

## **Appendix J – Benthic Survey Report**



# **BENTHIC SURVEY REPORT**

## **Virginia Offshore Wind Technology Advancement Project (VOWTAP)**

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## EXECUTIVE SUMMARY

Tetra Tech, Inc. conducted a benthic survey for the Virginia Offshore Wind Technology Advancement Project (VOWTAP or Project) in June of 2013. The benthic survey covered six Outer Continental Shelf (OCS) sub-blocks, identified as the Research Lease Area, and an approximately 27-mile (43-kilometer) corridor to accommodate the siting of an offshore electric transmission cable, identified as the Export Cable.

Survey activities were planned and executed in accordance with a written Benthic Survey Plan developed in accordance with Bureau of Ocean Energy Management (BOEM) “Guidelines for Providing Benthic Habitat Information for Renewable Energy Development on the Atlantic OCS pursuant to 30 CFR Part 585,” dated February 14, 2013. The Benthic Survey Plan was submitted to regulatory agencies for review and comment prior to execution of the surveys.

The benthic survey was conducted in coordination with the Project’s marine geophysical and shallow geotechnical site characterization surveys. A power grab sampler, with positioning and camera systems attached, was used to collect benthic samples in the Research Lease Area and at specified intervals along the Export Cable corridor. Analog and digital video camera systems were mounted to the benthic grab sampler to document type of surface sediments and any marine life at the sample sites.

The combined results of the benthic and geophysical and shallow geotechnical surveys indicate that all benthic habitats within the lease block aliquots and cable corridor were softbottom; no hardbottom habitats were observed within the survey area. Sand dominated the benthic substrate composition across all grab sample locations, with a mean of 91.5 percent (primarily fine sand), followed by silt and clay (6.3 percent), and gravel (2.2 percent). Annelids (specifically, polychaete worms) were numerically dominant across all sampling areas (Research Lease Area, cable corridor, and reference sites), followed by mollusks, then crustaceans. Mollusks had the highest overall biomass, representing approximately 66 percent of the total. Annelids were second in total biomass of the combined dataset (17 percent), and crustaceans represented approximately 11 percent of the combined total biomass.

Overall, the composition of sediment types as measured by grain size and organic content analysis was consistent with the expected site conditions, and similar between the Project and reference sites within both the Research Lease Area and the Export Cable corridor. The coarse-grained sand of the VOWTAP area provides a uniform and rather simple (non-complex) habitat for benthic infaunal organisms typical of this region. This type of sandy substrate provides habitat for infaunal annelids and molluscs, and does not support any seagrasses, hardbottom, livebottom, or any other unique habitat features. No hardbottom substrate was observed in the VOWTAP lease and cable corridor sites. As expected, all surveyed sites exhibit the type of softbottom habitat that is ubiquitous within the Virginia Wind Energy Area located adjacent to the Project site, and the Project sites did not differ substantially from the reference sites.

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## ATTACHMENTS

Attachment A – Sample Photo Log: Underwater and On-deck Imagery

Attachment B – Benthic Taxonomy; Laboratory Data

Attachment C – Surface Sediments within the VOWTAP; Plate 7, Sheets 1–4 from the Draft Marine Site Characterization Survey

## ACRONYMS AND ABBREVIATIONS

Acronym	Definition
ASTM	American Society for Testing and Materials
BOEM	Bureau of Ocean Energy Management
CFR	Code of Federal Regulations
CMECS	Coastal and Marine Ecological Classification Standard
Dominion	Virginia Electric and Power Company, a wholly-owned subsidiary of Dominion Resources Inc.
HD	high definition
km	kilometer
km <sup>2</sup>	square kilometers
kV	kilovolts
MLLW	Mean Lower Low Water
NAD83	North American Datum 1983
NOAA	National Oceanic and Atmospheric Administration
OCS	Outer Continental Shelf
Tetra Tech	Tetra Tech, Inc.
TOC	total organic carbon
Project	Virginia Offshore Wind Technology Advancement Project
RAP	Research Activities Plan
USBL	ultra-short baseline positioning system
USFWS	U.S. Fish and Wildlife Service
UTM	Universal Transverse Mercator
VOWTAP	Virginia Offshore Wind Technology Advancement Project
WEA	Wind Energy Area



# 1 INTRODUCTION

Tetra Tech, Inc. (Tetra Tech) conducted a benthic survey for the Virginia Electric and Power Company, a wholly-owned subsidiary of Dominion Resources, Inc. (Dominion) for the Virginia Offshore Wind Technology Advancement Project (VOWTAP or Project) in June of 2013. VOWTAP is a two-turbine, 12 megawatt, offshore wind technology demonstration project proposed approximately 24 nautical miles (27 statute miles, 43 kilometers [km]) offshore of Virginia Beach, Virginia (Figure 1). The Project will also include an approximately 27-mile (43-km) subsea 34.5-kilovolt (kV) electric transmission cable (Export Cable) that will pass through state and federal waters, an onshore electric transmission cable (Onshore Interconnection Cable), and ancillary onshore facilities. The primary objectives of this research project are to test technological and other innovations in the deployment of offshore wind projects with the goal of achieving the cost reductions necessary to support an economically viable commercial-scale offshore wind industry in the United States.

The benthic survey conducted by Tetra Tech will support and inform Dominion and the VOWTAP team in the Project design and engineering phase and will support the Research Activities Plan (RAP) filing to the Bureau of Ocean Energy Management (BOEM). The survey was developed and carried out in accordance with the 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" dated February 14, 2013 (BOEM 2013).

## 1.1 Survey Area Description

VOWTAP marine surveys were performed in U.S. federal waters within Outer Continental Shelf (OCS) Lease Blocks 6111 (aliquots D, H, L) and 6112 (aliquots E and I) as depicted in Table 1 and Figure 1. Each offshore aliquot measures 1.2 square kilometers (km<sup>2</sup>). This area represents the proposed VOWTAP Research Lease Area. A 27-mile- (43-km-) long and 300-meter- (m-) wide cable corridor that will support the siting of the proposed VOWTAP Export Cable was also surveyed.

**Table 1. VOWTAP Benthic Survey Area Lease Blocks.**

Federal Lease Blocks	6011	6112
	Aliquots	
Benthic Survey Area	D, H, L	E, I

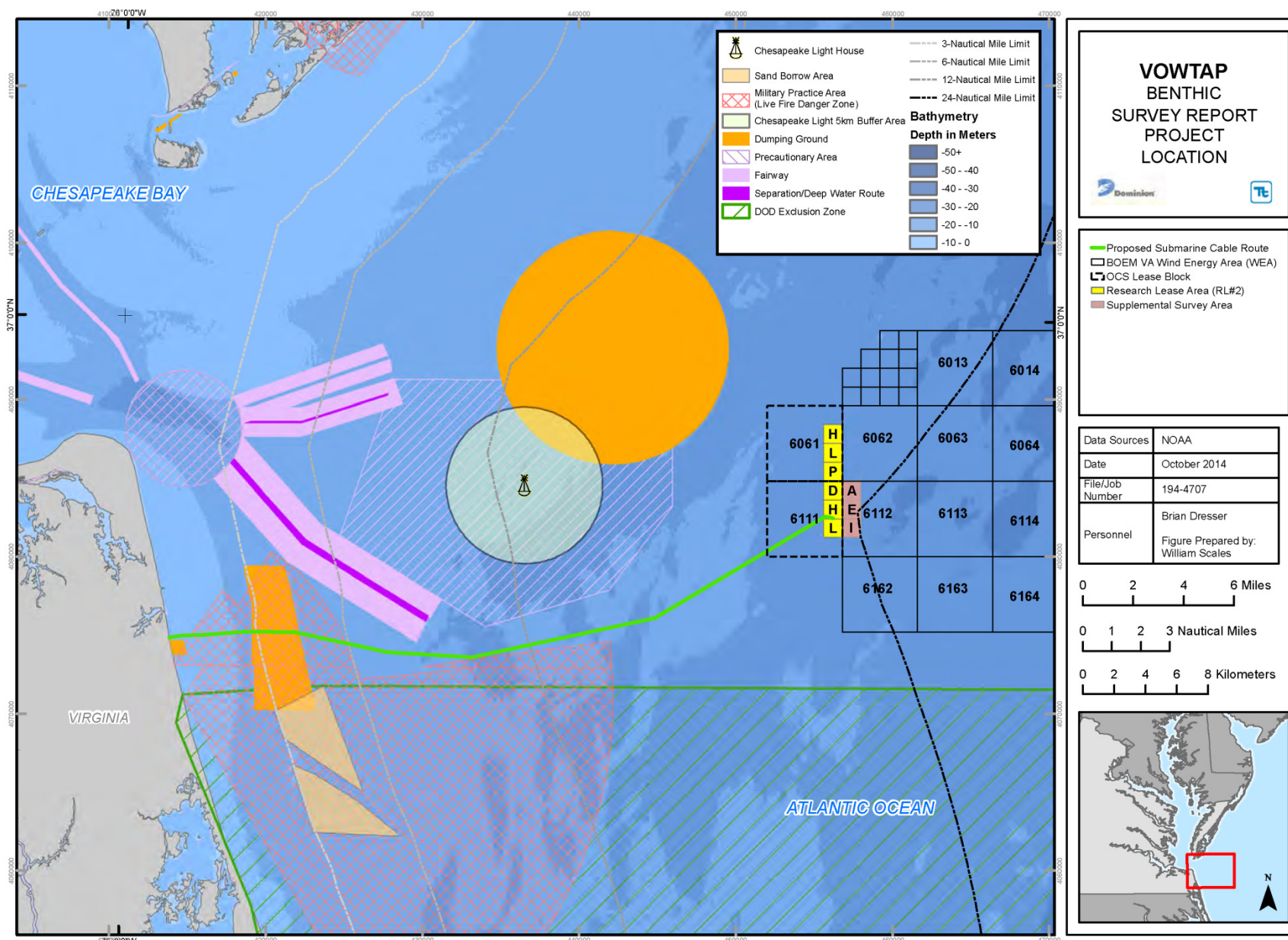


Figure 1. Project Location

## 1.2 Existing Benthic Resource Conditions

The Mid-Atlantic Bight is an area of relatively flat topography, composed primarily of soft sediments (Steimel and Zetlin 2000). Benthic habitats in this region may be divided into seven bathymetric/morphologic subdivisions, as documented by Johnson (2002): the inner shelf, central shelf, central and inner shelf swales, outer shelf, outer shelf swales, shelf break, and continental slope. These subdivisions are based on several factors, including depth, faunal zone, and characteristic macrofauna (BOEM 2012).

Substrate conditions within the vicinity of the VOWTAP were initially assessed using the Marine Cadastre Viewer (NOAA and BOEM 2013), as well as The Nature Conservancy's Benthic Habitat Model (Greene et al. 2010), which both suggested that the portion of the continental shelf where the VOWTAP is located is predominately sand. This was also supported by other regional studies located within and adjacent to the VOWTAP (Cutter and Diaz 1998; Diaz et al. 2004; USACE 2009; BOEM 2012). U.S. Fish and Wildlife Service (USFWS) benthic sampling programs determined that the most abundant taxa in Virginia nearshore habitats (in descending order) were polychaete worms, bivalve mollusks, and amphipods (USACE 2009). Cutter and Diaz (1998) noted a benthic community composition dominated by polychaetes, amphipods, decapods, bivalves, sand dollars, and lancelets. An additional study by Diaz et al. (2004) found polychaete species to be the most abundant benthic group during the 2002-2005 monitoring period.

BOEM (2012) provided an overview of the existing benthic resources expected to occur within the Virginia Wind Energy Area (WEA), which is located immediately adjacent to the proposed VOWTAP Research Lease Area (Figure 1). The Virginia WEA is located in the inner to central shelf zone, where polychaete worms are expected to dominate (BOEM 2012). Sandy sediments within the Project sites and reference sites supported a diverse fauna dominated by polychaete species and, to a lesser extent, mollusks and arthropods. Marine benthic organism distribution in the Virginia WEA is influenced by habitat, as well as physical and chemical characteristics of the water (e.g., depth, temperature, salinity, nutrient concentrations, and ocean currents) (Levinton 2009). The higher number of species (diversity) and abundance of marine invertebrates in coastal water habitats, relative to the open ocean, is a result of the food and protection that coastal water habitats provide (Levinton 2009). The diversity and abundance of Arthropoda (e.g., crabs, lobsters, and barnacles) and Mollusca (e.g., snails and clams) are highest on the seafloor over the continental shelf (compared with the abyssal plain) due to high productivity and complex habitats relative to typical soft bottom habitat of the deep ocean (Karleskint et al. 2006). These benthic invertebrates are important in the marine food web as prey for many higher organisms (e.g., fish and whales), as scavengers and recyclers of nutrients, and as habitat-forming organisms. Table 2 includes the benthic infaunal organism groups commonly found in sand-bottom habitat in the mid-Atlantic bight.

