.607515	-75.752915	36.612729	-75.751423	99	38
EH_019	11/14/2020	27:22	36.593122	-75.720401	36.598779	-75.718484	69	63
EH_020	11/14/2020	28:37	36.589428	-75.714821	36.594631	-75.713013	69	64
EH_021	11/8/2020	21:42	36.58685	-75.692344	36.587357	-75.685570	110	44
EH_022	11/8/2020	22:08	36.590242	-75.687572	36.592052	-75.680995	74	57
EH_023	11/8/2020	22:54	36.585008	-75.671604	36.584502	-75.664693	73	57
EH_024	11/8/2020	22:52	36.572689	-75.642462	36.572793	-75.635724	81	50
EH_025	11/8/2020	22:32	36.573715	-75.645462	36.573742	-75.638728	88	44
EH_026	11/8/2020	25:44	36.55766	-75.597547	36.555918	-75.591205	69	62
EH_027	11/8/2020	27:23	36.564421	-75.585581	36.560847	-75.580328	70	62
EH_028	10/15/2020	41:43	36.559796	-75.558162	36.553989	-75.557482	78	49
EH_029	10/15/2020	44:34	36.553643	-75.547778	36.548090	-75.545977	78	50
EH_030	10/15/2020	24:08	36.551157	-75.533011	36.545397	-75.532989	78	54
EH_031	10/15/2020	23:18	36.54426	-75.531081	36.538548	-75.531050	77	53
EH_032	10/15/2020	25:05	36.533584	-75.516316	36.527593	-75.514975	87	46
EH_033	10/15/2020	30:12	36.529629	-75.487964	36.522416	-75.484711	70	61
EH_034	10/15/2020	25:49	36.518535	-75.450782	36.512753	-75.447768	74	73
EH_035	10/15/2020	24:32	36.501714	-75.414886	36.505246	-75.408729	108	35
EH_036	10/16/2020	26:15	36.48782	-75.382935	36.481637	-75.385599	74	59
EH_037	10/16/2020	25:17	36.481978	-75.367799	36.475919	-75.368698	77	56
EH_038	10/16/2020	27:35	36.483633	-75.352752	36.478865	-75.347152	62	54
EH_039	10/16/2020	23:50	36.480709	-75.357167	36.477031	-75.351636	77	53
EH_040	10/16/2020	26:47	36.477449	-75.349024	36.471970	-75.345083	68	63
EH_041	10/16/2020	28:26	36.475709	-75.343647	36.469431	-75.340744	64	57

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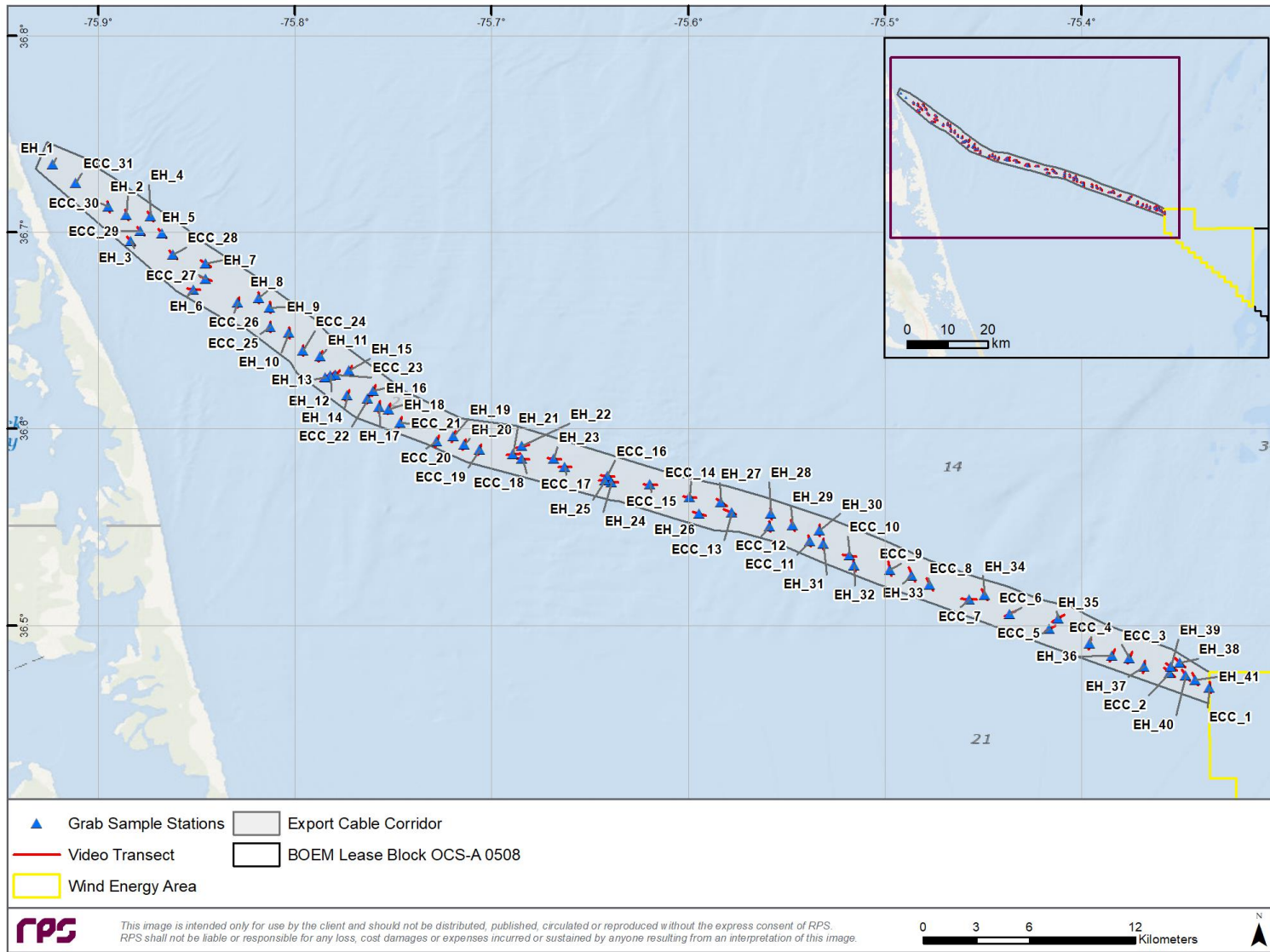


Figure 3-8. Map of video transects (red) and grab sample sites (blue) in the ECC project area.

3.1.2.1 Organisms and Features

The abundances of enumerable features greater than 4 cm were recorded during the video review process. Organisms were identified to the LPTL, usually to order or family. A total of 2,333 features, including 2,280 organisms from 6 phyla were identified and recorded within the 70 ECC and EH transects (Table 3-13 Table 3-15, Figure 3-9 through Figure 3-12). The most numerous organisms were sea urchins, Atlantic silversides, and skate eggs comprising 30%, 12%, and 12% of all organisms, respectively. Of the 694 individual sea urchins observed, 93% were observed in just three transects; including 280 in EH_008, which was the highest single transect abundance of any feature. Diversity ranged from 0 when a single LPTL was observed (5 transects) to 2.15 (EH_036; Table 3-16).

The total observed organisms comprised 1,122 vertebrates from 35 unique LPTLs in 11 orders (Figure 3-13) and 1,158 invertebrates from 26 unique LPTLs in 10 classes (Figure 3-14). An additional 53 other observations were recorded: 9 instances of anthropogenic debris, including 1 observation of derelict fishing gear (ECC_007), and 44 instances of unidentified organisms and/or unidentified objects (unclear if living). Some organisms and objects were not identifiable due to high turbidity, distance from seafloor, angle, or lighting conditions.

The presence or absence of other qualifying features (i.e., habitat features of note or species that were quantified by their percent cover of the sea floor rather than through enumeration [see Section 2.3.2 for full list]) ranged from being absent in all ECC and EH transects (eelgrass and oysters) to present in 17 transects (bushy plant-like organisms; Figure 3-15). There were no observations of potential invasive species.

For representative images of some observed species see Table 3-17 and for complete reviewer notes see Appendix B.

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Table 3-13. Megafauna and other enumerated features observed during review of the ECC (001-024) video transects (continued next page).

Common Name	Lowest Taxonomic Level	Counts per ECC Transect																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Vertebrate																									
Blackcheek tonguefish	Symphurus plagiusa	-	-	-	-	-	-	-	-	0	-	-	-	1	-	-	0	-	-	-	-	-	-	1	-
Burrfish, striped	Chilomycterus schoepfi	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Butterfish	Peprilus triacanthus	-	-	3	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Croaker, Atlantic	Micropogonias undulatus	-	-	6	13	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Cunner	Tautoglabrus adspersus	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Drum, black	Pogonias cromis	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Eel, unidentified	Anguilliformes	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Fish, unidentified (bony)	Teleostei	-	-	1	-	-	-	-	-	0	-	2	-	1	2	0	-	-	-	-	-	-	1	-	-
Flatfish, unidentified	Teleostei	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Flounder, smallmouth	Etropus microstomus	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Flounder, summer	Paralichthys dentatus	-	-	-	-	-	-	-	-	0	-	-	1	-	-	-	0	-	-	-	-	-	-	-	-
Flounder, unidentified	Pleuronectiformes	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Hake, silver	Merluccius bilinearis	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Hake, unidentified	Gadidae	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Kingfish, gulf	Menticirrhus littoralis	-	-	2	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Kingfish, northern	Menticirrhus saxatilis	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Kingfish, southern	Menticirrhus americanus	-	-	17	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Largehead hairtail	Trichiurus lepturus	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	31
Lizardfish, inshore	Synodus foetens	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Lizardfish, unidentified	Synodontidae	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Northern puffer	Sphoeroides maculatus	-	-	-	-	-	-	-	-	0	-	-	-	1	-	-	0	-	-	-	-	-	-	-	-
Pigfish	Orthopristis chrysoptera	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Roundfish, unidentified	Teleostei	-	-	1	-	-	-	-	-	0	2	-	3	-	-	-	0	-	-	-	-	-	-	-	-
Sea bass, black	Centropristis striata	-	-	4	1	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Sea robin, northern	Prionotus carolinus	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Sea robin, unidentified	Prionotus	-	5	3	16	-	-	-	-	0	-	-	-	1	3	1	0	-	-	-	-	-	-	-	6
Shark, Atlantic sharpnose	Rhizoprionodon terraenovae	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	1
Sheepshead	Archosargus probatocephalus	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Silverside, Atlantic	Menidia menidia	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-	13 14

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Common Name	Lowest Taxonomic Level	Counts per ECC Transect																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Skate	Rajidae	-	-	-	-	-	-	-	1	0	-	-	-	-	-	0	-	-	1	-	-	-	-	-	-
Skate, clearnose	Raja eglanteria	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	1	-	1	-	-
Skate, egg case	Rajidae	-	1	-	-	2	1	1	-	0	-	1	-	22	-	2	0	2	1	-	49	-	4	3	-
Spot	Leiostomus xanthurus	-	-	-	-	-	-	-	-	0	1	-	-	-	-	0	-	-	-	-	-	-	-	-	8
Stingray, Atlantic	Dasyatis sabina	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
Stingray, southern	Dasyatis americana	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
Invertebrate																									
Anemone, burrowing	Anthozoa	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
Arthropod, unidentified	Arthropoda	-	-	-	-	1	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
Clam, surf	Spisula solidissima	36	3	59	31	-	1	-	1	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	
Crab, blue	Callinectes sapidus	-	-	-	-	-	-	-	-	0	-	-	-	2	-	0	-	-	-	-	-	-	-	-	-
Crab, cancer	Cancer	-	-	1	3	4	2	1	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
Crab, hermit	Pagurus	-	-	10	2	5	-	-	-	0	-	-	-	1	1	1	0	-	-	-	-	-	-	-	-
Crab, horseshoe	Limulus polyphemus	-	-	-	-	1	-	-	-	0	-	-	1	-	-	1	0	1	2	-	-	-	-	1	-
Crab, lady	Ovalipes ocellatus	-	-	-	-	-	-	-	-	0	-	-	1	-	-	0	-	-	-	-	1	-	-	-	-
Crab, portunid	Portunidae	-	1	-	1	12	4	2	-	0	3	1	1	-	-	0	-	-	-	-	-	-	-	1	-
Crab, spider	Libinia	-	-	-	1	2	-	-	-	0	-	-	-	1	-	0	-	-	-	-	-	-	-	-	-
Crab, unidentified	Decapoda	-	-	-	-	-	-	-	-	0	-	-	-	-	-	1	0	-	-	-	-	1	-	-	-
Mollusc, unidentified	Mollusca	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
Moon snail	Naticidae	-	-	1	-	-	1	-	-	0	-	-	-	-	-	0	-	-	-	-	1	-	-	-	-
Moon snail, egg case	Naticidae	3	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
Sea cucumber, unidentified	Holothuroidea	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
Sea star, forbes	Asterias forbesi	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
Sea star, unidentified	Asteroidea	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
Sea urchin	Echinoidea	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	1	-
Shrimp	Decapoda	-	20	-	-	-	-	-	-	0	-	-	-	1	-	1	0	-	-	-	-	-	-	-	-
Solitary hydroid	Hydrozoa	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
Squid, unidentified	Cephalopoda	-	1	-	-	-	1	-	-	0	-	-	-	8	6	-	0	-	-	-	-	-	-	1	-
Whelk eggs	Melongenidae	2	-	-	-	-	-	-	-	0	1	-	-	-	1	-	0	1	1	-	-	-	-	-	1
Whelk, channeled or knobbed	Melongenidae	-	-	-	-	1	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
Whelk, unidentified	Melongenidae	-	-	-	-	-	-	-	-	0	-	1	-	-	-	0	-	-	-	-	-	-	-	-	-
Worm, Polychaete	Polychaeta	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
Worm, unidentified	Polychaeta	-	1	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
Other																									
Debris, anthropogenic	Debris, anthropogenic	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	-	1
Debris, anthropogenic (fishing gear)	Debris, anthropogenic (fishing gear)	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-
Object, unidentified	Object, unidentified	-	-	-	-	-	-	-	-	0	-	-	1	-	-	0	-	-	-	-	-	-	-	-	-
Organism, unidentified	Organism, unidentified	-	-	-	-	-	-	-	-	0	-	-	1	-	2	1	0	-	-	-	-	-	1	-	-
Unidentified	Unidentified	-	-	-	-	-	-	-	2	0	-	-	1	-	-	0	3	-	-	-	-	-	-	-	2

KITTY HAWK PHASE 3 BENTHIC ASSESSMENT REPORT

Common Name	Lowest Taxonomic Level	Counts per ECC Transect																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Total Organisms		41	32	108	68	28	10	4	2	0	7	5	6	40	12	9	0	4	4	1	49	4	6	22	61
Total Observations		41	32	108	68	28	10	4	4	0	7	5	9	40	14	10	0	7	4	1	49	4	7	22	64

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Table 3-14. Megafauna and other enumerated features observed during review of the ECC (025-030) and EH (002-018) video transects (continued next page).

Common Name	Lowest Taxonomic Level	Counts per ECC and EH Transects																					
		25	26	27	28	29	30	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Vertebrate																							
Blackcheek tonguefish	Symphurus plagiusa	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	1	-	-	0
Burrfish, striped	Chilomycterus schoepfi	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	1	5	-	-	0
Butterfish	Peprilus triacanthus	-	-	8	-	-	-	-	-	-	-	25	-	14	-	-	-	-	2	-	-	-	0
Croaker, Atlantic	Micropogonias undulatus	1	-	-	-	-	-	-	-	-	3	-	-	1	5	-	-	-	-	-	-	-	0
Cunner	Tautoglabrus adspersus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Drum, black	Pogonias cromis	-	-	-	-	-	-	-	-	-	-	-	18	-	-	-	-	-	-	-	-	-	0
Eel, unidentified	Anguilliformes	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Fish, unidentified (bony)	Teleostei	-	14	-	-	-	-	-	-	-	41	-	5	21	-	2	-	-	9	4	1	-	0
Flatfish, unidentified	Teleostei	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	3	-	-	-	0
Flounder, smallmouth	Etropus microstomus	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	0
Flounder, summer	Paralichthys dentatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Flounder, unidentified	Pleuronectiformes	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	1	-	-	-	-	-	0
Hake, silver	Merluccius bilinearis	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Hake, unidentified	Gadidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Kingfish, gulf	Menticirrhus littoralis	2	-	-	-	-	-	-	-	-	-	-	-	9	-	-	-	-	-	-	-	-	0
Kingfish, northern	Menticirrhus saxatilis	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	0
Kingfish, southern	Menticirrhus americanus	1	-	-	-	-	-	-	-	-	-	1	-	3	-	1	-	-	-	-	-	-	0
Largehead hairtail	Trichiurus lepturus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47	5	3	4	-	-	-	0
Lizardfish, inshore	Synodus foetens	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	1	-	-	-	-	0
Lizardfish, unidentified	Synodontidae	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	0
Northern puffer	Sphoeroides maculatus	-	-	-	-	-	-	-	-	-	-	1	1	-	-	1	-	-	-	-	-	-	0
Pigfish	Orthopristis chrysoptera	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	0
Roundfish, unidentified	Teleostei	6	-	17	-	-	-	-	-	-	-	-	-	-	31	-	-	-	-	-	-	-	0
Sea bass, black	Centropristis striata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	0
Sea robin, northern	Prionotus carolinus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	0
Sea robin, unidentified	Prionotus	1	1	-	-	-	-	-	-	-	1	1	1	-	-	1	-	1	1	-	1	-	0
Shark, Atlantic sharpnose	Rhizoprionodon terraenovae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Sheepshead	Archosargus probatocephalus	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	0
Silverside, Atlantic	Menidia menidia	1	-	-	-	-	-	-	-	-	-	-	-	-	3	118	29	9	82	5	-	-	0
Skate	Rajidae	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Skate, clearnose	Raja eglanteria	-	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	0

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Common Name	Lowest Taxonomic Level	Counts per ECC and EH Transects																						
		25	26	27	28	29	30	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Skate, egg case	Rajidae	1	2	-	2	-	-	-	-	-	2	-	1	1	7	1	-	-	3	26	81	-	2	0
Spot	Leiostamus xanthurus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Stingray, Atlantic	Dasyatis sabina	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	0
Stingray, southern	Dasyatis americana	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	0
Invertebrates																								
Anemone, burrowing	Anthozoa	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Arthropod, unidentified	Arthropoda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Clam, surf	Spisula solidissima	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	0
Crab, blue	Callinectes sapidus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Crab, cancer	Cancer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Crab, hermit	Pagurus	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	0
Crab, horseshoe	Limulus polyphemus	-	1	1	-	-	-	-	-	-	-	1	-	1	1	-	-	-	-	3	1	1	-	0
Crab, lady	Ovalipes ocellatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Crab, portunid	Portunidae	-	-	1	-	-	-	-	-	-	-	1	-	-	6	-	-	1	-	-	1	-	-	0
Crab, spider	Libinia	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	0
Crab, unidentified	Decapoda	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	0
Mollusc, unidentified	Mollusca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	0
Moon snail	Naticidae	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	0
Moon snail, egg case	Naticidae	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Sea cucumber, unidentified	Holothuroidea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Sea star, forbes	Asterias forbesi	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Sea star, unidentified	Asteroidea	-	-	-	3	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	0
Sea urchin	Echinoidea	-	-	-	-	1	-	145	9	1	12	-	-	280	223	20	-	-	-	1	1	-	-	0
Shrimp	Decapoda	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	0
Solitary hydroid	Hydrozoa	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Squid, unidentified	Cephalopoda	1	-	-	-	-	-	-	-	-	-	-	-	2	2	-	1	-	-	-	1	-	-	0
Whelk eggs	Melongenidae	-	-	-	-	-	-	-	-	-	1	1	-	1	-	-	-	-	-	-	-	1	-	0
Whelk, channeled or knobbed	Melongenidae	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	0
Whelk, unidentified	Melongenidae	-	3	1	1	-	-	1	-	-	-	-	-	-	11	-	-	2	-	-	-	-	-	0
Worm, Polychaete	Polychaeta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	0	
Worm, unidentified	Polychaeta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	
Other																								
Debris, anthropogenic	Debris, anthropogenic	-	-	1	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	0
Debris, anthropogenic (fishing gear)	Debris, anthropogenic (fishing gear)	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	0
Object, unidentified	Object, unidentified	-	-	1	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	0
Organism, unidentified	Organism, unidentified	-	-	3	-	-	1	-	2	-	-	-	-	-	-	-	-	-	-	1	1	-	-	0
Unidentified	Unidentified	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	4	-	-	-	-	-	0
Total Organisms		17	26	32	6	4	1	147	10	3	15	48	35	318	306	65	172	47	21	128	115	4	4	0
Total Observations		17	26	38	6	4	2	147	13	4	15	49	36	319	306	66	172	51	21	129	116	4	4	0

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Table 3-15. Megafauna and other enumerated features observed during review of the EH (019-040) video transects (continued next page).

Common Name	Lowest Taxonomic Level	Counts per EH Transect																				ECC/EH Total		
		19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38		39	40
Vertebrate																								
Blackcheek tonguefish	Symphurus plagiusa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
Burrfish, striped	Chilomycterus schoepfi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
Butterfish	Peprilus triacanthus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52
Croaker, Atlantic	Micropogonias undulatus	-	-	-	-	-	-	-	1	6	-	-	-	-	-	-	-	-	-	-	-	-	-	36
Cunner	Tautoglabrus adspersus	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Drum, black	Pogonias cromis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18
Eel, unidentified	Anguilliformes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Fish, unidentified (bony)	Teleostei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	2	-	1	-	-	-	113
Flatfish, unidentified	Teleostei	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	6
Flounder, smallmouth	Etropus microstomus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Flounder, summer	Paralichthys dentatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Flounder, unidentified	Pleuronectiformes	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	6
Hake, silver	Merluccius bilinearis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Hake, unidentified	Gadidae	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2
Kingfish, gulf	Menticirrhus littoralis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13
Kingfish, northern	Menticirrhus saxatilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Kingfish, southern	Menticirrhus americanus	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25
Largehead hairtail	Trichiurus lepturus	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	91
Lizardfish, inshore	Synodus foetens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Lizardfish, unidentified	Synodontidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	4
Northern puffer	Sphoeroides maculatus	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
Pigfish	Orthopristis chrysoptera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Roundfish, unidentified	Teleostei	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	61
Sea bass, black	Centropristis striata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11
Sea robin, northern	Prionotus carolinus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Sea robin, unidentified	Prionotus	-	-	-	-	-	1	3	2	-	-	-	1	-	2	-	5	2	-	4	-	-	-	64
Shark, Atlantic sharpnose	Rhizoprionodon terraenovae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Sheepshead	Archosargus probatocephalus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Silverside, Atlantic	Menidia menidia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	274
Skate	Rajidae	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5

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Common Name	Lowest Taxonomic Level	Counts per EH Transect																				ECC/EH Total			
		19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38		39	40	41
Skate, clearnose	Raja eglanteria	-	1	-	-	1	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-	-	-	12	
Skate, egg case	Rajidae	1	11	3	2	2	-	1	-	1	7	2	4	-	-	2	8	1	-	1	4	-	1	269	
Spot	Leiostamus xanthurus	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	10	
Stingray, Atlantic	Dasyatis sabina	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
Stingray, southern	Dasyatis americana	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
Invertebrate																									
Anemone, burrowing	Anthozoa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	
Arthropod, unidentified	Arthropoda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
Clam, surf	Spisula solidissima	-	-	2	-	-	-	-	-	-	-	-	-	-	2	-	-	5	6	1	-	-	-	7	157
Crab, blue	Callinectes sapidus	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	3	
Crab, cancer	Cancer	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	9	6	-	-	1	-	-	28	
Crab, hermit	Pagurus	-	1	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2	2	-	1	-	-	30	
Crab, horseshoe	Limulus polyphemus	-	1	1	-	-	1	-	-	3	-	1	-	-	-	-	-	-	-	-	-	-	-	24	
Crab, lady	Ovalipes ocellatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
Crab, portunid	Portunidae	-	-	-	-	-	-	2	-	-	3	-	1	-	1	9	-	-	-	-	-	-	1	53	
Crab, spider	Libinia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	3	1	-	-	-	-	11	
Crab, unidentified	Decapoda	-	1	-	-	-	-	-	-	1	-	1	-	1	-	5	2	5	-	-	-	-	-	21	
Mollusc, unidentified	Mollusca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
Moon snail	Naticidae	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	2	-	-	-	-	-	8	
Moon snail, egg case	Naticidae	2	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	3	-	-	-	-	1	13	
Sea cucumber, unidentified	Holothuroidea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	
Sea star, forbes	Asterias forbesi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
Sea star, unidentified	Asteroidea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	
Sea urchin	Echinoidea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	694	
Shrimp	Decapoda	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	26	
Solitary hydroid	Hydrozoa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	3	
Squid, unidentified	Cephalopoda	-	-	-	-	-	-	-	2	-	-	-	-	-	-	2	-	1	-	-	4	-	-	33	
Whelk eggs	Melongenidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	12	
Whelk, channeled or knobbed	Melongenidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	
Whelk, unidentified	Melongenidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	21	
Worm, Polychaete	Polychaeta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
Worm, unidentified	Polychaeta	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
Other																									
Debris, anthropogenic	Debris, anthropogenic	-	2	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	8	
Debris, anthropogenic (fishing gear)	Debris, anthropogenic (fishing gear)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
Object, unidentified	Object, unidentified	1	-	1	-	-	-	-	-	-	-	-	-	-	2	-	-	1	-	-	-	1	2	12	
Organism, unidentified	Organism, unidentified	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	14	
Unidentified	Unidentified	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	3	18	
Total Organisms		4	16	6	2	3	1	4	9	13	18	8	7	1	5	4	40	19	36	8	5	12	3	9	2,280
Total Observations		5	18	7	2	3	1	4	9	14	19	8	7	2	7	4	40	20	36	8	5	14	5	12	2,333

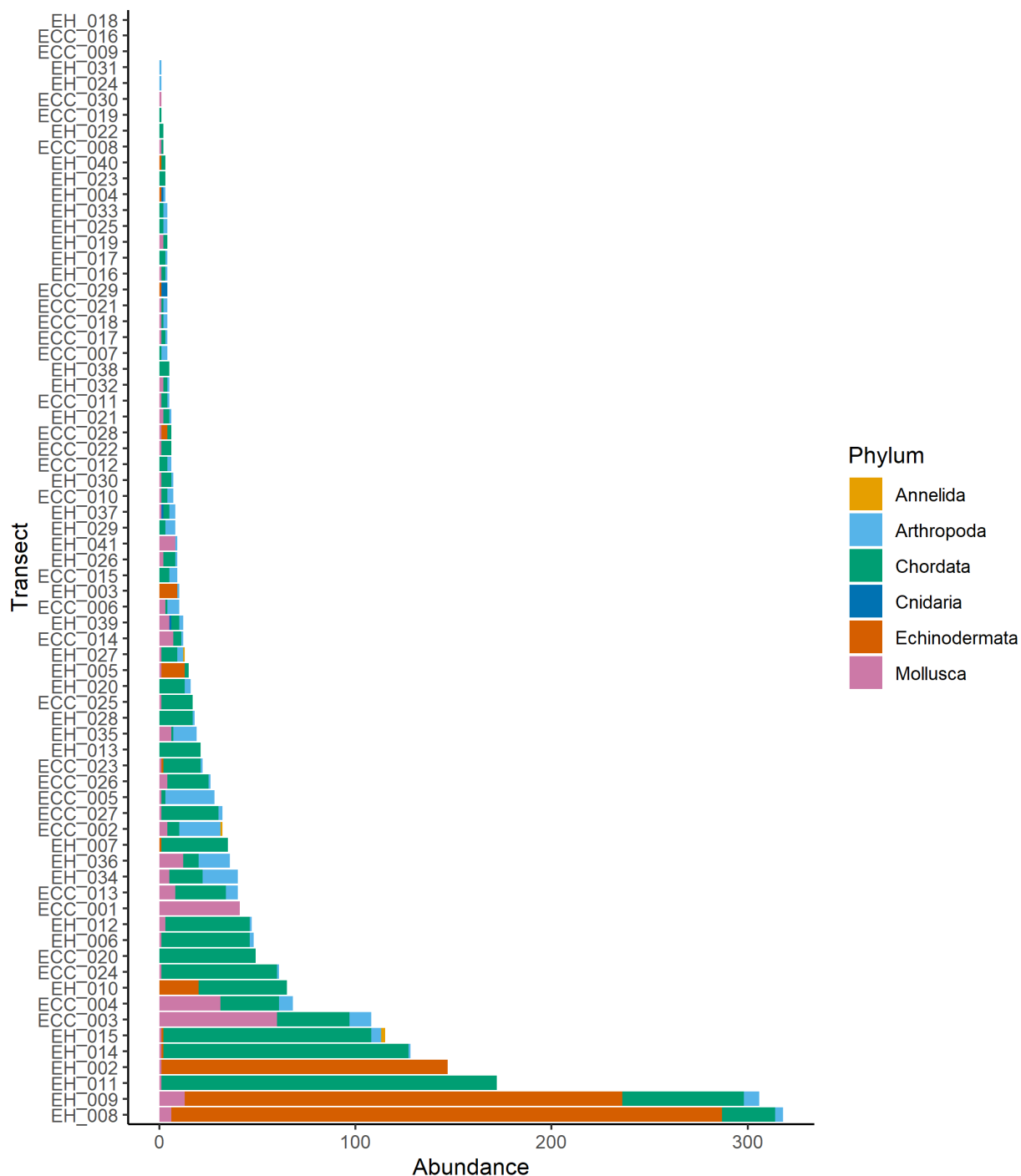


Figure 3-9. Distribution of enumerated organisms larger than 4 cm aggregated by phylum in each video transect within the ECC. Organisms not identified to the level of phylum were excluded. See text for complete explanation of which species were quantified by enumeration versus by percent of bottom cover.

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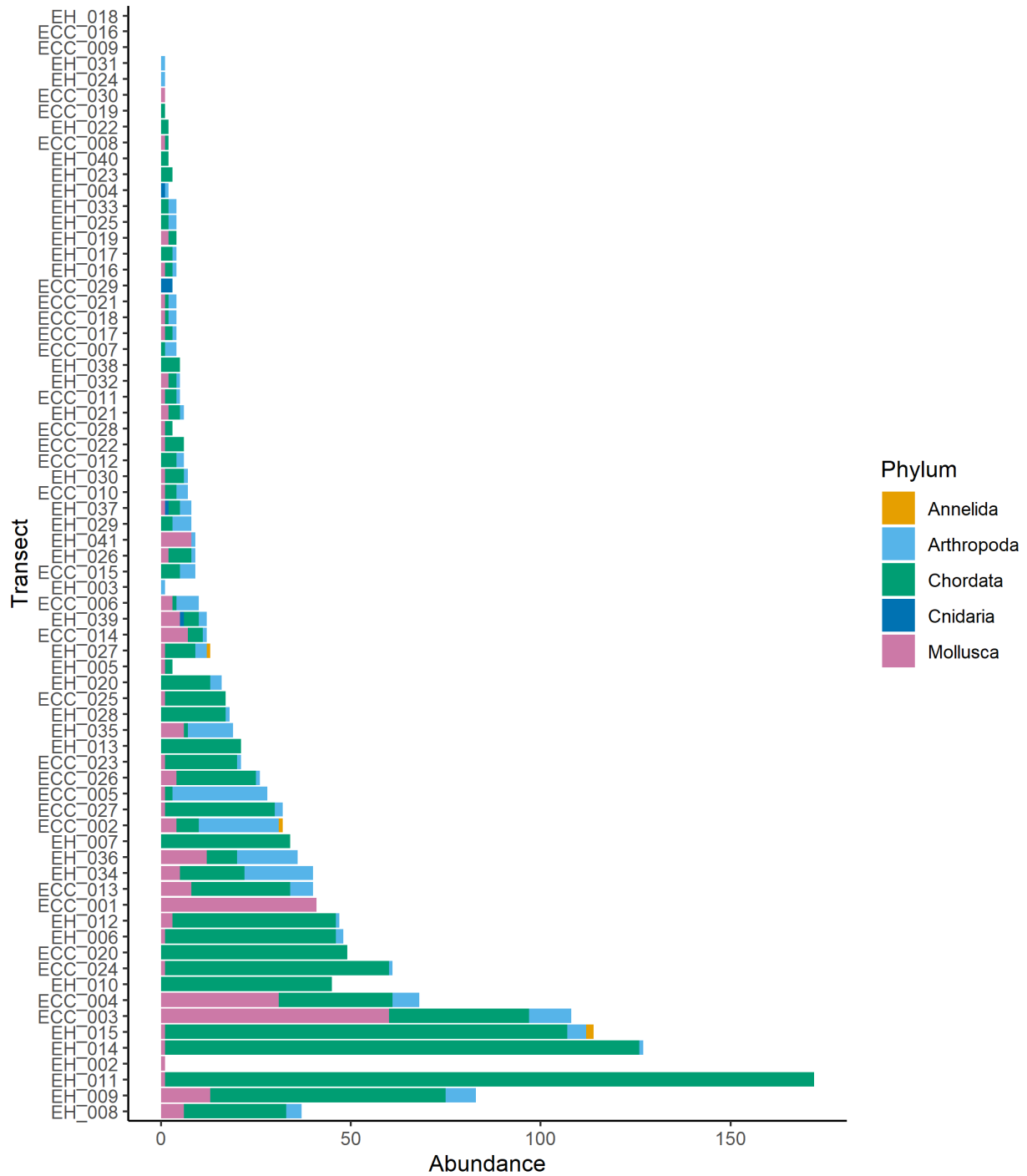


Figure 3-10. Distribution of enumerated organisms larger than 4 cm aggregated by phyla in each video transect within the ECC. Organisms not identified to the level of phylum were excluded. Echinodermata were excluded to enlarge details. See above for similar figure with Echinodermata included.

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Table 3-16 Shannon-Weiner diversity index values for each video transect within the ECC based on observations to the level of family (or LTPL).