**Table 2. Common Marine Benthic Organisms within Coastal Virginia Waters**

Common Name (Taxonomic Group)	Description
Flatworms (Phylum Platyhelminthes)	Mostly bottom-dwelling; simplest form of marine worm with a flattened body.
Hydroids and corals (Phylum Cnidaria)	Bottom-dwelling animals either habit-forming or attached to other substrates.
Ribbon worms (Phylum Nemertea)	Bottom-dwelling marine worms with a long extension from the mouth (proboscis) that helps capture food.
Segmented worms (Phylum Annelida)	Mostly bottom-dwelling, highly mobile marine worms; many tube-dwelling species. Includes polychaetes and oligochaetes.
Peanut worms (Phylum Sipuncula)	Named for their similarity in shape to shelled peanuts. Primarily occur in shallow waters. While some burrow into sand and mud, others live in crevices in rocks or in empty shells.
Squid, bivalves, clams, quahog, sea snails, chitons, conchs (Phylum Mollusca)	Mollusks are a diverse group of soft-bodied invertebrates with a specialized layer of tissue called a mantle. Mollusks such as squid are active swimmers and predators, while others such as sea snails are predators or grazers; clams may be filter feeders or deposit feeders.
Shrimp, crab, lobster, barnacles, copepods (Phylum Arthropoda)	Bottom-dwelling or pelagic; some are immobile; with an external skeleton; all feeding modes from predator to filter feeder
Sea stars, sea urchins, sea cucumbers (Phylum Echinodermata)	Bottom-dwelling predators and filter feeders with tube feet.
Horseshoe worms, lamp shells, moss animals (Phylum Lophophorata)	Sessile suspension feeders enclosed in secreted exoskeleton, shell, or tube. Have a common ring of ciliated, hollow tentacles called a lophophore, used for feeding, defense, and respiration.
Chordates (Phylum Chordata)	Chordates include both vertebrates and invertebrates. All chordates have a number of structures in common, including a notochord; a dorsal, hollow, ectodermal nerve cord; pharyngeal slits; and a post-anal tail. Only non-vertebrate chordates are discussed in this Report.
Acorn worms (Phylum Hemichordata)	Generally live in burrows and are deposit feeders, but some species are pharyngeal filter feeders.

### 1.3 Survey Planning and Regulatory Permitting

The benthic survey was performed to facilitate a thorough understanding of existing seafloor conditions as well as to inform BOEM's assessment of the environmental effects of the Project pursuant to the National Environmental Policy Act. BOEM requires applicants planning to file a RAP for projects proposing installation of structures or cables on the OCS to perform marine site characterization surveys in accordance with 30 Code of Federal Regulations (CFR) Part 585.645(a) and associated guidelines (BOEM 2012).

Tetra Tech prepared a VOWTAP Benthic Survey Plan (Tetra Tech, 2013a) that was submitted to the following agencies for review and comment prior to deployment:

- BOEM
- U.S. Department of Energy
- U.S. Army Corps of Engineers
- U.S. Department of Navy
- U.S. Fish & Wildlife Service
- National Oceanic and Atmospheric Administration (NOAA) Fisheries Division
- U.S. Coast Guard
- Virginia Department of Mines, Minerals, and Energy
- Virginia Department of Game and Inland Fisheries (DGIF)
- Virginia Marine Resources Commission
- Virginia Department of Historic Resources

Dominion and Tetra Tech also hosted technical working sessions and conference calls with the above-referenced agencies to review the Benthic Survey Plan on April 22 and 29, 2013. Several iterations of the Survey Plan were prepared to allow for all agency comments to be adequately addressed. Pursuant to BOEM's Guidelines (BOEM 2012), pre-survey meetings were held on May 16 and 22, 2013. Tetra Tech's final Benthic Survey Plan was submitted to BOEM and other application agencies on May 20, 2013.

## 1.4 Survey Schedule

The marine benthic survey was conducted in coordination with the Project's geophysical and shallow geotechnical survey, as shown in Table 3.

**Table 3. Survey Schedule**

Start Date	End Date	Activity
06/01/2013	06/13/2013	Geophysical Survey (Multibeam bathymetry, side scan, sub-bottom profiling and magnetometer survey of aliquot blocks and cable corridor).
06/14/2013	06/15/2013	Setup and tested benthic sampling and medium penetration sub-bottom profiler systems. Departed for survey area.
06/16/2013	06/17/2013	Benthic sampling and medium penetration sub-bottom survey.
06/17/2013	06/20/2013	Demobilized medium penetration sub-bottom equipment, continued benthic sampling.
06/20/2013	06/21/2013	Completed benthic sampling, packaged samples for shipment, mobilized piston and vibracore equipment.
06/22/2013	08/25/2013	Laboratory sample processing (taxonomy, biomass, TOC, grain size)
06/22/2013	09/20/2013	Data processing and analysis

## 2 METHODS

### 2.1 Vessel

Surveys were conducted from the *R/V Sea Lion V* (Figure 2), a 110-foot vessel with a back deck adequate for the efficient and safe deployment, recovery, and stowing of survey and sampling systems. Mounts and side poles were available for rigid installation of the surface positioning and altitude sensor, multibeam echosounder and ultra-short acoustic baseline positioning system (USBL). The vessel was outfitted with an A-frame, winches, and crane for deployment of the towed survey and sediment sampling equipment. During mobilization, two shipping containers were added for data processing and storage.



Figure 2. R/V Sea Lion V Mobilized to Conduct Surveys for the VOWTAP Project

## 2.2 Equipment

The equipment mobilized for the survey is listed in Table 4. Horizontal (X, Y) positioning data for the Project were collected in North American Datum 1983 (NAD83), Universal Transverse Mercator (UTM) Zone 18N, in meters. Vertical data were collected in Mean Lower Low Water (MLLW), in meters. Details on vessel positioning can be found in the Marine Site Characterization Report (Tetra Tech, 2013b).

Table 4. Primary Benthic Survey Systems

System Type/Sensor	Manufacturer
Survey Vessel	R/V Sea Lion V
Positioning Systems and Software	IXBLUE PHINS 6000 (with DELPH INS Software), Trimble SPS651 with MarineStar, Trimble Ag132 DGPS
Subsea Positioning	IXBLUE GAPS USBL
Heading, and Motion Reference System	IXBLUE PHINS 6000
Grab Sampler	Pneumatic power grab
Digital Imagery	DeepSea Power and Light WideEye, GoPro Hero 3 cameras, scaling laser, and LED lights

The benthic survey was conducted following completion of the geophysical survey operations to gather information on benthic infaunal organisms, sediment grain size, and total organic carbon (TOC) of benthic sediments. Underwater video/still imagery was collected during sediment sampling operations to support the benthic resource investigation. A power grab sampler, with positioning and camera systems attached, was used to collect benthic samples in the Research Lease Area and at specified intervals along the cable corridor. Analog and digital video camera systems were mounted to the benthic grab sampler to document type of surface sediments and any marine life at the sample sites. The tools that were used to collect the

sediment samples, video/still images, and sediment characteristics are fully described in the Marine Site Characterization Report (Tetra Tech 2013b).

### **2.3 Geophysical Data Review and Station Selection**

During the geophysical and shallow geotechnical survey, Tetra Tech geophysicists reviewed the acquired and processed bathymetric and geophysical data to produce a preliminary interpretation of geologic and habitat conditions within the survey areas. The interpretation was based on physical characteristics relevant to benthic habitat, as shown in Table 5. The sidescan sonar data were reviewed for significant changes in acoustic reflectivity, which may indicate a change in sediment type. Sample stations were identified within the Research Lease Area and along the cable corridor to satisfy the requirements established by BOEM (2013) for characterizing sediment type, benthic organisms, and the function and value of the existing benthic habitat within the Project Area. The bathymetric data were reviewed to identify areas of low to high topographic relief that may provide important benthic habitat. The bathymetry was also assessed using the Benthic Terrain Modeler, a set of ESRI ArcGIS® tools developed by Oregon State University and NOAA to analyze seabed characteristics such as slope and rugosity captured in high-resolution bathymetric data. The sub-bottom profiler and seismic reflection data were reviewed to incorporate sub-surface information into the determination of sediment type and thickness. These and other analyses are discussed in the Marine Site Characterization Report (Tetra Tech 2013b).

Based upon these analyses, bottom conditions within the survey areas were categorized by substrate grain size and relief, within the context of the Coastal and Marine Ecological Classification Standard (CMECS), in accordance with Table 5.

The benthic survey was designed to use a series of grab sample locations within the Research Lease Area, as well as the cable corridor to characterize benthic habitat and organisms. The reference sites were selected to allow for comparison of benthic habitat within and outside of the Project Area both before and after Project implementation. Reference locations serve as controls against which the impacts of construction can be evaluated. In this report, the reference locations are compared with project locations to verify that they are representative of general benthic conditions in the area. Ideally, reference locations should be statistically indistinguishable from project locations. A good reference location functions as an indicator of regional, non-Project-related changes over time, responding to such perturbations as storms, oil spills, fishing pressure, and other events that may alter baseline conditions of all benthic habitats in the area. Later, after the Project is constructed, the reference locations will be evaluated against the project locations to determine whether the project locations have changed in ways not explained by generalized, regional changes caused by other factors. Thus, it is essential at the pre-construction stage to document the representativeness of the reference locations.

A total of 60 project locations and 9 reference locations were selected for sampling (Figure 3, Table 6). All sample locations were submitted to BOEM for review and comment prior to sampling.

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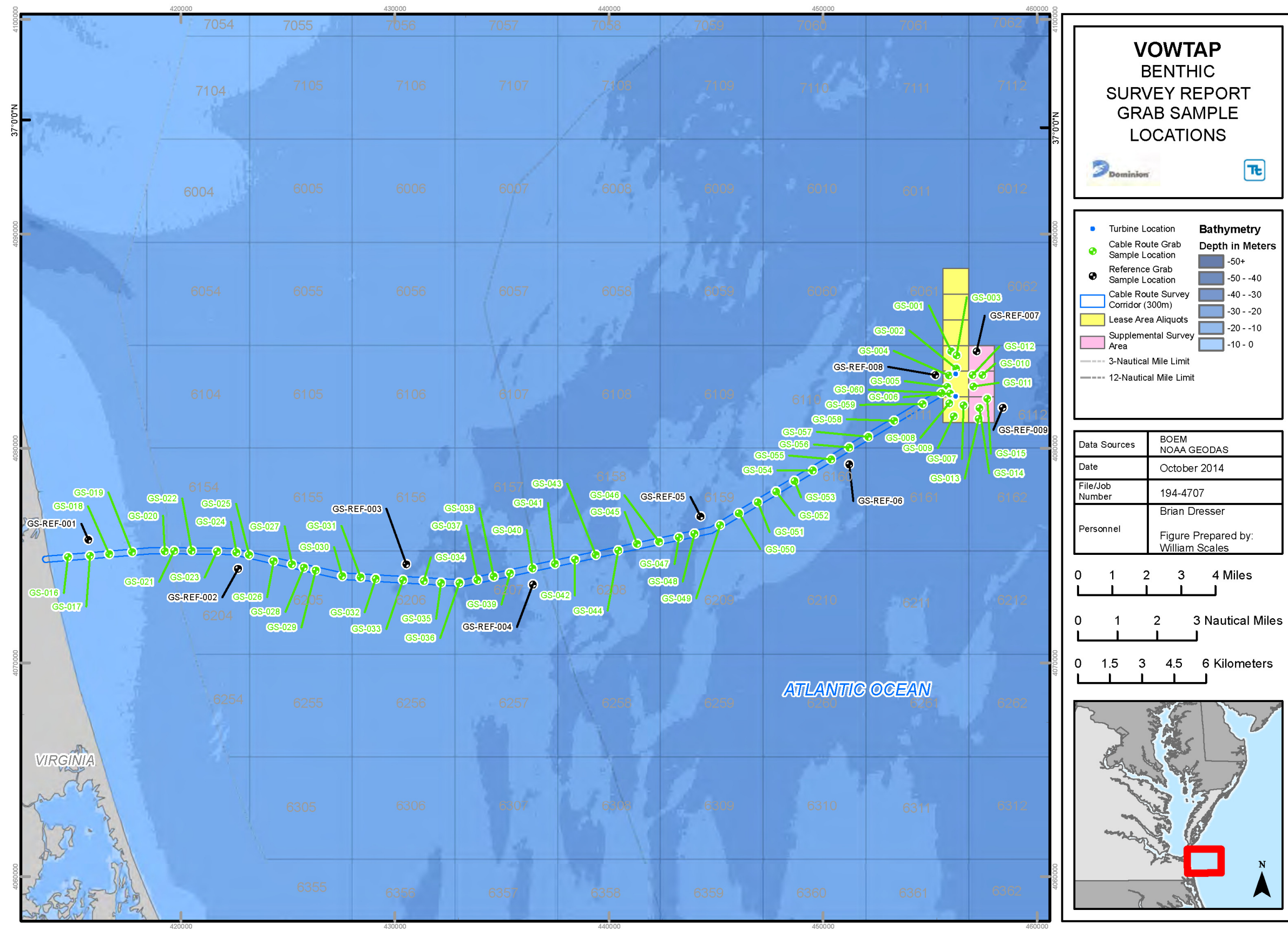


Figure 3. Grab Sample Locations

Table 5. Range of Sediment Characteristics Expected to be Found within the VOWTAP and Used in Geological Interpretation

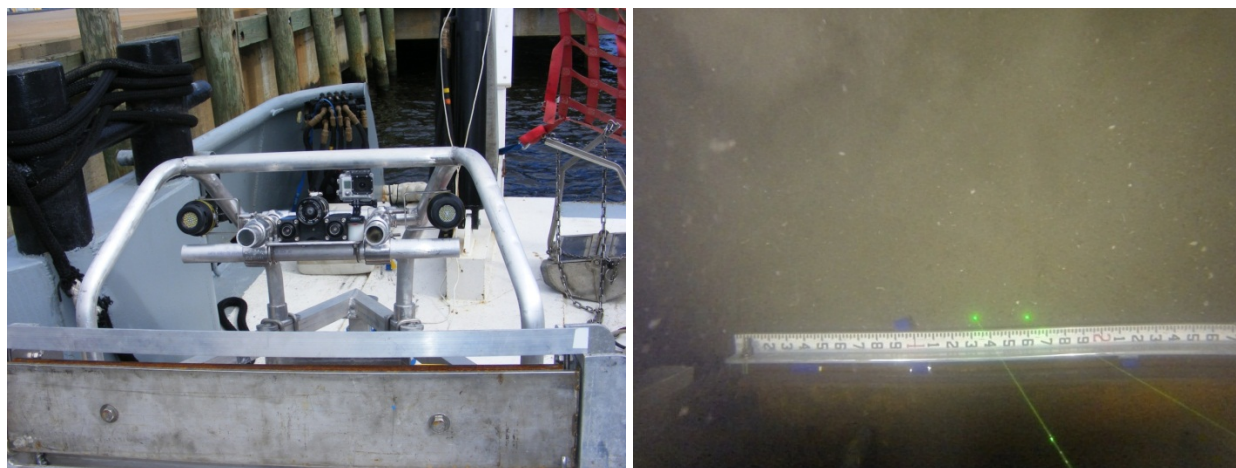
VOWTAP Survey Category	CMECS Group (with Modifiers)	Particle Size Range (mm)	Bathymetric and Geophysical Characteristics
Silt & Clay	<b>Muddy Sand</b> (silty sand, silty-clayey sand, clayey sand)	< 0.07 millimeter (mm)	Good subsurface penetration with sub-bottom profiler (10 to 50 m below seabed) and seismic reflection. May show parallel or sub-parallel banded layering; low return and smooth, continuous pattern on side scan sonar imagery.
Fine-grained Sand	<b>Sand</b> (very coarse sand, coarse sand, fine sand, and very fine sand)	0.07 mm – 0.42 mm	Good subsurface penetration with sub-bottom profiler (10 to 50 m below seabed) and seismic reflection. May show parallel or sub-parallel banded layering; low return and smooth, continuous pattern on side scan sonar imagery.
Medium-grained Sand		0.42 mm – 1.98 mm	Medium reflectivity, low relief, little to no sub-surface penetration with the sub-bottom profiler, good penetration (up to 300 m depending on system) with seismic reflection.
Coarse-grained Sand		1.98 mm – 4.70 mm	Medium to high reflectivity, low relief, no sub-surface penetration with the sub-bottom profiler, good penetration (up to 300 m depending on system) with seismic reflection.
Gravel	<b>Gravel Mixes</b> (sandy gravel)	> 4.70 mm	Medium to high reflectivity, low relief, no sub-surface penetration with the sub-bottom profiler, good penetration (up to 300 m depending on system) with seismic reflection.
Pavement	Pavement Area	N/A	High reflectivity, low relief, no subsurface penetration with sub-bottom profiler, possible penetration with seismic reflection.
Bedrock	<b>Bedrock</b> (Rock Outcrop)	N/A	High reflectivity, moderate to high relief, no subsurface penetration with sub-bottom profiler and seismic reflection.

**Table 6. Sample Locations within the Research Lease Area and the Cable Corridor**

Sample Location	Research Lease Area	Cable Corridor
Project Sites	GS-001 through GS-015	GS-016 through GS-060
Reference Sites	GS-REF-007 through GS-REF-009	GS-REF-001 through GS-REF-006

## 2.4 Underwater Imagery

Underwater imagery methods included a video camera with imagery feedback to the surface, a high-definition (HD) video camera, high power underwater lights with dimmer control, and a scaling laser system. For each grab sample collected, a single image was taken of the bottom sediment from the HD video camera mounted to the grab sampler, as shown in Figure 4. A more detailed description of underwater imagery methods is included in the Marine Site Characterization Report (Tetra Tech 2013b).



**Figure 4. Grab Sampler Camera and Light Systems (left) and an Example of the Bottom Imagery (right)**

## 2.5 Benthic Grab Samples

In accordance with BOEM (2013) guidelines, benthic power grab samples were collected within each of the survey area aliquots as well as along the proposed cable corridor. The grab sampler was also equipped with a USBL transponder for accurate positioning of the sample and with cameras and lights to document information on the surface sediments and to support benthic habitat studies. Figure 5 shows the grab sampler and supporting equipment being deployed.

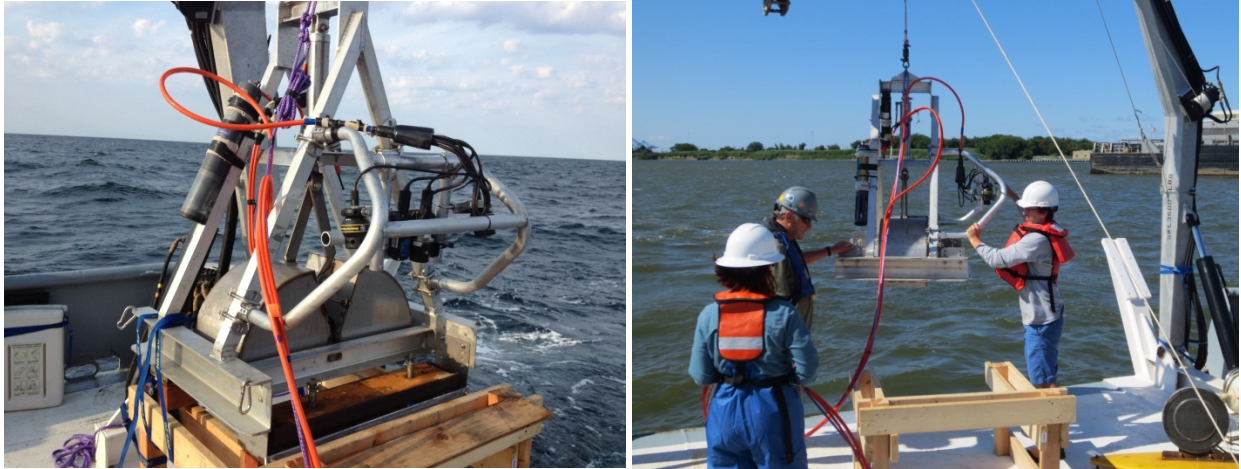


Figure 5. Benthic Power Grab Sampler (left) and Deployment (right)

## 2.6 Grain Size and TOC

Grain size and TOC samples were analyzed by Tetra Tech’s Ardaman Laboratory in Orlando, Florida. Grain size samples were analyzed in accordance with American Society for Testing and Materials (ASTM) Standard D422 “Particle-Size Analysis of Soils” using sieve analysis or ASTM Standard D6913 “Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis” (ASTM International 2002). These methods require sifting the sediment samples through progressively smaller, nested sieves. Results are determined by dividing the post-drying weight of material retained by each sieve by the total post-drying weight of the sample. Size ranges for each category are as follows: gravel was retained on the No. 4 sieve (0.185"); coarse sand passed through the No. 4 sieve and was retained in the No. 10 sieve (0.078"); medium sand passed through the No. 10 sieve and was retained in the No. 40 sieve (0.0164"); fine sand passed through the No. 40 sieve and was retained in the No. 200 sieve (0.0029"); silt and clay passed through the No. 200 sieve. Silt and clay particles collected in the bottom pan were not further differentiated. Use of this procedure facilitates a direct comparison between pre-construction and post-construction habitat condition.

Sediment samples were analyzed for TOC in accordance with ASTM Standard D2974, “Moisture, Ash and Organic Matter of Peat and Other Organic Soils,” Method C (loss on ignition at 440°C). TOC results were reported as percent organic content.

## 2.7 Benthic Infauna

Benthic macroinvertebrate samples were identified to the lowest practical taxonomic level, typically genus or species, by EcoAnalysts in Moscow, Idaho. Individual organisms were picked from each sample, sorted into major taxonomic categories, then further identified by lowest practical taxonomic unit and enumerated. The picking, sorting, and taxonomic identification processes were subject to quality control checks by laboratory staff. Oligochaetes (Class Oligochaeta) were the only class not identified to lower taxonomic level. Planktonic fauna and colonial epifauna were not included in the raw data files. Data were recorded electronically and taxa were coded with the relevant National Oceanographic Data Center code. The taxonomic diversity of each site was evaluated using the Shannon diversity index ( $H'$ ), which is calculated by using the proportional abundance of each species observed in the sample. Alpha diversity, or the measure of species diversity within specific sites or localized habitats, was evaluated by calculating the log-series

alpha for each site. Pielou's evenness ( $J'$ ) was used to compare the Shannon diversity, if the observed species had equal proportion within the site.

### 3 RESULTS

The following section summarizes the results of the benthic analysis including sediment type, grain size, total organic carbon, and benthic infauna of the samples collected within the proposed VOWTAP area including both Project Locations (Research Lease Area and cable corridor) and their associated Reference Locations. Overall results common to the entire VOWTAP study areas are presented first, followed by results for the Research Lease Area (project vs. reference sites) and then for the cable corridor (project vs. reference sites). Project Sites are compared to Reference Sites so that comparisons can be made between the baseline conditions reported here and the post-construction conditions, following the construction of the VOWTAP.

#### 3.1 Underwater Imagery

Based on the combined results from the geophysical survey data and underwater imagery analysis, all benthic habitats within the lease block aliquots and cable corridor were soft-bottom; no hard-bottom habitats were observed within the survey area. Therefore, additional underwater imagery, or habitat characterization beyond those images captured at each grab sample location, was not necessary. Images from each grab location are included in Attachment A.

#### 3.2 Benthic Habitat and Sediment Types

One of the purposes of the geophysical and shallow geotechnical survey was to identify the benthic habitat types present within the Research Lease Area and the cable corridor. Sand dominated the benthic substrate composition across all grab sample locations, with a mean of 91.5 percent (primarily fine sand), followed by silt and clay (6.3 percent), and gravel (2.2 percent). Within the context of CMECS, the entire VOWTAP Research Lease Area and cable corridor, including reference sample locations, are classified within the following CMECS groups (NOAA, 2012), listed in Table 7.

**Table 7. Classifications of Geologic and Biogenic Substrates Encountered in the VOWTAP Benthic Survey in Accordance with CMECS**

Setting/Origin	Class	CMECS Subclass	Group	Additional Modifiers	VOWTAP Survey Category
Geologic Substrate	Unconsolidated Mineral Substrate	Coarse Unconsolidated Substrate	Gravel Mixes	sandy gravel	Gravel
		Fine Unconsolidated Substrate	Sand	very coarse sand, coarse sand, fine sand, and very fine sand	Fine/Medium/ Coarse Grained Sand
			Muddy Sand	silty sand, silty-clayey sand, clayey sand	Silt & Clay

**Table 7. Classifications of Geologic and Biogenic Substrates Encountered in the VOWTAP Benthic Survey in Accordance with CMECS (continued)**

Setting/Origin	Class	CMECS Subclass	Group	Additional Modifiers	VOWTAP Survey Category
Biogenic Substrate	Shell Substrate	Shell Hash	Clam Hash	Shell Hash/Fragments various species	N/A
Benthic/ Attached Biota	Faunal Bed	Soft Sediment Fauna	Small Surface-Burrowing Fauna	Benthic Infauna various species	N/A
			Diverse Soft Sediment Epifauna	Benthic Infauna various species	N/A

The bathymetry survey confirmed depths, relative to the Project vertical datum of MLLW, within the VOWTAP ranging from -7 m in the shallowest accessible extent of the cable corridor, to -28.3 m in the southeast of the Research Lease Area.