Transect	Shannon-Weiner Diversity	Transect	Shannon-Weiner Diversity
ECC_001	0.45	EH_002	0.08
ECC_002	1.24	EH_003	0.94
ECC_003	1.37	EH_004	1.39
ECC_004	1.44	EH_005	0.63
ECC_005	1.68	EH_006	0.72
ECC_006	1.61	EH_007	1.22
ECC_007	1.04	EH_008	0.61
ECC_008	1.04	EH_009	1.14
ECC_010	1.28	EH_010	1.45
ECC_011	1.33	EH_011	0.81
ECC_012	1.83	EH_012	1.57
ECC_013	1.54	EH_013	1.63
ECC_014	1.54	EH_014	1.19
ECC_015	1.89	EH_015	1.3
ECC_017	1.28	EH_016	1.39
ECC_018	1.04	EH_017	0.56
ECC_019	0	EH_019	1.33
ECC_020	0	EH_020	0.96
ECC_021	1.39	EH_021	1.28
ECC_022	1.15	EH_022	0
ECC_023	1.32	EH_023	0
ECC_024	1.47	EH_024	0
ECC_025	1.79	EH_025	1.04
ECC_026	1.3	EH_026	1.31
ECC_027	1.74	EH_027	1.91
ECC_028	1.01	EH_028	1.19
ECC_029	0.56	EH_029	1.49
ECC_030	0.69	EH_030	1.15
		EH_031	0.69
		EH_032	1.55
		EH_033	1.04
		EH_034	2.04
		EH_035	1.54
		EH_036	2.15
		EH_037	1.73
		EH_038	0.5
		EH_039	1.85
		EH_040	1.33
		EH_041	1.08

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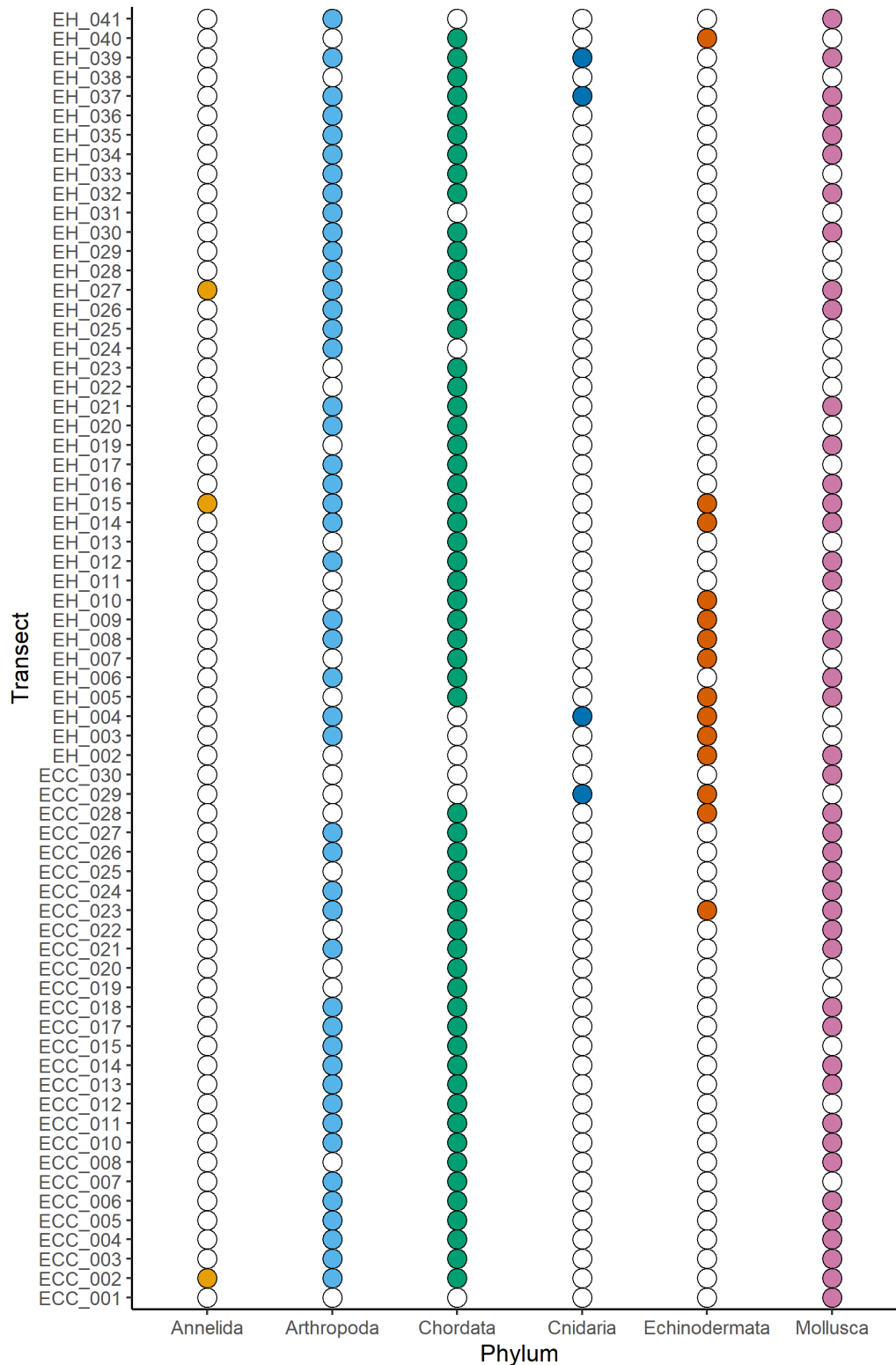


Figure 3-11. Presence (colored) or absence (white) of phyla in each video transect within the ECC. These data include only enumerated species larger than 4 cm. See text for complete explanation of which species were quantified by enumeration versus by percent of bottom cover.

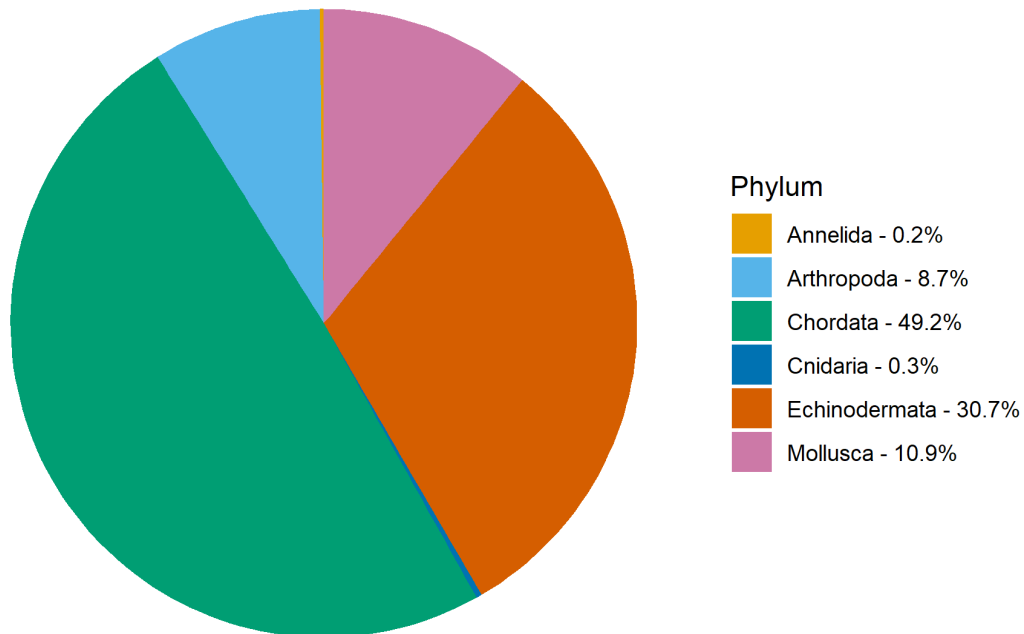


Figure 3-12. Percent composition of enumerated organisms larger than 4 cm aggregated by phyla in all video transects within the ECC. Organisms not identified to the level of phylum were excluded.

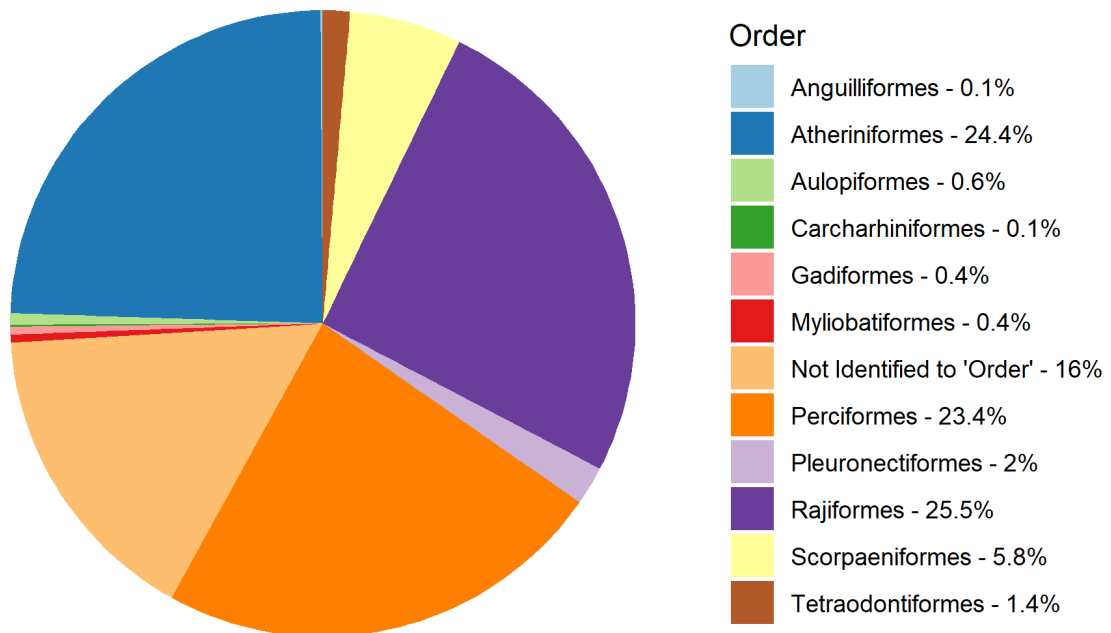


Figure 3-13. Percent composition of enumerated vertebrates (phylum Chordata) larger than 4 cm aggregated by taxonomic level "order" in all video transects within the ECC. Organisms not identified to the level of order were excluded.

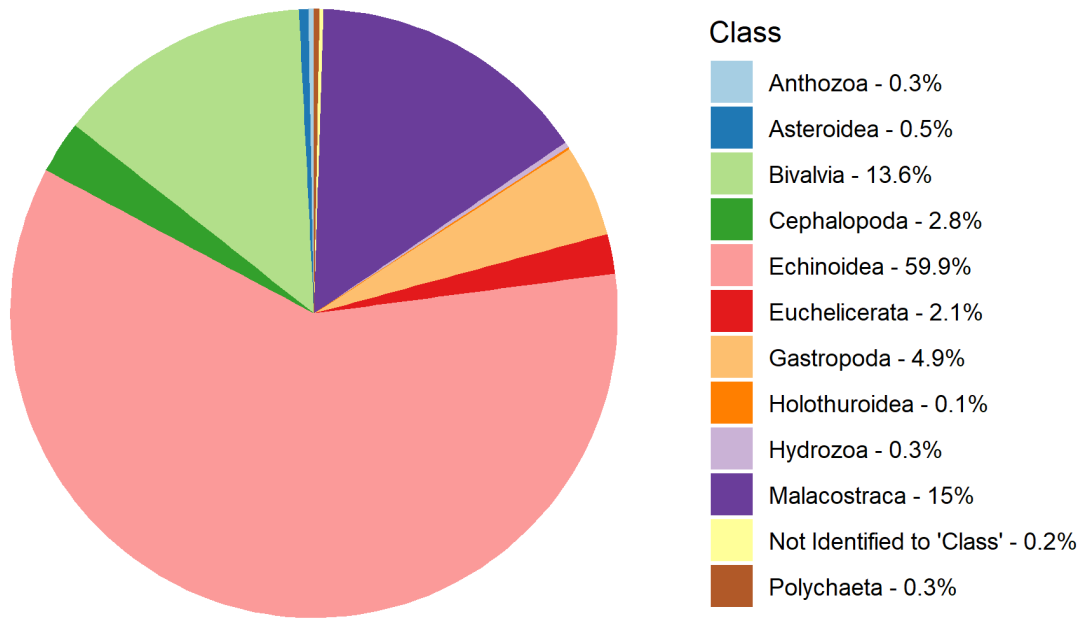


Figure 3-14. Percent composition of enumerated invertebrates larger than 4 cm aggregated by taxonomic level "class" in all video transects within the ECC. Organisms not identified to the level of class were excluded.

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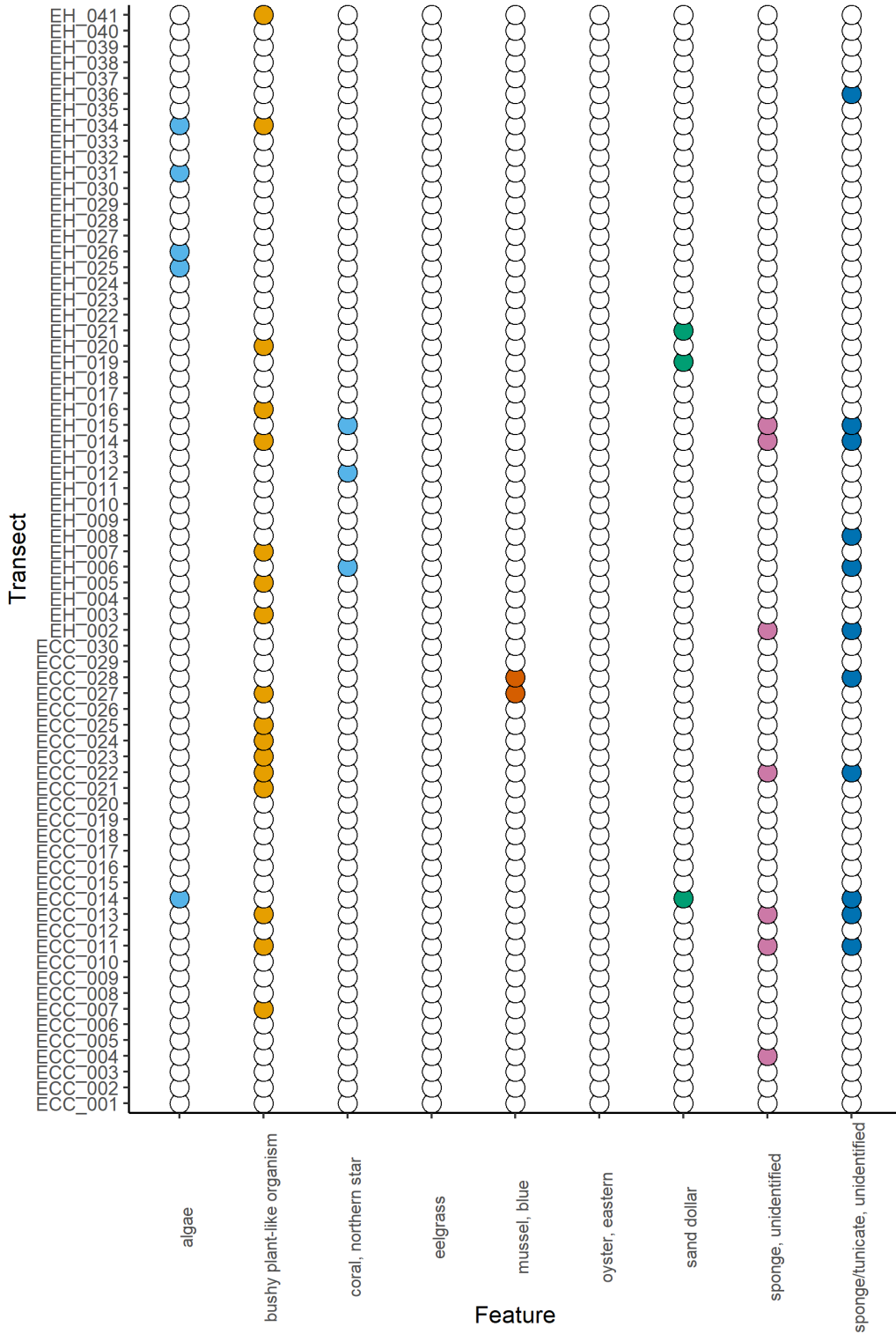








Figure 3-15. Presence (colored) or absence (white) of important features in each video transect within the ECC. These data only include features that were marked as present or absent and not enumerated. See text for complete explanation of which species were quantified by enumeration versus by percent of bottom cover.

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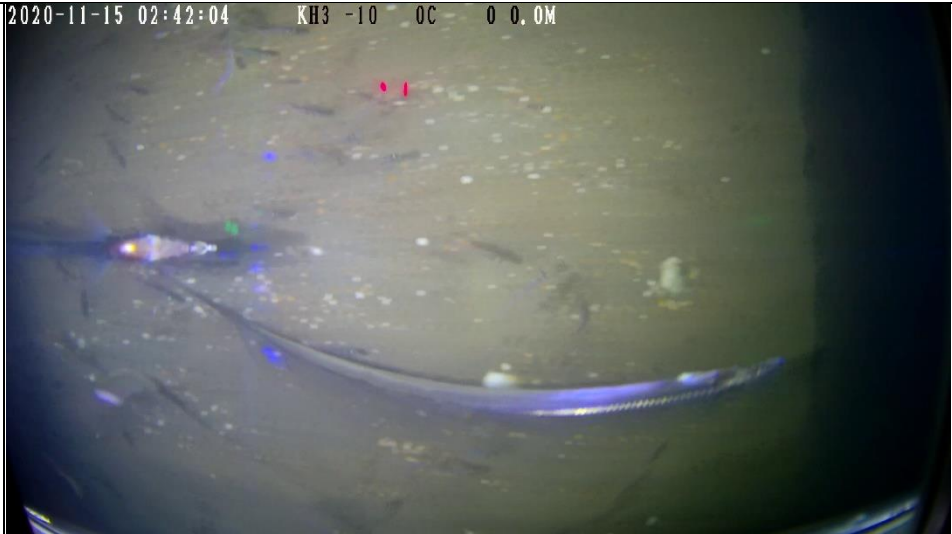


Table 3-17. Representative images of megafauna and debris observed and identified in the videos collected in the ECC. (Continued on next pages)

<p>Sea Robin (<i>Prionotus evolans</i>) EH_027</p>	
<p>Clearnose Skate (<i>Raja eglanteria</i>) ECC_021</p>	
<p>Blackcheek Tonguefish (<i>Symphurus plagiusa</i>) EH_012</p>	




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<p>Atlantic Sharpnose (<i>Rhizoprionodon terraenovae</i>) ECC_023</p>	<p>2020-11-15 02:11:21 KH3 -92 0C 0 0.0M</p> 
<p>Croakers (<i>Micropogonias undulatus</i>) EH_004</p>	<p>2020-10-16 03:02:41 KH3 -10 0C 0 0.0M</p> 
<p>Atlantic Silversides (various) EH_011</p>	<p>2020-11-15 02:39:48 KH3 -10 0C 0 0.0M</p> 

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<p>Largehead Hairtail (<i>Trichiurus lepturus</i>) and Forage fish (various) EH_011</p>	<p>2020-11-15 02:42:04 KH3 -10 0C 0 0.0M</p> 
<p>Northern Kingfish (<i>Menticirrhus saxatilis</i>) EH_028</p>	<p>2020-10-15 22:55:25 KH3 -10 0C 0 0.0M</p> 
<p>Horseshoe Crab (<i>Limulus polyphemus</i>) EH_027</p>	<p>2020-11-08 05:45:34 KH3 -95 0C 0 0.0M</p> 

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<p>Bryozoans Cupuladriidae EH_028</p>	<p>2020-10-15 22:56:37 KH3 -10 0C 0 0.0M</p> 
<p>Moon Snail Egg Case (Naticidae) EH_034</p>	<p>2020-10-15 09:55:43 KH3 -95 0C 0 0.0M</p> 
<p>Northern Star Coral (<i>Astrangia poculata</i>) EH_015</p>	<p>2020-11-15 01:51:14 KH3 -93 0C 0 0.0M</p> 

3.1.2.2 Percent Cover

The following section summarizes the results of the percent cover analysis of still images derived from underwater video transects in the ECC project area. Percent cover of various bottom substrates and features within a measured surface area of each image were recorded and used to define the NMFS-modified (NMFS, 2021) CMECS substrate classification that was most suitable for the sampled area (Table 3-18). In addition to percent cover of different sediment grain sizes (boulder, cobble, pebble/granule, or sand/mud), biological elements were also recorded (Table 3-19). Examples of biological elements include flora (e.g., algae or seagrass), fauna (e.g., mobile megafauna, encrusting species, sand dollars), and evidence of biological activity (e.g., burrows, infaunal structures). Thus, in addition to CMECS classification of the main substrate, the density of co-occurring shell and flora/fauna cover were calculated to illustrate these aspects of habitat complexity. Visual examples of habitat types defined using the still images are presented in the CMECS Classifications section (Section 3.2.2).

A total of 3,329m² of seafloor was analyzed in the ECC region (Table 3-18). The substrate group with the highest percent cover across all transects was fine sand/mud, composing 95% (3,159 m²) of the surface area analyzed through still images for the transects. Transects ECC_019 and EH_034 had the highest sand/mud coverage, both at nearly 100%, but with varying spatial area covered within the imagery, with 146 m² for ECC_019 and 46 m² for EH_034. Transect ECC_019 had the greatest area sampled in the ECC region (146 m²).

Gravel cover (boulder, cobble, and pebble/granule sizes combined) composed >5% of the substrate in 3 out of 70 transects. While ECC_025 had the least sand/mud cover (56%, 12 m²), it also had the highest gravel cover (36% or 7m²; Table 3-18). EH_009 had the second highest gravel cover (29%, 9m²) and a sand/mud cover of (58%, 18m²). Additionally, EH_010 had 12% (1m²) gravel and 85% (13 m²) sand/mud. Only a total of 0.6% (21 m²) of the seafloor analyzed comprised gravel substrate. Over 99% of the gravel analyzed was pebble/granule sized (2-64mm), with cobbles (64-256 mm) in two transects and boulders (>256 mm) in one transect.

Biogenic shell cover was the second highest abundant substrate type, accounting for 4% (144 m²) of the substrate within the ECC transects. The percent of shell cover was highest at transects EH_008 (17%, 5 m²) and EH_027 (19%, 10 m²). There was no substrate observed from anthropogenic sources.

The total area of biological elements (i.e., flora or fauna) sampled in the ECC was 3 m² and accounted for 0.1% of the bottom cover (Table 3-19). The most common element was megafauna, comprising 87% of the total flora/fauna although they only accounted for 2 m² of the bottom cover. Megafauna included mainly sea urchins, Atlantic silversides, and skate eggs. Infaunal structures, encrusting organisms, and bushy plant-like organisms comprised the remaining flora/fauna cover. There were no observations of burrows, sand dollars, eelgrass, or algae detected in the ECC project area.

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Table 3-18. Area and percent coverage of different substrates summarized from still images taken from each of the 70 video transects in the ECC project area. The values presented in this table represent percent of each substrate type per total area analyzed for that transect. The total area analyzed per transect is provided in the Total Area Analyzed (m²) column.

Transect	Total Area Analyzed (m ²)	Percent of Area – Gravel Substrates				Fine Sand/Mud Substrate (%)	Biogenic Shell Cover (%) ¹	Anthropo- genic Cover (%) ²	Flora/Fauna Cover (%) ³
		Boulder (%)	Cobble (%)	Pebble/ Granule (%)	All Gravel Combined (%)				
ECC_001	107.03	0	0	0.03	0.03	96.14	3.8	0	0.03
ECC_002	94.4	0	0	0	0	88.82	11.18	0	0
ECC_003	66.33	0	0	<0.01	<0.01	93	6.9	0	0.11
ECC_004	47.9	0	0	0	0	99.59	0.41	0	0
ECC_005	13.57	0	0	0	0	94.78	5.16	0	0.06
ECC_006	29.04	0	0	0	0	99.5	0.48	0	0.03
ECC_007	62.39	0	0	0	0	99.75	0.25	0	0
ECC_008	42.88	0	0	0	0	99.64	0.36	0	0
ECC_009	36.9	0	0	0	0	99.48	0.52	0	0
ECC_010	9.1	0	0	0	0	99.61	0.36	0	0.03
ECC_011	30.17	0	0	0	0	93.54	6.45	0	0.01
ECC_012	8.16	0	0	0	0	95.91	4.09	0	0
ECC_013	63.34	0	0	0	0	96.3	3.69	0	0.01
ECC_014	64.73	0	0	0	0	98.95	1.03	0	0.01
ECC_015	62.03	0	0	0	0	99.66	0.34	0	0
ECC_016	19.10	0	0	0	0	99.74	0.26	0	0
ECC_017	56.37	0	0	0	0	99.91	0.01	0	0.08
ECC_018	61.63	0	0	0	0	99.57	0.43	0	0
ECC_019	145.94	0	0	0	0	99.99	0.01	0	0
ECC_020	54.33	0	0	0	0	96.2	3.8	0	0
ECC_021	104.15	0	0	0	0	90.17	9.75	0	0.08
ECC_022	84.41	0	0	0	0	96.49	3.51	0	0
ECC_023	40.88	0	0	0	0	98.89	0.55	0	0.56
ECC_024	48.68	0	0	0.02	0.02	97.44	2.38	0	0.17
ECC_025	21.56	0	0	36.29	36.29	55.88	7.79	0	0.04
ECC_026	26.71	0	0	0	0	97.24	2.56	0	0.21
ECC_027	27.80	0	0	0.88	0.88	93.91	5.21	0	0
ECC_028	16.13	0	0	0.77	0.77	93.06	6.17	0	0
ECC_029	26.41	0	0	0	0	98.11	1.86	0	0.04
ECC_030	7.96	0	0	0	0	99.76	0.24	0	0
EH_002	28.88	0	0.02	1.23	1.24	93.1	5.35	0	0.31
EH_003	10.94	0	0	0	0	97.26	2.68	0	0.06
EH_004	31.71	0	0	0	0	96.55	3.44	0	0.02
EH_005	49.29	0	0	0	0	95.96	4.04	0	0
EH_006	12.61	0	0	0	0	96.41	3.59	0	0
EH_007	29.58	0	0	1.11	1.11	95.53	3.35	0	0
EH_008	34.96	0	0	2.58	2.58	80.11	17.13	0	0.19
EH_009	31.51	0	0	29.34	29.34	58.07	12.17	0	0.41
EH_010	15.94	0	0	12	12	84.91	3.09	0	0

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Transect	Total Area Analyzed (m ²)	Percent of Area – Gravel Substrates				Fine Sand/Mud Substrate (%)	Biogenic Shell Cover (%) ¹	Anthropogenic Cover (%) ²	Flora/Fauna Cover (%) ³
		Boulder (%)	Cobble (%)	Pebble/Granule (%)	All Gravel Combined (%)				
EH_011	50.24	0	0	0.2	0.2	96.39	2.24	0	1.17
EH_012	40.94	0	0	0	0	98.35	0.86	0	0.79
EH_013	38.56	0	0	0.03	0.03	98.2	1.76	0	0
EH_014	54.23	0	0	0	0	94.61	4.02	0	1.37
EH_015	56.91	0.27	0.03	0.07	0.37	97.04	2.55	0	0.04
EH_016	59.73	0	0	0.08	0.08	92.35	7.56	0	0.01
EH_017	14.85	0	0	0	0	98.81	1.19	0	0
EH_018	20.34	0	0	0	0	96.45	3.55	0	0
EH_019	76.12	0	0	0	0	99.49	0.51	0	0
EH_020	90.66	0	0	0	0	94.02	5.98	0	0
EH_021	15.82	0	0	0	0	96.99	2.94	0	0.07
EH_022	54.03	0	0	0	0	98.97	1.03	0	0
EH_023	41.99	0	0	0.63	0.63	97.19	2.18	0	0
EH_024	58.31	0	0	0	0	99.86	0.14	0	0
EH_025	44.87	0	0	0	0	99.19	0.81	0	0
EH_026	55.46	0	0	0	0	91.32	8.67	0	0.01
EH_027	54.20	0	0	0.06	0.06	80.68	19.23	0	0.03
EH_028	13.34	0	0	0.69	0.69	93.52	5.53	0	0.25
EH_029	25.38	0	0	0	0	97.68	2.32	0	0
EH_030	25.52	0	0	0	0	99.78	0.22	0	0
EH_031	23.61	0	0	0	0	97.37	2.63	0	0
EH_032	24.08	0	0	0	0	99.27	0.73	0	0
EH_033	43.28	0	0	0	0	99.89	0.11	0	0
EH_034	45.98	0	0	0	0	99.98	0	0	0.02
EH_035	30.48	0	0	0	0	96.69	3.31	0	0
EH_036	101.23	0	0	<0.01	<0.01	96.62	3.34	0	0.04
EH_037	89.02	0	0	0	0	99.37	0.63	0	0
EH_038	80.87	0	0	0.99	0.99	76.54	22.44	0	0.03
EH_039	51.46	0	0	0.45	0.45	85.8	13.75	0	<0.01
EH_040	135.95	0	0	0.02	0.02	93.02	6.96	0	0
EH_041	85.61	0	0	0.01	0.01	97.48	2.51	0	0
Total Percentage in ECC (%)⁴	100	<0.01	<0.01	0.68	0.69	94.91	4.32	0	0.08
Total Area in ECC (m²)⁵	3,328.54	0.16	0.02	22.64	22.82	3,159.17	143.79	0	2.77

¹ Biogenic shell cover includes fragments of shell or empty shell of once living organism.

² Anthropogenic material includes rock, wood, construction materials, metal, and trash.

³ Biological elements (i.e. flora/fauna) includes burrows, infaunal structures, megafauna, encrusting organisms, sand dollars, eelgrass, algae-codium, and bushy plant-like organisms.

⁴ Total Percentage in WEA (%) provides a summary of the total percent cover of each substrate type across all transects.

⁵ Total Area in WEA (m²) provides a summary of the total area of each substrate type across all transects.

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Table 3-19. Area and percent coverage of different biological elements (i.e., flora/fauna) observed within still images taken from each of the 70 video transects in the ECC project area.

Transect	Flora/ Fauna Area (m ²)	Burrows (%)	Infaunal Structures (%)	Megafauna (%)	Encrusting Orgs. (%)	Sand Dollars (%)	Eelgrass (%)	Algae – Codium (%)	Bushy Plant-like Orgs. (%)
ECC_001	0.03	0	0.03	0	0	0	0	0	0
ECC_002	0	0	0	0	0	0	0	0	0
ECC_003	0.07	0	0	0.11	0	0	0	0	0
ECC_004	0	0	0	0	0	0	0	0	0
ECC_005	0.01	0	0	0.06	0	0	0	0	0
ECC_006	0.01	0	<0.01	0.02	0	0	0	0	0
ECC_007	0	0	0	0	0	0	0	0	0
ECC_008	0	0	0	0	0	0	0	0	0
ECC_009	0	0	0	0	0	0	0	0	0
ECC_010	<0.01	0	0.03	0	0	0	0	0	0
ECC_011	<0.01	0	0	0	0.01	0	0	0	0
ECC_012	0	0	0	0	0	0	0	0	0
ECC_013	0.01	0	0	0.01	0	0	0	0	0
ECC_014	0.01	0	0	0	0	0	0	0	0.01
ECC_015	0	0	0	0	0	0	0	0	0
ECC_016	0	0	0	0	0	0	0	0	0
ECC_017	0.04	0	0	0.08	0	0	0	0	0
ECC_018	0	0	0	0	0	0	0	0	0
ECC_019	0	0	0	0	0	0	0	0	0
ECC_020	0	0	0	0	0	0	0	0	0
ECC_021	0.09	0	0	0.08	0	0	0	0	0
ECC_022	0	0	0	0	0	0	0	0	0
ECC_023	0.23	0	0	0.56	0	0	0	0	0
ECC_024	0.08	0	0.02	0.14	0	0	0	0	0
ECC_025	0.01	0	0	0	0.04	0	0	0	0
ECC_026	0.06	0	0	0.21	0	0	0	0	0
ECC_027	0	0	0	0	0	0	0	0	0
ECC_028	0	0	0	0	0	0	0	0	0
ECC_029	0.01	0	0	0.04	0	0	0	0	0
ECC_030	0	0	0	0	0	0	0	0	0
EH_002	0.09	0	0	0	0.08	0	0	0	0.23
EH_003	0.01	0	0	0	0	0	0	0	0.06
EH_004	0.01	0	0	0	0	0	0	0	0.02
EH_005	0	0	0	0	0	0	0	0	0
EH_006	0	0	0	0	0	0	0	0	0
EH_007	0	0	0	0	0	0	0	0	0
EH_008	0.07	0	0	0.19	0	0	0	0	0
EH_009	0.13	0	0	0.41	0	0	0	0	0
EH_010	0	0	0	0	0	0	0	0	0
EH_011	0.59	0	0	1.17	0	0	0	0	0
EH_012	0.32	0	0	0.79	0	0	0	0	0
EH_013	0	0	0	0	0	0	0	0	0
EH_014	0.74	0	0	1.17	0.08	0	0	0	0.12
EH_015	0.02	0	0	0.04	0	0	0	0	0
EH_016	<0.01	0	0	0	0.01	0	0	0	0
EH_017	0	0	0	0	0	0	0	0	0
EH_018	0	0	0	0	0	0	0	0	0
EH_019	0	0	0	0	0	0	0	0	0

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Transect	Flora/ Fauna Area (m ²)	Burrows (%)	Infaunal Structures (%)	Megafauna (%)	Encrusting Orgs. (%)	Sand Dollars (%)	Eelgrass (%)	Algae – Codium (%)	Bushy Plant-like Orgs. (%)
EH_020	0	0	0	0	0	0	0	0	0
EH_021	0.01	0	0.07	0	0	0	0	0	0
EH_022	0	0	0	0	0	0	0	0	0
EH_023	0	0	0	0	0	0	0	0	0
EH_024	0	0	0	0	0	0	0	0	0
EH_025	0	0	0	0	0	0	0	0	0
EH_026	0.01	0	0	0.01	0	0	0	0	0
EH_027	0.02	0	0.03	0	0	0	0	0	0
EH_028	0.03	0	0	0.25	0	0	0	0	0
EH_029	0	0	0	0	0	0	0	0	0
EH_030	0	0	0	0	0	0	0	0	0
EH_031	0	0	0	0	0	0	0	0	0
EH_032	0	0	0	0	0	0	0	0	0
EH_033	0	0	0	0	0	0	0	0	0
EH_034	0.01	0	0	0.02	0	0	0	0	0
EH_035	0	0	0	0	0	0	0	0	0
EH_036	0.04	0	0.02	0.02	0	0	0	0	0.01
EH_037	0	0	0	0	0	0	0	0	0
EH_038	0.02	0	0.03	0	0	0	0	0	0
EH_039	<0.01	0	0	<0.01	0	0	0	0	0
EH_040	0	0	0	0	0	0	0	0	0
EH_041	0	0	0	0	0	0	0	0	0
Total Flora/Fauna Percentage in ECC (%)¹	100	0	4.33	87.36	2.89	0	0	0	5.78
Total Flora/ Fauna Area in ECC (m²)²	2.77	0	0.12	2.42	0.08	0	0	0	0.16

¹ Total Flora/Fauna Percentage in WEA (%) provides a summary of the total percent cover per each biological element type in the Flora/Fauna area.

² Total Area in WEA (m²) provides a summary of the total area per each biological element type in the Flora/Fauna area.

3.2 Grab Samples

Grab samples were collected at 200 stations within the project area, with 128 occurring in the WEA (69 labeled WEA, 69 labeled WH) and 72 collected in the ECC (31 labeled ECC, 41 labeled EH). Although it is typical for only three attempts to be made at a single station, additional successful attempts were made for stations ECC_028, EH_003, EH_009, WH_042, and WH_061. Sampling attempts failed at stations EH_003 and EH_009 due to low sediment quantity; however, material in the final attempts were collected and processed as all other requirements were met.

3.2.1 Wind Energy Area

The characteristics and locations of the 128 stations at which grab samples were obtained in the WEA are described in Table 3-20 and shown in Figure 3-1.

Table 3-20. Location and characteristics of grab samples collected in the WEA project area (continued on next page).

Sample	Date (UTC)	Time (UTC)	Latitude (°N)	Longitude (°W)	Water Depth (m)	Sample Penetration Depth (mm)
WEA_001	11/7/2020	21:35	36.468889	-75.312436	31	104
WEA_002	11/7/2020	1:27	36.468902	-75.290165	31	70
WEA_003	11/6/2020	19:51	36.469005	-75.267918	32	65
WEA_004	11/7/2020	15:46	36.450811	-75.334709	30	73
WEA_005	11/7/2020	14:28	36.450896	-75.312423	31	65
WEA_006	11/7/2020	11:32	36.450898	-75.290096	31	87
WEA_007	11/6/2020	18:37	36.450925	-75.267859	33	85
WEA_008	11/6/2020	12:25	36.432739	-75.334643	31	67
WEA_009	11/6/2020	7:35	36.432744	-75.312375	32	67
WEA_010	11/5/2020	21:39	36.432838	-75.290045	32	70
WEA_011	11/5/2020	18:58	36.432869	-75.267704	34	73
WEA_012	11/5/2020	15:45	36.432960	-75.245333	36	65
WEA_013	11/3/2020	21:59	36.433038	-75.223188	34	92
WEA_014	11/3/2020	20:40	36.433069	-75.200927	35	65
WEA_015	11/3/2020	20:14	36.433091	-75.178555	34	75
WEA_016	10/29/2020	2:07	36.433110	-75.156220	34	50
WEA_017	10/24/2020	16:26	36.414797	-75.312311	30	95
WEA_018	10/24/2020	13:27	36.414834	-75.289974	27	70
WEA_019	10/24/2020	18:53	36.414932	-75.267683	33	63
WEA_020	10/24/2020	19:55	36.414874	-75.245493	38	76
WEA_021	10/24/2020	23:29	36.414997	-75.223029	38	98
WEA_022	10/25/2020	0:40	36.415006	-75.200762	31	76
WEA_023	10/25/2020	1:57	36.415019	-75.178464	35	78
WEA_024	10/25/2020	6:16	36.415079	-75.156131	34	85
WEA_025	10/25/2020	8:39	36.415097	-75.138542	34	70
WEA_026	10/24/2020	7:46	36.396802	-75.289959	32	95
WEA_027	10/24/2020	2:23	36.396838	-75.267612	38	72
WEA_028	10/24/2020	1:16	36.396883	-75.245164	37	88
WEA_029	10/23/2020	15:05	36.396988	-75.223050	39	60
WEA_030	10/23/2020	10:20	36.396994	-75.200721	30	90
WEA_031	10/23/2020	2:35	36.397033	-75.178411	32	80
WEA_032	10/23/2020	1:34	36.397036	-75.156107	31	76
WEA_033	10/25/2020	11:29	36.397067	-75.138417	31	103
WEA_034	10/23/2020	17:52	36.378776	-75.267618	35	78
WEA_035	10/22/2020	13:56	36.378864	-75.245277	36	83

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Sample	Date (UTC)	Time (UTC)	Latitude (°N)	Longitude (°W)	Water Depth (m)	Sample Penetration Depth (mm)
WEA_036	10/22/2020	15:13	36.378905	-75.223025	36	90
WEA_037	10/22/2020	17:04	36.378981	-75.200734	33	83
WEA_038	10/22/2020	18:12	36.378985	-75.178404	34	88
WEA_039	10/22/2020	19:32	36.379001	-75.156034	31	94
WEA_040	10/22/2020	22:36	36.379015	-75.138371	36	72
WEA_041	10/21/2020	10:50	36.360785	-75.245226	33	65
WEA_042	10/21/2020	14:35	36.360922	-75.222999	33	50
WEA_043	10/22/2020	6:46	36.360926	-75.200648	33	80
WEA_044	10/22/2020	2:05	36.360957	-75.178350	33	69
WEA_045	10/22/2020	0:56	36.361003	-75.156058	33	78
WEA_046	10/21/2020	23:48	36.361011	-75.138327	34	66
WEA_047	10/21/2020	18:36	36.342893	-75.222905	30	50
WEA_048	10/21/2020	7:12	36.342914	-75.200602	36	85
WEA_049	10/21/2020	2:28	36.342931	-75.178282	33	71
WEA_050	10/21/2020	0:23	36.342978	-75.156015	35	82
WEA_051	10/20/2020	22:41	36.342985	-75.138354	35	70
WEA_052	10/11/2020	3:30	36.324843	-75.200558	35	88
WEA_053	10/11/2020	6:07	36.324946	-75.178281	32	78
WEA_054	10/11/2020	8:09	36.324897	-75.156044	30	60
WEA_055	10/20/2020	21:18	36.324907	-75.138261	31	90
WEA_056	10/11/2020	1:59	36.306811	-75.178215	35	95
WEA_057	10/10/2020	23:43	36.306897	-75.155919	30	92
WEA_058	10/10/2020	20:51	36.306970	-75.138163	35	68
WEA_059	10/10/2020	16:34	36.288867	-75.155954	33	87
WEA_060	10/10/2020	15:05	36.288997	-75.138252	35	68
WEA_061	10/21/2020	20:37	36.270871	-75.155825	37	76
WEA_062	10/21/2020	21:31	36.270835	-75.138236	30	82
WH_001	11/6/2020	21:05	36.475059	-75.272124	31	85
WH_002	11/7/2020	0:10	36.473436	-75.299904	28	62
WH_003	11/7/2020	23:48	36.469907	-75.321123	27	75
WH_004	11/7/2020	21:57	36.468630	-75.323482	29	48
WH_005	11/7/2020	3:53	36.463261	-75.279141	35	63
WH_006	11/7/2020	6:39	36.463157	-75.308527	34	75
WH_007	11/7/2020	19:48	36.462426	-75.331007	28	70
WH_008	11/7/2020	18:33	36.460986	-75.325621	31	100
WH_009	11/7/2020	2:41	36.461031	-75.287457	30	86
WH_010	11/7/2020	17:16	36.459449	-75.328163	30	79
WH_011	11/7/2020	8:10	36.459253	-75.300353	32	80
WH_012	11/7/2020	9:38	36.453424	-75.294471	30	80
WH_013	11/7/2020	12:51	36.448422	-75.293649	31	80
WH_014	11/6/2020	15:13	36.443028	-75.302083	31	80
WH_015	11/6/2020	17:13	36.440008	-75.293244	34	70
WH_016	11/5/2020	17:50	36.438307	-75.269347	38	45
WH_017	11/6/2020	13:40	36.438025	-75.324924	31	67
WH_018	11/5/2020	20:14	36.432054	-75.284882	28	92
WH_019	11/5/2020	23:42	36.430974	-75.293876	34	77
WH_020	11/6/2020	6:08	36.430336	-75.292945	34	80
WH_021	11/3/2020	19:18	36.429232	-75.174904	32	95
WH_022	11/3/2020	21:35	36.428018	-75.212860	36	80
WH_024	11/6/2020	9:41	36.425075	-75.318262	33	50
WH_025	10/25/2020	12:42	36.424886	-75.140107	40	75
WH_026	11/5/2020	14:19	36.423502	-75.254410	36	74
WH_027	10/24/2020	17:47	36.416561	-75.284932	31	80
WH_028	10/24/2020	14:35	36.416028	-75.304482	33	68
WH_029	10/24/2020	12:06	36.411332	-75.283228	30	75
WH_030	10/25/2020	2:53	36.410027	-75.171177	30	108

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Sample	Date (UTC)	Time (UTC)	Latitude (°N)	Longitude (°W)	Water Depth (m)	Sample Penetration Depth (mm)
WH_031	10/24/2020	10:51	36.409749	-75.283744	28	100
WH_032	10/25/2020	5:08	36.407927	-75.160632	34	98
WH_033	10/24/2020	22:30	36.407007	-75.225014	41	100
WH_034	10/24/2020	9:12	36.403211	-75.282459	38	76
WH_035	10/23/2020	0:27	36.400220	-75.140524	33	50
WH_036	10/23/2020	7:12	36.397635	-75.186904	37	75
WH_037	10/23/2020	13:34	36.397483	-75.204459	35	60
WH_038	10/23/2020	11:54	36.396614	-75.208792	35	55
WH_039	10/23/2020	8:31	36.395051	-75.206769	36	95
WH_040	10/23/2020	5:38	36.394973	-75.182292	33	88
WH_041	10/23/2020	4:26	36.394882	-75.181757	33	80
WH_042	11/4/2020	18:52	36.394244	-75.229602	42	85
WH_043	10/24/2020	6:35	36.390465	-75.278450	38	70
WH_044	10/23/2020	22:32	36.389352	-75.232765	40	80
WH_045	10/23/2020	21:08	36.388651	-75.231482	40	80
WH_046	10/23/2020	20:11	36.386261	-75.226751	37	75
WH_047	10/23/2020	18:59	36.385585	-75.259684	57	83
WH_048	10/24/2020	4:37	36.384696	-75.273115	34	75
WH_049	10/22/2020	21:08	36.383208	-75.143104	34	81
WH_050	10/22/2020	12:34	36.375068	-75.246444	35	92
WH_051	10/22/2020	5:04	36.366892	-75.210316	31	75
WH_052	10/22/2020	3:05	36.364831	-75.187136	36	73
WH_053	10/21/2020	12:21	36.364297	-75.224067	33	63
WH_054	10/21/2020	16:16	36.361894	-75.210207	31	75
WH_055	10/21/2020	17:20	36.361038	-75.207567	30	85
WH_056	10/22/2020	9:00	36.360301	-75.211401	30	75
WH_057	10/22/2020	8:26	36.358666	-75.204180	31	100
WH_058	10/22/2020	10:56	36.357664	-75.201156	34	70
WH_059	10/21/2020	9:02	36.354152	-75.234891	34	34
WH_060	10/21/2020	1:24	36.351627	-75.166192	34	74
WH_061	11/4/2020	22:56	36.350667	-75.195622	40	75
WH_062	10/21/2020	4:23	36.347776	-75.191737	38	40
WH_063	10/20/2020	20:01	36.321651	-75.144248	33	89
WH_064	10/20/2020	16:14	36.318633	-75.170247	35	70
WH_065	10/20/2020	18:42	36.315324	-75.149290	31	86
WH_066	10/20/2020	14:48	36.296002	-75.163806	31	100
WH_067	10/20/2020	13:25	36.282975	-75.139734	35	78

3.2.1.1 Sediment Analysis

The following section presents grab sample grain size composition results from the GeoTesting lab analysis. The grain size data in Section 3.2.1.1 conform to the Wentworth Soil Classification System, which aligns with the NMFS modified CMECS classifications (NMFS, 2021). The cutoff for gravel for CMECS (> 2 mm sieve size) is captured in the grain size analysis. The majority of the 128 grab sample stations in the WEA project area were fine with 80% of samples sand or finer (Table 3-21, Figure 3-16, and Figure 3-17). Gravel percent composition ranged from 0 – 40% of each sample (mean of 3.9%), with all gravel within the pebble/granule size range (2 – 64 mm) and no cobble or boulder were detected. Percentage of silt and clay (< 0.063 mm) ranged from 0 – 33% of each sample (mean of 2.7%), with only one sample (WH_019) containing ≥ 30% silt and clay.

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Only 9 of the 128 WEA samples had non-detectable Total Organic Carbon (TOC) levels below 0.2%, while all other samples ranged widely from 0.35 – 8.89% with an average of 1.58%. Fifty-three percent of samples were above 1%, and only five samples were above 5% TOC. These five samples were classified as gravelly or gravel mixes, and in general samples containing gravel also had higher TOC levels.

Table 3-21. Grain size composition from grab samples collected in the WEA and WH sampling areas.
(Continued on next page)

Station	Boulder % (256-4096 mm)	Cobble % (64-256 mm)	Pebble / Granule % (2-64 mm)	Very Coarse / Coarse Sand % (0.5-2 mm)	Medium Sand % (0.25-0.5 mm)	Fine / Very Fine Sand % (0.063- 0.25mm)	Mud % < 0.063 mm	Total Organic Carbon ¹ (%)
WEA_001	0	0	0	1	10	87	2	0.83
WEA_002	0	0	0	12	35	49	4	3.06
WEA_003	0	0	0	1	5	91	3	0.94
WEA_004	0	0	1	1	6	90	2	1.5
WEA_005	0	0	0	1	3	92	4	1.04
WEA_006	0	0	1	25	51	22	1	1.45
WEA_007	0	0	1	0	3	93	3	1.08
WEA_008	0	0	0	0	2	94	4	1.08
WEA_009	0	0	0	0	5	91	4	1.09
WEA_010	0	0	0	2	77	19	2	0.71
WEA_011	0	0	0	0	39	59	2	0.86
WEA_012	0	0	0	0	3	93	4	1.19
WEA_013	0	0	0	0	3	93	4	0.96
WEA_014	0	0	1	0	2	93	4	0.94
WEA_015	0	0	0	1	11	86	2	0.76
WEA_016	0	0	0	1	11	85	3	0.83
WEA_017	0	0	0	1	8	90	1	0.92
WEA_018	0	0	0	1	14	83	2	0.69
WEA_019	0	0	5	28	41	23	3	1.11
WEA_020	0	0	0	0	3	92	5	1.58
WEA_021	0	0	0	0	1	93	6	3.26
WEA_022	0	0	0	1	25	71	3	0.7
WEA_023	0	0	0	0	2	94	4	1.2
WEA_024	0	0	3	32	53	9	3	1.69
WEA_025	0	0	0	0	8	89	3	1.03
WEA_026	0	0	0	0	9	89	2	0.91
WEA_027	0	0	1	2	4	87	6	0.35
WEA_028	0	0	0	0	2	96	2	1.34
WEA_029	0	0	7	27	57	8	1	1.79
WEA_030	0	0	0	3	67	28	2	0.6
WEA_031	0	0	0	0	3	97	0	0.9
WEA_032	0	0	0	0	18	80	2	0.77
WEA_033	0	0	0	1	7	90	2	1.37
WEA_034	0	0	20	39	37	4	0	3.52
WEA_035	0	0	0	5	58	35	2	0.59
WEA_036	0	0	9	46	42	2	1	0.69
WEA_037	0	0	0	0	18	80	2	0.55
WEA_038	0	0	0	0	16	82	2	0.42
WEA_039	0	0	0	2	53	44	1	0.82
WEA_040	0	0	0	2	5	90	3	1.79
WEA_041	0	0	1	9	70	19	1	1.55
WEA_042	0	0	35	34	24	6	1	5.54

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Station	Boulder % (256-4096 mm)	Cobble % (64-256 mm)	Pebble / Granule % (2-64 mm)	Very Coarse / Coarse Sand % (0.5-2 mm)	Medium Sand % (0.25-0.5 mm)	Fine / Very Fine Sand % (0.063- 0.25mm)	Mud % < 0.063 mm	Total Organic Carbon ¹ (%) ²
WEA_043	0	0	0	1	41	56	2	0.81
WEA_044	0	0	2	2	44	51	1	2.86
WEA_045	0	0	0	1	12	85	2	1.62
WEA_046	0	0	0	2	89	7	2	1.83
WEA_047	0	0	12	68	16	2	2	2.84
WEA_048	0	0	5	1	65	28	1	0.71
WEA_049	0	0	0	0	29	68	3	0.52
WEA_050	0	0	0	0	7	90	3	0.89
WEA_051	0	0	29	41	16	6	8	1.09
WEA_052	0	0	6	66	20	6	2	ND
WEA_053	0	0	0	1	34	64	1	ND
WEA_054	0	0	1	10	58	31	0	ND
WEA_055	0	0	0	0	29	70	1	0.66
WEA_056	0	0	0	3	60	34	3	ND
WEA_057	0	0	0	2	55	41	2	ND
WEA_058	0	0	0	2	21	75	2	ND
WEA_059	0	0	0	0	17	82	1	ND
WEA_060	0	0	0	0	3	94	3	ND
WEA_061	0	0	0	0	4	94	2	0.91
WEA_062	0	0	0	1	36	61	2	0.61
WH_001	0	0	0	15	55	28	2	1.05
WH_002	0	0	0	10	51	36	3	1.48
WH_003	0	0	0	0	14	84	2	0.63
WH_004	0	0	4	61	26	7	2	2.44
WH_005	0	0	0	0	4	94	2	1.37
WH_006	0	0	6	63	21	6	4	3.89
WH_007	0	0	5	45	30	18	2	ND
WH_008	0	0	0	0	5	93	2	0.65
WH_009	0	0	0	1	13	84	2	0.96
WH_010	0	0	4	35	37	22	2	0.92
WH_011	0	0	12	35	37	13	3	1.12
WH_012	0	0	1	22	42	32	3	0.69
WH_013	0	0	0	5	22	71	2	0.83
WH_014	0	0	0	0	8	89	3	0.82
WH_015	0	0	0	0	3	93	4	1.08
WH_016	0	0	5	41	47	4	3	4.51
WH_017	0	0	2	1	4	86	7	1.83
WH_018	0	0	0	1	17	80	2	0.9
WH_019	0	0	0	1	4	62	33	3.54
WH_020	0	0	0	1	20	75	4	0.96
WH_021	0	0	1	53	9	35	2	0.59
WH_022	0	0	0	0	2	94	4	0.95
WH_024	0	0	0	0	2	95	3	1.18
WH_025	0	0	0	0	9	87	4	1.12
WH_026	0	0	0	0	3	94	3	1.03
WH_027	0	0	0	1	10	87	2	1.13
WH_028	0	0	1	6	56	36	1	1.48
WH_029	0	0	16	66	15	2	1	8.89
WH_030	0	0	0	2	52	42	4	0.91
WH_031	0	0	0	4	21	74	1	1.02
WH_032	0	0	1	1	32	65	1	0.86
WH_033	0	0	0	1	0	93	6	1.91

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Station	Boulder % (256-4096 mm)	Cobble % (64-256 mm)	Pebble / Granule % (2-64 mm)	Very Coarse / Coarse Sand % (0.5-2 mm)	Medium Sand % (0.25-0.5 mm)	Fine / Very Fine Sand % (0.063- 0.25mm)	Mud % < 0.063 mm	Total Organic Carbon ¹ (% ²)
WH_034	0	0	1	1	15	82	1	0.78
WH_035	0	0	21	30	29	19	1	3.13
WH_036	0	0	0	1	7	90	2	1.63
WH_037	0	0	33	33	28	6	0	1.68
WH_038	0	0	29	32	35	3	1	2.45
WH_039	0	0	0	3	60	35	2	0.53
WH_040	0	0	0	1	31	67	1	0.67
WH_041	0	0	0	2	52	44	2	0.46
WH_042	0	0	0	0	1	88	11	2.05
WH_043	0	0	3	1	2	92	2	1.59
WH_044	0	0	0	1	21	76	2	1.95
WH_045	0	0	21	59	18	2	0	6.01
WH_046	0	0	17	37	40	5	1	4.25
WH_047	0	0	0	1	4	93	2	1.43
WH_048	0	0	27	37	31	4	1	1.77
WH_049	0	0	0	1	9	89	1	1.27
WH_050	0	0	0	1	28	63	8	1.24
WH_051	0	0	9	33	44	13	1	2.89
WH_052	0	0	0	2	15	78	5	1.29
WH_053	0	0	33	41	20	5	1	5.53
WH_054	0	0	23	44	28	4	1	3.18
WH_055	0	0	0	17	63	17	3	1.07
WH_056	0	0	24	39	22	9	6	7.61
WH_057	0	0	1	1	54	43	1	0.51
WH_058	0	0	40	47	9	3	1	1.32
WH_059	0	0	7	34	50	8	1	2.95
WH_060	0	0	0	0	5	92	3	0.77
WH_061	0	0	0	1	11	85	3	1.1
WH_062	0	0	9	12	33	43	3	2.48
WH_063	0	0	0	0	15	83	2	0.53
WH_064	0	0	1	1	13	84	1	0.64
WH_065	0	0	0	2	39	57	2	2.19
WH_066	0	0	0	2	54	42	2	0.56
WH_067	0	0	1	1	7	89	2	0.84

¹ND is non-detectable levels below 0.2 %

²Percent by weight after drying

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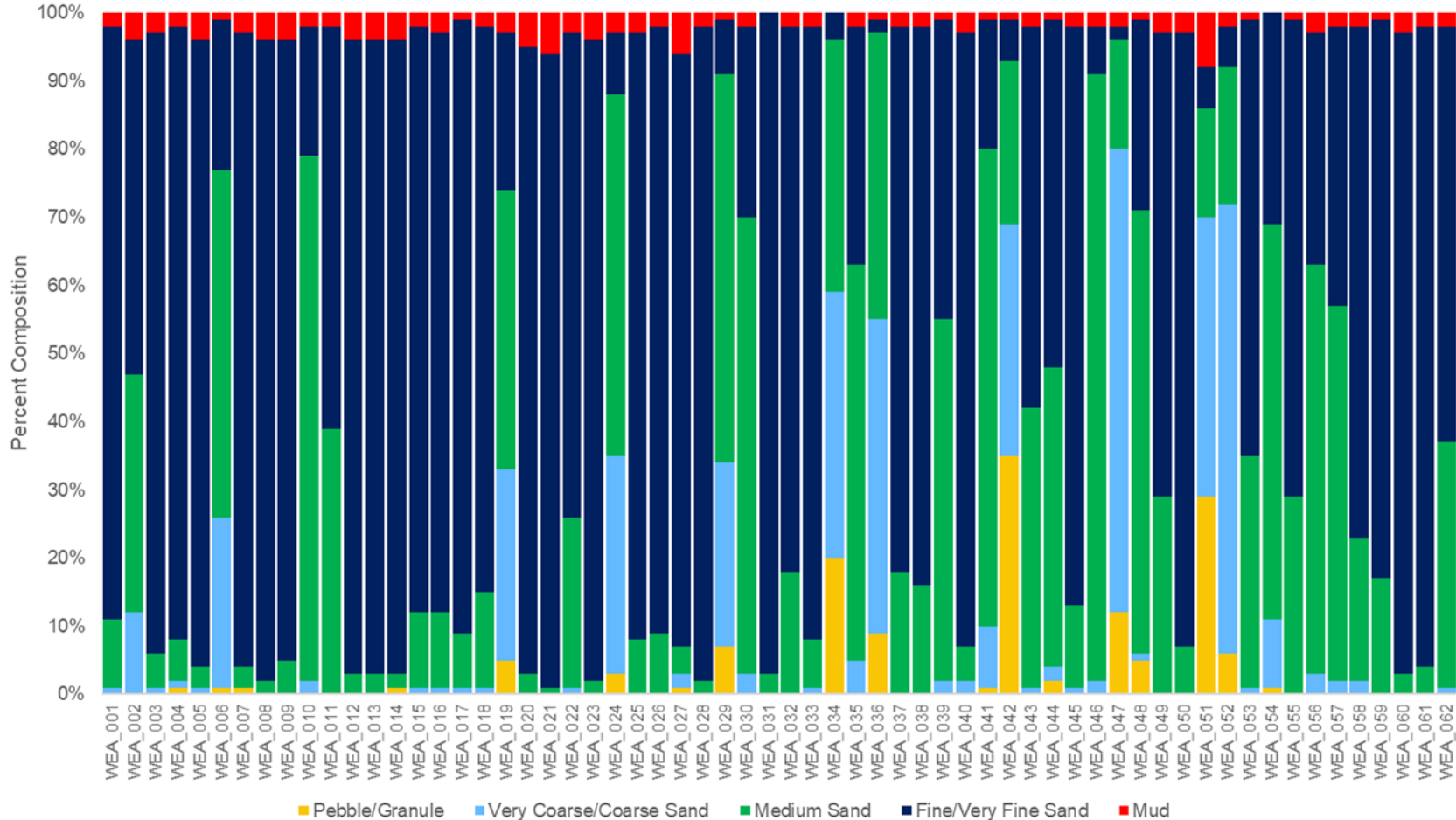


Figure 3-16. Grain size composition (as defined by NMFS [2021] modified CMECS substrate classifications) at each grab sample station collected in the WEA sampling area. No boulder or cobble was present in any samples.

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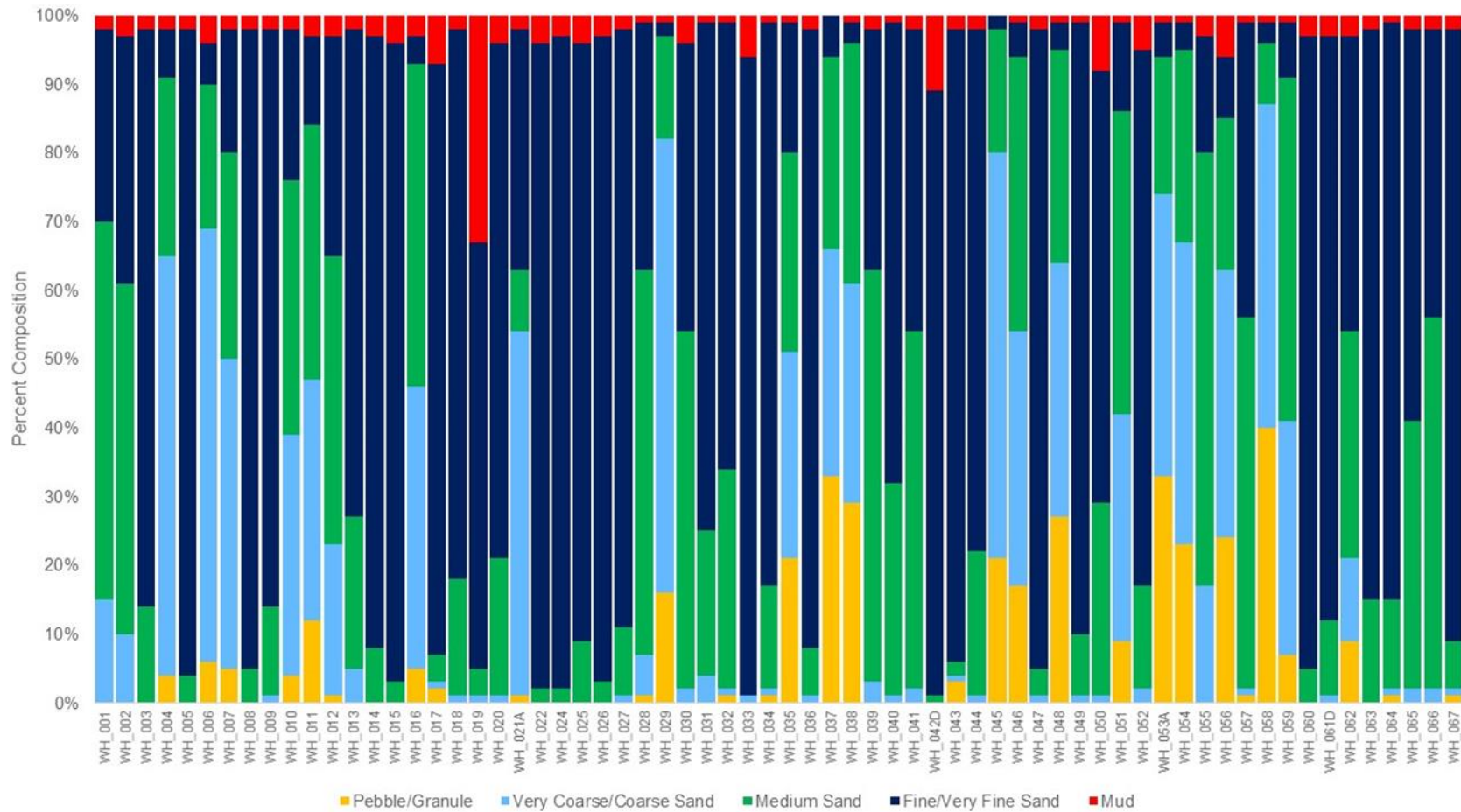


Figure 3-17. Grain size composition (as defined by NMFS [2021] modified CMECS substrate classifications) at each grab sample station collected in the WH sampling area. No boulder or cobble was present in any samples.

3.2.1.2 Benthic Community Analysis

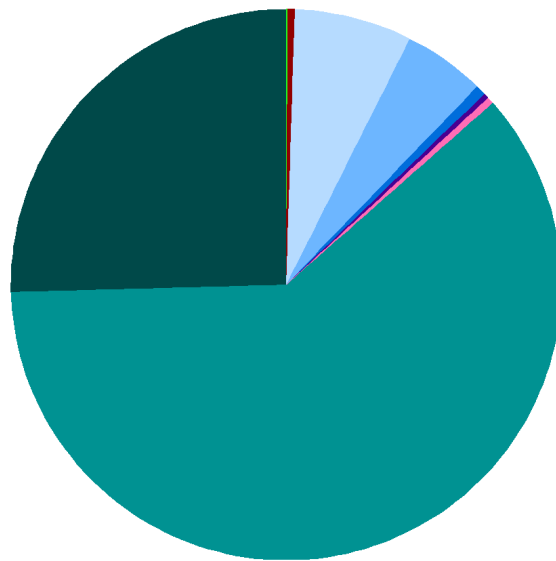
3.2.1.2.1 Taxonomic Composition

Grab samples were attempted at 128 sample locations within the WEA for infaunal macroinvertebrate analysis, all of which were successful. These 128 successful grab samples yielded a total of 17,219 individual macroinvertebrates (per all 128 0.05 m² samples). Organisms collected in this survey area were from 13 unique phyla, 119 families or NLPTL, and 227 species or NLPTL (Table 3-22). The Phyla Arthropoda, Annelida, and Nematoda dominated the abundance in samples, representing 93% of all organisms in total, while Annelida, Arthropoda, and Mollusca dominated in unique taxa, together representing 92% of the taxa identified (Figure 3-18).

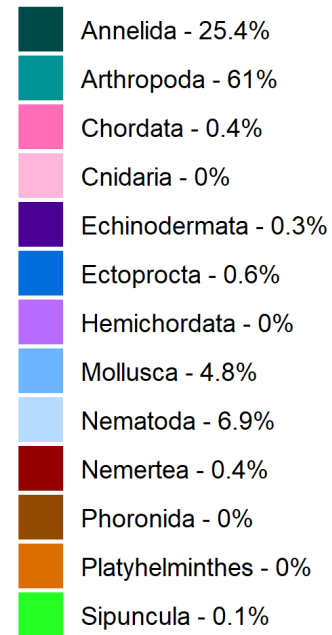
Table 3-22. Phyla, families, and species present in the 128 WEA and WH benthic grab samples collected in the project area.

Phylum	Abundant Taxonomic Groups (common names)	Sample Abundance (per all 0.05 m ² samples)	Number of Families (or NLPTL)	Number of Species (or NLPTL)
Annelida	Polychaete worms (segmented and bamboo worms)	4,373	33	106
Arthropoda	Amphipods, calanoid copepods, ostracods	10,495	41	62
Chordata	Lancelets	74	1	1
Cnidaria	Hydroid	5	1	1
Echinodermata	Sand dollars, sea cucumbers	59	6	6
Ectoprocta	Bryozoans	106	1	1
Hemichordata	Acorn Worm	1	1	1
Mollusca	Nut clams	833	27	41
Nematoda	Nematodes	1,186	1	1
Nemertea	Ribbon worms	65	4	4
Phoronida	Horseshoe worms	1	1	1
Platyhelminthes	Flatworms	7	1	1
Sipuncula	Peanut worms	14	1	1
Totals		17,219	119	227

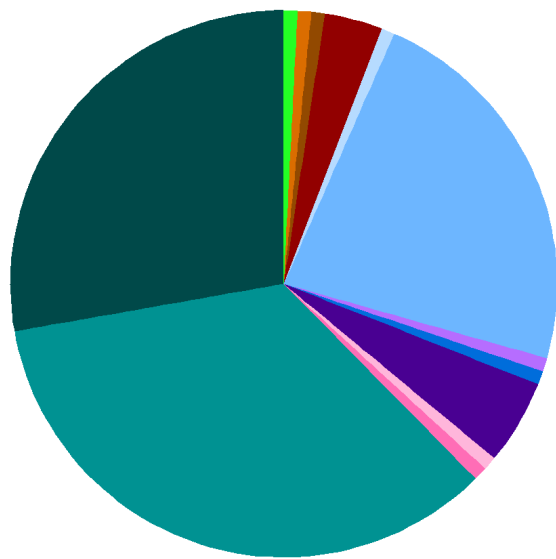
A.



Phylum



B.



Phylum

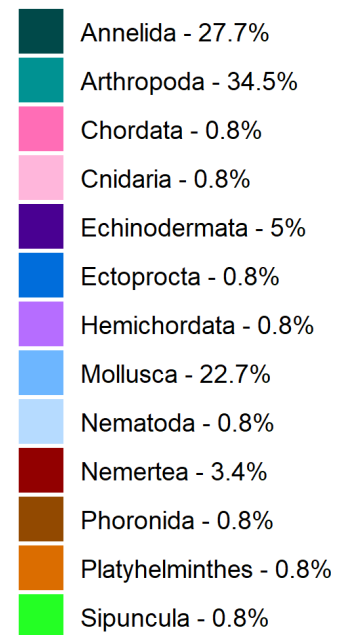


Figure 3-18. A. (top) Proportional abundance and B. (bottom) proportion of unique taxa (family or NLPTL) for each phylum collected in all WEA and WH benthic grab sample. Results presented as percentage of total.

Sample abundance in the 128 benthic grab samples ranged from 25 organisms in WH_044 to 382 organisms in WH_058. Annelids and Arthropods were present in every sample collected and although nematodes were overall more abundant than molluscs; molluscs occurred more frequently, observed in 112 of the 128 samples whereas nematodes were only present in 62 of the 128. Data for abundance by phylum is presented in for WEA samples and for the WH samples. These data are shown as percentages in Figure 3-19.

The range between samples in the number of families or NLPTL and the number of species or NLPTL was 30 and 40 respectively. Sample WH_058 contained both the highest number of families or NLPTL at 37 and the highest number of species or NLPTL at 51. Similarly, WEA_054 contained the lowest number of families or NLPTL at 7 and the lowest number of species or NLPTL at 11. The most abundant families are members of the most abundant phyla: Ampeliscidae amphipods, Haustoriidae amphipods, and Phoxocephalidae crustaceans of Arthropoda; nematode worms of Nematoda; and Paraonidae worms of Annelida. Together these five families make up 67% of all organisms identified (11,492 of 17,219 organisms; Table 3-25).

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Table 3-23. Abundance (per 0.05 m² sample) of each Phylum counted within each WEA grab sample collected.