### 3.3 Benthic Infauna

Overall, the type and number of benthic infaunal species is consistent with expectations of the Project Site and findings of previous investigations near the VOWTAP site, as discussed in Section 1.2 (Existing Benthic Resource Conditions). Annelids (specifically, polychaete worms) were numerically dominant across all sampling areas (Research Lease Area, cable corridor, and reference sites), followed by mollusks, then crustaceans. Mollusks had the highest overall biomass, representing approximately 66 percent of the total. Annelids were second in total biomass of the combined dataset (17 percent), and crustaceans represented approximately 11 percent of the combined total biomass. The detailed breakouts and comparisons between the project and reference sites of the Research Lease Area and cable corridor are included in Section 3.4 (Research Lease Area) and Section 3.5 (Cable Corridor). Raw laboratory data are included in Attachment B.

### 3.4 Research Lease Area

This section contains the results from sample sites located within the Research Lease Area. The sample sites associated with the Research Lease Area project sites include GS-001 through GS-015. The samples associated with the Research Lease Area reference sites include GS-REF-007 through GS-REF-009. The location of these sites within the Research Lease Area is provided on Figure 3 and Attachment C.

#### 3.4.1 Benthic Habitat and Sediment Type

The physical and geological characteristics of the VOWTAP area are fully described in the Marine Site Characterization Report (Tetra Tech 2013b). The sediments contained in each of the grab samples collected were characterized descriptively. Photographs were taken of each grab sample from an underwater perspective of the seafloor, as well as from within the sampler upon retrieval (Appendix A). The complete descriptions for each of the Project and reference sites within the Research Lease Area are included in Table 8 and Table 9.

**Table 8. Sample Log and Description for the Project Sites within the Research Lease Area**

Area	Sample Number	UTC Date	UTC Time	Northing	Easting	Water Depth (MLLW) (m)	Complete Description
Lease	GS-001	6/16/2013	4:45	4084517.8	455996.5	21.10	Loose gray medium SAND, shell hash
Lease	GS-002	6/16/2013	6:42	4083727.9	456216.6	23.78	Loose gray fine SAND, shell hash
Lease	GS-003	6/16/2013	5:56	4084324.5	456226.2	25.37	Medium dense light yellowish brown medium SAND, worms and shells/shell hash
Lease	GS-004	6/16/2013	7:25	4083407.6	455865.7	24.70	Dense grayish brown fine SAND, worms/worm tubes
Lease	GS-005	6/16/2013	8:03	4082871.6	455796.7	26.15	Medium dense yellowish brown medium SAND, shell hash, clamshell
Lease	GS-006	6/16/2013	8:45	4082563.0	455927.8	24.15	Medium dense yellowish brown medium SAND, shell hash, hermit crab
Lease	GS-007	6/16/2013	9:28	4082004.1	456561.2	26.33	Dense greenish gray silty fine SAND, worm tubes, hermit crab, shrimp, shell hash
Lease	GS-008	6/16/2013	9:50	4082105.5	455896.4	24.59	Medium dense yellowish brown medium SAND, shell hash, worms
Lease	GS-009	6/16/2013	10:33	4081500.5	456106.9	26.01	Medium dense yellowish brown medium SAND, shell hash
Lease	GS-010	6/17/2013	3:58	4083427.3	457436.4	24.97	Dense grayish brown silty fine SAND, shell hash
Lease	GS-011	6/17/2013	3:08	4082884.7	457013.1	25.90	Dense grayish brown silty fine SAND, shell hash, worm tubes
Lease	GS-012	6/17/2013	4:51	4083427.5	456973.0	24.33	Dense grayish brown silty fine SAND, shell hash, snail shell
Lease	GS-013	6/17/2013	0:55	4081371.1	457270.8	25.38	Loose yellowish brown gravelly coarse SAND, shell hash, clam tube
Lease	GS-014	6/17/2013	1:25	4081882.4	457298.5	28.11	Firm gray sandy SILT on surface above Firm dark gray clayey SILT, clamshells, shell hash
Lease	GS-015	6/17/2013	2:33	4082304.9	457667.7	26.84	Dense grayish brown fine silty SAND, worm tubes, shell hash

**Table 9. Sample Log and Description for the Reference Sites within the Research Lease Area**

Area	Sample Number	UTC Date	UTC Time	Northing	Easting	Water Depth (MLLW) (m)	Complete Description
Lease	GS-REF-007	6/17/2013	5:25	4084515.9	457169.0	20.52	Dense grayish brown fine SAND, worms/worm tubes, shell hash
Lease	GS-REF-008	6/17/2013	6:00	4083409.5	455249.7	19.61	Dense grayish brown fine SAND, hermit crabs, worm tubes, shell hash
Lease	GS-REF-009	6/17/2013	6:40	4081896.6	458398.9	23.57	Dense grayish brown fine SAND, worm tubes, hermit crabs, shell hash

As expected, the grain size analysis revealed that fine sand-sized sediment particles dominated the project samples within the Research Lease Area, followed by medium sand (Table 10, Figure 6). The grain size analysis revealed a slightly different composition than for the reference site samples; fine sand-sized sediment particles dominated the reference samples within the Research Lease Area, followed by silt/clay (Table 11, Figure 6).

On average, the sediment composition for the project samples within the Research Lease Area was approximately 60 percent fine sand, 29 percent medium sand, 7 percent silt/clay, 2 percent coarse sand, and 2 percent gravel. Notable exceptions to this were GS-014 which contained approximately 65% silt and clay and GS-013 with approximately 13 percent gravel. On average, the sediment composition for the reference samples within the Research Lease Area was approximately 94 percent fine sand, 5 percent silt/clay, 1 percent medium sand, and less than 1 percent coarse sand and gravel combined.

Organic content of the project samples within the Research Lease Area was an average of 0.6 percent, ranging from 0.3 to 2.3 percent. Organic content of the reference samples within the Research Lease Area was an average of 0.6 percent, ranging from 0.5 to 0.8 percent.

**Table 10. Grain Size and Organic Content for the Project Sites within the Research Lease Area**

Grab Sample	Organic Content (%)	Particle-Size Distribution (dry mass basis)						
		Specimen Mass (grams)	Maximum Particle Size (inch)	Gravel-Size (%)	Sand-Size (%)			Silt- & Clay-Size (%)
					Coarse	Medium	Fine	
GS-001	0.3	399.04	< 3/4	0.9	0.8	56.9	40.2	1.2
GS-002	0.4	125.26	< 3/16	0.0	0.1	4.5	93.0	2.4
GS-003	0.4	661.46	< 3/4	2.1	1.6	83.2	12.1	1.0
GS-004	0.6	156.84	< 3/16	0.0	0.1	1.2	93.3	5.4
GS-005	0.3	880.54	< 3/4	1.1	1.3	67.5	29.0	1.1
GS-006	0.4	834.20	< 3/4	2.8	6.8	53.9	35.5	1.0
GS-007	0.7	248.66	< 3/8	0.2	0.1	2.6	91.2	5.9
GS-008	0.3	512.63	< 3/4	1.2	5.1	58.7	34.0	1.0
GS-009	0.3	235.86	< 3/16	0.0	0.5	42.8	55.3	1.4
GS-010	0.5	215.73	< 3/4	0.1	0.2	1.2	94.7	3.8
GS-011	0.6	248.00	< 3/8	0.1	0.1	0.9	93.3	5.6
GS-012	0.5	308.10	< 3/8	0.0	0.1	3.6	93.8	2.5
GS-013	0.3	665.38	< 3/4	13.2	13.5	57.3	14.9	1.1
GS-014	2.3	209.50	< 3/8	0.7	0.6	6.8	27.0	64.9
GS-015	0.6	215.80	< 3/8	0.1	0.1	0.6	92.5	6.7

Notes: 1. Group symbol in accordance with ASTM Standard D2487 "Classification of Soils for Engineering Purposes (Unified Soil Classification System)." 2. Organic content in accordance with ASTM Standard D2974 "Moisture, Ash and Organic Matter of Peat and Other Organic Soils," Method C (loss on ignition at 440°C). 3. Water content in accordance with ASTM Standard D2216 "Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass," Method B (107°C). Water contents not corrected for salt concentration. 4. Particle-size distribution in accordance with ASTM Standard D422 "Particle-Size Analysis of Soils" using sieve analysis or ASTM Standard D6913 "Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis." Gravel-size: retained on No. 4 sieve (0.185"); coarse sand-size: passing No. 4 sieve and retained on No. 10 sieve (0.078"); medium sand-size: passing No. 10 sieve and retained on No. 40 sieve (0.0164"); fine sand-size: passing No. 40 sieve and retained on No. 200 sieve (0.0029"); silt- and clay-size: passing No. 200 sieve.



**Table 11. Grain Size and Organic Content for the Reference Sites within the Research Lease Area**

Grab Sample	Organic Content (%)	Particle-Size Distribution (dry mass basis)						Silt- & Clay-Size (%)
		Specimen Mass (grams)	Maximum Particle Size (inch)	Gravel-Size (%)	Sand-Size (%)			
					Coarse	Medium	Fine	
GS-REF-007	0.5	236.30	< 3/8	0.1	0.3	2.5	93.1	4.0
GS-REF-008	0.5	235.12	< 3/16	0.0	0.0	0.5	95.2	4.3
GS-REF-009	0.8	266.22	< 3/4	0.6	0.1	0.4	92.6	6.3

Notes: 1. Group symbol in accordance with ASTM Standard D2487 "Classification of Soils for Engineering Purposes (Unified Soil Classification System)." 2. Organic content in accordance with ASTM Standard D2974 "Moisture, Ash and Organic Matter of Peat and Other Organic Soils," Method C (loss on ignition at 440°C). 3. Water content in accordance with ASTM Standard D2216 "Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass," Method B (107°C). Water contents not corrected for salt concentration. 4. Particle-size distribution in accordance with ASTM Standard D422 "Particle-Size Analysis of Soils" using sieve analysis or ASTM Standard D6913 "Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis." Gravel-size: retained on No. 4 sieve (0.185"); coarse sand-size: passing No. 4 sieve and retained on No. 10 sieve (0.078"); medium sand-size: passing No. 10 sieve and retained on No. 40 sieve (0.0164"); fine sand-size: passing No. 40 sieve and retained on No. 200 sieve (0.0029"); silt- and clay-size: passing No. 200 sieve.