Station	Annelida	Arthropoda	Chordata	Cnidaria	Echino- dermata	Ectoprocta	Hemichord- ata	Mollusca	Nematoda	Nemertea	Phoronida	Platyhelm- inthes	Sipuncula	Sample Abundance
WEA_001	27	129	-	-	-	-	-	2	2	-	-	-	-	160
WEA_002	33	74	-	-	-	-	-	3	5	-	-	-	-	115
WEA_003	35	120	-	-	-	-	-	8	2	-	-	-	-	165
WEA_004	28	118	-	-	-	-	-	1	4	-	-	-	-	151
WEA_005	24	62	-	-	1	-	-	1	-	-	-	-	-	88
WEA_006	74	151	1	-	-	-	-	4	5	-	-	-	-	235
WEA_007	19	41	-	-	-	-	-	3	2	2	-	-	-	67
WEA_008	23	27	-	-	-	-	-	9	-	1	-	-	-	60
WEA_009	26	38	-	-	-	-	-	11	1	-	-	-	-	76
WEA_010	4	173	-	-	-	-	-	-	-	-	-	-	-	177
WEA_011	7	98	-	-	-	1	-	4	-	-	-	-	-	110
WEA_012	23	74	-	-	-	2	-	7	-	-	-	-	-	106
WEA_013	56	140	-	-	2	3	-	5	1	-	-	-	-	207
WEA_014	46	97	-	-	-	1	-	8	1	-	-	-	-	153
WEA_015	22	142	-	-	-	-	-	2	-	-	-	-	-	166
WEA_016	34	101	-	-	1	-	-	1	-	-	-	-	-	137
WEA_017	58	173	-	-	-	-	-	5	5	2	-	-	-	243
WEA_018	4	98	-	-	-	-	-	3	-	-	-	-	-	105
WEA_019	24	88	1	-	-	-	-	2	-	-	-	1	-	116
WEA_020	50	20	-	-	1	-	-	2	-	-	-	-	-	73
WEA_021	133	12	-	-	-	-	-	77	1	-	-	-	6	229
WEA_022	8	53	-	-	-	-	-	1	1	-	-	-	1	64
WEA_023	23	77	-	-	-	-	-	8	-	-	-	-	-	108
WEA_024	26	66	3	-	5	2	-	1	3	-	-	-	-	106
WEA_025	26	91	-	-	2	3	-	8	3	-	-	-	-	133
WEA_026	41	163	-	-	-	-	-	-	-	1	-	-	-	205
WEA_027	151	1	-	-	1	-	-	8	-	-	-	-	-	161
WEA_028	28	14	-	1	-	2	-	51	-	-	-	-	-	96
WEA_029	96	109	-	-	1	1	1	5	35	4	-	1	-	253
WEA_030	11	125	-	-	-	1	-	2	-	-	-	-	-	139
WEA_031	5	96	-	-	-	6	-	4	1	-	-	-	-	112
WEA_032	9	131	-	-	-	-	-	6	-	-	-	-	-	146
WEA_033	21	143	-	-	-	-	-	8	-	-	-	-	-	172
WEA_034	43	17	3	-	-	-	-	1	-	-	-	1	-	65
WEA_035	27	65	-	-	-	-	-	-	-	-	-	-	-	92
WEA_036	102	31	3	-	-	1	-	12	102	1	-	-	-	252
WEA_037	2	111	-	-	-	1	-	2	-	-	-	-	-	116
WEA_038	38	189	-	-	1	1	-	10	-	-	-	-	-	239
WEA_039	2	56	-	-	1	3	-	5	1	-	-	-	-	68
WEA_040	26	145	-	-	-	-	-	6	-	-	-	-	-	177
WEA_041	19	118	-	-	-	-	-	8	7	-	-	-	-	152

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Station	Annelida	Arthropoda	Chordata	Cnidaria	Echino- dermata	Ectoprocta	Hemichord- ata	Mollusca	Nematoda	Nemertea	Phoronida	Platyhelm- inthes	Sipuncula	Sample Abundance
WEA_042	104	21	8	-	3	-	-	2	74	2	-	-	-	214
WEA_043	6	188	-	-	-	1	-	2	-	-	-	-	-	197
WEA_044	10	87	-	-	-	1	-	-	-	-	-	-	-	98
WEA_045	17	73	-	-	-	1	-	24	1	1	-	1	-	118
WEA_046	37	120	-	-	-	-	-	4	-	1	-	-	-	162
WEA_047	51	19	1	-	-	-	-	6	41	2	-	1	-	121
WEA_048	19	115	-	-	-	-	-	1	14	-	-	-	-	149
WEA_049	1	185	-	-	-	5	-	3	-	-	-	-	-	194
WEA_050	4	125	-	-	-	1	-	3	-	-	-	-	-	133
WEA_051	107	28	-	-	4	-	-	8	172	1	-	-	-	320
WEA_052	57	33	3	-	1	-	-	1	13	4	-	-	1	113
WEA_053	4	122	-	-	-	2	-	-	-	1	-	-	-	129
WEA_054	6	112	-	-	-	1	-	-	1	-	-	-	-	120
WEA_055	2	118	-	-	-	1	-	1	-	-	-	-	-	122
WEA_056	8	49	-	-	-	1	-	4	-	-	-	-	-	62
WEA_057	3	224	-	-	-	1	-	1	-	-	-	-	-	229
WEA_058	11	47	-	1	-	-	-	-	-	-	-	-	-	59
WEA_059	15	64	-	-	-	7	-	1	-	-	1	-	-	88
WEA_060	13	121	-	-	-	-	-	2	-	-	-	-	-	136
WEA_061	12	40	-	-	-	-	-	15	-	2	-	-	-	69
WEA_062	3	251	-	-	-	2	-	8	-	-	-	-	-	264
Total Abundance (across all samples)	1,944	5,919	23	2	24	52	1	390	498	25	1	5	8	8,892

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Table 3-24. Abundance (per 0.05 m² sample) of each Phylum counted within each WH grab sample collected.

Station	Annelida	Arthropoda	Chordata	Cnidaria	Echino- dermata	Ectoprocta	Hemichord- ata	Mollusca	Nematoda	Nemertea	Phoronida	Platyhelm- inthes	Sipuncula	Sample Abundance
WH_001	12	138	1	-	-	-	-	3	6	-	-	-	-	160
WH_002	27	139	-	-	-	-	-	-	4	-	-	-	-	170
WH_003	10	156	-	-	-	-	-	4	-	-	-	-	-	170
WH_004	78	30	4	-	2	2	-	9	22	-	-	-	-	147
WH_005	33	77	-	-	-	-	-	12	8	-	-	-	-	130
WH_006	70	8	1	-	-	2	-	2	74	-	-	-	-	157
WH_007	24	15	4	-	-	-	-	-	32	-	-	-	-	75
WH_008	46	63	-	-	-	-	-	6	3	-	-	-	-	118
WH_009	11	164	-	-	1	-	-	1	-	1	-	-	-	178
WH_010	8	23	1	-	-	1	-	5	3	-	-	-	-	41
WH_011	159	39	-	-	1	4	-	1	23	-	-	-	-	227
WH_012	24	81	1	-	1	-	-	4	7	-	-	-	-	118
WH_013	7	168	-	-	-	-	-	2	-	-	-	-	-	177
WH_014	13	61	-	-	-	-	-	2	-	-	-	-	-	76
WH_015	71	73	-	-	-	-	-	17	4	-	-	-	-	165
WH_016	141	16	-	-	-	1	-	-	92	-	-	-	-	250
WH_017	16	13	-	-	-	-	-	1	-	-	-	-	-	30
WH_018	9	168	-	-	-	-	-	2	-	-	-	-	-	179
WH_019	56	7	-	-	-	-	-	1	-	-	-	-	-	64
WH_020	4	223	-	-	-	-	-	-	-	-	-	-	-	227
WH_021	10	31	-	-	-	1	-	3	8	-	-	-	-	53
WH_022	49	33	-	1	-	3	-	9	-	-	-	-	-	95
WH_024	31	79	-	-	-	-	-	22	1	1	-	-	-	134
WH_025	15	121	-	-	7	2	-	7	2	-	-	-	-	154
WH_026	46	88	-	-	-	-	-	16	3	-	-	-	-	153
WH_027	17	124	-	-	-	-	-	8	-	-	-	-	-	149
WH_028	4	35	1	-	-	1	-	3	9	-	-	-	-	53
WH_029	40	12	5	-	6	-	-	2	16	-	-	-	-	81
WH_030	11	117	-	-	-	1	-	1	-	-	-	-	-	130
WH_031	17	185	-	-	-	-	-	9	-	-	-	-	-	211
WH_032	12	65	-	-	-	-	-	6	-	2	-	-	-	85
WH_033	106	4	-	-	-	-	-	81	10	-	-	-	2	203
WH_034	18	65	-	-	-	-	-	-	1	-	-	-	-	84
WH_035	91	34	-	-	1	1	-	1	-	1	-	-	-	129
WH_036	92	31	-	1	-	3	-	6	1	-	-	-	-	134
WH_037	42	19	10	-	1	13	-	-	-	-	-	-	-	85
WH_038	43	41	1	-	-	12	-	1	34	12	-	-	-	144
WH_039	4	87	-	-	1	1	-	3	-	-	-	-	-	96
WH_040	12	120	-	-	1	-	-	-	-	-	-	-	-	133
WH_041	2	115	-	-	-	-	-	4	-	-	-	-	-	121
WH_042	144	5	-	-	-	-	-	60	7	-	-	-	-	216

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Station	Annelida	Arthropoda	Chordata	Cnidaria	Echino- dermata	Ectoprocta	Hemichord- ata	Mollusca	Nematoda	Nemertea	Phoronida	Platyhelm- inthes	Sipuncula	Sample Abundance
WH_043	29	43	-	-	-	-	-	48	-	-	-	-	2	122
WH_044	8	15	-	-	-	-	-	2	-	-	-	-	-	25
WH_045	89	7	3	-	2	-	-	3	80	1	-	-	-	185
WH_046	31	69	-	-	-	-	-	3	1	-	-	-	-	104
WH_047	22	16	-	-	-	2	-	2	-	-	-	-	-	42
WH_048	47	25	-	-	-	-	-	6	9	-	-	-	-	87
WH_049	30	48	-	-	-	-	-	1	1	-	-	-	-	80
WH_050	14	79	-	-	-	-	-	1	-	2	-	-	-	96
WH_051	27	54	1	-	-	-	-	3	4	-	-	-	-	89
WH_052	30	62	-	-	1	-	-	2	-	-	-	-	-	95
WH_053	74	33	7	-	2	-	-	5	49	9	-	-	-	179
WH_054	19	15	2	-	-	-	-	3	-	-	-	1	-	40
WH_055	4	58	1	-	-	-	-	5	1	-	-	-	-	69
WH_056	84	23	-	-	1	-	-	-	17	4	-	-	-	129
WH_057	10	127	-	-	-	-	-	2	1	-	-	-	-	140
WH_058	155	58	6	1	6	1	-	5	144	4	-	-	2	382
WH_059	24	38	1	-	-	1	-	2	9	-	-	-	-	75
WH_060	6	95	-	-	-	-	-	5	1	1	-	-	-	108
WH_061	30	65	-	-	1	-	-	6	-	-	-	-	-	102
WH_062	27	25	-	-	-	-	-	3	-	-	-	-	-	55
WH_063	6	92	-	-	-	-	-	1	-	1	-	-	-	100
WH_064	13	59	-	-	-	-	-	-	-	1	-	-	-	73
WH_065	7	124	-	-	-	2	-	3	1	-	-	1	-	138
WH_066	2	207	1	-	-	-	-	3	-	-	-	-	-	213
WH_067	16	66	-	-	-	-	-	15	-	-	-	-	-	97
Total Abundance (across all samples)	2,429	4,576	51	3	35	54	0	443	688	40	0	2	6	8,327

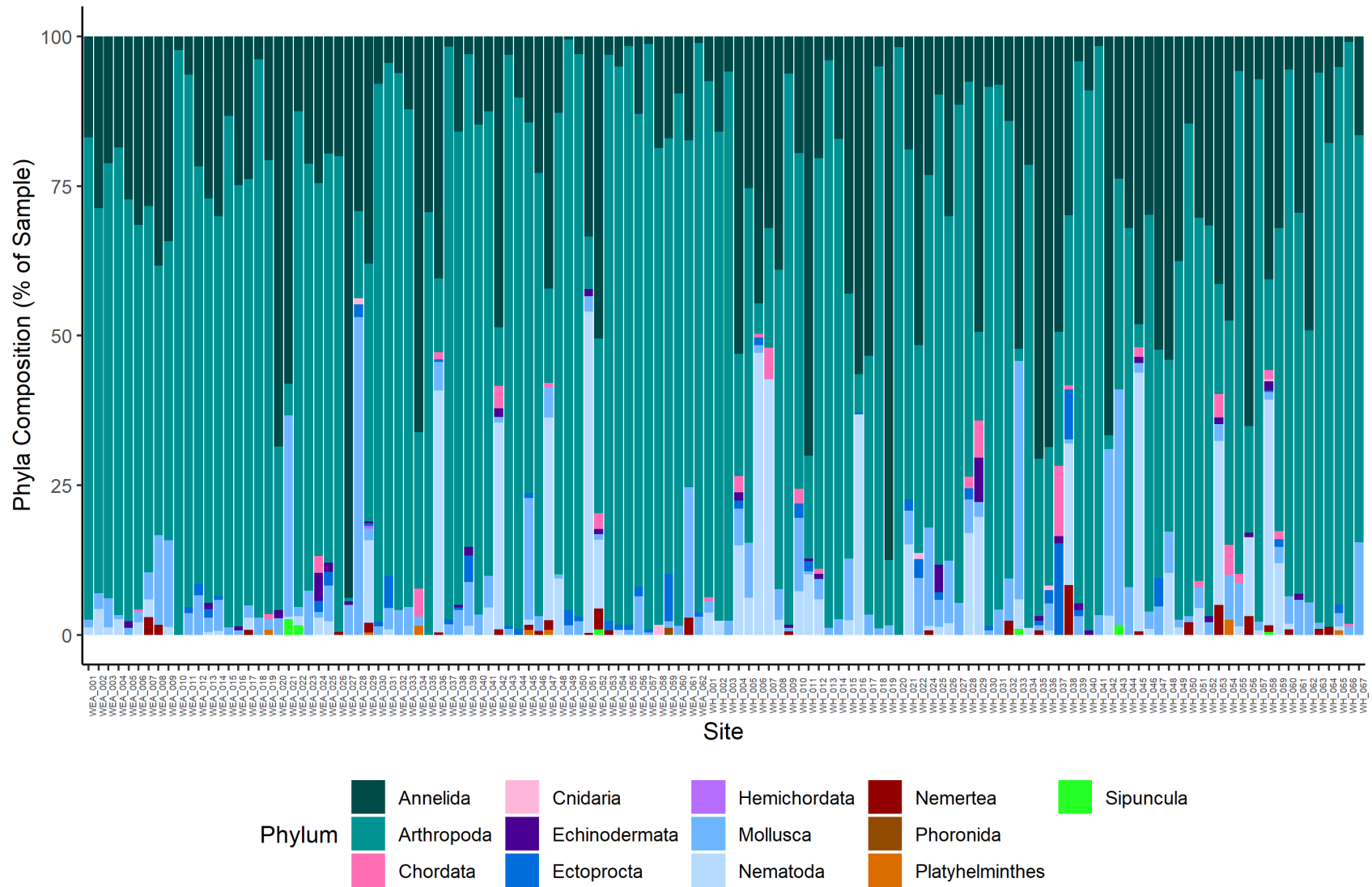


Figure 3-19. Percent composition of organisms in each represented phylum for the 128 WEA and WH benthic grab samples collected.

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Table 3-25. Abundance of each phylum and taxon (family or NLPTL) across all grab WEA and WH samples. Frequency of occurrence represents the percentage of WEA/WH samples that contained a particular family or NLPTL (continued on next two pages).

Phylum	Family or NLPTL	Abundance Across All Samples	Mean Sample Abundance per 0.05 m ²	Median Sample Abundance per 0.05 m ²	Frequency of Occurrence (% of WEA/WH samples)	
Annelida	Acrocirridae	2	<0.001	0	1%	
	Ampharetidae	88	0.7	0	32%	
	Capitellidae	7	0.1	0	5%	
	Chaetopteridae	4	<0.001	0	3%	
	Cirratulidae	507	4.0	1.5	66%	
	Dorvilleidae	113	0.9	0	19%	
	Eunicidae	1	<0.001	0	1%	
	Glyceridae	102	0.8	0	22%	
	Goniadidae	23	0.2	0	9%	
	Hesionidae	5	<0.001	0	3%	
	Lumbrineridae	212	1.7	0	42%	
	Magelonidae	4	<0.001	0	3%	
	Maldanidae	80	0.6	0	14%	
	Nephtyidae	195	1.5	1.0	55%	
	Nereididae	1	<0.001	0	1%	
	Oeonidae	25	0.2	0	15%	
	Oligochaeta	617	4.8	1.0	58%	
	Onuphidae	135	1.1	0	38%	
	Opheliidae	587	4.6	1.0	53%	
	Orbiniidae	275	2.1	1.0	52%	
	Oweniidae	1	<0.001	0	1%	
	Paraonidae	886	6.9	5.0	89%	
	Phyllodocidae	68	0.5	0	13%	
	Pilargidae	5	<0.001	0	3%	
	Poecilochaetidae	4	<0.001	0	2%	
	Polygordiidae	93	0.7	0	33%	
	Polynoidae	20	0.2	0	2%	
	Sabellariidae	1	<0.001	0	1%	
	Scalibregmatidae	5	<0.001	0	4%	
	Sigalionidae	25	0.2	0	12%	
Spionidae	166	1.3	0	48%		
Syllidae	95	0.7	0	21%		
Terebellidae	21	0.2	0	6%		
Arthropoda	Acari	1	<0.001	0	1%	
	Ampeliscidae	6,159	48.1	36.5	91%	
	Ampithoidae	1	<0.001	0	1%	
	Anthuridae	22	0.2	0	14%	
	Aoridae	43	0.3	0	16%	
	Bodotriidae	21	0.2	0	14%	
	Callianassidae	4	<0.001	0	2%	
	Cancridae	14	0.1	0	9%	
	Ceratopogonidae	1	<0.001	0	1%	
	Chaetiliidae	44	0.3	0	16%	
	Chironomidae	1	<0.001	0	1%	
	Cirolanidae	1	<0.001	0	1%	
	Corophiidae	1	<0.001	0	1%	
	Crangonidae	6	<0.001	0	5%	
	Decapoda	4	<0.001	0	3%	
	Diastylidae	9	0.1	0	7%	
	Gomphidae	10	0.1	0	1%	
	Haustoriidae	1,691	13.2	6.0	71%	
	Hepatidae	1	<0.001	0	1%	
	Hyperiidea	5	<0.001	0	3%	
	Idoteidae	7	0.1	0	4%	
	Ischyroceridae	2	<0.001	0	2%	
	Arthropoda	Leucosiidae	3	<0.001	0	2%
		Liljeborgiidae	40	0.3	0	20%

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Phylum	Family or NLPTL	Abundance Across All Samples	Mean Sample Abundance per 0.05 m ²	Median Sample Abundance per 0.05 m ²	Frequency of Occurrence (% of WEA/WH samples)
	Maeridae	2	<0.001	0	1%
	Melitidae	105	0.8	0	9%
	Mysidae	4	<0.001	0	2%
	Oedicerotidae	133	1.0	1.0	55%
	Ostracoda	171	1.3	0	48%
	Paguridae	167	1.3	0	40%
	Pasiphaeidae	22	0.2	0	16%
	Photidae	1	<0.001	0	1%
	Phoxocephalidae	1,570	12.3	10.0	98%
	Polybiidae	6	<0.001	0	5%
	Pontoporeiidae	98	0.8	0	25%
	Portunidae	1	<0.001	0	1%
	Stomatopoda	5	<0.001	0	4%
	Synopiidae	5	<0.001	0	4%
	Tanaissuidae	102	0.8	0	20%
	Unciolidae	11	0.1	0	5%
	Xanthoidea	1	<0.001	0	1%
Chordata	Branchiostomatidae	74	0.6	0	20%
Cnidaria	Actinaria	5	<0.001	0	4%
	Amphiuridae	2	<0.001	0	1%
	Asteroidea	1	<0.001	0	1%
Echinodermata	Echinarachniidae	4	<0.001	0	2%
	Echinodermata	43	0.3	0	16%
	Echinoidea	3	<0.001	0	2%
	Ophiuroidea	6	<0.001	0	2%
Ectoprocta	Cupuladriidae	106	0.8	0	35%
Hemichordata	Ptychoderidae	1	<0.001	0	1%
	Arcidae	1	<0.001	0	1%
	Astartidae	6	<0.001	0	4%
	Bivalvia	37	0.3	0	20%
	Caecidae	12	0.1	0	7%
	Calyptraeidae	15	0.1	0	9%
	Columbellidae	13	0.1	0	3%
	Crassatellidae	3	<0.001	0	2%
	Cylichnidae	2	<0.001	0	2%
	Gastropoda	5	<0.001	0	2%
	Lasaeidae	9	0.1	0	6%
	Lucinidae	51	0.4	0	8%
	Mactridae	7	0.1	0	5%
	Marginellidae	21	0.2	0	13%
Mollusca	Mytilidae	18	0.1	0	9%
	Nassariidae	26	0.2	0	18%
	Naticidae	7	0.1	0	5%
	Nuculidae	313	2.4	0	30%
	Olividae	1	<0.001	0	1%
	Pandoridae	14	0.1	0	7%
	Pharidae	2	<0.001	0	2%
	Pyramidellidae	47	0.4	0	9%
	Semelidae	100	0.8	0	28%
	Solemyidae	26	0.2	0	13%
	Solenidae	1	<0.001	0	1%
	Tellinidae	27	0.2	0	16%
	Ungulinidae	54	0.4	0	16%
	Veneridae	15	0.1	0	9%
Nematoda	Nematoda	1,186	9.3	0	48%
	Carinomidae	5	<0.001	0	3%
Nemertea	Emplectonematidae	1	<0.001	0	1%
	Lineidae	6	<0.001	0	5%
	Nemertea	53	0.4	0	13%
Phoronida	Phoronida	1	<0.001	0	1%
Platyhelminthes	Turbellaria	7	0.1	0	5%

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Phylum	Family or NLPTL	Abundance Across All Samples	Mean Sample Abundance per 0.05 m ²	Median Sample Abundance per 0.05 m ²	Frequency of Occurrence (% of WEA/WH samples)
Sipuncula	Sipuncula	14	0.1	0	5%

3.2.1.2.2 Richness, Diversity, and Evenness

The abundance of organisms per sample ranged from 25 organisms identified in WH_044 to 382 identified in WH_058 (Table 3-26 and Table 3-27). Taxonomic richness within individual samples ranged from 1.25 at station WEA_055 to 6.06 at station WH_058 (Figure 3-20). Diversity ranged from 0.27 at station WH_020, which contained 227 organisms from 11 families to 2.92 at station WH_054, which contained 40 organisms from 25 families. Evenness across the individual grab samples ranged from 0.12 at station WH_020 to .94 at WH_054. Richness, diversity, and evenness are indices that do not have units; however, higher values indicate greater amounts of richness, diversity, or evenness in each sample.

Table 3-26. Community composition parameters calculated for each WEA grab sample station (1 of 2).

Station	Sample Abundance (per 0.05 m ²)	Number of NLPTLs	Number of Families (or NLPTL)	Ecological Indices		
				Richness	Diversity	Evenness
WEA_001	160	16	14	2.56	1.46	0.55
WEA_002	115	17	15	2.95	1.76	0.65
WEA_003	165	20	16	2.94	1.90	0.69
WEA_004	151	20	14	2.59	1.91	0.72
WEA_005	88	18	14	2.90	1.91	0.72
WEA_006	235	26	18	3.11	1.77	0.61
WEA_007	67	17	15	3.33	2.18	0.81
WEA_008	60	21	16	3.66	2.50	0.90
WEA_009	76	22	18	3.93	2.24	0.77
WEA_010	177	12	11	1.93	0.75	0.31
WEA_011	110	14	12	2.34	1.08	0.44
WEA_012	106	28	22	4.50	2.05	0.66
WEA_013	207	31	24	4.31	1.67	0.53
WEA_014	153	31	24	4.57	2.32	0.73
WEA_015	166	21	15	2.74	1.66	0.61
WEA_016	137	24	17	3.25	2.23	0.79
WEA_017	243	24	20	3.46	1.79	0.60
WEA_018	105	12	9	1.72	1.38	0.63
WEA_019	116	21	21	4.21	1.64	0.54
WEA_020	73	26	20	4.43	2.50	0.84
WEA_021	229	38	26	4.60	2.46	0.75
WEA_022	64	17	13	2.89	1.59	0.62
WEA_023	108	22	19	3.84	2.22	0.75
WEA_024	106	17	15	3.00	1.66	0.61
WEA_025	133	30	23	4.50	2.35	0.75
WEA_026	205	20	14	2.44	1.60	0.61
WEA_027	161	31	20	3.74	1.80	0.60
WEA_028	96	26	22	4.60	2.26	0.73
WEA_029	253	40	34	5.96	2.47	0.70
WEA_030	139	20	15	2.84	1.34	0.49
WEA_031	112	17	14	2.76	1.64	0.62
WEA_032	146	15	11	2.01	1.53	0.64
WEA_033	172	21	16	2.91	1.79	0.65
WEA_034	65	21	18	4.07	2.38	0.82
WEA_035	92	15	11	2.21	1.41	0.59
WEA_036	252	26	23	3.98	1.94	0.62
WEA_037	116	12	10	1.89	1.08	0.47
WEA_038	239	26	20	3.47	1.78	0.59

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Station	Sample Abundance (per 0.05 m ²)	Number of NLPTLs	Number of Families (or NLPTL)	Ecological Indices		
				Richness	Diversity	Evenness
WEA_039	68	18	15	3.32	2.15	0.80
WEA_040	177	24	19	3.48	1.84	0.62
WEA_041	152	21	17	3.18	1.77	0.62
WEA_042	214	28	22	3.91	2.14	0.69
WEA_043	197	17	13	2.27	1.01	0.39
WEA_044	98	16	11	2.18	1.38	0.58
WEA_045	118	23	22	4.40	2.28	0.74
WEA_046	162	24	20	3.73	1.83	0.61
WEA_047	121	27	25	5.00	2.31	0.72
WEA_048	149	22	18	3.40	1.42	0.49
WEA_049	194	11	9	1.52	1.07	0.49
WEA_050	133	16	15	2.86	1.40	0.52
WEA_051	320	35	31	5.20	2.00	0.58
WEA_052	113	29	25	5.08	2.72	0.85
WEA_053	129	13	12	2.26	1.04	0.42
WEA_054	120	11	7	1.25	0.75	0.39
WEA_055	122	14	11	2.08	0.97	0.40
WEA_056	62	19	16	3.63	2.09	0.75
WEA_057	229	14	12	2.02	1.04	0.42
WEA_058	59	15	12	2.70	1.65	0.66
WEA_059	88	19	15	3.13	1.95	0.72
WEA_060	136	13	12	2.24	1.53	0.62
WEA_061	69	24	23	5.20	2.60	0.83
WEA_062	264	23	20	3.41	1.28	0.43

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Table 3-27. Community composition parameters calculated for each WH grab sample station.

Station	Sample Abundance (per 0.05 m ²)	Number of NLPTLs	Number of Families (or NLPTL)	Ecological Indices		
				Richness	Diversity	Evenness
WH_001	160	20	15	2.76	1.34	0.50
WH_002	170	14	11	1.95	1.60	0.67
WH_003	170	17	15	2.73	1.47	0.54
WH_004	147	33	26	5.01	2.82	0.87
WH_005	130	25	18	3.49	2.07	0.72
WH_006	157	29	24	4.55	2.04	0.64
WH_007	75	19	17	3.71	2.22	0.78
WH_008	118	19	16	3.14	2.08	0.75
WH_009	178	16	13	2.32	1.46	0.57
WH_010	41	19	18	4.58	2.61	0.90
WH_011	227	30	23	4.06	2.35	0.75
WH_012	118	26	20	3.98	1.90	0.64
WH_013	177	13	11	1.93	0.67	0.28
WH_014	76	20	15	3.23	1.97	0.73
WH_015	165	30	20	3.72	2.38	0.79
WH_016	250	28	22	3.80	2.01	0.65
WH_017	30	18	12	3.23	2.33	0.94
WH_018	179	12	9	1.54	1.24	0.57
WH_019	64	23	18	4.09	2.08	0.72
WH_020	227	11	9	1.47	0.27	0.12
WH_021	53	20	18	4.28	2.46	0.85
WH_022	95	30	23	4.83	2.58	0.82
WH_024	134	28	19	3.68	1.97	0.67
WH_025	154	29	24	4.57	2.15	0.68
WH_026	153	30	25	4.77	2.33	0.73
WH_027	149	20	17	3.20	1.63	0.58
WH_028	53	19	13	3.02	2.04	0.80
WH_029	81	16	15	3.19	2.30	0.85
WH_030	130	20	13	2.47	1.41	0.55
WH_031	211	20	17	2.99	1.43	0.51
WH_032	85	21	17	3.60	2.28	0.80
WH_033	203	33	23	4.14	2.46	0.78
WH_034	84	14	12	2.48	1.77	0.71
WH_035	129	19	16	3.09	1.97	0.71
WH_036	134	30	23	4.49	2.75	0.88
WH_037	85	18	17	3.60	2.07	0.73
WH_038	144	28	25	4.83	2.56	0.80
WH_039	96	15	12	2.41	0.87	0.35
WH_040	133	14	12	2.25	1.19	0.48
WH_041	121	12	11	2.09	1.15	0.48
WH_042	216	33	24	4.28	2.51	0.79
WH_043	122	29	22	4.37	2.47	0.80
WH_044	25	12	11	3.11	2.07	0.86
WH_045	185	35	29	5.36	2.19	0.65
WH_046	104	19	18	3.66	1.87	0.65
WH_047	42	20	16	4.01	2.41	0.87
WH_048	87	29	24	5.15	2.88	0.91
WH_049	80	19	15	3.19	2.00	0.74
WH_050	96	17	16	3.29	1.55	0.56
WH_051	89	22	19	4.01	2.42	0.82
WH_052	95	23	17	3.51	1.74	0.61
WH_053	179	33	29	5.40	2.64	0.78
WH_054	40	25	22	5.69	2.92	0.94

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Station	Sample Abundance (per 0.05 m ²)	Number of NLPTLs	Number of Families (or NLPTL)	Ecological Indices		
				Richness	Diversity	Evenness
WH_055	69	14	13	2.83	2.02	0.79
WH_056	129	25	21	4.12	2.38	0.78
WH_057	140	23	18	3.44	1.52	0.53
WH_058	382	51	37	6.06	2.47	0.69
WH_059	75	23	19	4.17	2.38	0.81
WH_060	108	16	12	2.35	1.66	0.67
WH_061	102	26	20	4.11	2.32	0.77
WH_062	55	20	17	3.99	2.29	0.81
WH_063	100	15	12	2.39	1.23	0.50
WH_064	73	16	12	2.56	1.50	0.60
WH_065	138	22	15	2.84	1.50	0.55
WH_066	213	17	12	2.05	0.92	0.37
WH_067	97	19	18	3.72	1.93	0.67

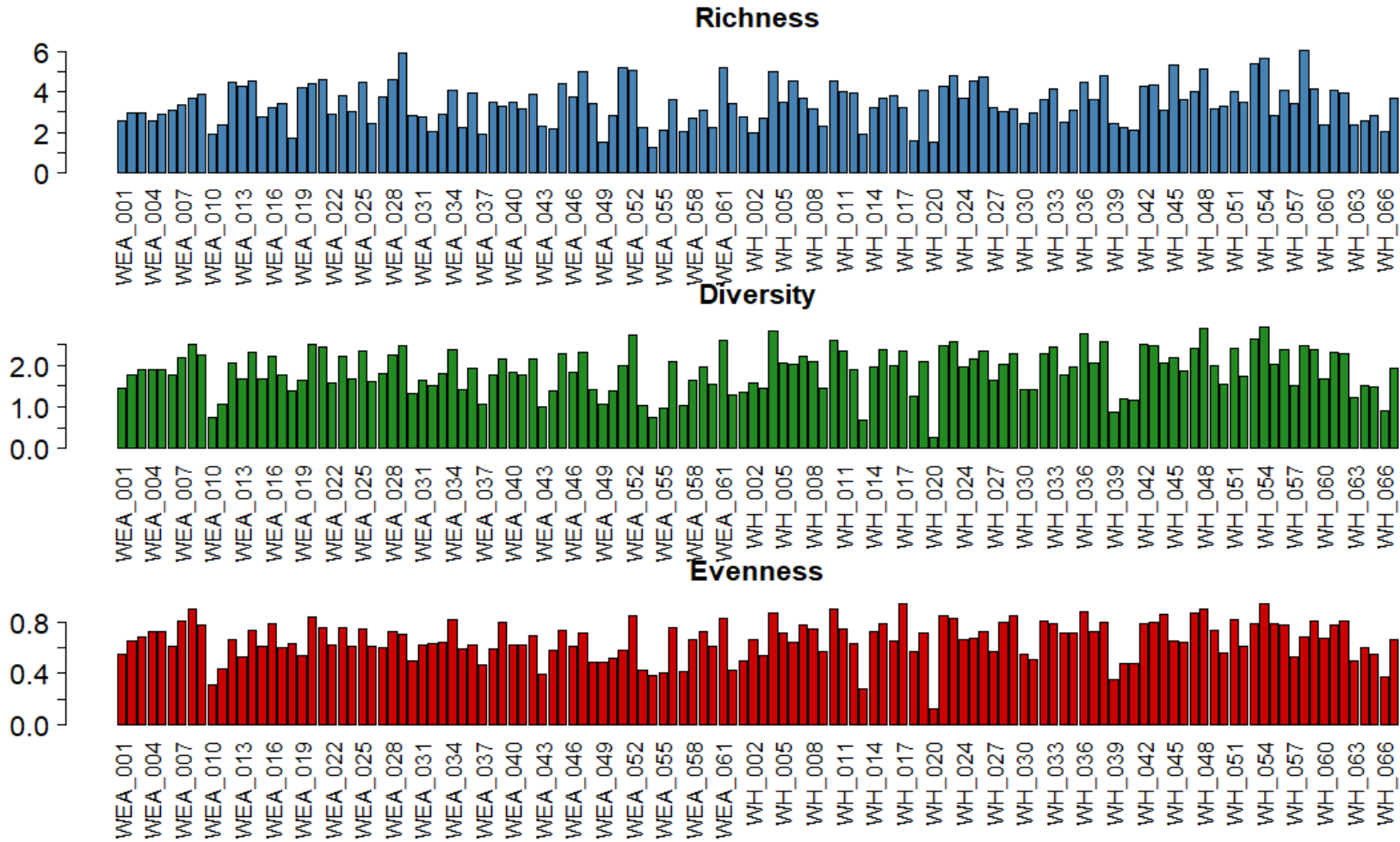


Figure 3-20. Ecological index values calculated for each sample station in the WEA and WH project areas.

3.2.2 Export Cable Corridor

The characteristics and locations of the 72 stations at which grab samples were obtained are described in Table 3-28 and shown in Figure 3-8.

Table 3-28. Location and characteristics of grab samples collected in the project area (continued on next page).