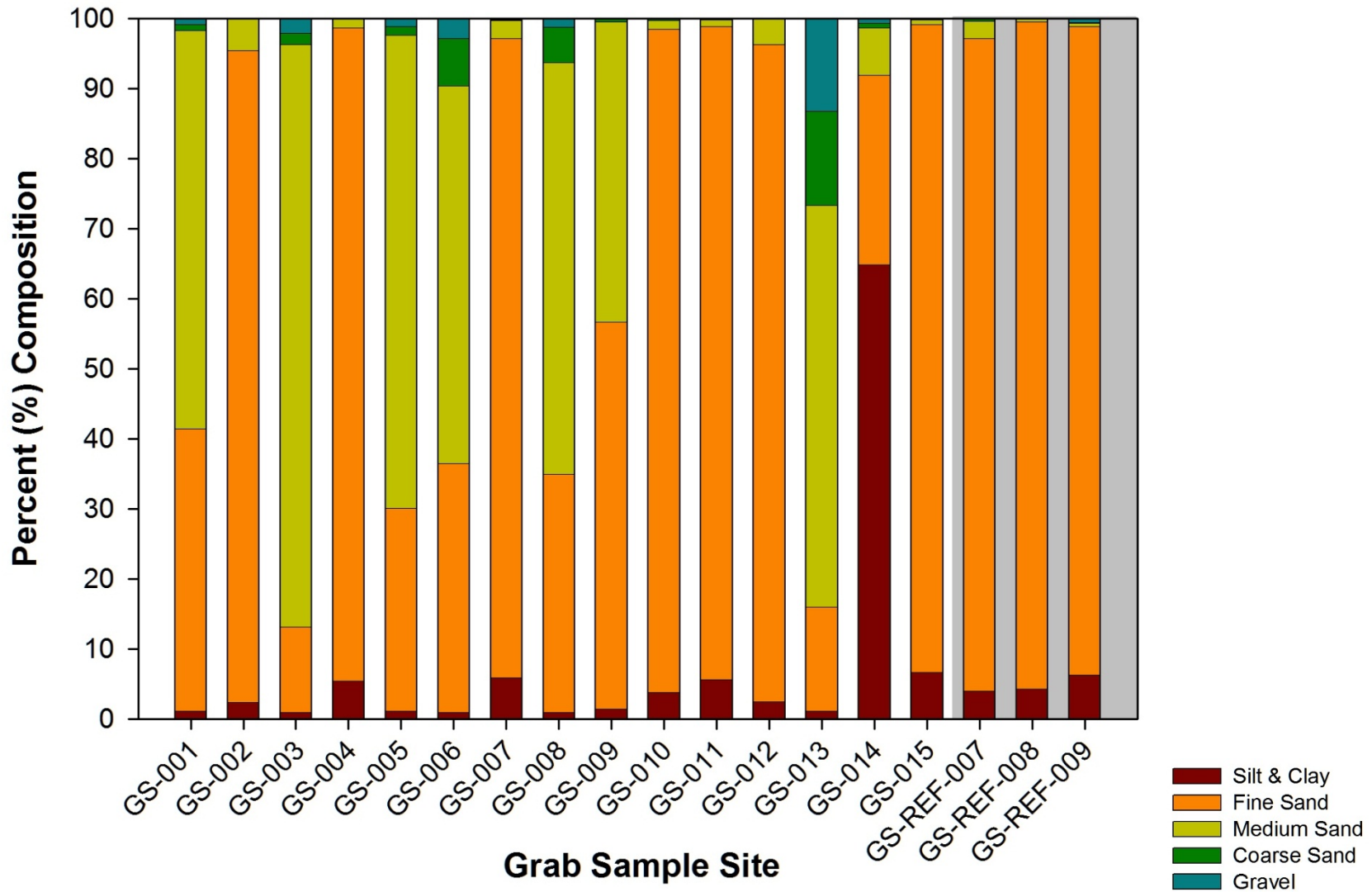


Figure 6. Percentage of Sediment Type for the Project Sites and the Reference Sites within the Research Lease Area

### 3.4.2 Benthic Infauna

Overall, annelids (segmented worms) dominated the project site samples within the Research Lease Area, accounting for approximately 80 percent of all species for the project site samples and 70 percent of all species for the reference site samples. Mollusks and arthropod crustaceans were the second and third most abundant taxa for the project site and reference site samples (Table 12).

**Table 12. Abundance of Species by Phylum for the Project Sites and Reference Sites within the Research Lease Area**

Phylum	Project Sites		Reference Sites	
	Total in Research Lease Area	% of Identified Species	Total in Research Lease Area	% of Identified Species
Annelida	9,036	72.50	609	69.68
Mollusca	1,681	13.49	197	22.54
Arthropoda	1,481	11.88	59	6.75
Chordata	124	0.99	0	0.00
Nemertea	86	0.69	8	0.92
Turbellaria	25	0.20	0	0.00
Echinodermata	12	0.10	0	0.00
Lophophorata	8	0.06	1	0.11
Cnidaria	5	0.04	0	0.00
Hemichordata	3	0.02	0	0.00
Sipuncula	2	0.02	0	0.00

Abundance of individual organisms per sample collected within the Research Lease Area ranged from 64 to 579 individuals per sample for project sites and from 142 to 393 individuals per sample for reference sites. Total number of species ranged from 14 to 32 per sample for project sites and from 25 per sample to 35 per sample for reference sites. Shannon diversity ( $H'$ ) was generally low, ranging from 1.05 to 3.04 for project sites and from 1.46 to 2.87 for reference sites. Pielou's evenness ( $J'$ ) varied from 0.32 to 0.89 for project sites and from 0.46 to 0.85 for reference sites. The overall diversity, as measured by log-series alpha, ranged from 4.41 to 16.57 for project sites and from 5.90 to 11.0 for reference sites (Table 13, Table 14).

**Table 13. Total Individuals, Species, and Diversity Indices for the Project Sites within the Research Lease Area**

Sample Site	Total Individuals	Total Species	$H'$	$J'$	Log Series Alpha
GS-001	107	23	2.60	0.83	9.0
GS-002	101	14	1.56	0.59	4.4
GS-003	178	30	2.58	0.76	10.3
GS-004	543	32	1.74	0.50	7.4
GS-005	68	23	2.78	0.89	12.2
GS-006	64	21	2.56	0.84	10.9
GS-007	579	27	1.05	0.32	5.9
GS-008	130	30	2.64	0.78	12.2
GS-009	240	24	1.94	0.61	6.6
GS-010	91	31	3.04	0.89	16.6

**Table 13. Total Individuals, Species, and Diversity Indices for the Project Sites within the Research Lease Area (continued)**

Sample Site	Total Individuals	Total Species	H'	J'	Log Series Alpha
GS-011	221	27	2.00	0.61	8.1
GS-012	68	17	2.37	0.84	7.3
GS-013	240	27	2.55	0.77	7.8
GS-014	96	21	2.61	0.86	8.3
GS-015	216	19	1.45	0.49	5.0

Notes: 1. H' = Shannon diversity; J' = Pielou's evenness

**Table 14. Total Individuals, Species, and Diversity Indices for the Reference Sites within the Research Lease Area**

Sample Sites	Total Individuals	Total Species	H'	J'	Log Series Alpha
GS-REF-007	393	25	1.46	0.46	5.9
GS-REF-008	142	29	2.87	0.85	11.0
GS-REF-009	325	35	2.18	0.61	10.0

Notes: 1. H' = Shannon diversity; J' = Pielou's evenness

Numerically, the infauna in the Research Lease Area was strongly dominated by the annelid worm *Spiophanes bombyx*, which accounted for approximately 33 percent of all individuals identified for the project site samples and 50 percent of all individuals identified for the reference site samples. The ten most abundant taxa accounted for nearly 65 percent of the total project site infauna and nearly 92 percent of the total infauna identified. There was little compositional difference in the numerically dominant taxa throughout these samples. Of the 20 most abundant species identified for the project site samples, 13 were polychaete worms, including *Spiophanes bombyx*, *Exogone hebes*, *Aricidea (Acmira) cerrutii*, *Scalibregma inflatum*, *Polygordius jouinae*, *Salvatoria clavata*, *Aricidea (Acmira) catherinae*, *Cirratulidae* spp, *Brania wellfleetensis*, *Protodorvillea kefersteini*, *Aricidea (Aricidea) wassi*, *Spio filicornis*, and *Asabellides oculata* (Table 15). Of the 20 most abundant species identified for the reference site samples, 10 were polychaete worms, including *Spiophanes bombyx*, *Aricidea (Acmira) catherinae*, *Aricidea (Aricidea) wassi*, *Abyssoninoe* sp., *Spio filicornis*, *Scalibregma inflatum*, *Scoletoma fragilis*, *Asabellides oculata*, *Nephtys picta*, and *Leitoscoloplos robustus* (Table 15).

Table 15. Rank and Abundance of Organisms Present in the Project Sites and Reference Sites within the Research Lease Area

Major Taxon	Description	Family	Project Sites		Reference Sites	
			Total	% of Individuals	Total	% of Individuals
Annelida-Polychaeta	<i>Spiophanes bombyx</i>	Spionidae	1,104	33.37	432	49.43
Annelida-Oligochaeta	Oligochaeta spp.		253	7.65	--	--
Annelida-Polychaeta	<i>Exogone hebes</i>	Syllidae	168	5.08	--	--
Annelida-Polychaeta	<i>Aricidea (Acmira) cerrutii</i>	Paraonidae	115	3.48	--	--
Annelida-Polychaeta	<i>Scalibregma inflatum</i>	Scalibregmatidae	100	3.02	12	1.37
Mollusca-Gastropoda	<i>Nassarius trivittatus</i>	Nassariidae	89	2.69	42	4.81
Annelida-Polychaeta	<i>Polygordius jouinae</i>	Polygordiidae	80	2.42	--	--
Mollusca-Bivalvia	<i>Abra longicallus</i>	Semelidae	79	2.39	85	9.73
Annelida-Polychaeta	<i>Salvatoria clavata</i>	Syllidae	78	2.36	--	--
Annelida-Polychaeta	<i>Aricidea (Acmira) catherinae</i>	Paraonidae	76	2.30	39	4.46
Annelida-Polychaeta	Cirratulidae spp.		74	2.24	--	--
Arthropoda-Crustacea-Amphipoda	<i>Protohaustorius deichmannae</i>	Haustoriidae	73	2.21	--	--
Annelida-Polychaeta	<i>Brania wellfleetensis</i>	Syllidae	52	1.57	--	--
Annelida-Polychaeta	<i>Protodorvillea kefersteini</i>	Dorvilleidae	51	1.54	--	--
Arthropoda-Crustacea-Amphipoda	<i>Ampelisca verrilli</i>	Ampeliscidae	47	1.42	15	1.72
Annelida-Polychaeta	<i>Aricidea (Aricidea) wassi</i>	Paraonidae	46	1.39	20	2.29
Annelida-Polychaeta	<i>Spio filicornis</i>	Spionidae	42	1.27	16	1.83
Arthropoda-Crustacea-Amphipoda	<i>Byblis serrata</i>	Ampeliscidae	39	1.18	--	--
Arthropoda-Crustacea-Amphipoda	<i>Metharpinia floridana</i>	Phoxocephalidae	39	1.18	--	--
Annelida-Polychaeta	<i>Asabellides oculata</i>	Ampharetidae	33	1.00	10	1.14
Crustacea-Isopoda	<i>Edotea montosa</i>	Idoteidae	--	--	20	2.29
Annelida-Polychaeta	<i>Abyssoninoe</i> sp. 2 EcoA	Lumbrineridae	--	--	16	1.83
Mollusca-Bivalvia	<i>Pitar morrhuanus</i>	Veneridae	--	--	16	1.83
Mollusca-Bivalvia	<i>Ensis</i> sp.	Pharidae	--	--	13	1.49
Annelida-Polychaeta	<i>Scoletoma fragilis</i>	Lumbrineridae	--	--	12	1.37
Annelida-Polychaeta	<i>Nephtys picta</i>	Nephtyidae	--	--	10	1.14

Table 15. Rank and Abundance of Organisms Present in the Project Sites and Reference Sites within the Research Lease Area (continued)

Major Taxon	Description	Family	Project Sites		Reference Sites	
			Total	% of Individuals	Total	% of Individuals
Mollusca-Gastropoda	<i>Turbonilla</i> sp.	Pyramidellidae	--	--	10	1.14
Mollusca-Bivalvia	<i>Parvicardium pinnulatum</i>	Cardiidae	--	--	9	1.03
Mollusca-Bivalvia	<i>Tellina versicolor</i>	Tellinidae	--	--	9	1.03
Nemertea	<i>Palaeonemertea</i> spp.		--	--	8	0.92
Annelida-Polychaeta	<i>Leitoscoloplos robustus</i>	Orbiniidae	--	--	7	0.80
		<b>Site Total</b>	<b>3,308</b>		<b>874</b>	

Within the Research Lease Area, 101 species were collected for the project site samples and 57 species were collected for the reference site samples. The numerically dominant species previously mentioned for these samples were among the most widespread species. This suggests that these infaunal communities are fairly similar across the project and reference site samples within the Research Lease Area.

Although annelids were the most abundant organisms for the project sites and reference sites within the Research Lease Area, mollusks dominated the biomass (g) of the samples. Typical mollusks encountered in the project site samples were *Nassarius trivittatus*, *Abra longicallus*, and *Ensis* sp. Typical mollusks encountered in the reference site samples were *Abra longicallus*, *Nassarius trivittatus*, and *Pitar morrhuanus*, all of which are generally heavier animals than annelids. Percentage biomass of organisms collected within the Research Lease Area is shown in Figure 7.