Sample	Date (UTC)	Time (UTC)	Latitude (°N)	Longitude (°W)	Water Depth (m)	Sample Penetration Depth (mm)
ECC_001	10/16/2020	16:54	36.468385	-75.334789	26	75
ECC_002	10/16/2020	11:08	36.475923	-75.355191	34	110
ECC_003	10/16/2020	6:43	36.483372	-75.375458	25	86
ECC_004	10/16/2020	4:14	36.490763	-75.395804	24	65
ECC_005	10/15/2020	4:30	36.498238	-75.416165	32	85
ECC_006	10/15/2020	7:11	36.505739	-75.436505	26	68
ECC_007	10/15/2020	8:55	36.513227	-75.456824	28	83
ECC_008	10/15/2020	11:56	36.520682	-75.477027	28	70
ECC_009	10/15/2020	15:01	36.528156	-75.497459	27	65
ECC_010	10/14/2020	23:42	36.535547	-75.517854	27	70
ECC_011	10/15/2020	19:58	36.542942	-75.538074	27	68
ECC_012	10/16/2020	1:00	36.550426	-75.558471	23	63
ECC_013	11/8/2020	4:20	36.557333	-75.577806	27	80
ECC_014	11/8/2020	9:03	36.565287	-75.599239	21	64
ECC_015	11/8/2020	10:41	36.571763	-75.619327	22	81
ECC_016	11/8/2020	12:05	36.576137	-75.641030	23	65
ECC_017	11/8/2020	15:38	36.580560	-75.662608	21	85
ECC_018	11/8/2020	19:43	36.584979	-75.684361	21	69
ECC_019	11/9/2020	0:23	36.589364	-75.706048	21	69
ECC_020	11/9/2020	2:28	36.593724	-75.727737	21	68
ECC_021	11/9/2020	3:00	36.603194	-75.746388	22	93
ECC_022	11/9/2020	5:27	36.615420	-75.762816	23	95
ECC_023	11/9/2020	8:25	36.627601	-75.779350	21	70
ECC_024	11/9/2020	11:31	36.639749	-75.795834	17	75
ECC_025	11/9/2020	13:18	36.651981	-75.812359	18	71
ECC_026	11/13/2020	21:50	36.664351	-75.828881	18	60
ECC_027	11/13/2020	23:18	36.676342	-75.845255	17	70
ECC_028	11/16/2020	8:25	36.688521	-75.861867	14	63
ECC_029	11/14/2020	5:37	36.700732	-75.878376	14	61
ECC_030	11/14/2020	7:32	36.712916	-75.894929	13	55
ECC_031	11/14/2020	8:22	36.725055	-75.911432	12	75
EH_001	11/14/2020	8:56	36.734533	-75.923211	12	80
EH_002	11/14/2020	6:42	36.708871	-75.885589	14	30
EH_003	11/16/2020	7:50	36.695651	-75.883500	14	30
EH_004	10/14/2020	15:41	36.708205	-75.873336	13.5	63
EH_005	11/14/2020	3:01	36.699425	-75.867463	14	98
EH_006	11/14/2020	0:06	36.670898	-75.851314	72	72
EH_007	11/14/2020	1:22	36.684209	-75.845280	17	70
EH_008	11/14/2020	10:41	36.666654	-75.818392	19	50
EH_009	11/16/2020	9:18	36.661795	-75.812612	18	35
EH_010	11/9/2020	12:46	36.648807	-75.802961	19	65
EH_011	11/9/2020	10:55	36.636882	-75.787168	18	90
EH_012	11/9/2020	9:02	36.627039	-75.781901	20	75
EH_013	11/9/2020	9:32	36.626235	-75.784581	20	100
EH_014	11/9/2020	7:08	36.617092	-75.773228	22	55
EH_015	11/9/2020	7:39	36.629606	-75.772528	22	78

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Sample	Date (UTC)	Time (UTC)	Latitude (°N)	Longitude (°W)	Water Depth (m)	Sample Penetration Depth (mm)
EH_016	11/9/2020	6:06	36.619415	-75.760155	21	70
EH_017	11/9/2020	3:53	36.611206	-75.757181	22	89
EH_018	11/9/2020	3:29	36.610027	-75.752238	20	86
EH_019	11/9/2020	2:00	36.596141	-75.719375	19	70
EH_020	11/9/2020	1:30	36.592121	-75.713906	23	79
EH_021	11/8/2020	21:03	36.587109	-75.689018	23	72
EH_022	11/8/2020	23:07	36.591262	-75.684360	19	85
EH_023	11/8/2020	18:21	36.584765	-75.668109	24	75
EH_024	11/8/2020	14:23	36.572628	-75.638948	20	80
EH_025	11/8/2020	13:19	36.573782	-75.642041	23	70
EH_026	11/8/2020	7:38	36.556836	-75.594342	24	50
EH_027	11/8/2020	6:14	36.562776	-75.583108	26	50
EH_028	10/15/2020	23:44	36.556843	-75.557874	27	52
EH_029	10/15/2020	21:57	36.550892	-75.546736	24	86
EH_030	10/15/2020	18:33	36.548332	-75.533028	28	70
EH_031	10/15/2020	17:25	36.541449	-75.531179	23.5	90
EH_032	10/15/2020	16:13	36.530429	-75.515695	23	72
EH_033	10/15/2020	13:12	36.525283	-75.486149	28	70
EH_034	10/15/2020	10:31	36.515504	-75.449298	26	100
EH_035	10/15/2020	5:58	36.503550	-75.411670	33	40
EH_036	10/16/2020	5:31	36.484469	-75.384473	21	70
EH_037	10/16/2020	7:58	36.478891	-75.368210	30	90
EH_038	10/16/2020	12:40	36.480972	-75.349788	35	50
EH_039	10/16/2020	9:45	36.478901	-75.354476	33	64
EH_040	10/16/2020	14:11	36.474473	-75.347027	34	75
EH_041	10/16/2020	15:29	36.472203	-75.342151	25	75

3.2.2.1 Sediment Analysis

The following section presents grab sample grain size composition results from the GeoTesting lab analysis. The grain size data in Section 3.2.1.1 conform to the Wentworth Soil Classification System, which aligns with the NMFS modified CMECS classifications (NMFS, 2021). The cutoff for gravel for CMECS (> 2 mm sieve size) is captured in the grain size analysis. The majority of the 72 grab sample stations in the WEA/WH were fine with 82% of samples sand or finer (Table 3-29, Figure 3-21). Gravel percent composition ranged from 0 – 53% of each sample (mean of 5.3%), with all gravel being in the pebble granule size range (2 – 64 mm) and no cobble or boulder was detected. Percentage of silt and clay (< 0.063 mm) ranged from 1 – 51% of each sample (mean of 5.7%), with only one sample (EH_001) containing ≥ 30% silt and clay.

Only 1 of the 72 ECC samples had non-detectable Total Organic Carbon levels below 0.2%, and the other samples had a wide range from 0.37 – 9.67% and an average of 1.42% TOC. Forty-nine percent of samples were above 1%, and only two samples were above 5%. These two samples were gravelly or gravel mixes, and in general samples containing gravel also had higher TOC levels.

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Table 3-29. Grain size composition from grab samples collected in the ECC and EH sampling areas. (Continued on next page)

Station	Boulder % (256-4096 mm)	Cobble % (64-256 mm)	Pebble / Granule % (2-64 mm)	Very Coarse / Coarse Sand % (0.5- 2 mm)	Medium Sand % (0.25-0.5 mm)	Fine / Very Fine Sand % (0.063- 0.25mm)	Mud % < 0.063 mm	Total Organic Carbon ¹ (%) ²
ECC_001	0	0	1	9	53	35	2	0.73
ECC_002	0	0	0	2	25	70	3	0.6
ECC_003	0	0	0	3	13	81	3	0.58
ECC_004	0	0	0	1	9	88	2	0.5
ECC_005	0	0	0	1	5	89	5	1.32
ECC_006	0	0	0	1	2	94	3	1.24
ECC_007	0	0	0	1	11	85	3	1.71
ECC_008	0	0	0	0	2	94	4	1.2
ECC_009	0	0	0	1	4	90	5	1.27
ECC_010	0	0	0	1	5	92	2	1.43
ECC_011	0	0	0	1	12	83	4	1.4
ECC_012	0	0	0	0	25	70	5	1.02
ECC_013	0	0	0	0	19	75	6	3.96
ECC_014	0	0	0	1	13	84	2	1.29
ECC_015	0	0	0	0	4	93	3	0.98
ECC_016	0	0	0	0	3	91	6	0.9
ECC_017	0	0	0	0	22	76	2	0.66
ECC_018	0	0	0	1	10	86	3	0.77
ECC_019	0	0	0	0	4	93	3	0.61
ECC_020	0	0	0	1	34	63	2	0.52
ECC_021	0	0	2	5	31	58	4	0.76
ECC_022	0	0	10	40	43	3	4	1.06
ECC_023	0	0	0	4	35	56	5	0.67
ECC_024	0	0	1	54	38	4	3	0.8
ECC_025	0	0	23	46	6	14	11	ND
ECC_026	0	0	17	13	9	55	6	0.83
ECC_027	0	0	37	18	17	16	12	0.8
ECC_028	0	0	22	46	17	8	7	2.75
ECC_029	0	0	4	54	33	4	5	1.17
ECC_030	0	0	0	0	1	88	11	1.63
ECC_031	0	0	0	1	1	88	10	0.66
EH_001	0	0	0	0	0	49	51	4.55
EH_002	0	0	13	29	28	19	11	1.41
EH_003	0	0	39	13	7	33	8	3.44
EH_004	0	0	0	3	16	76	5	1.22
EH_005	0	0	0	2	6	85	7	0.69
EH_006	0	0	1	5	57	34	3	0.53
EH_007	0	0	1	6	27	60	6	0.89
EH_008	0	0	53	10	4	20	13	0.79
EH_009	0	0	36	17	17	18	12	2.98
EH_010	0	0	21	21	12	29	17	2.28
EH_011	0	0	1	22	44	30	3	0.65
EH_012	0	0	0	1	5	89	5	0.8
EH_013	0	0	1	0	10	82	7	1.49
EH_014	0	0	1	17	24	52	6	1.04
EH_015	0	0	0	1	12	80	7	0.99
EH_016	0	0	2	19	72	4	3	1.71
EH_017	0	0	0	1	31	60	8	1.16
EH_018	0	0	0	1	19	77	3	0.59

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Station	Boulder % (256-4096 mm)	Cobble % (64-256 mm)	Pebble / Granule % (2-64 mm)	Very Coarse / Coarse Sand % (0.5- 2 mm)	Medium Sand % (0.25-0.5 mm)	Fine / Very Fine Sand % (0.063- 0.25mm)	Mud % < 0.063 mm	Total Organic Carbon ¹ (%) ²
EH_019	0	0	0	1	31	65	3	0.6
EH_020	0	0	1	2	11	72	14	1.26
EH_021	0	0	0	1	6	88	5	0.8
EH_022	0	0	0	1	6	91	2	0.5
EH_023	0	0	0	0	12	84	4	0.68
EH_024	0	0	0	0	14	84	2	0.37
EH_025	0	0	0	0	10	87	3	1.08
EH_026	0	0	26	35	20	15	4	9.67
EH_027	0	0	29	51	13	5	2	4.49
EH_028	0	0	1	5	45	46	3	1.59
EH_029	0	0	0	0	16	82	2	1.31
EH_030	0	0	1	1	9	86	3	1.28
EH_031	0	0	0	2	22	74	2	0.9
EH_032	0	0	1	0	13	83	3	1.54
EH_033	0	0	0	0	1	94	5	1.61
EH_034	0	0	0	0	13	83	4	0.53
EH_035	0	0	3	12	59	23	3	1.9
EH_036	0	0	0	1	15	81	3	0.64
EH_037	0	0	0	1	3	92	4	0.91
EH_038	0	0	28	45	11	6	10	5.8
EH_039	0	0	3	34	38	21	4	0.92
EH_040	0	0	1	59	27	10	3	0.68
EH_041	0	0	1	19	39	40	1	0.61

¹ND is non-detectable levels below 0.2 %

²Percent by weight after drying

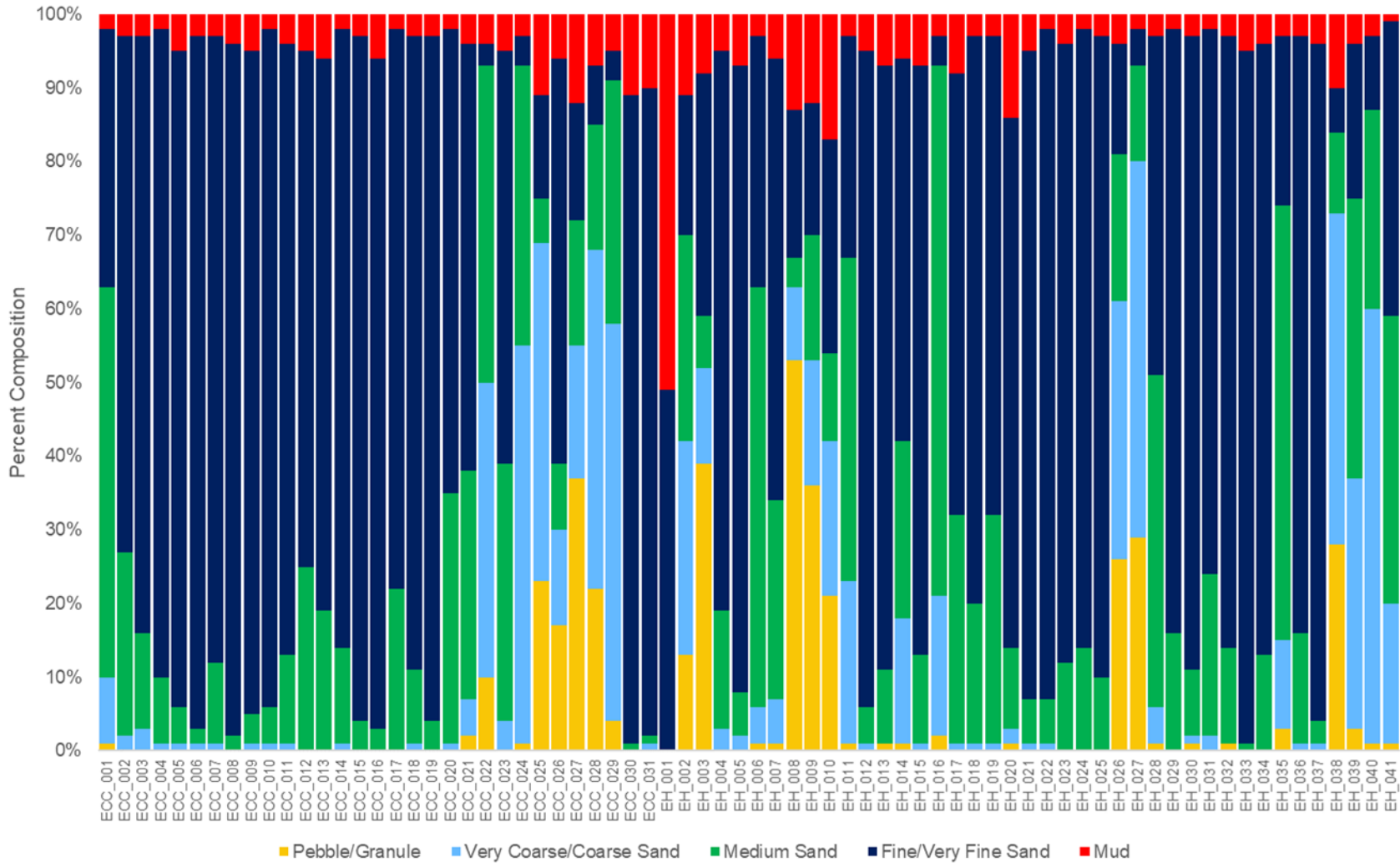


Figure 3-21. Grain size composition (as defined by NMFS [2021] modified CMECS substrate classifications) at each grab sample station collected in the ECC and EH sampling areas. No boulder or cobble was present in any samples.

3.2.2.2 Benthic Community Analysis

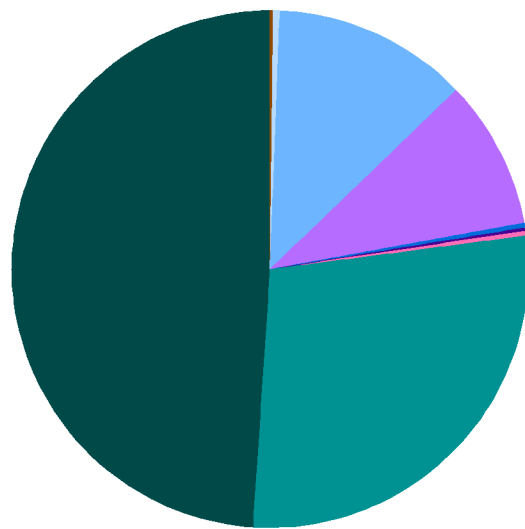
3.2.2.2.1 Taxonomic Composition

Grab samples were attempted at 72 sample locations within the ECC for infaunal macroinvertebrate analysis. Of the 72 stations, two (EH_003 and 009) were technical failures (grab sampler less than 50% full). However, these samples were still accepted upon request of Client Representative. The two grab stations where insufficient amounts of sediment were obtained were a result of coarse/hard bottom sediments preventing full closure of grab sampler bucket. The 72 successful grab samples yielded a total of 13,040 individual macroinvertebrates (per all 72 0.05 m² samples). Organisms collected in this survey area were from 13 unique phyla, 118 families or NLPTL, and 247 species or NLPTL (Table 3-30). The Phyla Annelida, Arthropoda, Nematoda, and Mollusca dominated the abundance in samples, representing 99% of all organisms when combined, while Annelida, Arthropoda, and Mollusca dominated in unique taxa, together representing 94% of the taxa identified (Figure 3-22).

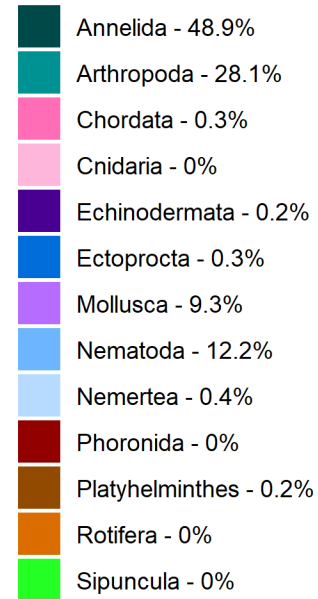
Table 3-30. Phyla present in the 72 ECC and EH benthic grab samples collected.

Phylum	Abundant Taxonomic Groups (common names)	Sample Abundance (per all 0.05 m ² samples)	Number of Families (or NLPTL)	Number of Species (or NLPTL)
Annelida	Polychaete worms (segmented and bamboo worms)	6,373	36	120
Arthropoda	Amphipods, calanoid copepods, ostracods	3,670	39	65
Chordata	Lancelets	45	1	1
Cnidaria	Hydroid	2	1	1
Echinodermata	Sand dollars, sea cucumbers	25	3	4
Ectoprocta	Bryozoans	35	1	1
Mollusca	Nut clams	1,219	28	46
Nematoda	Nematodes	1,593	1	1
Nemertea	Ribbon worms	55	4	4
Phoronida	Horseshoe worms	1	1	1
Platyhelminthes	Flatworms	20	1	1
Rotifera	Rotifers	1	1	1
Sipuncula	Peanut worms	1	1	1
Totals		13,040	118	247

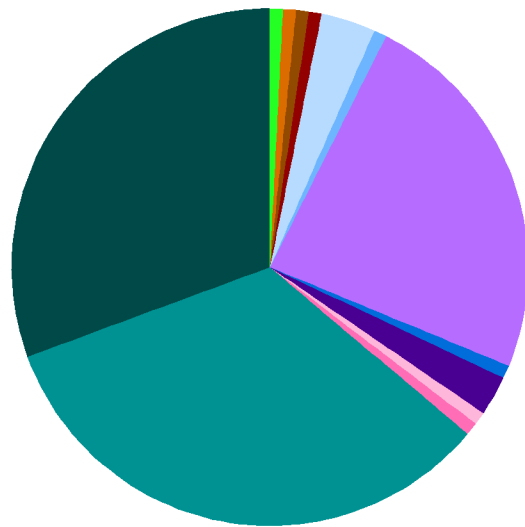
A.



Phylum



B.



Phylum

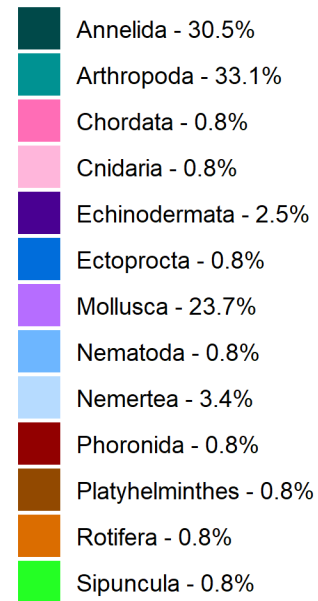


Figure 3-22. (top) Proportional abundance and B. (bottom) proportion of unique taxa (family or NLPTL) for each phylum collected in all ECC and EH benthic grab samples. Results presented as percentage of total.

Abundance across the 72 benthic grab samples ranged from 41 organisms in both EH_004 and EH_025 to 877 in ECC_029. Data for abundance by phylum is presented in Table 3-31 for ECC samples and Table 3-32 for EH samples. The percent composition of each sample by phyla is also shown in Figure 3-23 and abundance of unique taxa is presented in Table 3-33.

The highest number of families or NLPTL identified was 41 in sample EH_021 and the lowest was 8 in EH_010. The highest number of species or NLPTL identified was 58 in stations ECC_025, ECC_027, and ECC_009 whereas the lowest was 11 in samples ECC_002 and EH_036. The most abundant families were members of the most abundant phyla: Ampeliscidae amphipods of Arthropoda, nematode worms of Nematoda, and Spionidae worms of Polychaeta. Together these families made up 36% of all organisms identified within the EH and ECC areas (4,686 of 13,040 organisms; Table 3-33).

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Table 3-31. Abundance (per 0.05 m² sample) of each Phylum counted within each ECC grab sample collected.

Station	Annelida	Arthropoda	Chordata	Cnidaria	Echino- dermata	Ectoprocta	Mollusca	Nematoda	Nemertea	Phoronida	Platyhelm- inthes	Rotifera	Sipuncula	Sample Abundance
ECC_001	5	134	-	-	-	-	8	-	-	-	-	-	-	147
ECC_002	10	139	-	-	-	-	2	-	-	-	-	-	-	151
ECC_003	7	161	-	-	-	-	-	-	-	-	-	-	-	168
ECC_004	13	126	-	1	-	-	4	-	-	-	-	-	-	144
ECC_005	81	85	-	-	-	1	3	2	-	-	-	-	-	172
ECC_006	53	202	-	-	-	-	6	2	-	-	-	-	-	263
ECC_007	124	18	-	-	-	-	1	-	1	-	-	-	-	144
ECC_008	87	102	-	-	-	-	11	5	1	-	-	-	-	206
ECC_009	65	104	-	-	-	-	45	1	-	-	1	-	-	216
ECC_010	36	36	-	-	-	1	69	-	1	1	-	-	-	144
ECC_011	29	32	-	-	-	2	10	-	-	-	1	-	-	74
ECC_012	12	189	-	-	-	-	72	-	-	-	-	-	-	273
ECC_013	73	17	-	-	-	-	4	-	3	-	-	-	-	97
ECC_014	18	83	-	-	-	-	2	-	-	-	-	-	-	103
ECC_015	34	30	-	-	-	-	8	-	-	-	-	-	-	72
ECC_016	43	9	-	-	1	1	13	1	-	-	-	-	-	68
ECC_017	15	45	-	-	-	-	5	-	1	-	-	-	-	66
ECC_018	38	32	1	-	-	-	8	-	-	-	-	-	-	79
ECC_019	30	23	-	-	-	-	2	-	1	-	-	-	-	56
ECC_020	13	41	-	-	-	3	4	3	-	-	-	-	-	64
ECC_021	100	20	1	-	-	1	7	30	-	-	-	-	-	159
ECC_022	256	3	1	-	-	-	3	110	-	-	-	-	-	373
ECC_023	52	9	-	-	-	1	12	19	-	-	-	-	-	93
ECC_024	209	8	9	1	-	-	5	96	1	-	-	-	-	329
ECC_025	385	21	-	-	1	-	204	129	-	-	-	-	-	740
ECC_026	99	9	-	-	-	-	-	20	-	-	2	-	-	130
ECC_027	236	28	-	-	-	-	14	119	6	-	-	-	-	403
ECC_028	277	29	-	-	-	-	6	82	-	-	-	-	-	394
ECC_029	409	5	2	-	-	-	1	459	-	-	1	-	-	877
ECC_030	243	12	-	-	-	-	3	-	1	-	-	-	-	259
ECC_031	134	3	-	-	-	-	7	-	-	-	-	-	-	144
Total	3,186	1,755	14	2	2	10	539	1078	16	1	5	-	-	6,608

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Table 3-32. Abundance (per 0.05 m² sample) of each Phylum counted within each EH grab sample collected.

Station	Annelida	Arthropoda	Chordata	Cnidaria	Echino- dermata	Ectoprocta	Mollusca	Nematoda	Nemertea	Phoronida	Platyhelm- inthes	Rotifera	Sipuncula	Sample Abundance
EH_001	102	-	-	-	-	-	6	1	1	-	-	1	-	111
EH_002	105	15	-	-	-	-	11	45	3	-	-	-	-	179
EH_003	122	24	-	-	1	-	34	24	-	-	-	-	-	205
EH_004	20	19	-	-	-	-	1	-	-	-	1	-	-	41
EH_005	55	4	1	-	-	-	1	-	-	-	-	-	-	61
EH_006	21	6	1	-	-	-	5	7	2	-	-	-	-	42
EH_007	51	8	-	-	-	-	3	12	-	-	-	-	-	74
EH_008	396	66	-	-	-	-	46	44	9	-	1	-	-	562
EH_009	265	38	-	-	1	-	18	52	1	-	1	-	-	376
EH_010	86	27	-	-	-	-	35	33	-	-	-	-	-	181
EH_011	99	97	1	-	2	-	4	47	1	-	-	-	-	251
EH_012	60	3	-	-	-	-	20	2	-	-	-	-	-	85
EH_013	57	6	-	-	-	-	25	-	1	-	-	-	-	89
EH_014	82	8	-	-	1	-	2	32	-	-	-	-	-	125
EH_015	70	15	-	-	-	3	17	2	-	-	-	-	1	108
EH_016	194	64	11	-	-	-	2	82	-	-	-	-	-	353
EH_017	38	7	-	-	-	5	23	-	-	-	-	-	-	73
EH_018	20	28	-	-	1	-	6	-	1	-	-	-	-	56
EH_019	7	70	-	-	1	1	2	-	-	-	-	-	-	81
EH_020	98	9	-	-	-	4	5	5	-	-	-	-	-	121
EH_021	65	3	-	-	-	1	6	2	-	-	-	-	-	77
EH_022	15	56	-	-	-	-	6	1	-	-	-	-	-	78
EH_023	54	14	-	-	-	2	15	6	1	-	-	-	-	92
EH_024	5	62	-	-	-	-	2	-	-	-	-	-	-	69
EH_025	18	16	-	-	-	1	6	-	-	1	-	-	-	41
EH_026	254	52	1	-	10	1	80	57	14	-	10	-	-	479
EH_027	80	28	4	-	6	-	6	8	3	-	-	-	-	135
EH_028	148	20	1	-	-	-	47	5	-	-	-	-	-	221
EH_029	56	43	-	-	-	-	44	1	-	-	-	-	-	144
EH_030	148	24	-	-	-	3	42	-	-	-	-	-	-	217
EH_031	18	52	-	-	-	-	39	-	-	-	-	-	-	109
EH_032	56	33	-	-	-	3	46	4	-	-	-	-	-	142
EH_033	74	88	1	-	-	-	45	1	2	-	-	-	-	211
EH_034	18	183	-	-	-	-	7	-	-	-	-	-	-	208
EH_035	38	29	1	-	-	-	10	3	-	-	-	-	-	81
EH_036	3	95	-	-	-	-	3	-	-	-	-	-	-	101
EH_037	36	387	-	-	-	-	1	-	-	-	-	-	-	424
EH_038	35	6	-	-	-	1	3	3	-	-	-	-	-	48
EH_039	27	91	1	-	-	-	5	2	-	-	-	-	-	126
EH_040	82	11	7	-	-	-	-	33	-	-	-	-	-	133
EH_041	9	108	1	-	-	-	1	1	-	-	2	-	-	122
Total	3,187	1,915	31	0	23	25	680	515	39	0	15	1	1	6,432

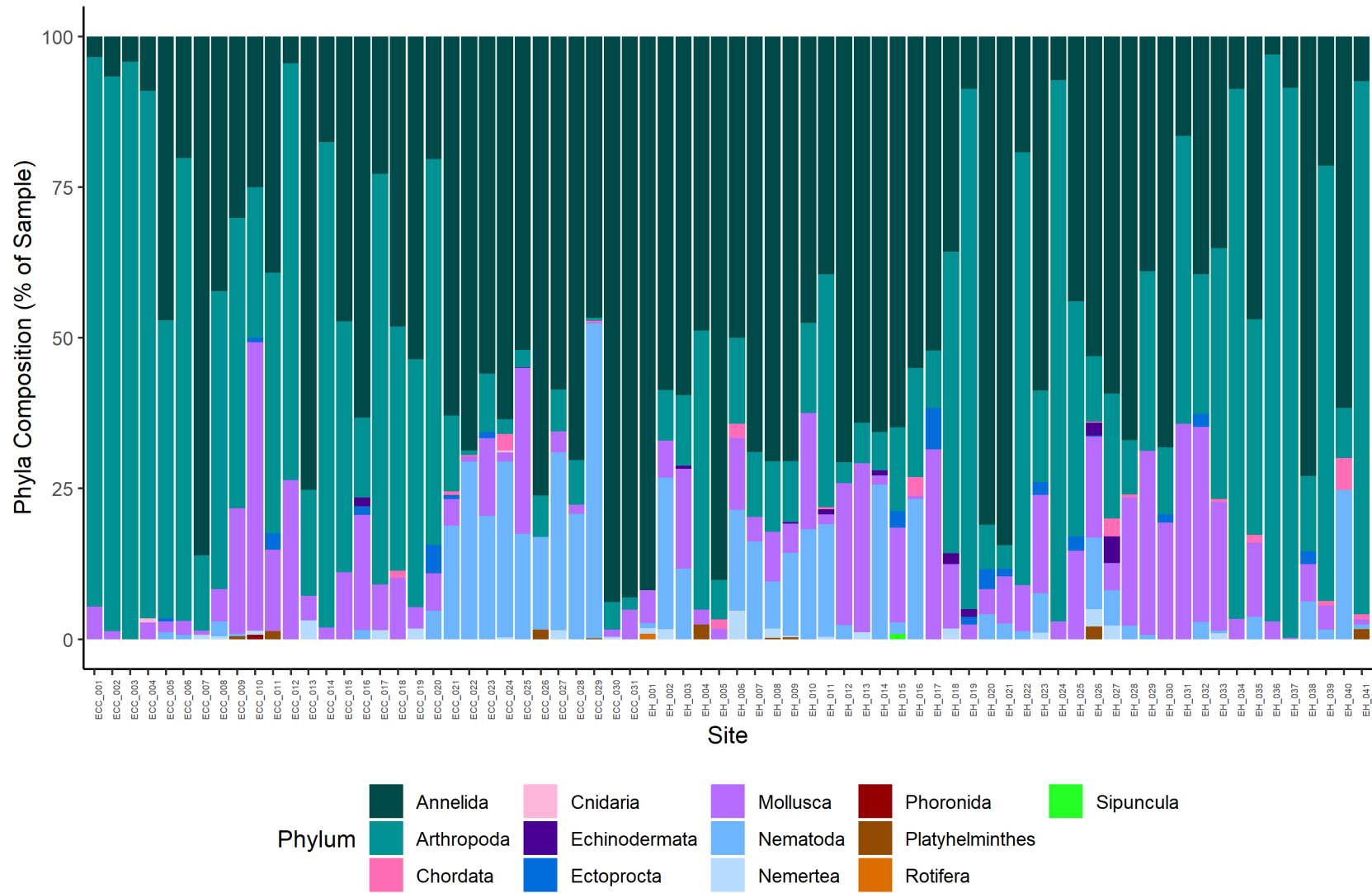


Figure 3-23. Percent composition of organisms in each represented phylum for the 72 ECC and EH benthic grab samples collected.

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Table 3-33. Abundance of each phylum and taxon (family or NLPTL) across all grab samples. Frequency of occurrence represents the percentage of WEA/WH samples that contained a particular family or NLPTL (continued on next page).

Phylum	Family or NLPTL	Abundance Across All Samples	Mean Sample Abundance per 0.05 m ²	Median Sample Abundance per 0.05 m ²	Frequency of Occurrence (% of ECC/EH samples)
Annelida	Acrocirridae	4	0.10	0	1%
	Ampharetidae	9	0.10	0	7%
	Capitellidae	303	4.20	0	36%
	Chaetopteridae	5	0.10	0	6%
	Chrysopetalidae	2	<0.001	0	1%
	Cirratulidae	745	10.30	8	94%
	Dorvilleidae	141	2.00	0	25%
	Eunicidae	2	<0.001	0	3%
	Glyceridae	94	1.30	0	31%
	Goniadidae	10	0.10	0	10%
	Hesionidae	4	0.10	0	6%
	Lumbrineridae	152	2.10	0	29%
	Magelonidae	9	0.10	0	10%
	Maldanidae	16	0.20	0	11%
	Nephtyidae	196	2.70	2	75%
	Nereididae	41	0.60	0	14%
	Neridae	1	<0.001	0	1%
	Oeonidae	30	0.40	0	25%
	Oligochaeta	1,066	14.80	1	54%
	Onuphidae	29	0.40	0	21%
	Opheliidae	158	2.20	0	35%
	Orbiniidae	75	1.00	1	51%
	Oweniidae	28	0.40	0	21%
	Paraonidae	988	13.70	6	82%
	Phyllodocidae	44	0.60	0	24%
	Pilargidae	40	0.60	0	18%
	Poecilochaetidae	1	<0.001	0	1%
	Polygordiidae	134	1.90	1	53%
	Polynoidae	2	<0.001	0	3%
	Sabellariidae	24	0.30	0	11%
	Sabellidae	1	<0.001	0	1%
	Scalibregmatidae	65	0.90	0	33%
	Sigalionidae	3	<0.001	0	4%
Spionidae	1,297	18.00	7	93%	
Syllidae	533	7.40	0	32%	
Terebellidae	121	1.70	0	22%	
Arthropoda	Ampeliscidae	1,796	24.90	3	79%
	Anthuridae	33	0.50	0	25%
	Aoridae	49	0.70	0	15%
	Bateidae	20	0.30	0	10%
	Bodotriidae	4	0.10	0	6%
	Calappidae	1	<0.001	0	1%
	Callianassidae	2	<0.001	0	3%
	Cancridae	3	<0.001	0	4%
	Chaetiliidae	1	<0.001	0	1%
	Cirolanidae	1	<0.001	0	1%
	Corophiidae	8	0.10	0	4%
	Crangonidae	1	<0.001	0	1%
	Decapoda	5	0.10	0	6%
	Diastylidae	7	0.10	0	10%
	Haustoriidae	664	9.20	2	65%
	Hyperidea	6	0.10	0	6%
	Isaeidae	24	0.30	0	4%
	Ischyroceridae	39	0.50	0	11%
	Leucosiidae	2	<0.001	0	3%
	Liljeborgiidae	38	0.50	0	29%
	Melitidae	2	<0.001	0	1%
	Microprotopidae	2	<0.001	0	3%

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Phylum	Family or NLPTL	Abundance Across All Samples	Mean Sample Abundance per 0.05 m ²	Median Sample Abundance per 0.05 m ²	Frequency of Occurrence (% of ECC/EH samples)
Arthropoda	Mysidae	9	0.10	0	6%
	Oedicerotidae	39	0.50	0	33%
	Ostracoda	29	0.40	0	25%
	Paguridae	142	2.00	1	64%
	Pasiphaeidae	3	<0.001	0	4%
	Penaeidae	1	<0.001	0	1%
	Photidae	5	0.10	0	1%
	Phoxocephalidae	295	4.10	1	63%
	Pinnotheridae	8	0.10	0	7%
	Polybiidae	1	<0.001	0	1%
	Pontoporeiidae	92	1.30	0	22%
	Porcellanidae	8	0.10	0	6%
	Processidae	2	<0.001	0	3%
	Synopiidae	6	0.10	0	8%
	Tanaissuidae	221	3.10	0	19%
	Unciolidae	89	1.20	0	13%
Xanthoidea	12	0.20	0	10%	
Chordata	Branchiostomatidae	45	0.60	0	24%
Cnidaria	Actinaria	2	<0.001	0	3%
Echinodermata	Amphiuridae	17	0.20	0	4%
	Cucumariidae	3	<0.001	0	4%
	Echinodermata	5	0.10	0	6%
Ectoprocta	Cupuladriidae	35	0.50	0	25%
Mollusca	Acteonidae	1	<0.001	0	1%
	Arcidae	11	0.20	0	7%
	Bivalvia	474	6.60	1.00	51%
	Caecidae	227	3.20	0	8%
	Calyptraeidae	134	1.90	0	21%
	Cardiidae	1	<0.001	0	1%
	Columbellidae	25	0.30	0	8%
	Conidae	1	<0.001	0	1%
	Crassatellidae	10	0.10	0	10%
	Cylichnidae	15	0.20	0	11%
	Dentaliidae	1	<0.001	0	1%
	Gastropoda	10	0.10	0	14%
	Ischnochitonidae	4	0.10	0	6%
	Lucinidae	2	<0.001	0	3%
	Mactridae	10	0.10	0	4%
	Marginellidae	9	0.10	0	11%
	Nassariidae	150	2.10	1.00	60%
	Naticidae	5	0.10	0	7%
	Nuculidae	9	0.10	0	8%
	Pandoridae	1	<0.001	0	1%
	Pharidae	1	<0.001	0	1%
	Pleurobranchidae	3	<0.001	0	3%
	Protobranchia	2	<0.001	0	1%
	Pyramidellidae	26	0.40	0	17%
	Semelidae	45	0.60	0	24%
	Solemyidae	2	<0.001	0	3%
	Tellinidae	36	0.50	0	31%
Veneridae	4	0.10	0	6%	
Nematoda	Nematoda	1,593	22.10	1.50	60%
Nemertea	Amphiporidae	1	<0.001	0	1%
	Lineidae	6	0.10	0	8%
	Nemertea	39	0.50	0	17%
	Tubulanidae	9	0.10	0	3%
Phoronida	Phoronida	1	<0.001	0	1%
Platyhelminthes	Turbellaria	20	0.30	0	13%
Rotifera	Brachionidae	1	<0.001	0	1%
Sipuncula	Phascolionidae	1	<0.001	0	1%

3.2.2.2 Richness, Diversity, and Evenness

The abundance of organisms per sample across the 72 stations in the ECC project area ranged from 41 organisms found in both EH_004 and EH_025 to 877 found in ECC_029 (Table 3-34 and Table 3-35). Taxonomic richness of individual samples ranged from 1.52 at station EH_036 to 7.31 at station EH_010 (Figure 3-24). Diversity ranged from 0.76 at station EH_037, which contained 424 organisms from 19 families, to 3.03 at station EH_010, which contained 42 organisms from 21 families. Evenness across individual grab samples ranged from 0.29 at station EH_037 to 0.93 at station EH_006. Richness, diversity, and evenness are indices that do not have units; however, higher values indicate greater amounts of richness, diversity, or evenness in each sample.

Table 3-34. Community composition parameters calculated for ECC grab sample stations.

Station	Sample Abundance (per 0.05 m ²)	Number of NLPTLs	Number of Families (or NLPTL)	Ecological Indices		
				Richness	Diversity	Evenness
ECC_001	147	15	13	2.40	1.84	0.72
ECC_002	151	11	9	1.59	0.95	0.43
ECC_003	168	18	12	2.15	1.57	0.63
ECC_004	144	18	15	2.82	1.15	0.43
ECC_005	172	28	20	3.69	1.81	0.61
ECC_006	263	20	15	2.51	1.38	0.51
ECC_007	144	21	17	3.22	1.21	0.43
ECC_008	206	32	23	4.13	2.13	0.68
ECC_009	216	29	22	3.91	1.97	0.64
ECC_010	144	28	23	4.43	2.01	0.64
ECC_011	74	26	22	4.88	2.71	0.88
ECC_012	273	19	16	2.67	1.37	0.49
ECC_013	97	19	15	3.06	1.88	0.69
ECC_014	103	18	12	2.37	1.84	0.74
ECC_015	72	26	20	4.44	2.34	0.78
ECC_016	68	23	19	4.27	1.88	0.64
ECC_017	66	25	19	4.30	2.35	0.80
ECC_018	79	18	13	2.75	2.03	0.79
ECC_019	56	14	12	2.73	1.67	0.67
ECC_020	64	24	21	4.81	2.36	0.78
ECC_021	159	33	28	5.33	2.51	0.75
ECC_022	373	31	22	3.55	1.86	0.60
ECC_023	93	28	21	4.41	2.51	0.83
ECC_024	329	35	27	4.49	2.21	0.67
ECC_025	740	58	37	5.45	2.34	0.65
ECC_026	130	29	24	4.73	2.48	0.78
ECC_027	403	58	37	6.00	2.70	0.75
ECC_028	394	47	31	5.02	2.34	0.68
ECC_029	877	27	22	3.10	1.62	0.52
ECC_030	259	18	16	2.70	1.12	0.40
ECC_031	144	12	10	1.81	0.93	0.40

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Table 3-35. Community composition parameters calculated for EH grab sample stations.

Station	Sample Abundance (per 0.05 m ²)	Number of NLPTLs	Number of Families (or NLPTL)	Ecological Indices		
				Richness	Diversity	Evenness
EH_001	111	19	14	2.76	1.65	0.62
EH_002	179	34	28	5.20	2.67	0.80
EH_003	205	43	32	5.82	2.79	0.80
EH_004	41	19	17	4.31	2.52	0.89
EH_005	61	16	12	2.68	1.30	0.52
EH_006	42	21	17	4.28	2.64	0.93
EH_007	74	29	22	4.88	2.67	0.86
EH_008	562	51	39	6.00	2.67	0.73
EH_009	376	58	41	6.75	2.83	0.76
EH_010	181	46	39	7.31	3.03	0.83
EH_011	251	35	27	4.71	2.33	0.71
EH_012	85	24	18	3.83	2.12	0.73
EH_013	89	22	20	4.23	2.23	0.75
EH_014	125	32	23	4.56	2.50	0.80
EH_015	108	25	20	4.06	2.25	0.75
EH_016	353	28	20	3.24	2.13	0.71
EH_017	73	19	16	3.50	2.26	0.82
EH_018	56	24	21	4.97	2.60	0.85
EH_019	81	14	11	2.28	1.36	0.57
EH_020	121	22	18	3.54	1.93	0.67
EH_021	77	25	18	3.91	1.92	0.67
EH_022	78	22	16	3.44	1.94	0.70
EH_023	92	25	19	3.98	2.16	0.73
EH_024	69	12	9	1.89	1.58	0.72
EH_025	41	16	12	2.96	2.23	0.90
EH_026	479	44	35	5.51	2.60	0.73
EH_027	135	36	28	5.50	2.76	0.83
EH_028	221	29	19	3.33	2.12	0.72
EH_029	144	26	17	3.22	2.21	0.78
EH_030	217	35	26	4.65	2.32	0.71
EH_031	109	22	17	3.41	2.07	0.73
EH_032	142	29	22	4.24	2.41	0.78
EH_033	211	29	22	3.92	2.19	0.71
EH_034	208	18	13	2.25	1.42	0.55
EH_035	81	21	16	3.41	2.11	0.76
EH_036	101	11	8	1.52	1.40	0.67
EH_037	424	19	14	2.15	0.76	0.29
EH_038	48	18	17	4.13	2.08	0.73
EH_039	126	24	19	3.72	1.56	0.53
EH_040	133	21	18	3.48	2.24	0.77
EH_041	122	19	15	2.91	1.69	0.62

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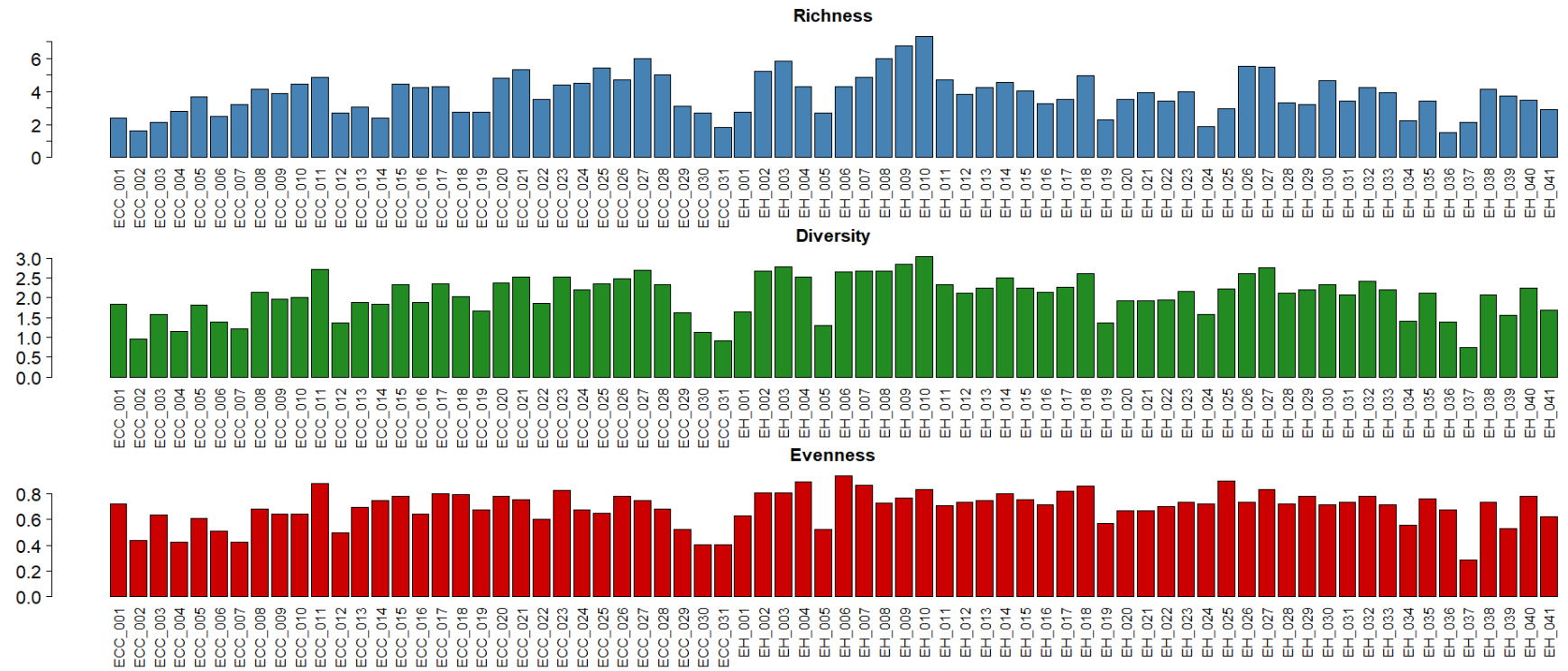


Figure 3-24. Ecological index values calculated for each sample station in ECC and EH project areas.

3.2.3 Multivariate Analysis

The NMDS analysis and Bray-Curtis Similarity Index fit with two dimensions produced a stress value of 0.18, indicating a moderately good fit of the data in the ordination. Results from the cluster analysis and NMDS based on the Bray-Curtis dissimilarity of macroinvertebrate assemblages are presented below in a series of figures and tables (Figure 3-25 and Figure 3-26; Table 3-36 and Table 3-37). Results from the NMDS plot, color-coded based on a sample stations NMFS (2021) modified CMECS classification, indicated slight grouping (representing a similarity in assemblages) between stations with CMECS classifications of fine/very fine sand, medium sand, gravelly muddy sand, and gravelly sand (Figure 3-25). The NMDS ordination plot color-coded by sample location in the project area shows little to no clustering based on location, indicating overall high variability and overlap in the invertebrate communities from both areas (Figure 3-26).

Samples from stations EEC_027, EH_003, EH_008, EH_009, WEA_042, WH_037, WH_053, EH_001, and WH_058 from four substrate types (muddy sandy gravel, sandy gravel, sandy mud, and shell hash) were removed from SIMPER and ANOSIM analyses and results because of limited intragroup variability between samples (<5 samples per substrate type). Based on ANOSIM global test results, the null hypothesis that similarity of invertebrate assemblages between NMFS (2021) modified CMECS groups was greater than or equal to the similarity within CMECS groups was rejected (R value = 0.38 and significance level $p = 0.001$; Table 3-36). Similarly, the second null hypothesis that benthic invertebrate assemblages between sample location groups was greater than or equal to the similarity within location groups was rejected (R value = 0.30 and significance level $p = 0.001$; Table 3-36). The moderate to low R statistic result for the ANOSIM of CMECS group indicated that the invertebrate assemblages within samples were more similar to other samples with the same CMECS substrate type than to other substrate types; however, variability between groupings was also high and this relationship was apparent for only some CMECS substrate types. The low R statistic for the ANOSIM of sample location indicated that the location of a sample in the WEA or ECC only weakly accounted for the similarities/differences between the invertebrate communities within each sample.

The SIMPER analysis was conducted on the CMECS substrate factors because the NMDS plot and ANOSIM demonstrated significant and meaningful relationships between the invertebrate assemblages within these classifications. The SIMPER analysis provided pairwise insight as to which NMFS (2021) modified CMECS substrate classifications were more dissimilar to each other. According to the SIMPER results, medium sand and gravelly muddy sand, fine/very fine sand and gravelly muddy sand, and muddy sand and gravelly muddy sand were the substrate component pairs with the least similar invertebrate assemblages (81%, 80%, and 76% dissimilar, respectively). Differences in the abundances of Ampeliscidae, Nematoda, Oligochaeta, and Spionidae contributed the most to dissimilarity between pairs

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of CMECS substrate classifications (Table 3-37). In general, macroinvertebrate assemblages were most similar between samples collected in substrates composed of similarly fine or coarse material, with assemblages from gravelly sand and very coarse/coarse sand and medium sand and fine/very fine sand showing the lowest dissimilarity percentages.

Table 3-36. Results from the ANOSIM conducted on the three classification groups: CMECS substrate classification and sample location within the project area.

Test Variable	R Statistic	P-Value
CMECS	0.38	0.001
Sample Location	0.30	0.001

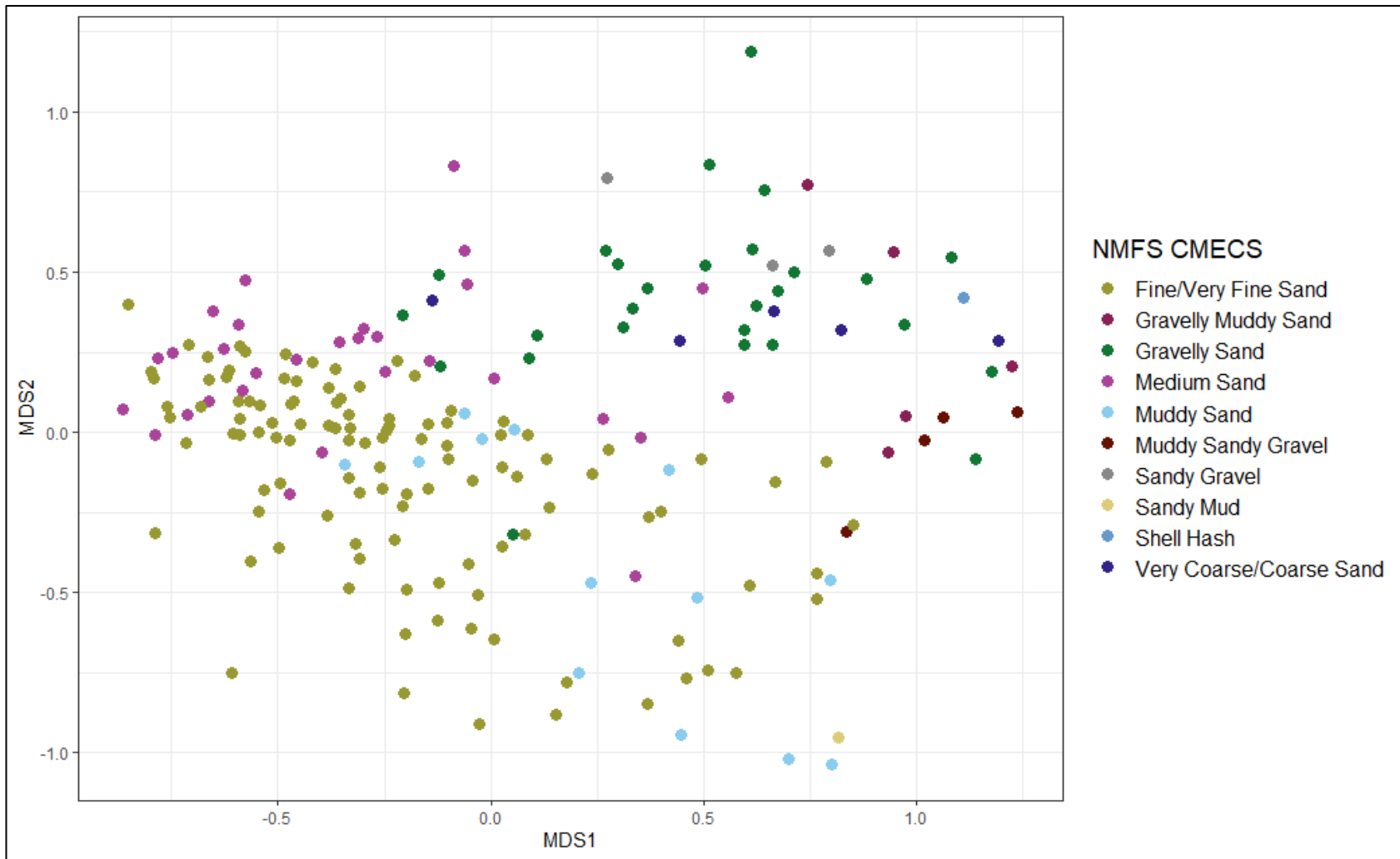


Figure 3-25. NMDS plot of Bray-Curtis similarities of square-root transformed taxonomic abundances at each sample station. Points are color-coded based on NMFS (2021) modified CMECS substrate component types.

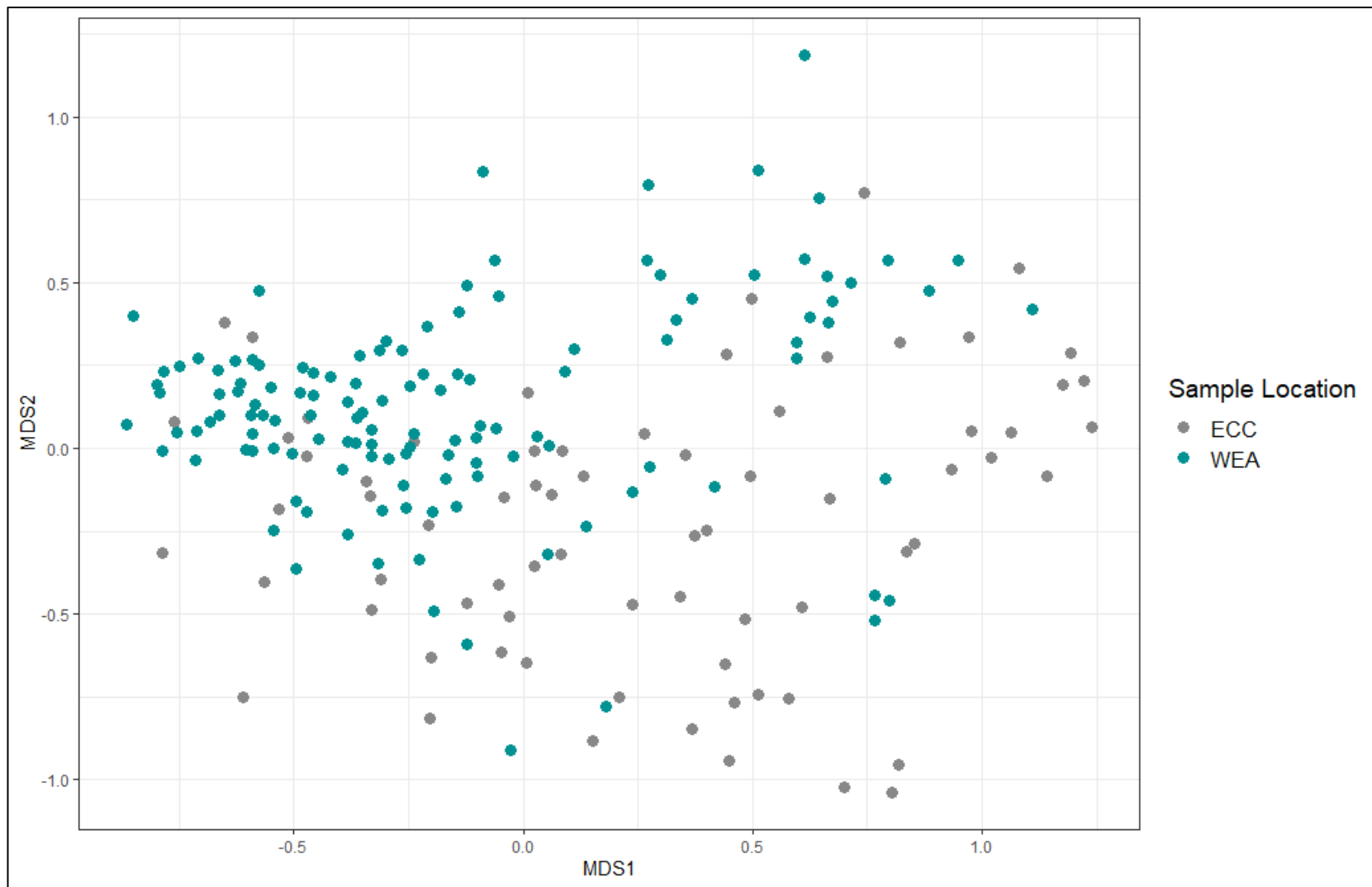


Figure 3-26. NMDS plot of Bray-Curtis similarities of square-root transformed taxonomic abundances at each sample station. Points are color-coded based on sample station location: WEA and ECC.

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Table 3-37. SIMPER results presenting the dissimilarity of macroinvertebrate assemblages between NMFS (2021) modified CMECS substrate types.

Substrate Type (A)	Substrate Type (B)	Bray-Curtis Dissimilarity	Dissimilar Taxa ¹	% Contribution
Medium Sand	Gravelly Muddy Sand	81%	Ampeliscidae	9%
			Nematoda	8%
			Oligochaeta	6%
Fine/Very Fine Sand	Gravelly Muddy Sand	80%	Nematoda	8%
			Ampeliscidae	7%
			Oligochaeta	6%
Muddy Sand	Gravelly Muddy Sand	76%	Nematoda	8%
			Oligochaeta	6%
			Spionidae	5%
Fine/Very Fine Sand	Very Coarse/Coarse Sand	73%	Nematoda	11%
			Ampeliscidae	8%
			Oligochaeta	7%
Muddy Sand	Gravelly Sand	72%	Ampeliscidae	7%
			Spionidae	7%
			Nematoda	7%
Fine/Very Fine Sand	Gravelly Sand	72%	Ampeliscidae	8%
			Nematoda	7%
			Haustoriidae	6%
Muddy Sand	Very Coarse/Coarse Sand	72%	Nematoda	11%
			Oligochaeta	7%
			Spionidae	6%
Medium Sand	Muddy Sand	70%	Ampeliscidae	12%
			Spionidae	10%
			Cirratulidae	4%
Medium Sand	Very Coarse/Coarse Sand	70%	Nematoda	11%
			Ampeliscidae	10%
			Oligochaeta	8%
Medium Sand	Gravelly Sand	70%	Ampeliscidae	10%
			Nematoda	7%
			Oligochaeta	6%
Fine/Very Fine Sand	Muddy Sand	65%	Ampeliscidae	12%
			Spionidae	9%
			Haustoriidae	6%
Gravelly Sand	Gravelly Muddy Sand	64%	Nematoda	7%
			Oligochaeta	5%
			Opheliidae	4%
Very Coarse/Coarse Sand	Gravelly Muddy Sand	61%	Nematoda	8%
			Syllidae	5%
			Oligochaeta	5%
Medium Sand	Fine/Very Fine Sand	59%	Ampeliscidae	11%
			Haustoriidae	6%
			Paraonidae	5%
Gravelly Sand	Very Coarse/Coarse Sand	59%	Nematoda	10%
			Oligochaeta	6%
			Syllidae	5%

¹ Includes taxa contributing highest percentage to the dissimilarity between location.

4 CMECS CLASSIFICATIONS

4.1 Video Transects

Still images were derived from underwater video transects and were assigned a CMECS substrate component classification based on the percent cover results (Sections 3.1.1.2 and 3.1.2.2) following NMFS modifications (NMFS, 2021). In addition to substrate classes, the density of biogenic shell, anthropogenic substrates, and flora/fauna cover were calculated for each still image and summarized at the transect level. Representative images of different CMECS classifications are presented in Table 4-1 and Table 4-3. Maps displaying the location and CMECS classification of each still image analyzed from the video transects are provided in Appendix D: CMECS Classifications for Still Images Derived from Video Analysis.

4.1.1 Wind Energy Area

Across the 128 transects in the WEA, 6,626 still images were assigned a CMECS classification. The number of still images classified as geologic origin, unconsolidated, fine substrate of sand/mud size (6,390) was far greater than any other CMECS group, composing 9,254 m² of the analyzed area (Table 4-1, Table 4-2, Figure 4-1). The sand/mud CMECS group is not considered complex under the NMFS guidelines (NMFS, 2021); thus, almost 99% of the area analyzed in the WEA is not complex.

Complex habitats include those with $\geq 5\%$ of gravels, those dominated by biogenic origin substrates, or those with a substantial amount of biological activity or presence. Habitats classified as gravel had $\geq 80\%$ sediment particles of pebble/granule size and composed 14 m² of the WEA area in 12 images across 3 transects, most of which was in WEA_042 (Table 4-1, Table 4-2, Figure 4-1). Gravel mixes of pebble/granule with sand/mud ($< 80\%$ and $\geq 30\%$ gravel) were classified in 42 still images from 8 transects, with WEA_042 and WEA_041 containing the most by area (50 m² and 9 m², respectively). Gravelly sand/mud ($< 30\%$ and $\geq 5\%$ gravel) was classified in 86 images across 23 transects, with a dominant gravel type of pebble/granule and a few instances of cobble. Transects WH_053 and WEA_041 had relatively large areas classified as gravelly sand/mud with pebble/granule (35 m² and 35 m², respectively). These portions of the transects classified to either gravel, gravel mixes, or gravelly substrate groups is considered complex habitat.

Biogenic origin substrates present in the WEA include shell hash, with pieces of shell between 2 and 64 mm size, and shell rubble, with pieces or whole shells larger than 64 mm. Shell hash was classified as the main CMECS substrate group in 95 images across 32 transects and composed 151 m² of area in the WEA. Shell rubble was classified as the main CMECS substrate group in only 2 images from transect WEA_027 and composed 3 m² of area. These areas where shells dominate the substrate as the main CMECS classification are considered complex habitat.

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Shells were also frequent as co-occurring substrate types, classified as a secondary CMECS group in 3,317 (50%) still images at various levels of cover density (Table 4-1 and Figure 4-2). The only other co-occurring substrate type was anthropogenic metal and trash, classified in two images.

The area of the biological elements recorded in the percent cover analysis was summarized to approximate the density of flora/fauna cover for each still image along a transect. Greater densities of flora/fauna suggest presence of potentially more complex habitat due to greater biological activity (e.g., burrows, megafauna) or occurrence of additional structure in the environment (e.g., infaunal structures, encrusting organisms, algae). No images analyzed comprised more than sparse amounts of flora/fauna cover (> 2% and < 30%; Figure 4-3) and many images contained zero.

Representative images of CMECS substrate types are in Table 4-3.

Table 4-1. The number of stills and the total area (m²) classified to each combination of main CMECS substrate component and secondary/co-occurring substrate groups for each of the 128 video transects in the WEA project area. Abbreviations are as follows: S/M = Sand/Mud, B = Boulder, C = Cobble, and P/G = Pebble/Granule.

Main and Co-Occurring CMECS Substrate Group Combinations	Number of Stills Classified to Group	Percent of Stills Classified to Group (%)	Area of Stills Classified to Group (m ²)	Percent of Area Classified to Group (%)
Biogenic Shell Hash with Moderate Gravel Mixes	2	0.03	1.48	0.02
Biogenic Shell Hash with Moderate Gravelly Sand/Mud	18	0.27	22.85	0.24
Biogenic Shell Hash with Moderate Sand/Mud	34	0.51	55.24	0.57
Biogenic Shell Hash with Sparse Gravelly Sand/Mud	4	0.06	4.03	0.04
Biogenic Shell Hash with Sparse Sand/Mud	36	0.54	66.34	0.69
Biogenic Shell Hash with Sparse Sand/Mud + Sparse Metal	1	0.02	0.70	0.01
Biogenic Shell rubble with Moderate Sand/Mud	2	0.03	3.21	0.03
Gravel - Pebble/Granule with Moderate Shell	2	0.03	3.15	0.03
Gravel - Pebble/Granule with Sparse Shell	10	0.15	10.88	0.11
Gravel Mixes - Pebble/Granule with S/M with Moderate Shell	6	0.09	8.51	0.09
Gravel Mixes - Pebble/Granule with S/M with Sparse Shell	34	0.51	63.77	0.66
Gravel Mixes - Pebble/Granule with S/M with Trace Shell	1	0.02	1.62	0.02
Gravelly Sand/Mud with C with Moderate Shell	1	0.02	0.90	0.01
Gravelly Sand/Mud with C/P/G with Sparse Shell	1	0.02	4.97	0.05
Gravelly Sand/Mud with P/G	2	0.03	1.59	0.02
Gravelly Sand/Mud with P/G with Moderate Shell	31	0.47	57.00	0.59
Gravelly Sand/Mud with P/G with Sparse Shell	48	0.72	85.53	0.89
Gravelly Sand/Mud with P/G with Trace Shell	3	0.05	0.31	0.00
Sand/Mud	3,408	51.43	4,881.72	50.61
Sand/Mud with Moderate Shell	176	2.66	257.34	2.67
Sand/Mud with Sparse Shell	1,645	24.83	2,638.80	27.36
Sand/Mud with Sparse Trash	1	0.02	0.51	0.01
Sand/Mud with Trace Shell	1,160	17.51	1,474.88	15.29
Totals	6,626	100	9,645.31	100

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Table 4-2. Area (m²) classified to CMECS substrate component groups for each of the 128 video transects in the WEA project area. Abbreviations are as follows: S/M = Sand/Mud, B = Boulder, C = Cobble, and P/G = Pebble/Granule. All substrate groups except sand/mud are considered 'complex' habitat by NMFS (2021).