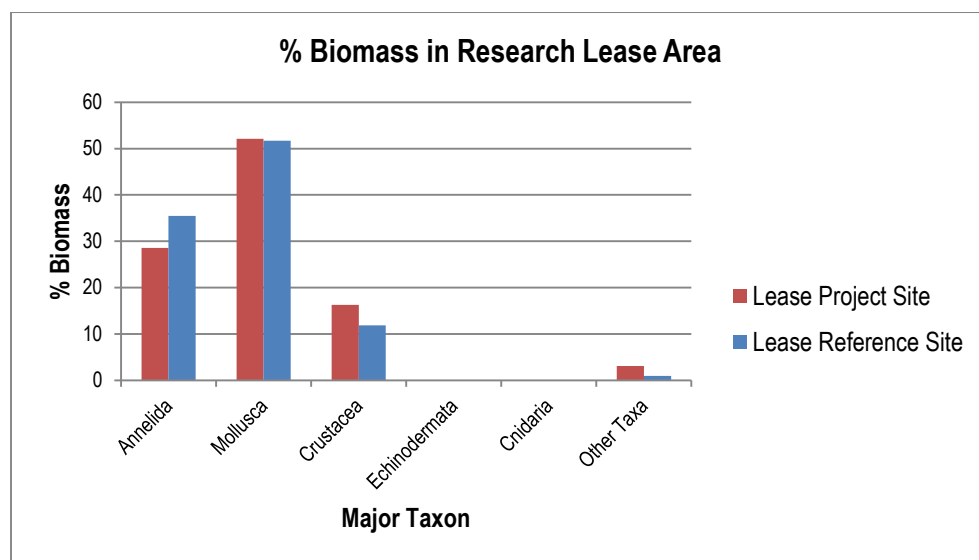


Figure 7. Biomass of the Most Common Taxa for the Project Sites and Reference Sites within the Research Lease Area

### 3.5 Cable Corridor

This section contains the results from sample sites located within the cable corridor. The project sample sites associated with the cable corridor project sites include GS-016 through GS-060. The samples associated with the cable corridor Reference Sites include GS-REF-001 through GS-REF-006. The location of these sites within the cable corridor is provided on Figure 3 and Appendix C.

#### 3.5.1 Benthic Habitat and Sediment Type

The physical and geological characteristics of the VOWTAP are fully described in the Marine Site Characterization Report (Tetra Tech 2013b). The sediments contained in each of the grab samples collected were characterized descriptively. Photographs were taken of each grab sample from an underwater perspective of the seafloor, as well as from within the sampler upon retrieval (Attachment A). The complete descriptions for each of the Project and reference sites within the cable corridor are included in Table 16 and Table 17.

**Table 16. Sample Log and Description for the Project Sites within the Cable Corridor**

Area	Sample Number	UTC Date	UTC Time	Northing	Easting	Water Depth (MLLW) (m)	Complete Description
Cable	GS-016	6/19/2013	22:48	4074924.7	414712.4	7.85	Dense gray silty fine SAND, worms, worm tube, razor clams, shell hash
Cable	GS-017	6/19/2013	23:13	4074995.2	415747.4	8.13	Dense dark gray silty fine SAND, shell hash
Cable	GS-018	6/20/2013	0:15	4075063.8	416645.4	8.41	Dense dark gray silty fine SAND, worms, shell hash, hermit crab, razor clams
Cable	GS-019	6/20/2013	2:16	4075154.5	417719.7	9.12	Dense dark grayish brown silty fine SAND, shell hash, worms, razor clams
Cable	GS-020	6/20/2013	2:37	4075206.7	419236.6	11.27	Loose dark gray silty fine SAND, shell hash, worms
Cable	GS-021	6/20/2013	3:00	4075222.9	419670.1	11.01	Loose yellowish brown coarse SAND with SILT, shell hash, sand dollar
Cable	GS-022	6/20/2013	3:25	4075221.9	420492.7	10.98	Loose light yellowish brown coarse SAND with SILT, shell hash
Cable	GS-023	6/20/2013	3:50	4075201.8	421680.0	14.01	Dense dark gray silty very fine SAND, shell hash, barnacle, razor clam, possible horseshoe crab egg sack
Cable	GS-024	6/20/2013	4:16	4075151.0	422597.9	14.79	Loose light yellowish brown coarse SAND with SILT, shell hash, hermit crab, razor clam, bivalves
Cable	GS-025	6/20/2013	4:47	4075021.9	423181.2	15.77	Dense dark gray silty very fine SAND, shell hash, razor clam, worm
Cable	GS-026	6/20/2013	5:12	4074734.4	424334.9	16.03	Loose light yellowish brown coarse SAND with SILT, shell hash
Cable	GS-027	6/19/2013	21:05	4074584.2	425191.4	15.65	Firm dark greenish gray fine sandy SILT, worm tubes, shell hash
Cable	GS-028	6/19/2013	20:30	4074443.7	425738.6	15.85	Medium dense dark greenish gray silty fine SAND, worm tubes, shell hash
Cable	GS-029	6/19/2013	20:08	4074308.5	426293.3	16.17	Firm greenish gray fine sandy SILT, worm tubes, clam shells, worms, razor clam, shell hash
Cable	GS-030	6/19/2013	19:49	4074028.4	427532.4	16.12	Medium dense dark grayish brown silty fine SAND, worms, clam shells, shell hash
Cable	GS-031	6/19/2013	19:25	4073981.9	428389.4	16.60	Medium dense grayish brown silty fine SAND, hermit crab, shrimp, worm tubes, razor clam, shell hash
Cable	GS-032	6/19/2013	19:02	4073914.5	429097.6	18.41	Loose grayish brown sandy GRAVEL, hermit crab, shell hash
Cable	GS-033	6/19/2013	18:12	4073865.4	430379.1	19.32	Loose pale brown gravelly coarse SAND, shell hash, oyster shells, mollusk
Cable	GS-034	6/19/2013	18:40	4073818.1	431348.8	18.53	Loose grayish brown medium to coarse gravelly SAND, worms, shell hash, clam and oyster shells, pieces of coral, mollusk
Cable	GS-035	6/19/2013	16:55	4073739.6	432141.6	18.89	Loose gray coarse sandy GRAVEL, worm tubes, snail shells, shell hash
Cable	GS-036	6/19/2013	16:05	4073728.9	433006.7	19.88	Loose gray coarse sandy GRAVEL, worm tubes, shell hash, piece of coral, clam shells



Table 16. Sample Log and Description for the Project Sites within the Cable Corridor (continued)

Area	Sample Number	UTC Date	UTC Time	Northing	Easting	Water Depth (MLLW) (m)	Complete Description
Cable	GS-037	6/19/2013	15:28	4073863.4	433839.7	21.03	Loose grayish brown gravelly coarse SAND, hermit crabs, shell fragments, worms
Cable	GS-038	6/18/2013	11:10	4074026.6	434609.3	19.66	Loose yellowish brown coarse SAND, hermit crabs, shell hash, worms
Cable	GS-039	6/18/2013	10:45	4074176.4	435375.3	20.37	Loose yellowish brown medium to coarse SAND, worms, shell fragments, piece of coral
Cable	GS-040	6/18/2013	9:48	4074407.0	436429.7	18.10	Loose yellowish brown coarse SAND, shells/shell hash, worm, clam-like organism
Cable	GS-041	6/18/2013	9:16	4074615.6	437469.8	17.18	Loose yellowish brown coarse SAND, shells/shell hash
Cable	GS-042	6/18/2013	8:50	4074817.7	438404.1	17.82	Loose yellowish brown coarse SAND, shell hash
Cable	GS-043	6/18/2013	8:21	4075027.9	439378.3	20.03	Medium dense grayish brown silty coarse SAND, shells/shell hash
Cable	GS-044	6/18/2013	7:56	4075238.7	440425.1	18.52	Loose yellowish brown coarse SAND, shell hash, worm, oyster shell
Cable	GS-045	6/18/2013	7:28	4075549.6	441310.2	19.17	Loose yellowish brown medium SAND, hermit crabs, snail, worms, trace shell hash
Cable	GS-046	6/18/2013	6:43	4075645.7	442325.7	17.93	Loose yellowish brown medium to coarse SAND, hermit crabs, worms, snails, shell hash
Cable	GS-047	6/18/2013	6:07	4075857.0	443262.5	23.68	Dense dark grayish brown silty fine SAND, shell hash, clam shell, worm/worm tubes
Cable	GS-048	6/18/2013	5:40	4076011.5	443999.1	19.39	Loose yellowish brown medium to coarse SAND, trace shell hash, worm
Cable	GS-049	6/18/2013	4:43	4076427.9	445185.3	19.90	Loose yellowish brown medium SAND, clam shell, shell hash
Cable	GS-050	6/18/2013	3:52	4076967.9	446079.7	18.03	Loose yellowish brown medium SAND with SILT, worm, shell hash
Cable	GS-051	6/18/2013	3:30	4077480.2	446952.9	18.14	Loose yellowish brown medium to coarse SAND with SILT, shell hash
Cable	GS-052	6/18/2013	2:58	4077980.2	447804.3	18.59	Dense dark yellowish brown medium SAND with SILT, worm, shell hash
Cable	GS-053	6/18/2013	2:28	4078486.6	448658.8	19.55	Loose yellowish brown medium SAND, crab, worm, shell hash
Cable	GS-054	6/17/2013	9:12	4078980.3	449526.5	18.38	Loose yellowish brown coarse SAND, shells/shell hash
Cable	GS-055	6/17/2013	9:42	4079494.5	450387.4	18.68	Loose yellowish brown medium SAND, sand dollar, worm, shell hash
Cable	GS-056	6/18/2013	1:30	4080046.6	451211.3	22.36	Loose grayish brown medium SAND, worm tubes, snail shell, shell hash
Cable	GS-057	6/17/2013	8:35	4080539.8	452112.2	24.29	Loose yellowish brown medium SAND, shell hash
Cable	GS-058	6/17/2013	10:11	4081277.1	453314.5	23.54	Loose yellowish brown medium SAND, shells, worms, shell hash
Cable	GS-059	6/18/2013	0:27	4082060.3	454649.2	24.74	Dense grayish brown fine SAND, shell hash
Cable	GS-060	6/17/2013	7:48	4082587.0	455522.9	24.59	Loose yellowish brown coarse SAND, shells/shell hash

**Table 17. Sample Log and Description for the Reference Sites within the Cable corridor**

Area	Sample Number	UTC Date	UTC Time	Northing	Easting	Water Depth (MLLW) (m)	Complete Description
Cable	GS-REF-001	6/19/2013	23:40	4075737.7	415683.8	7.41	Dense dark gray silty fine SAND, worms, razor clam, shell hash
Cable	GS-REF-002	6/20/2013	5:42	4074384.9	422667.8	13.82	Dense dark gray silty fine SAND, razor clams, worms, shell hash
Cable	GS-REF-003	6/19/2013	17:28	4074589.3	430533.9	18.39	Firm greenish gray fine sandy SILT, worms, hermit crab, shell hash
Cable	GS-REF-004	6/18/2013	10:20	4073661.6	436446.9	14.12	Loose yellowish brown coarse SAND, worms, oyster shells, clam shells, shell hash
Cable	GS-REF-005	6/18/2013	5:10	4076825.5	444282.7	17.17	Loose yellowish brown silty medium SAND, worm, trace shell hash
Cable	GS-REF-006	6/18/2013	1:55	4079257.4	451212.3	17.17	Loose yellowish brown medium SAND, worm, shells, shell hash

As expected, the grain size analysis revealed that fine sand-sized sediment particles dominated the project samples and reference samples within the cable corridor, followed by medium sand (Figure 8). On average, the sediment composition for the project samples within the cable corridor was approximately 70 percent fine sand, 19 percent medium sand, 6 percent silt/clay, 3 percent coarse sand, and 2 percent gravel. Notable exceptions to this were GS-022, GS-032, GS-041, GS-042, and GS-060 which contained slightly greater percentages of medium sand than fine sand (Table 18). Also, site GS-023 contained a substantially greater percentage of gravel (27 percent). On average, the sediment composition for the reference samples within the Research Lease Area was approximately 74 percent fine sand, 17 percent medium sand, 8 percent silt/clay, 1 percent coarse sand, and < 1 percent gravel. A notable exception to this was GS-REF-004, which contained approximately 68 percent medium sand (Table 19).

Organic content of the project samples within the cable corridor was an average of 0.5 percent, ranging from 0.2 to 2.3 percent. Organic content of the reference samples within the Research lease area was an average of 0.5 percent, ranging from 0.2 to 0.8 percent.