Transect	Biogenic Shell Rubble	Biogenic Shell Hash	Gravel - Pebble/Granule	Gravel Mixes – P/G with S/M	Gravelly Sand/Mud			Sand/Mud
					with C	with C/P/G	with P/G	
WEA_001								87.17
WEA_002								82.17
WEA_003								144.07
WEA_004								59.96
WEA_005								70.92
WEA_006								114.19
WEA_007								47.41
WEA_008								70.19
WEA_009								74.46
WEA_010								33.12
WEA_011								30.01
WEA_012								34.91
WEA_013								17.58
WEA_014							0.13	11.97
WEA_015		1.36						22.98
WEA_016								70.03
WEA_017								40.56
WEA_018								57.32
WEA_019		4.97					10.62	47.71
WEA_020								31.19
WEA_021								25.57
WEA_022								14.86
WEA_023								11.01
WEA_024		3.79						47.40
WEA_025								51.11
WEA_026								89.09
WEA_027	3.21	1.80						42.61
WEA_028								22.14
WEA_029							0.61	51.53
WEA_030								75.94
WEA_031								105.81
WEA_032								15.71
WEA_033								53.33
WEA_034							1.22	66.85
WEA_035		15.13						42.67
WEA_036								110.85
WEA_037								26.37
WEA_038								32.24
WEA_039								49.22
WEA_040								56.48
WEA_041		0.90	0.68	9.03			33.75	58.88
WEA_042			13.13	49.49		4.97	7.58	4.00

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Transect	Biogenic Shell Rubble	Biogenic Shell Hash	Gravel - Pebble/ Granule	Gravel Mixes – P/G with S/M	Gravelly Sand/Mud			Sand/Mud
					with C	with C/P/G	with P/G	
WEA_043		5.02		3.19			10.05	111.71
WEA_044								27.49
WEA_045								23.17
WEA_046		1.04						87.05
WEA_047		1.94						56.22
WEA_048								204.74
WEA_049								65.20
WEA_050								25.64
WEA_051		16.52						40.11
WEA_052							0.06	95.81
WEA_053								110.25
WEA_054								87.60
WEA_055								23.90
WEA_056								58.06
WEA_057								83.91
WEA_058								69.59
WEA_059								56.94
WEA_060								54.87
WEA_061								180.77
WEA_062		13.47						190.03
WH_001								114.40
WH_002							0.09	140.96
WH_003		4.26					4.69	39.23
WH_004								115.73
WH_005								90.47
WH_006								86.53
WH_007							1.75	120.34
WH_008								106.71
WH_009								139.96
WH_010							1.80	57.22
WH_011		8.49					3.57	63.46
WH_012								64.02
WH_013		1.49						148.01
WH_014								49.26
WH_015							0.89	119.49
WH_016								53.15
WH_017								60.37
WH_018								48.98
WH_019								60.30
WH_020		0.09					0.83	76.43
WH_021								13.61
WH_022								13.51
WH_024								69.65
WH_025								24.32
WH_026								70.90
WH_027								67.02

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Transect	Biogenic Shell Rubble	Biogenic Shell Hash	Gravel - Pebble/ Granule	Gravel Mixes – P/G with S/M	Gravelly Sand/Mud			Sand/Mud
					with C	with C/P/G	with P/G	
WH_028								41.32
WH_029		0.70						71.01
WH_030								16.73
WH_031								87.23
WH_032		1.01						60.21
WH_033								18.91
WH_034								58.93
WH_035		16.59						85.78
WH_036								108.47
WH_037								108.49
WH_038		1.80						46.11
WH_039		3.73						86.83
WH_040								88.90
WH_041		1.90						88.51
WH_042								53.87
WH_043								18.67
WH_044		0.37						47.47
WH_045		1.33						47.80
WH_046								35.38
WH_047				4.14			8.14	16.80
WH_048								32.08
WH_049								121.63
WH_050		3.49						51.86
WH_051		2.82	0.22	1.86			9.11	57.27
WH_052								58.46
WH_053		0.73		3.57			35.36	160.26
WH_054							5.22	145.76
WH_055							3.92	101.97
WH_056		1.23		0.54			0.19	148.76
WH_057				2.08			4.85	85.03
WH_058		2.12						88.19
WH_059		0.38						179.36
WH_060								53.06
WH_061		13.37						129.68
WH_062		0.84			0.90			54.74
WH_063		17.94						60.29
WH_064								97.20
WH_065								148.33
WH_066								133.57
WH_067								289.68
Total Area (m²) per Main CMECS Group in WEA	3.21	150.63	14.03	73.90	0.90	4.97	144.43	9,253.25

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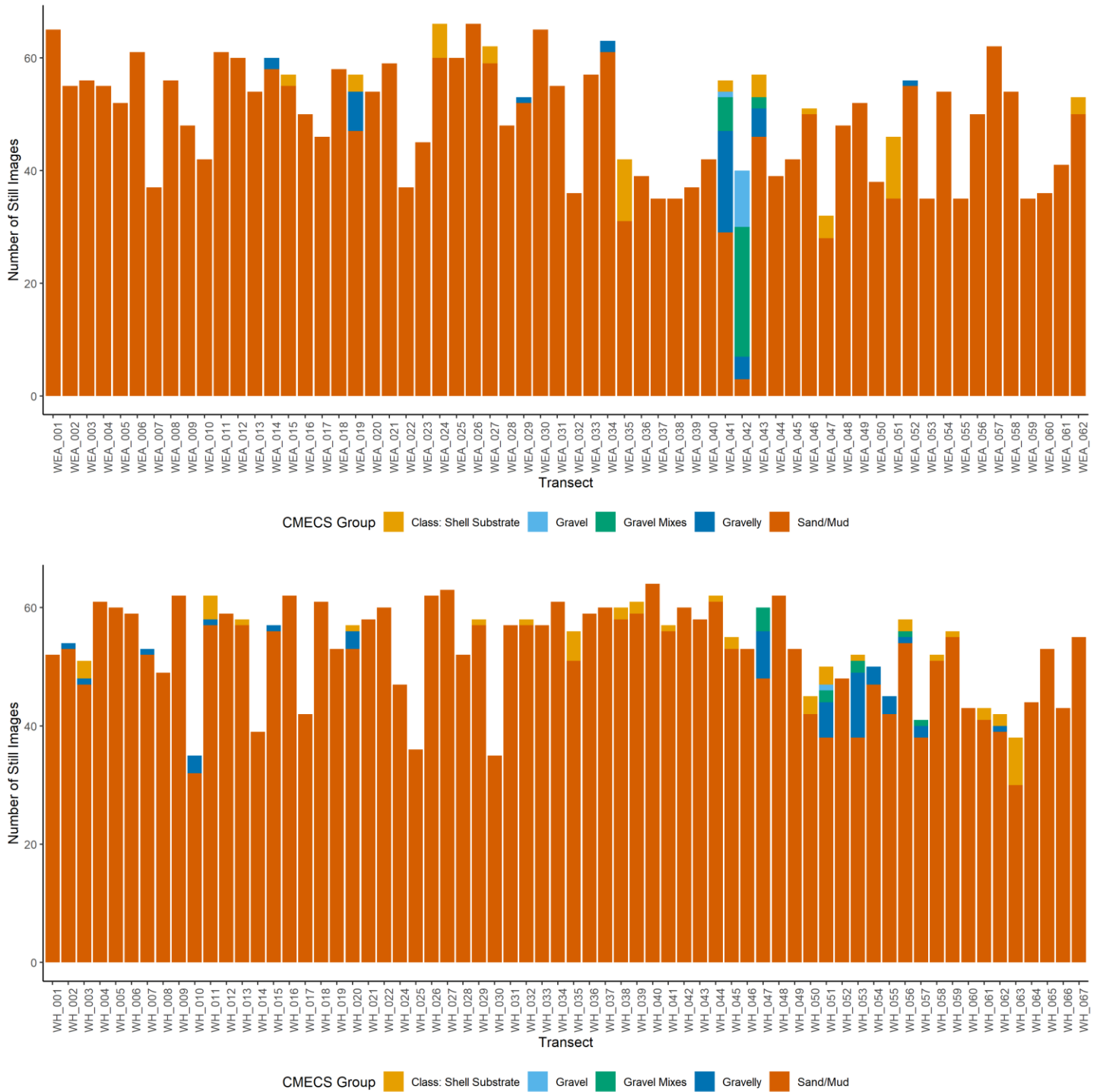


Figure 4-1. The number of still images classified to CMECS substrate component groups within each WEA video transect (top) and WH video transect (bottom) in the WEA project area.

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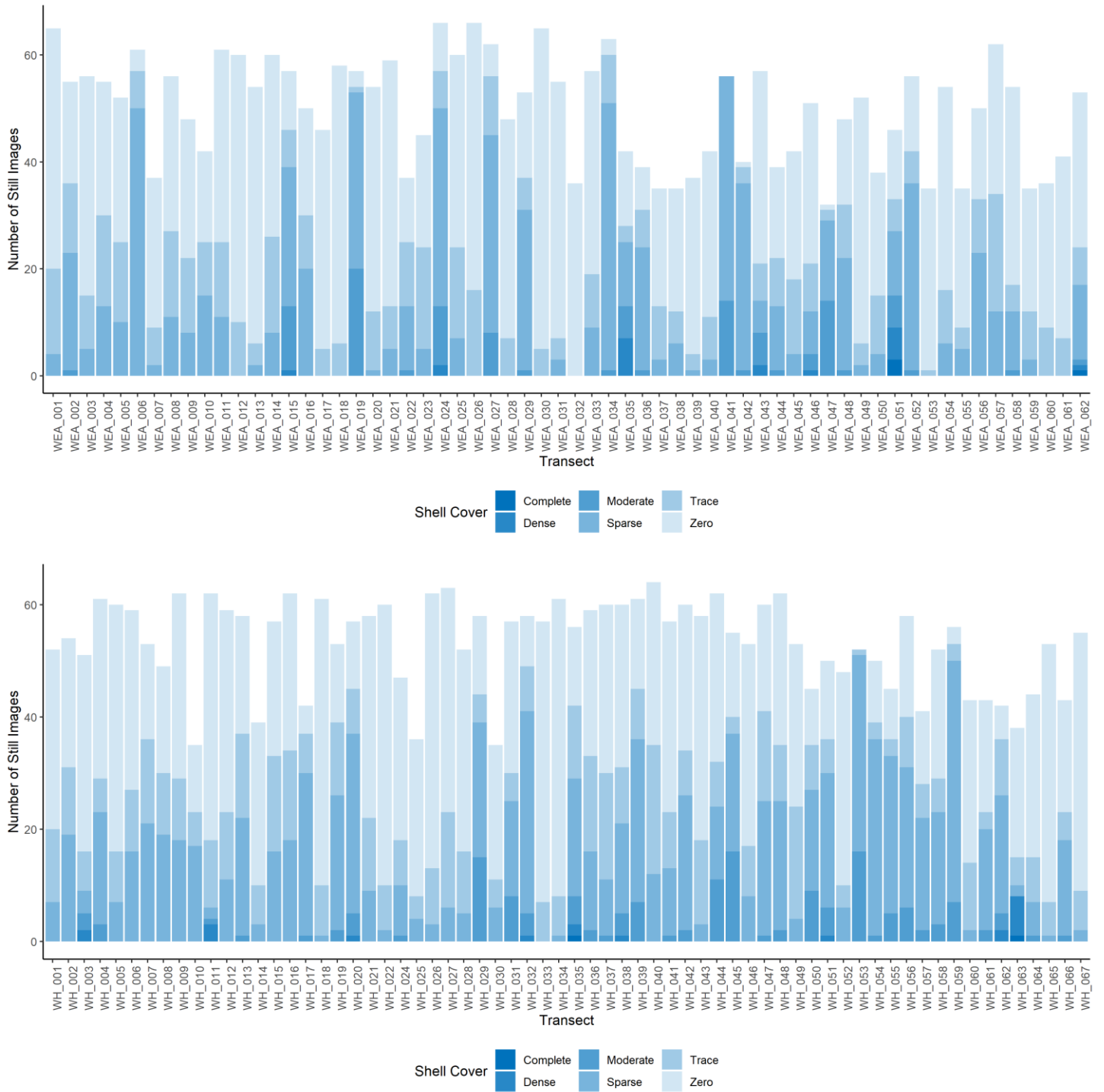


Figure 4-2. The number of still images classified to each shell cover density category within each WEA video transect (top) and WH video transect (bottom) in the WEA project area. Trace is $\leq 2\%$, Sparse is > 2 to $< 30\%$, Moderate is 30 to $< 70\%$, Dense is 70 to $< 90\%$, and Complete is 90 to 100% cover.

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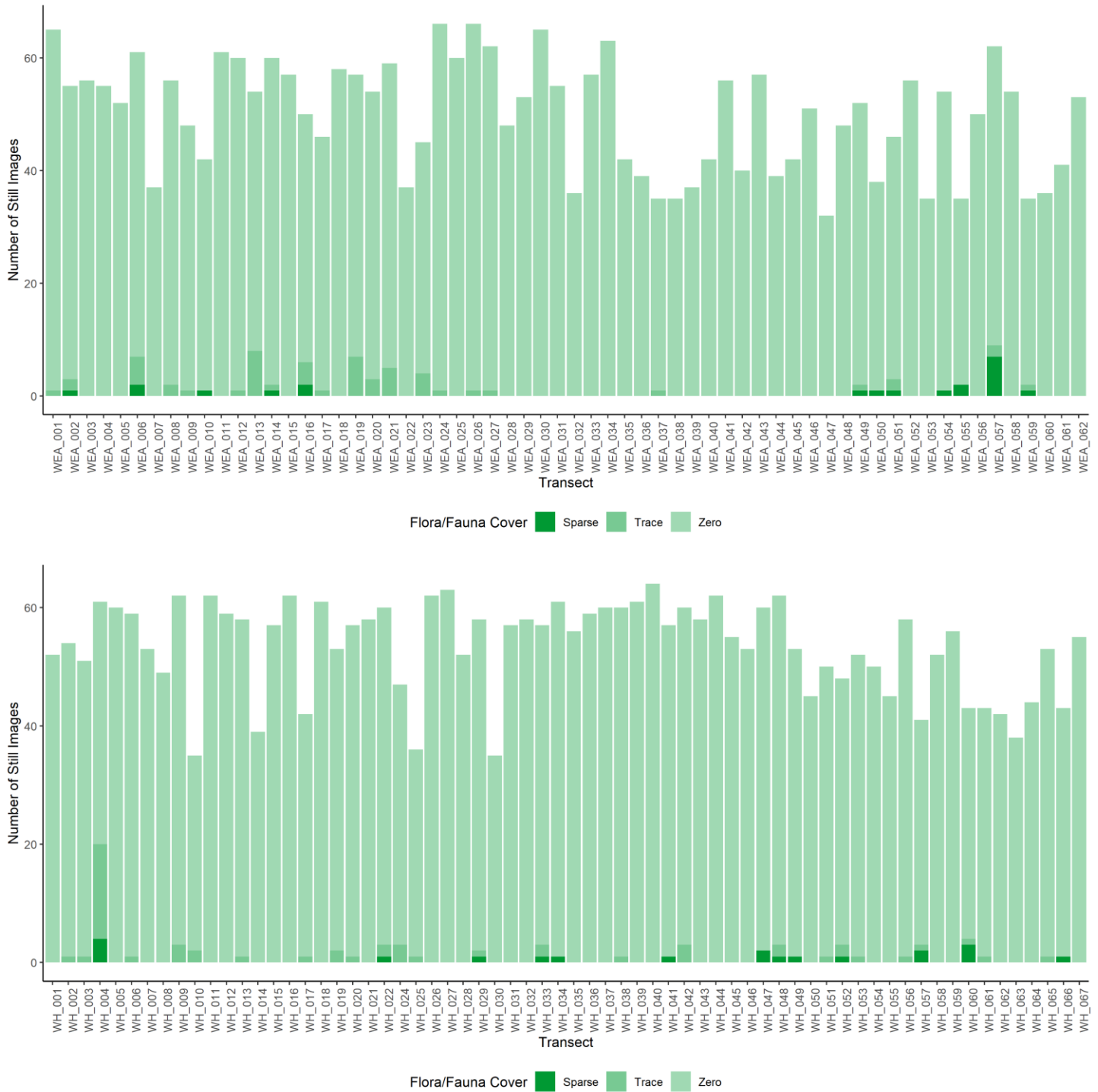




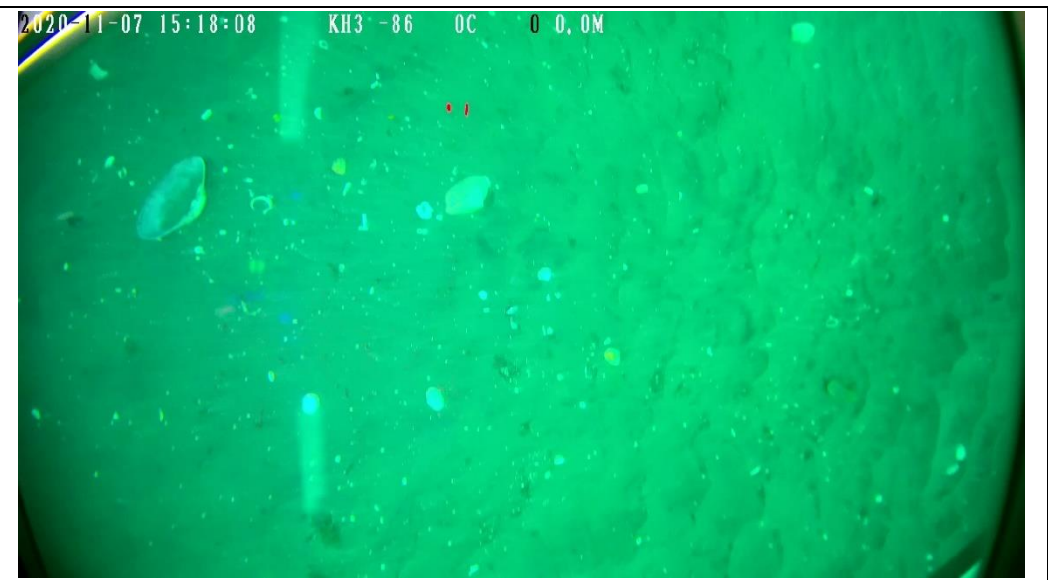

Figure 4-3. The number of still images classified to each flora/fauna density category within each WEA video transect (top) and WH video transect (bottom) in the WEA project area. Trace is ≤ 2%, Sparse is > 2 to < 30%, Moderate is 30 to < 70%, Dense is 70 to < 90%, and Complete is 90 to 100% cover.

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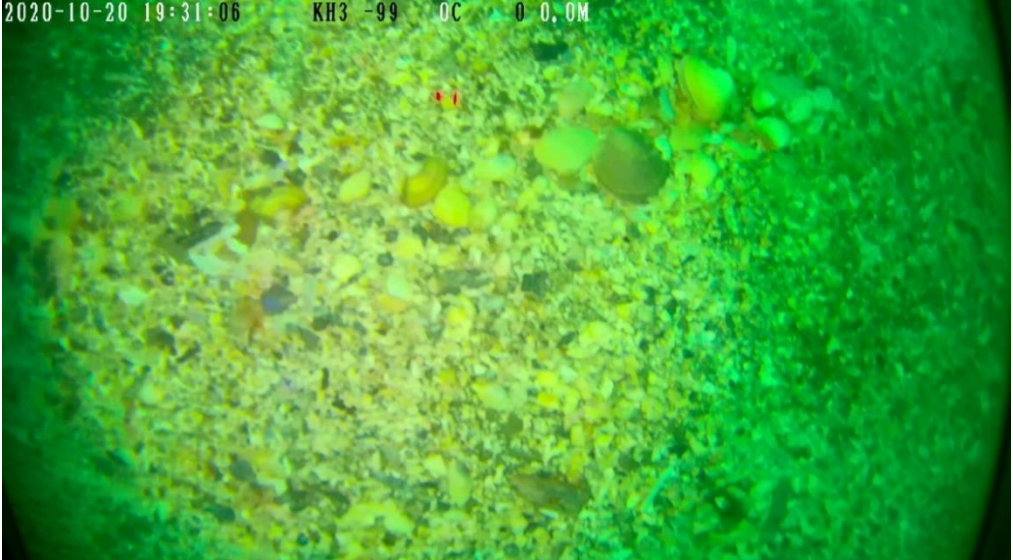
Table 4-3. Representative still images of various habitat types observed in the WEA and WH sampling areas. Still number in parenthesis.

<p>Geologic Unconsolidated Flat Sand/Mud WH_003 (87)</p>	 <p>2020-11-07 23:23:07 KH3 -95 0C 0 0.0M</p> <p>This underwater still image shows a flat, sandy/muddy seabed. The sediment is a mix of light and dark tones, with some small, indistinct particles. Two red laser dots are visible in the upper left corner. The image is taken at a depth of 0.0 meters.</p>
<p>Geologic Unconsolidated Fine Sand/Mud Sparse Shell Hash WEA_035 (39)</p>	 <p>2020-11-04 02:26:01 KH3 -96 0C 0 0.0M</p> <p>This underwater still image shows a seabed composed of fine sand and mud, interspersed with numerous small, light-colored shell fragments (hash). The sediment has a granular appearance. Two red laser dots are visible in the upper left corner. The image is taken at a depth of 0.0 meters.</p>



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<p>Geologic Unconsolidated Fine Sand/Mud Trace Shell Hash</p> <p>WEA_004 (67)</p>	
<p>Geologic Unconsolidated Fine Sand/Mud Moderate Shell Hash</p> <p>WEA_022 (47)</p>	

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<p>Geologic Unconsolidated Fine Sand/Mud Sparse Shell Rubble</p> <p>WEA_025 (101)</p>	
<p>Biogenic Shell Hash Sparse with Sand/Mud</p> <p>WEA_063 (93)</p>	

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<p>Biogenic Shell Hash Moderate Gravelly Sand/Mud</p> <p>WH_011 (62)</p>	<p>2020-11-07 07:31:26 KH3 -90 OC 0 0.0M</p> 
<p>Geologic Unconsolidated Coarse Gravel Mixes - Pebble/Granule with Sand/Mud and Moderate Shell Hash</p> <p>WH_053 (107)</p>	<p>2020-10-21 11:50:41 KH3 -85 OC 0 0.0M</p> 

4.1.2 Export Cable Corridor

Across the 70 transects in the ECC, 3,717 still images were assigned a CMECS classification. The number of still images classified as geologic origin, unconsolidated, fine substrate of sand/mud size (3,540) was far greater than any other CMECS group, composing 3,210 m² of the analyzed area (Table 4-4, Table 4-5, Figure 4-4). The sand/mud CMECS group is not considered complex under the NMFS guidelines (NMFS, 2021); thus, 94% of the area analyzed in the ECC is not complex.

Complex habitats include those with $\geq 5\%$ of gravels, those dominated by biogenic origin substrates, or those with a substantial amount of biological activity or presence. Habitats classified as gravel had $\geq 80\%$ sediment particles of pebble/granule size and composed 6 m² of the ECC area in 16 images across 2 transects, ECC_025 and EH_009 (Table 4-4, Table 4-5, Figure 4-4). Gravel mixes of pebble/granule with sand/mud ($< 80\%$ and $\geq 30\%$ gravel) were classified in 56 still images from 6 transects, with ECC_025 and EH_009 containing the most by area (6 m² and 14 m², respectively). Gravelly sand/mud ($< 30\%$ and $\geq 5\%$ gravel) was classified in 99 images across 14 transects, with a dominant gravel type of pebble/granule and a few instances of cobble and boulder. Transect EH_009 had the largest area classified as gravelly sand/mud with pebble/granule (13 m²), while EH_008 and EH_010 also had relatively large amounts (6 m² and 8 m², respectively). These portions of the transects classified to either gravel, gravel mixes, or gravelly substrate groups are considered complex habitat.

Biogenic origin substrates present in the ECC include shell hash, with pieces of shell between 2 and 64 mm size, and shell rubble, with pieces or whole shells larger than 64 mm. Shell hash was classified as the main CMECS substrate group in 37 images across 14 transects and composed 38 m² of area in the ECC. Shell rubble was classified as the main CMECS substrate group in 5 images from 3 transects (ECC_002, ECC_021, and EH_038) and composed 9 m² of area. Areas where shells dominated the observed substrate are considered complex habitat.

Shells were also a frequent co-occurring substrate type, classified as a secondary CMECS group in 1,808 (49%) still images at various levels of cover density (Table 4-4, Table 4-5). No anthropogenic origin substrates or features were observed in the ECC still images percent cover analysis.

The area of the biological elements recorded in the percent cover analysis was summarized to approximate the density of flora/fauna cover for each still image along a transect. Greater densities of flora/fauna suggest presence of potentially more complex habitat due to greater biological activity (e.g., burrows, megafauna) or occurrence of additional structure in the environment (e.g., infaunal structures, encrusting organisms, algae). No images analyzed comprised more than sparse amounts of flora/fauna cover ($> 2\%$ and $< 30\%$; Figure 4-6) and many images contained zero.

Representative images of CMECS substrate types are in Table 4-6.

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Table 4-4. The number of stills and the total area (m²) classified to each combination of main CMECS substrate component and secondary/co-occurring substrate groups for each of the 70 video transects in the ECC project area. Abbreviations are as follows: S/M = Sand/Mud, B = Boulder, C = Cobble, and P/G = Pebble/Granule.

Main and Co-Occurring CMECS Substrate Group Combinations	Number of Stills Classified to Group	Percent of Stills Classified to Group (%)	Area of Stills Classified to Group (m ²)	Percent of Area Classified to Group (%)
Biogenic Shell Hash with Moderate Gravelly Sand/Mud	9	0.24	6.52	0.20
Biogenic Shell Hash with Moderate Sand/Mud	21	0.56	26.15	0.79
Biogenic Shell Hash with Sparse Sand/Mud	7	0.19	5.03	0.15
Biogenic Shell rubble with Moderate Gravelly Sand/Mud	2	0.05	6.15	0.18
Biogenic Shell rubble with Sparse Sand/Mud	3	0.08	2.64	0.08
Gravel - Pebble/Granule	13	0.35	3.83	0.12
Gravel - Pebble/Granule with Sparse Shell	2	0.05	1.23	0.04
Gravel - Pebble/Granule with Trace Shell	1	0.03	0.43	0.01
Gravel Mixes - Pebble/Granule with S/M	17	0.46	6.25	0.19
Gravel Mixes - Pebble/Granule with S/M with Sparse Shell	37	1.00	15.96	0.48
Gravel Mixes - Pebble/Granule with S/M with Trace Shell	2	0.05	0.96	0.03
Gravelly Sand/Mud with B with Trace Shell	1	0.03	1.18	0.04
Gravelly Sand/Mud with C/P/G with Sparse Shell	1	0.03	0.79	0.02
Gravelly Sand/Mud with P/G	18	0.48	7.43	0.22
Gravelly Sand/Mud with P/G with Moderate Shell	12	0.32	2.74	0.08
Gravelly Sand/Mud with P/G with Sparse Shell	65	1.75	31.08	0.93
Gravelly Sand/Mud with P/G with Trace Shell	2	0.05	0.64	0.02
Sand/Mud	1,819	48.94	1,730.41	51.99
Sand/Mud with Moderate Shell	47	1.26	45.84	1.38
Sand/Mud with Sparse Shell	1,068	28.73	947.35	28.46
Sand/Mud with Trace Shell	570	15.33	485.94	14.60
Totals	3,717	100	3,328.54	100

Table 4-5. Area (m²) classified to CMECS substrate component groups for each of the 70 video transects in the ECC project area. Abbreviations are as follows: S/M = Sand/Mud, B = Boulder, C = Cobble, and P/G = Pebble/Granule. All substrate groups except sand/mud are considered 'complex' habitat by NMFS (2021).

Transect	Biogenic Shell Rubble	Biogenic Shell Hash	Gravel - Pebble/Granule	Gravel Mixes – P/G with S/M	Gravelly Sand/Mud			Sand/Mud
					with B	with C/P/G	with P/G	
ECC_001								107.03
ECC_002	1.20	9.07						84.13
ECC_003		0.44						65.89
ECC_004								47.90
ECC_005								13.57
ECC_006								29.04
ECC_007								62.39
ECC_008								42.88
ECC_009								36.90
ECC_010								9.10

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Transect	Biogenic Shell Rubble	Biogenic Shell Hash	Gravel - Pebble/ Granule	Gravel Mixes – P/G with S/M	Gravelly Sand/Mud			Sand/Mud
					with B	with C/P/G	with P/G	
ECC_011		0.55						29.62
ECC_012								8.16
ECC_013								63.34
ECC_014								64.73
ECC_015								62.03
ECC_016								19.10
ECC_017								56.37
ECC_018								61.63
ECC_019								145.94
ECC_020								54.33
ECC_021	0.48	3.91						99.77
ECC_022								84.41
ECC_023								40.88
ECC_024								48.68
ECC_025			4.26	6.30			2.77	8.23
ECC_026								26.71
ECC_027							2.59	25.21
ECC_028							0.95	15.18
ECC_029								26.41
ECC_030								7.96
EH_002				0.36			1.39	27.12
EH_003								10.94
EH_004								31.71
EH_005								49.29
EH_006		0.29						12.32
EH_007				0.40			2.50	26.68
EH_008		0.58		0.81			5.58	28.00
EH_009		0.54	1.23	13.73			13.10	2.91
EH_010		0.39		1.56			8.15	5.84
EH_011								50.24
EH_012								40.94
EH_013								38.56
EH_014								54.23
EH_015					1.18	0.79		54.94
EH_016							0.47	59.26
EH_017								14.85
EH_018								20.34
EH_019								76.12
EH_020		0.33						90.32
EH_021								15.82
EH_022								54.03
EH_023								41.99
EH_024								58.31
EH_025								44.87
EH_026		5.33						50.13
EH_027		3.87						50.34

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Transect	Biogenic Shell Rubble	Biogenic Shell Hash	Gravel - Pebble/ Granule	Gravel Mixes – P/G with S/M	Gravelly Sand/Mud			Sand/Mud
					with B	with C/P/G	with P/G	
EH_028		0.38					0.72	12.24
EH_029								25.38
EH_030								25.52
EH_031								23.61
EH_032								24.08
EH_033								43.28
EH_034								45.98
EH_035								30.48
EH_036		2.12						99.12
EH_037								89.02
EH_038	7.11	9.90					1.16	62.70
EH_039							2.15	49.31
EH_040							0.37	135.58
EH_041								85.61
Total Area (m²) per Main CMECS Group in ECC	8.79	37.69	5.49	23.17	1.18	0.79	41.90	3,209.54

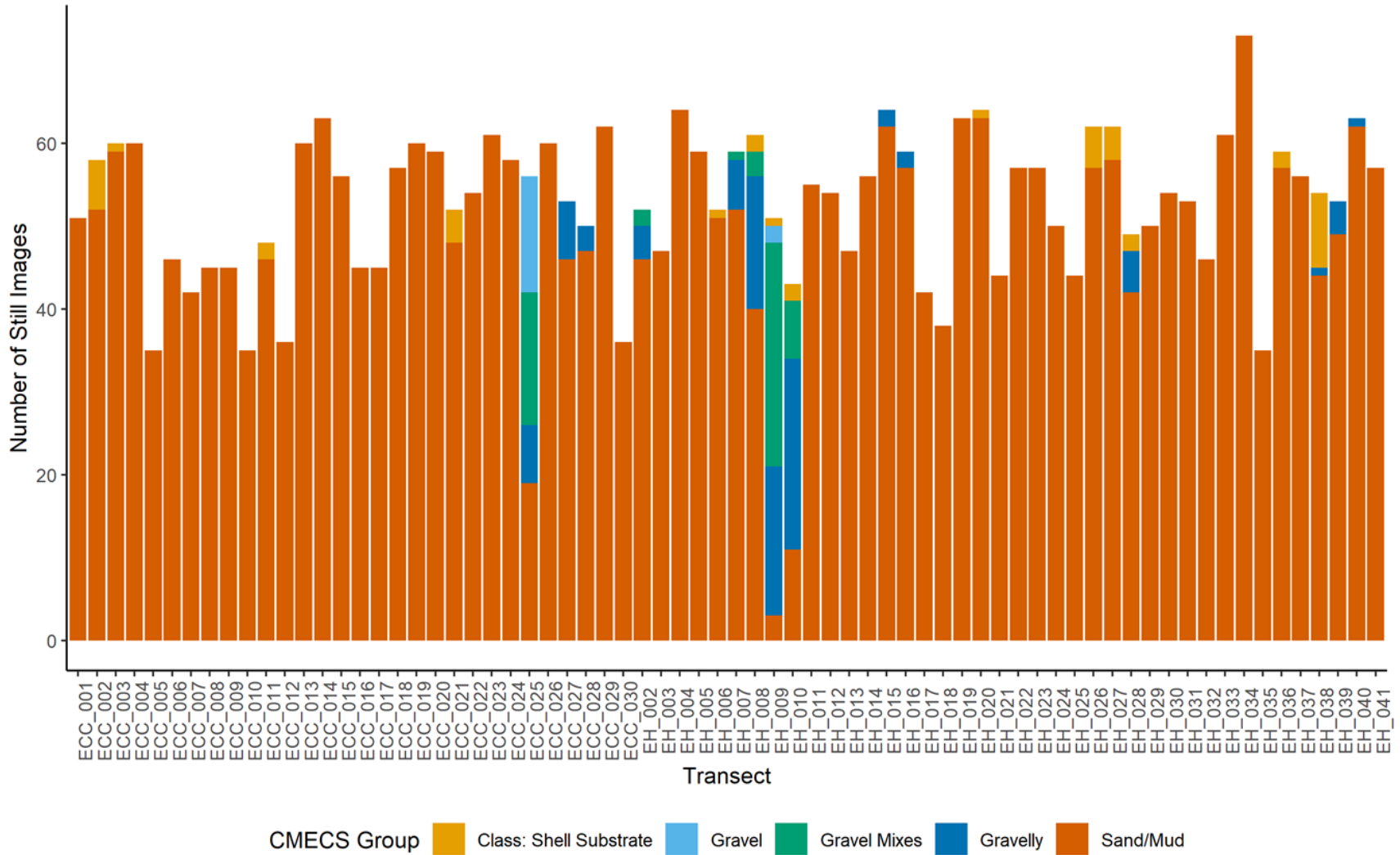


Figure 4-4. The number of still images classified to CMECS substrate component groups within each video transect in the ECC project area.

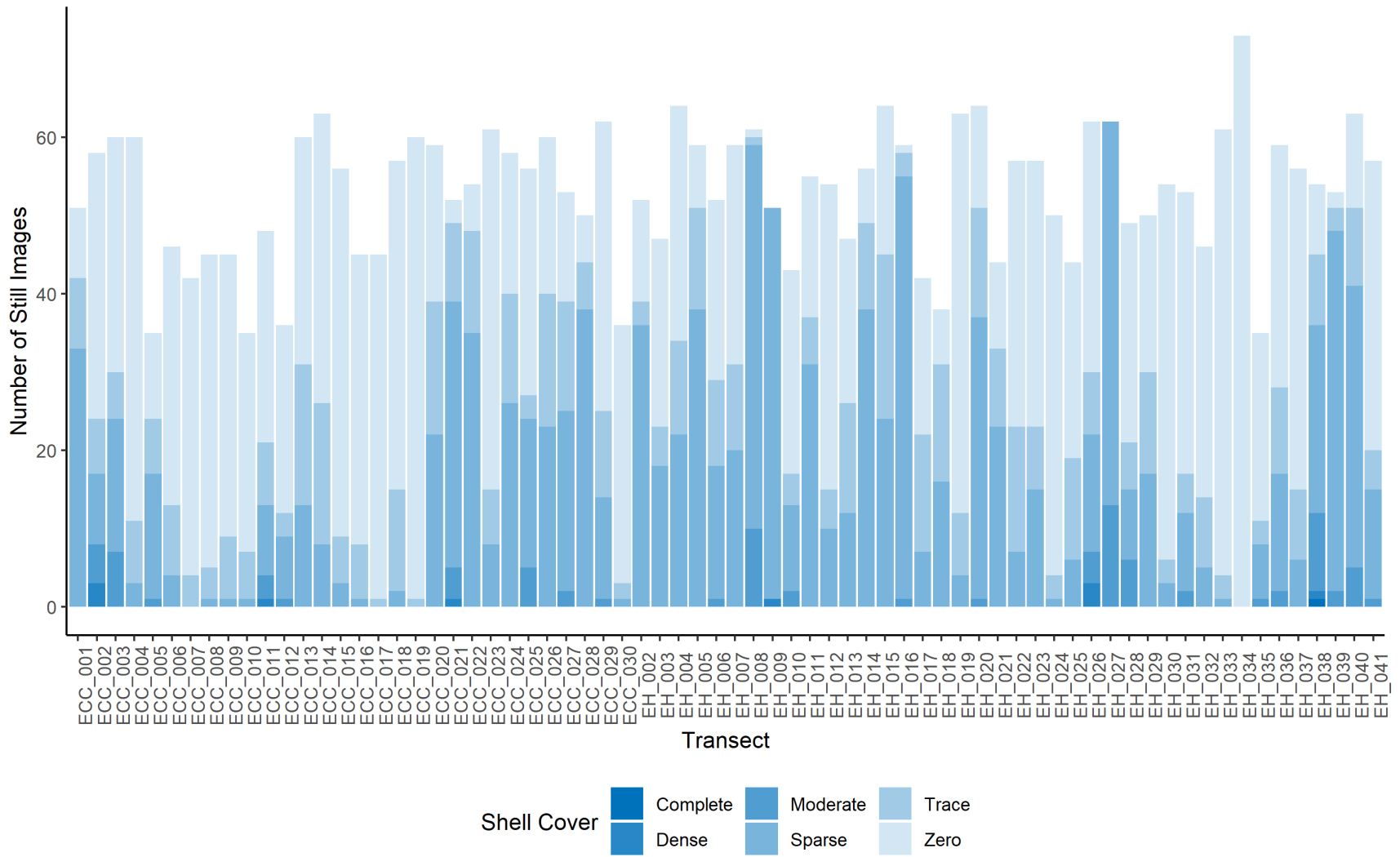


Figure 4-5. The number of still images classified to each shell cover density category within each video transect in the ECC project area. Trace is ≤ 2%, Sparse is > 2 to < 30%, Moderate is 30 to < 70%, Dense is 70 to < 90%, and Complete is 90 to 100% cover.