**Table 18. Grain Size and Organic Content for the Project Sites within the Cable Corridor**

Grab Sample	Organic Content (%)	Particle-Size Distribution (dry mass basis)						Silt- & Clay-Size (%)
		Specimen Mass (grams)	Maximum Particle Size (inch)	Gravel-Size (%)	Sand-Size (%)			
					Coarse	Medium	Fine	
GS-016	0.7	138.09	< 3/8	0.4	0.1	0.6	78.8	20.1
GS-017	0.6	141.90	< 3/16	0.0	0.1	0.4	87.3	12.2
GS-018	0.6	145.87	< 3/16	0.0	0.1	0.5	86.8	12.6
GS-019	0.5	148.02	< 3/16	0.0	0.2	0.3	86.9	12.6
GS-020	0.7	182.74	< 3/16	0.0	0.1	1.9	84.1	13.9
GS-021	0.2	158.94	< 3/8	0.3	0.4	3.1	94.9	1.3
GS-022	0.3	547.22	< 1½	4.6	8.0	50.2	36.1	1.1
GS-023	1.4	147.00	< 3/16	0.0	0.1	0.5	72.7	26.7
GS-024	0.4	505.65	< 3/8	0.2	0.2	29.5	67.8	2.3
GS-025	0.7	204.90	< 3/16	0.0	0.0	0.2	82.6	17.2
GS-026	0.5	598.66	< 3/8	0.1	0.2	17.5	77.5	4.7
GS-027	0.8	139.88	< 3/16	0.0	0.8	0.4	83.7	15.1
GS-028	0.6	145.19	< 3/8	0.1	0.1	0.2	84.5	15.1
GS-029	0.8	394.34	< 3/8	0.1	0.1	1.0	85.6	13.2
GS-030	0.8	293.28	< 3/16	0.0	0.1	0.2	84.5	15.2
GS-031	0.6	238.23	< 3/8	0.1	0.1	0.2	84.1	15.5
GS-032	1.2	612.84	< 3/4	12.3	25.5	44.9	9.2	8.1
GS-033	0.2	631.35	< 1½	14.3	3.4	34.2	46.0	2.1
GS-034	0.4	249.18	< 3/8	0.0	0.3	18.8	78.7	2.2
GS-035	0.3	819.47	<1	20.7	24.3	32.8	17.3	4.9
GS-036	0.5	683.73	<1	22.3	12.5	28.9	30.2	6.1
GS-037	0.8	502.12	< 3/4	13.0	10.0	31.9	39.1	6.0
GS-038	0.4	185.56	< 3/8	0.2	0.2	31.8	66.6	1.2
GS-039	0.4	177.06	< 3/16	0.0	0.1	17.3	81.1	1.5
GS-040	0.3	496.23	< 3/8	2.4	8.6	38.2	49.9	0.9
GS-041	0.3	593.42	< 1	6.5	9.5	43.7	39.5	0.8
GS-042	0.3	574.73	< 1½	4.0	4.6	45.2	45.3	0.9

**Table 18. Grain Size and Organic Content for the Project Sites within the Cable Corridor (continued)**

Grab Sample	Organic Content (%)	Particle-Size Distribution (dry mass basis)						Silt- & Clay-Size (%)
		Specimen Mass (grams)	Maximum Particle Size (inch)	Gravel-Size (%)	Sand-Size (%)			
					Coarse	Medium	Fine	
GS-043	0.4	620.86	< 1½	3.3	4.0	21.0	71.5	0.2
GS-044	0.3	214.43	< 3/4	0.7	0.5	26.5	71.2	1.1
GS-045	0.4	237.31	< 3/16	0.0	0.0	3.0	96.0	1.0
GS-046	0.4	276.57	< 3/8	0.1	0.1	9.5	89.2	1.1
GS-047	0.8	208.11	< 3/8	0.1	0.4	4.0	88.3	7.2
GS-048	0.4	272.98	< 3/8	0.1	1.1	32.1	64.5	2.2
GS-049	0.4	627.06	< 1½	2.7	0.8	17.2	79.2	0.1
GS-050	0.2	210.75	< 3/8	0.0	0.2	14.1	84.6	1.1
GS-051	0.2	318.04	< 3/8	0.5	1.9	26.1	70.4	1.1
GS-052	0.5	319.36	< 3/16	0.0	0.1	6.1	91.0	2.8
GS-053	0.2	352.12	< 3/4	0.5	0.4	7.6	90.2	1.3
GS-054	0.2	613.80	< 1½	12.2	4.7	27.2	55.1	0.8
GS-055	0.3	308.54	< 3/8	0.1	0.2	6.4	92.2	1.1
GS-056	0.6	510.39	< 3/8	0.3	1.5	26.2	68.8	3.2
GS-057	0.3	227.76	< 3/8	0.3	0.6	39.7	58.2	1.2
GS-058	0.3	466.70	< 3/8	0.2	1.1	39.4	58.2	1.1
GS-059	0.6	319.49	< 3/4	1.9	1.5	6.4	84.5	5.7
GS-060	0.3	565.47	< 1½	3.6	6.1	52.2	37.2	0.9

Notes: 1. Group symbol in accordance with ASTM Standard D2487 "Classification of Soils for Engineering Purposes (Unified Soil Classification System)." 2. Organic content in accordance with ASTM Standard D2974 "Moisture, Ash and Organic Matter of Peat and Other Organic Soils," Method C (loss on ignition at 440°C). 3. Water content in accordance with ASTM Standard D2216 "Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass," Method B (107°C). Water contents not corrected for salt concentration. 4. Particle-size distribution in accordance with ASTM Standard D422 "Particle-Size Analysis of Soils" using sieve analysis or ASTM Standard D6913 "Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis." Gravel-size: retained on No. 4 sieve (0.185"); coarse sand-size: passing No. 4 sieve and retained on No. 10 sieve (0.078"); medium sand-size: passing No. 10 sieve and retained on No. 40 sieve (0.0164"); fine sand-size: passing No. 40 sieve and retained on No. 200 sieve (0.0029"); silt- and clay-size: passing No. 200 sieve.

**Table 19. Grain Size and Organic Content of Samples for the Reference Sites within the Cable Corridor**

Grab Sample	Organic Content (%)	Particle-Size Distribution (dry mass basis)						Silt- & Clay-Size (%)
		Specimen Mass (grams)	Maximum Particle Size (inch)	Gravel-Size (%)	Sand-Size (%)			
					Coarse	Medium	Fine	
GS-REF-001	0.6	156.98	< 3/16	0.0	0.2	0.3	86.8	12.7
GS-REF-002	0.6	495.89	< 3/8	0.1	0.1	0.3	87.2	12.3
GS-REF-003	0.8	256.53	< 3/8	0.8	0.2	1.2	79.8	18.0
GS-REF-004	0.3	331.62	< 3/8	0.4	2.9	67.8	28.0	0.9
GS-REF-005	0.4	253.63	< 3/8	0.1	0.1	2.4	95.3	2.1
GS-REF-006	0.2	442.74	< 3/4	1.8	2.1	26.9	68.1	1.1

Notes: 1. Group symbol in accordance with ASTM Standard D2487 "Classification of Soils for Engineering Purposes (Unified Soil Classification System)." 2. Organic content in accordance with ASTM Standard D2974 "Moisture, Ash and Organic Matter of Peat and Other Organic Soils," Method C (loss on ignition at 440°C). 3. Water content in accordance with ASTM Standard D2216 "Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass," Method B (107°C). Water contents not corrected for salt concentration. 4. Particle-size distribution in accordance with ASTM Standard D422 "Particle-Size Analysis of Soils" using sieve analysis or ASTM Standard D6913 "Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis." Gravel-size: retained on No. 4 sieve (0.185"); coarse sand-size: passing No. 4 sieve and retained on No. 10 sieve (0.078"); medium sand-size: passing No. 10 sieve and retained on No. 40 sieve (0.0164"); fine sand-size: passing No. 40 sieve and retained on No. 200 sieve (0.0029"); silt- and clay-size: passing No. 200 sieve.

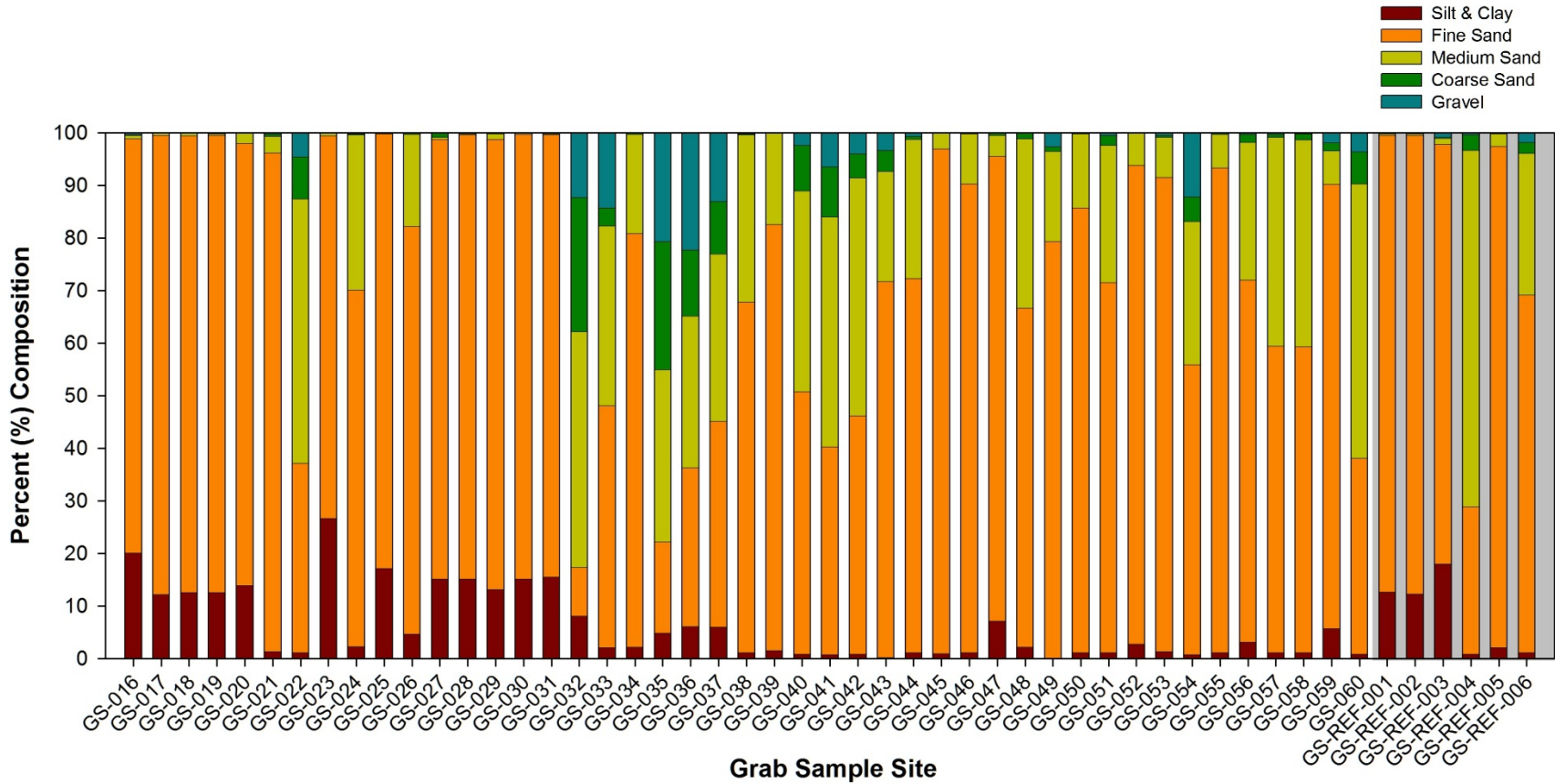


Figure 8. Percentage of Sediment Type for for the Project Sites and Reference Sites within the Cable Corridor

### 3.5.2 Benthic Infauna

Overall, annelids (segmented worms) dominated the project site samples within the cable corridor accounting for approximately 67 percent of all species for the project site samples and 63 percent of all species for the reference site samples. Mollusks and arthropod crustaceans were the second and third most abundant taxon, with approximately 18 percent of all species identified. Arthropods were the third most abundant taxa for the project site and reference site samples (Table 20).

**Table 20. Abundance of Species by Phylum in the Project Sites and Reference Sites within the Cable Corridor**

Phylum	Project Sites		Reference Sites	
	Total in Cable Corridor	% of Identified Species	Total in Cable Corridor	% of identified Species
Annelida	1,235	66.29	626	63.30
Mollusca	330	17.71	133	13.45
Arthropoda	165	8.86	106	10.72
Chordata	112	6.01	112	11.32
Nemertea	18	0.97	10	1.01
Echinodermata	1	0.05	1	0.10
Lophophorata	1	0.05	0	0.00
Turbellaria	1	0.05	1	0.10
Cnidaria	0	0.00	0	0.00
Hemichordata	0	0.00	0	0.00
Sipuncula	0	0.00	0	0.00

Abundance of individual organisms per sample collected for within the cable corridor ranged from 40 to 779 individuals per sample for project sites and from 63 to 320 individuals per sample for reference sites. Total number of species ranged from 14 to 37 per sample for project sites and from 19 to 31 per sample. Shannon diversity ( $H'$ ) was low, ranging from 1.02 to 3.11 for project sites and from 1.96 to 2.75 for reference sites. Pielou's evenness ( $J'$ ) varied from 0.31 to 0.92 for project sites and from 0.63 to 0.85 for reference sites. The overall diversity, as measured by the log-series alpha, varied from 3.8 to 18.4 for project sites and from 5.4 to 15.3 for reference sites (Table 21, Table 22).