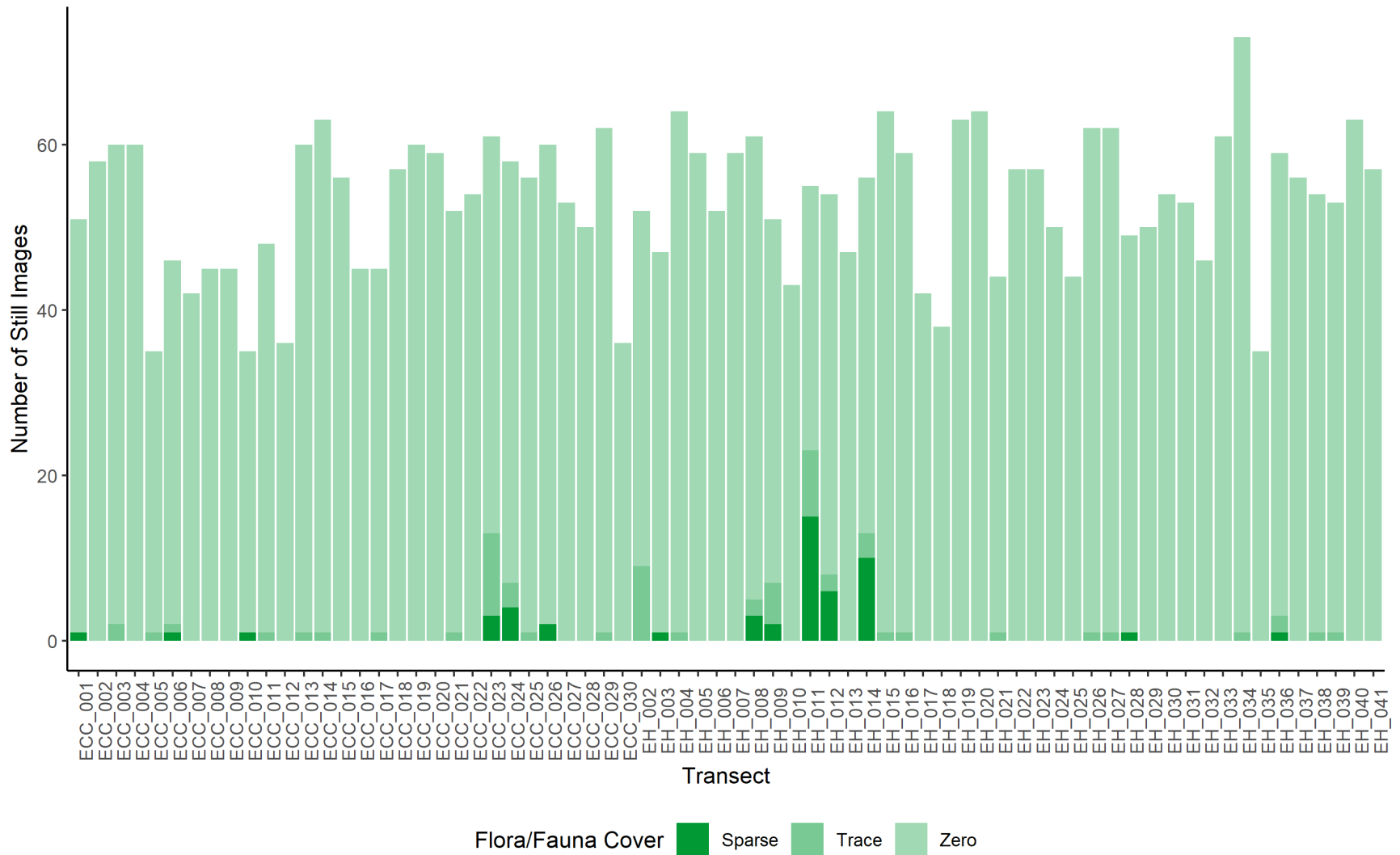
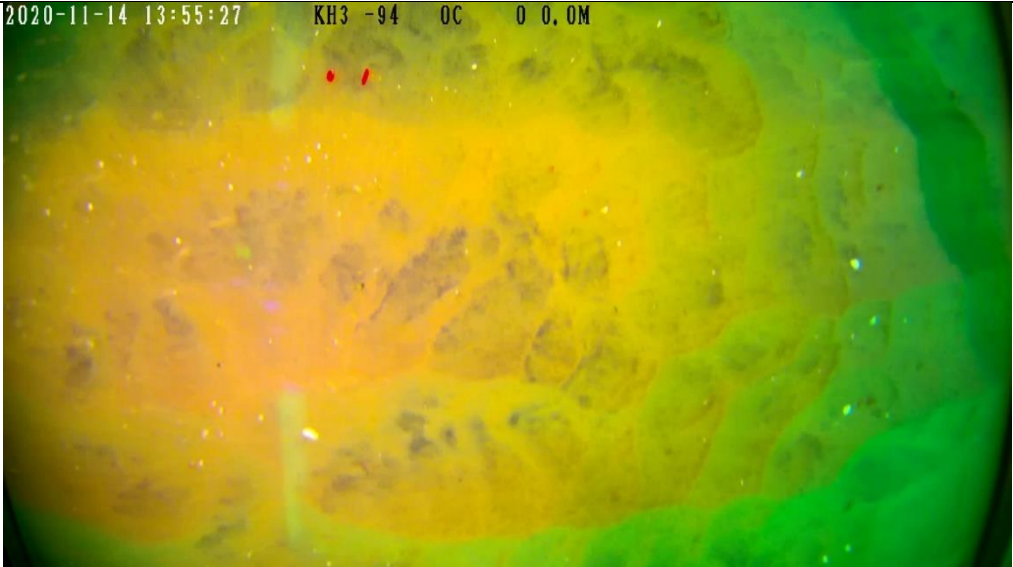



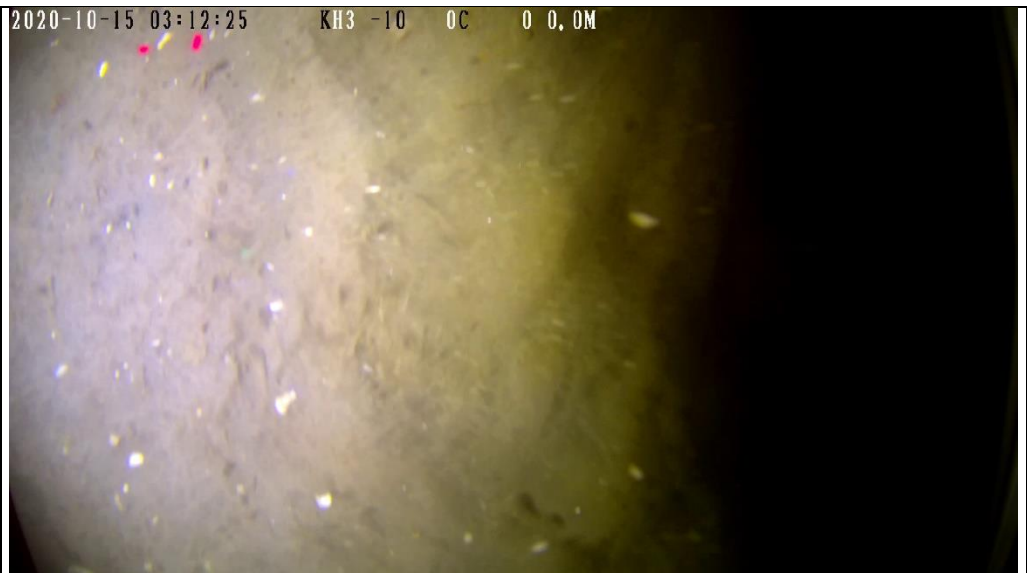

Figure 4-6. The number of still images classified to each flora/fauna density category within each video transect in the ECC project area. Trace is ≤ 2%, Sparse is > 2 to < 30%, Moderate is 30 to < 70%, Dense is 70 to < 90%, and Complete is 90 to 100% cover.

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Table 4-6. Representative still images of various habitat types observed in the ECC and EH sampling areas. Still number in parenthesis.

<p>Geologic Unconsolidated Flat Sand/Mud ECC_019 (126)</p>	
<p>Geologic Unconsolidated Fine Sand/Mud Trace Shell Hash ECC_005 (58)</p>	

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<p>Geologic Unconsolidated Fine Sand/Mud Sparse Shell Hash ECC_005 (64)</p>	<p>2020-10-15 03:12:25 KH3 -10 0C 0 0,0M</p> 
<p>Geologic Unconsolidated Fine Sand/Mud Sparse Shell Rubble ECC_005 (48)</p>	<p>2020-10-15 03:08:56 KH3 -10 0C 0 0,0M</p> 

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<p>Biogenic Shell Hash Sparse Mud/Sand ECC_011 (63)</p>	<p>2020-10-15 19:10:16 KH3 -95 OC 0 0,0M</p>  <p>This photograph shows a seabed covered with a sparse layer of biogenic shell hash and mud/sand. The shells are small and scattered across the surface. The water is dark, and the overall scene is dimly lit.</p>
<p>Biogenic Shell Hash Moderate Gravelly Sand/Mud EH_010 (5)</p>	<p>2020-11-15 04:07:10 KH3 -89 OC 0 0,0M</p>  <p>This photograph shows a seabed with a moderate amount of biogenic shell hash and gravelly sand/mud. The shells are more densely packed than in the previous image, and the overall appearance is more textured. The water is dark, and the scene is dimly lit.</p>

4.2 Grab Sample Stations

We assigned NMFS (2021) modified CMECS classifications to each benthic grab sample station based on visual inspection of the sample once on board the survey vessel, laboratory analysis of grain size, and still image point count analysis for grabs with insufficient sediment recovery and those with substantial amounts of shell cover based on the imagery of the grab bucket contents. Substrate classification results are presented as a hierarchy in Table 4-7 and Table 4-8 and Figure 4-7 and Figure 4-8.

4.2.1 Wind Energy Area

Appendix B shows the images of each grab sample along with the CMECS classifications and d50 (median grain size) for each sample. Samples were dominated by fine unconsolidated substrate of geologic origin, with 80% of all WEA/WH grab samples classified as sand or finer. The most abundant classification was fine/very fine sand with 75 of the 128 total samples, and the average d50 was 0.3114 mm (Figure 4-7). There were no failed grab stations that required image analysis and all CMECS classifications were made from GeoTesting lab data.

Nine WEA samples and 18 WH samples contained $\geq 5\%$ gravel that classified them as complex habitat according to the NMFS (2021) modified CMECS classifications, and no cobbles or boulders were present in any samples. These 27 samples equate to only 21% of the 128 total grab samples, with only four samples containing $\geq 30\%$ gravel (WEA_042, WH_037, WH_053A). One sample (WH_058) was classified as Sandy Gravel according to the lab results but then reclassified as biogenic Shell Hash, as $> 50\%$ of the substrate was shell hash of biogenic origin upon further review of grab sample via image analysis of sample bucket (see 2.2.1.1). Only three samples were classified as muddy sand or muddy (WEA_051, WH_019, WH_042). The hierarchical CMECS classifications of each grab sample is in Table 4-7.

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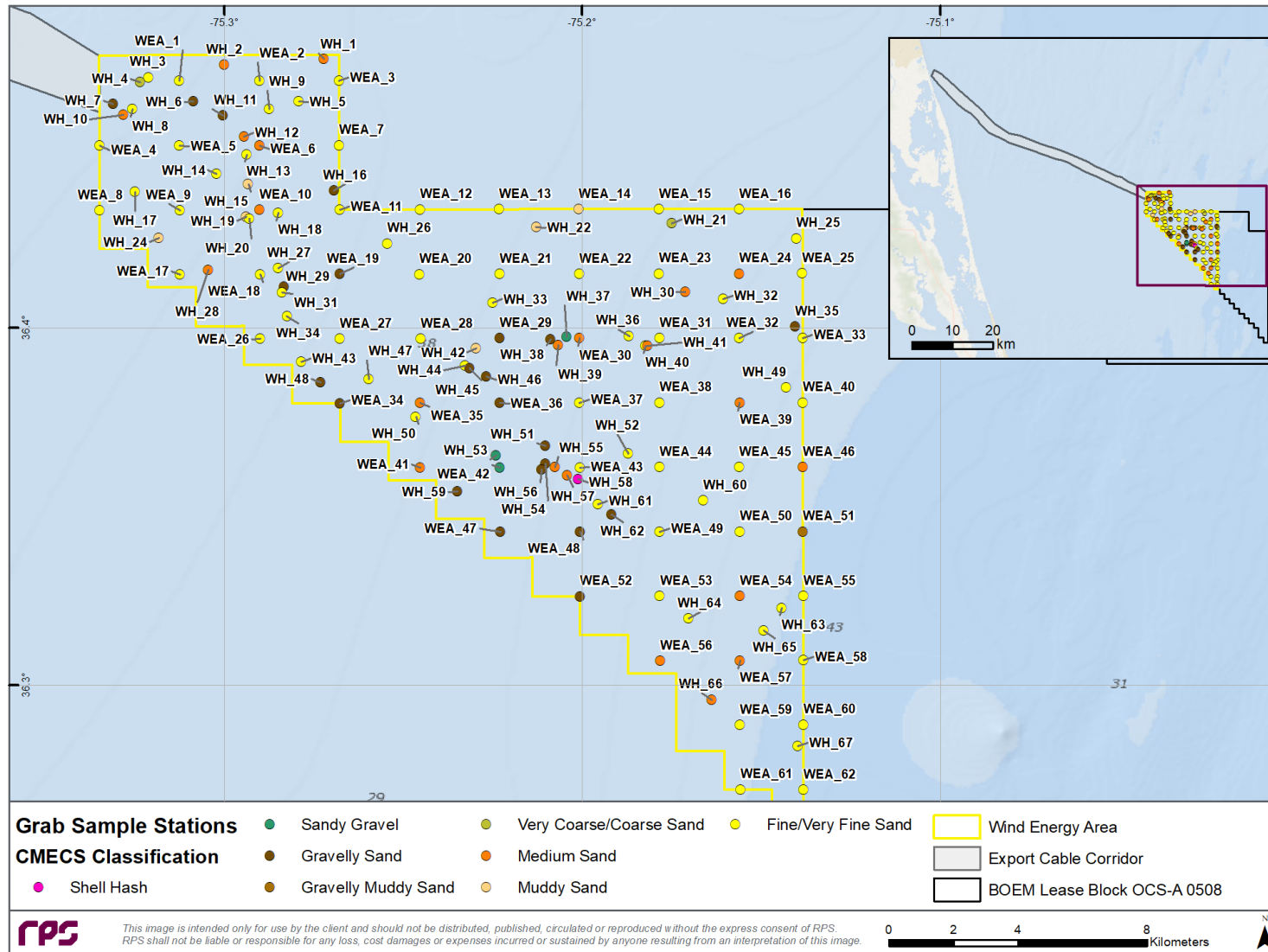
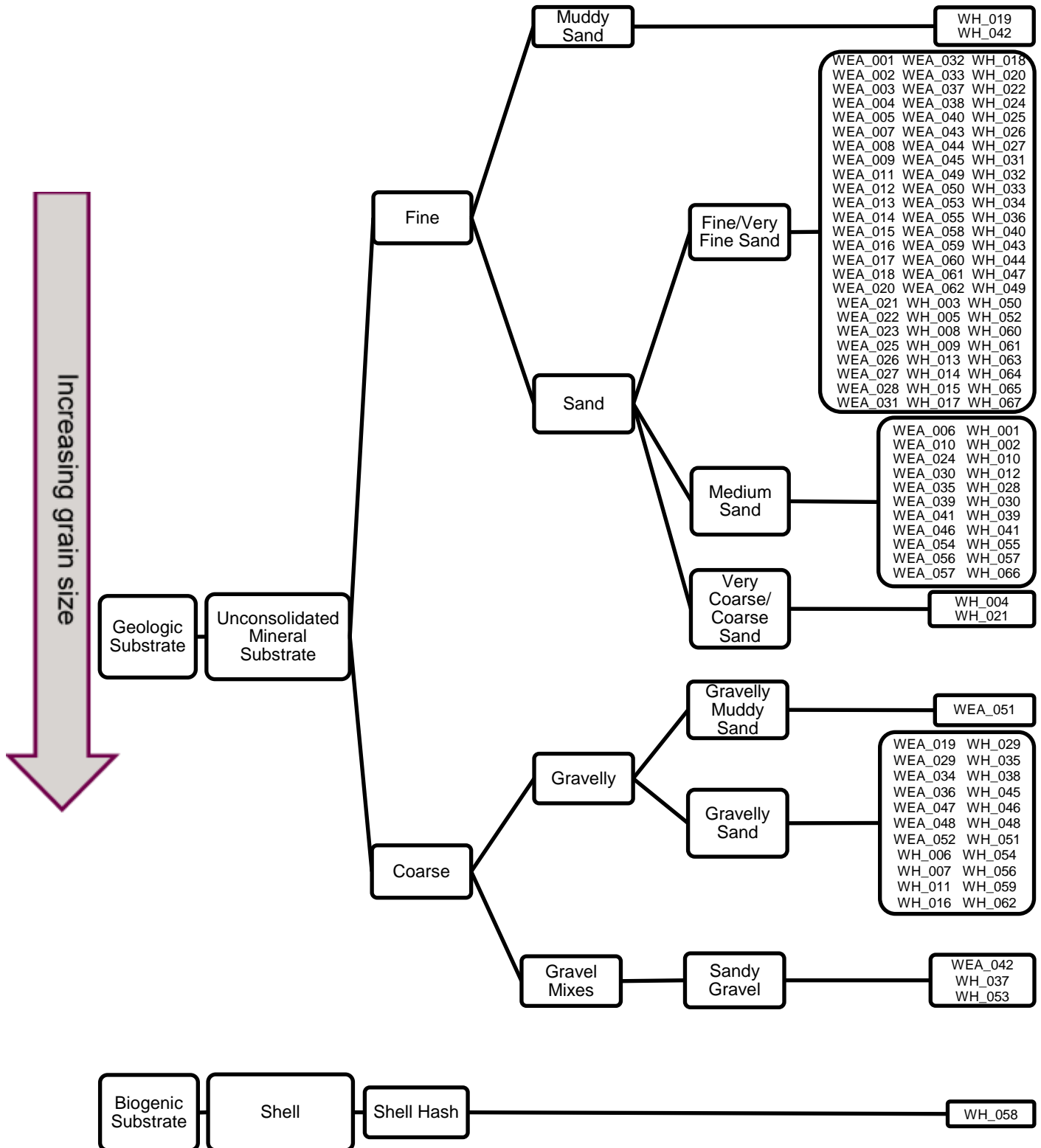


Figure 4-7. CMECS classification designated for each benthic grab sample collected in the WEA. Point colors indicate different CMECS classifications.

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Table 4-7. CMECS hierarchical classification of substrates collected at each grab sample in the WEA region.

Origin	Class	Subclass	Group	Subgroup	Grab Sample
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4.2.2 Offshore Export Cable Corridor

Appendix B shows the images of each grab sample and along with the CMECS classifications and d50 (median grain size) for each sample. Samples were dominated by fine unconsolidated substrate of geologic origin, with 82% of all ECC/EH grab samples classified as sand or finer. The most abundant classification was fine/very fine sand with 45 of the 72 total samples, and the average d50 was 0.3094 mm (Figure 4-8). There were no failed grab stations that required image analysis and all CMECS classifications were made from GeoTesting lab data.

Five ECC samples and eight EH samples contained $\geq 5\%$ gravel, designating them as complex habitat according to the NMFS (2021) modified CMECS classifications. These 13 samples equate to only 18% of the 72 ECC/EH grab samples, with only four samples containing $\geq 30\%$ gravel (ECC_027B, EH_003D, EH_008, EH_009D). No samples were classified as biogenic Shell Hash. Ten samples were classified as sandy mud, muddy sand, or muddy. Three of those ten samples were sandy mud or muddy sand, while the other seven were gravelly or gravel mixes. The hierarchical CMECS classifications of each grab sample is in Table 4-8.

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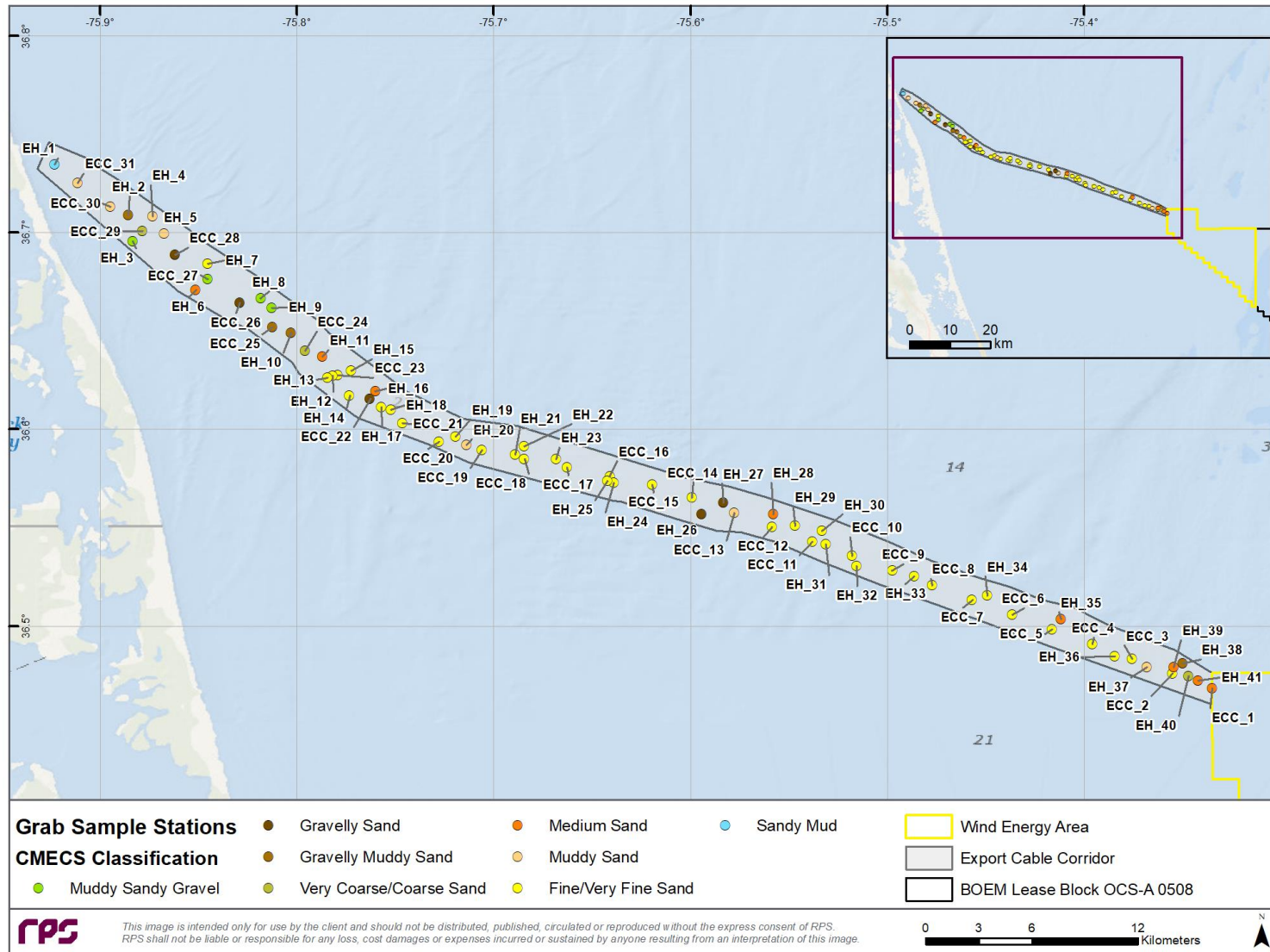
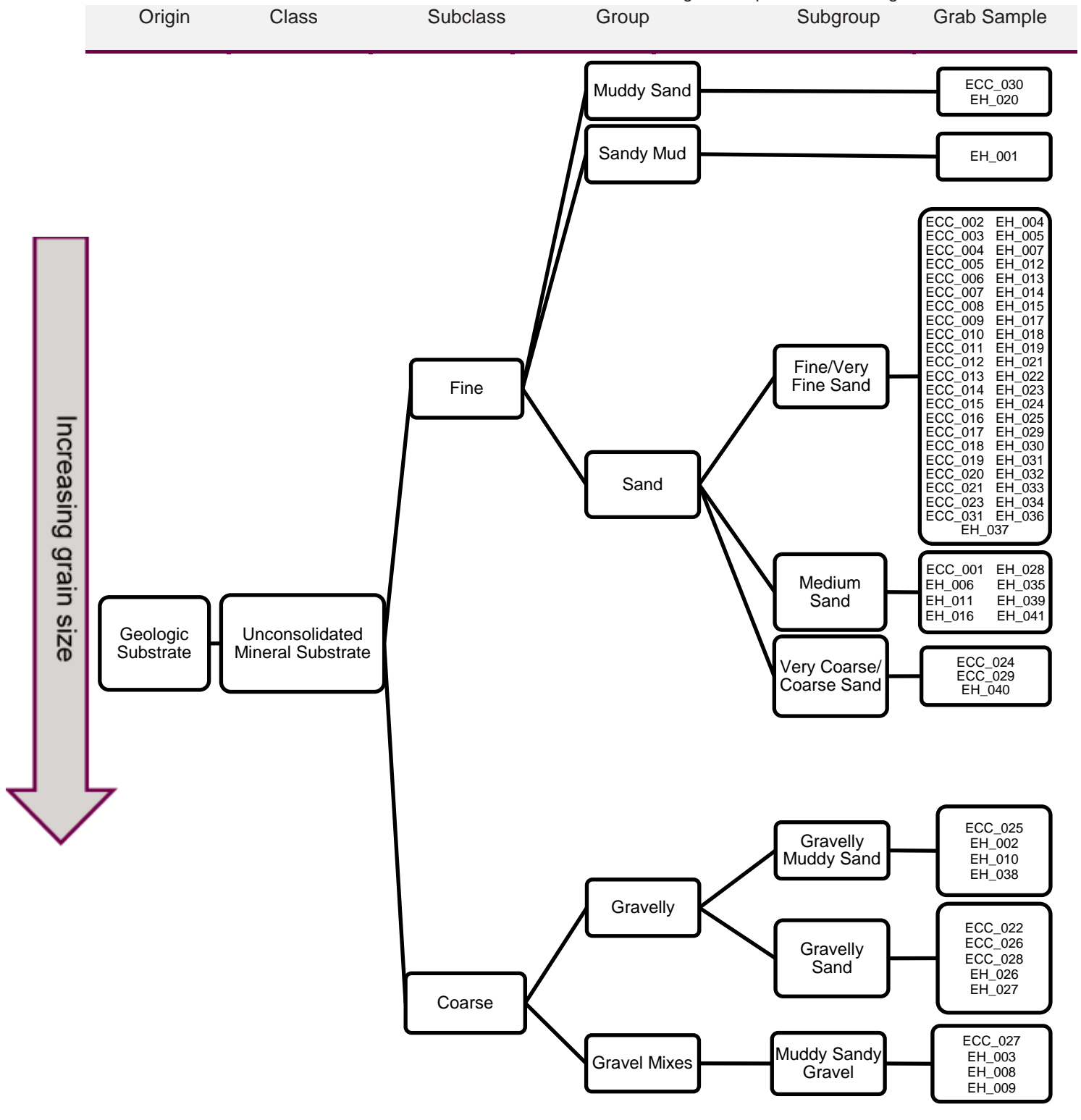


Figure 4-8. CMECS classification designated for each benthic grab sample collected in the ECC. Point colors indicate different CMECS classifications.

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Table 4-8. CMECS hierarchical classification of substrates collected at each grab sample in the ECC region.



5 SUMMARY

CMECS is a hierarchical system with classification thresholds based primarily on the percent and composition of gravel particles (≥ 2 mm) to identify substrates that may be considered “complex” by NMFS (2021) for the purposes of essential fish habitat mapping. Of the 200 benthic grab samples, 5 ECC samples, 8 EH samples, 9 WEA samples, and 18 WH samples contained $\geq 5\%$ gravel that classified them as complex habitat. These 40 samples equate to 20% of the 200 total grab samples, with 8 samples containing $\geq 30\%$ gravel (ECC_027B, EH_003D, EH_008, EH_009D, WEA_042, WH_037, WH_053A, and WH_058). Overall, samples were dominated by fine unconsolidated substrate of geologic origin, with 80% of all grab samples classified as sand or finer. The most abundant classification was fine/very fine sand, which defined 120 of the 200 total samples.

For the percent cover analysis of the video transects, 10,343 images were reviewed, covering 9,645 m² and 3,329 m² of the seafloor in the WEA and ECC project regions, respectively. Each image was assigned a CMECS substrate component classification. The transects were fairly homogenous in CMECS classification, shell cover, and flora/fauna cover throughout their lengths and between transects. Nearly all of the surface area analyzed in both the WEA (93%) and ECC (95%) was composed of fine unconsolidated sand/mud of geologic origin, and thus not considered complex habitat. Most of the remaining surface area in both project regions was composed of gravelly sand with pebble/granules (5% to $< 30\%$ gravel particles of 2 – 64 mm size) or shell hash substrate of biogenic origin. Biogenic substrates and substrates with $\geq 5\%$ gravel are considered complex habitat. Shell cover was a co-occurring substrate type in about half of the images in both project areas, but most images contained sparse ($< 30\%$ cover) or trace ($\leq 2\%$ cover) amounts.

Similarly, flora and fauna cover did not exceed sparse amounts for any images in the percent cover analysis. Megafauna, infaunal structures (i.e., amphipod tubes), and sand dollars were observed to cover 4 m² in the WEA project area as whole. In the ECC, 3 m² of flora/fauna cover was composed primarily of a variety of megafauna (fish species, crabs, skates, skate egg cases, and sea urchins), but also included infaunal structures, encrusting organisms, and bushy plant-like organisms, too.

Review of the 198 video transects produced 4,325 observations of features. A total of 1,992 features, including 1,923 organisms from 6 phyla, were identified and recorded while reviewing the 128 WEA video transects. The most numerous organisms were sea robins, unidentified fish, squid, and skate eggs composing 43%, 9%, 6%, and 6% of all organisms, respectively. In the ECC, a total of 2,333 features, including 2,280 organisms from 6 phyla, were identified and recorded from 70 video transects. The most numerous organisms were sea urchins, Atlantic silversides, and skate eggs composing 30%, 12%, and 12% of all organisms, respectively.

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A total of 30,259 macroinvertebrates were collected in sediment grab samples across the entire project area. Organisms contained in the samples were primarily from the phyla Arthropoda, Annelida, Nematoda, and Mollusca. Organisms from 142 families (or NLPTL) and 311 species (or NLPTL) were identified across all samples with the phyla Annelida, Arthropoda, and Mollusca accounting for much of the unique taxa.

The CMECS substrate component performed reasonably well at predicting which invertebrate assemblages may be present at a given station. However, the predictive power varied by group, as displayed by cluster patterns in the NMDS plots. For instance, although the results displayed evidence of dissimilarity (opposite ordination of points in NMDS plot) between the invertebrate assemblages from samples with finer substrate classifications (muddy sand, fine/very fine sand, and medium sand) and coarser substrate classifications (gravelly muddy sand, very coarse sand), there was high degree of overlap between the assemblages within most substrate types. Thus, CMECS substrate component alone did not define the macroinvertebrate community.

6 REFERENCES

- ASTM D6913 / D6913M-17, Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis, ASTM International, West Conshohocken, PA, 2017a, Available from: www.astm.org
- ASTM D7928-17, Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis, ASTM International, West Conshohocken, PA, 2017b, Available from: www.astm.org
- Bousfield, E.L. 1973. Shallow-Water Gammaridean Amphipoda of New England. Cornell University Press, xii. 312pp.
- Bureau of Ocean Energy Management (BOEM). 2019. Guidelines for Providing Benthic Habitat Survey Information for Renewable Energy Development on the Atlantic Outer Continental Shelf Pursuant to 30 CFR Part 585. June 2019. BOEM Office of Renewable Energy Programs, US Department of the Interior. 9 pp.
- Clarke, K.R. 1993. Non-parametric multivariate analyses of changes in community structure. Australian Journal of Ecology, 18: 117-143.
- Cutler, E.B. 1994. The Sipuncula: Their Systematics, Biology, and Evolution. Cornell University Press, xvii. 453 pp.
- Federal Geographic Data Committee (FGDC). 2012. Coastal and Marine Ecological Classification Standard, June 2012. FGDC-STD-018-2012. 353 pp.
- National Marine Fisheries Service (NMFS). 2021. Recommendations for Mapping Fish Habitat. NMFS GARFO Habitat Conservation and Ecosystem Services Division. March 2021. 22 pp.
- Oksanen, J., Blanchet, F. G., Friendly, M., Kindt, R., Legendre, P., McGlenn, D., Minchin, P.R., O'Hara, R. B., Simpson, G. L., Solymos, P., Henry, M., Stevens, H., Szoecs, E., and Wagner, H. 2019. vegan: Community Ecology Package. R package version 2.5-6. <https://CRAN.R-project.org/package=vegan>
- R Core Team. 2020. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.
- Trygonis, V., Sini, M. 2012. photoQuad: a dedicated seabed image processing software, and a comparative error analysis of four photoquadrat methods. Journal of Experimental Marine Biology and Ecology 424-425, 99-108. doi:10.1016/j.jembe.2012.04.018
- U.S. Environmental Protection Agency (EPA). 2004. Method 9060A Total Organic Carbon. SW-846: Hazardous Waste Test Methods, 5 pp.
- Winston, J.E., Hayward, P.J. 2012. The Marine Bryozoans of the Northeast Coast of the United States: Maine to Virginia. Virginia Museum of Natural History Memoir 11, xii. 180pp.

APPENDIX A: BENTHIC GRAB FIELD NOTES

Provided in separate PDF.

APPENDIX B: GRAB SAMPLE IMAGES

Provided in separate PDF.

APPENDIX C: UNDERWATER VIDEO FIELD NOTES

Provided in separate PDF.

APPENDIX D: CMECS CLASSIFICATIONS FOR STILL IMAGES DERIVED FROM VIDEO ANALYSIS

Provided in separate PDF.