**Table 21. Total Individuals, Species, and Diversity Indices for the Project Sites within the Cable Corridor**

Sample Site	Total Individuals	Total Species	H'	J'	Log Series Alpha
GS-016	146	31	2.86	0.83	12.0
GS-017	395	31	2.47	0.72	7.9
GS-018	314	21	2.14	0.70	5.1
GS-019	247	19	1.78	0.61	4.8
GS-020	255	22	1.92	0.62	5.8
GS-021	83	18	2.36	0.82	7.1
GS-022	40	12	1.97	0.79	5.8
GS-023	498	30	2.08	0.61	7.0
GS-024	144	28	2.59	0.78	10.4
GS-025	377	27	2.05	0.62	6.7
GS-026	42	19	2.27	0.77	13.4
GS-027	269	23	2.12	0.68	6.0
GS-028	224	23	2.03	0.65	6.4

**Table 21. Total Individuals, Species, and Diversity Indices for the Project Sites within the Cable Corridor (continued)**

Sample Site	Total Individuals	Total Species	H'	J'	Log Series Alpha
GS-029	501	25	1.97	0.61	5.5
GS-030	301	26	2.00	0.61	6.8
GS-031	264	37	2.24	0.62	11.7
GS-032	263	26	1.50	0.46	7.2
GS-033	109	22	2.56	0.83	8.3
GS-034	69	23	2.46	0.78	12.1
GS-035	219	31	2.33	0.68	9.9
GS-036	61	22	2.80	0.91	12.3
GS-037	178	31	2.12	0.62	10.9
GS-038	103	26	2.71	0.83	11.2
GS-039	262	25	1.55	0.48	6.8
GS-040	68	29	3.11	0.92	19.1
GS-041	49	10	1.96	0.85	3.8
GS-042	58	18	2.51	0.87	8.9
GS-043	779	28	1.02	0.31	5.7
GS-044	45	14	2.20	0.83	7.0
GS-045	180	25	1.89	0.59	7.9
GS-046	77	22	1.96	0.63	10.3
GS-047	141	22	2.26	0.73	7.3
GS-048	37	10	1.98	0.86	4.5
GS-049	144	24	2.85	0.90	8.2
GS-050	62	18	2.26	0.78	8.5
GS-051	52	16	2.24	0.81	7.9
GS-052	190	20	1.87	0.62	5.6
GS-053	92	18	2.12	0.73	6.7
GS-054	37	12	1.97	0.79	6.2
GS-055	62	18	2.39	0.83	8.5
GS-056	453	25	1.49	0.46	5.7
GS-057	230	29	2.51	0.75	8.8
GS-058	90	22	2.44	0.79	9.3
GS-059	210	34	2.79	0.79	11.5
GS-060	66	28	2.97	0.89	18.4

Notes: 1. H' = Shannon diversity; J' = Pielou's evenness

**Table 22. Total Individuals, Species, and Diversity Indices for the Reference Sites within the Cable Corridor**

Sample Sites	Total Individuals	Total Species	H'	J'	Log Series Alpha
GS-REF-001	97	22	2.38	0.77	8.9
GS-REF-002	320	22	1.96	0.63	5.4
GS-REF-003	106	23	2.57	0.82	9.0
GS-REF-004	222	31	2.21	0.64	9.8
GS-REF-005	84	19	2.34	0.80	7.7
GS-REF-006	63	25	2.75	0.85	15.3

Notes: 1. H' = Shannon diversity; J' = Pielou's evenness

Numerically, the infauna for the project sites of the cable corridor was strongly dominated by the polychaete worm *Spiophanes bombyx*, which accounted for approximately 17 percent of all individuals identified for the project site samples within the cable corridor. The ten most abundant taxa collected for the project sites within the cable corridor accounted for nearly 64 percent of the total infauna identified. Of the 20 most abundant species identified, 9 were polychaete worms, including *Spiophanes bombyx*, *Amastigos caperatus*, *Scalibregma inflatum*, *Prionospio pygmaeus*, *Streblospio benedicti*, *Spio filicornis*, *Polygordius jouinae*, *Cirratulidae* spp., and *Asabellides oculata* (Table 23).

Numerically, the infauna in the reference sites of the cable corridor was strongly dominated by the polychaete worm *Prionospio pygmaeus*, which accounted for approximately 18 percent of all individuals identified for the reference site samples within the Cable corridor. The 10 most abundant taxa for the reference site samples within the cable corridor accounted for nearly 62 percent of the total infauna identified. Of the 20 most abundant species identified, 12 were polychaete worms, including *Prionospio pygmaeus*, *Amastigos caperatus*, *Streblospio benedicti*, *Scalibregma inflatum*, *Aricidea (Acmira) catherinae*, *Brania wellfleetensis*, *Lumbrinerides acuta*, *Spiophanes bombyx*, *Aglaophamus verrilli*, *Cirratulidae* spp., *Asabellides oculata*, and *Aricidea (Acmira) cerrutii* (Table 23).



Table 23. Rank Based on Abundance of Organisms for the Project Sites and Reference Sites within the Cable Corridor

Major Taxon	Description	Family	Project Sites		Reference Sites	
			Total	% of Individuals	Total	% of Individuals
Annelida-Polychaeta	<i>Spiophanes bombyx</i>	Spionidae	1,535	16.77	18	1.82
Annelida-Polychaeta	<i>Amastigos caperatus</i>	Capitellidae	836	9.13	66	6.67
Mollusca-Bivalvia	<i>Ensis sp.</i>	Pharidae	705	7.70	47	4.75
Annelida-Polychaeta	<i>Scalibregma inflatum</i>	Scalibregmatidae	631	6.89	22	2.22
Annelida-Polychaeta	<i>Prionospio pygmaeus</i>	Spionidae	617	6.74	175	17.69
Annelida-Polychaeta	<i>Streblospio benedicti</i>	Spionidae	549	6.00	51	5.16
Annelida-Oligochaeta	<i>Oligochaeta spp.</i>		413	4.51	59	5.97
Mollusca-Bivalvia	<i>Tellina versicolor</i>	Tellinidae	326	3.56	37	3.74
Arthropoda-Crustacea-Amphipoda	<i>Protohaustorius wigleyi</i>	Haustoriidae	207	2.26	19	1.92
Annelida-Polychaeta	<i>Spio filicornis</i>	Spionidae	198	2.16	--	--
Annelida-Polychaeta	<i>Polygordius jouinae</i>	Polygordiidae	168	1.84	--	--
Arthropoda-Crustacea-Amphipoda	<i>Byblis serrata</i>	Ampeliscidae	168	1.84	--	--
Arthropoda-Crustacea-Amphipoda	<i>Acanthohaustorius millsii</i>	Haustoriidae	156	1.70	29	2.93
Arthropoda-Crustacea-Amphipoda	<i>Unciola irrorata</i>	Aoridae	131	1.43	--	--
Annelida-Polychaeta	<i>Cirratulidae spp.</i>		122	1.33	15	1.52
Arthropoda-Crustacea-Amphipoda	<i>Metharpinia floridana</i>	Phoxocephalidae	120	1.31	13	1.31
Annelida-Polychaeta	<i>Asabellides oculata</i>	Ampharetidae	118	1.29	14	1.42
Mollusca-Bivalvia	<i>Abra longicallus</i>	Semelidae	95	1.04	--	--
Mollusca-Gastropoda	<i>Nassarius trivittatus</i>	Nassariidae	93	1.02	14	1.42
Chordata-Cephalochordata	<i>Branchiostoma sp.</i>	Branchiostomidae	90	0.98	108	10.92
Annelida-Polychaeta	<i>Aricidea (Acmira) catherinae</i>	Paraonidae		--	20	2.02
Annelida-Polychaeta	<i>Brania wellfleetensis</i>	Syllidae		--	19	1.92
Annelida-Polychaeta	<i>Lumbrinerides acuta</i>	Lumbrineridae		--	19	1.92
Annelida-Polychaeta	<i>Aglaophamus verilli</i>	Nephtyidae		--	15	1.52
Annelida-Polychaeta	<i>Aricidea (Acmira) cerrutii</i>	Paraonidae		--	13	1.31
Crustacea-Amphipoda	<i>Rhepoxynius epistomus</i>	Phoxocephalidae		--	13	1.31
		<b>Site Total</b>	<b>9,155</b>		<b>989</b>	

Within the cable corridor, 166 species were collected for the project site samples and 81 species were collected for the reference site samples. The numerically dominant species previously mentioned for these samples were among the most widespread species. This suggests that these infaunal communities are fairly similar across the project and reference site samples within the cable corridor.

Although annelids were the most abundant organisms for the project sites and reference sites within the cable corridor, mollusks dominated the biomass (g) of the samples. Typical mollusks encountered in the project site samples were *Nassarius trivittatus*, *Abra longicallus*, and *Ensis* sp. Typical mollusks encountered in the reference site samples were *Ensis* sp., *Tellina versicolor*, and *Nassarius trivittatus*, all of which are generally heavier animals than annelids. Percentage biomass of organisms collected within the cable corridor is shown in Figure 9.

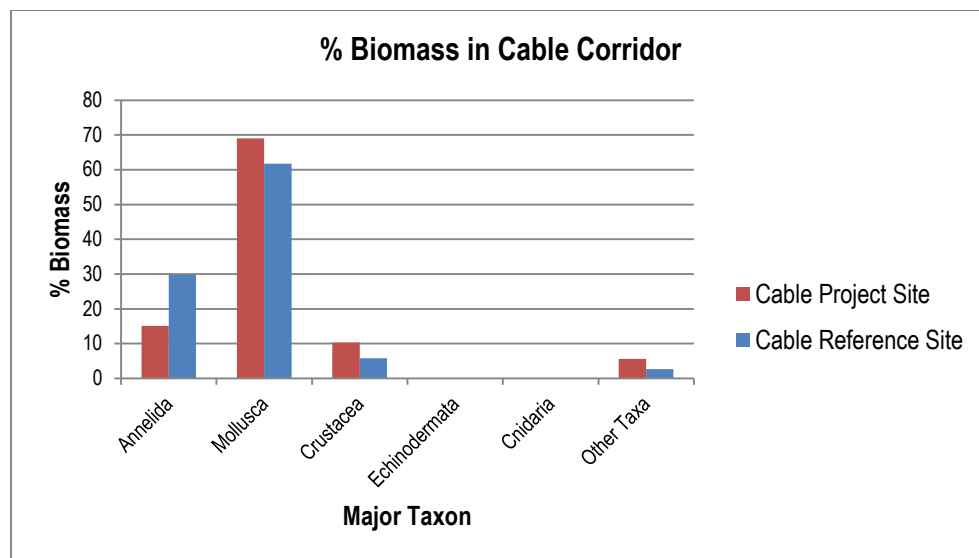


Figure 9. Biomass of the Most Common Taxa in the Project Sites and Reference Sites within the Cable Corridor

## 4 SUMMARY OF RESULTS AND DISCUSSION

Results for the VOWTAP project sites and reference sites within the Research Lease Area and cable corridor are summarized in Table 24. Overall, the composition of sediment types as measured by grain size and organic content analysis was consistent with the expected site conditions, and similar between the project and reference sites within both the Research Lease Area and the cable corridor. The sediments were dominated by fine sand with very low organic content in most of the sites. Species richness was highest in the sites containing the greatest number of samples, as expected based on fundamental species-area relationships for marine ecosystems (Valiela 1995; Neigel 2003). However, the number of species per sample and overall species diversity ( $H'$ ) was bound by similar ranges between the sampled sites. The dominant phyla across the project and reference sites were consistently Annelida and Mollusca, followed by Arthropoda. The polychaete worm *Spiophanes bombyx* was the dominant species within the project sites and reference sites of the Research Lease Area. While polychaete worms still dominated the species composition along the cable corridor, the percent composition for the most abundant species was lower than in the Research Lease Area sites and was split between two different species which accounted for this

abundance within the project sites (*Spiophanes bombyx*) and reference sites (*Prionospio pygmaeus*) of the cable corridor.

**Table 24. Summary Results and Comparisons between Project and Reference Sites within the Research Lease area and Cable Corridor**

Parameter	Research Lease Area		Cable Corridor	
	Project Sites	Reference Sites	Project Sites	Reference Sites
Number of Samples	15	3	45	6
Sample Numbers	GS-001 through GS-015	GS-REF-007 through GS-REF-009	GS-016 through GS-060	GS-REF-001 through GS-REF-006
Average Grain Size	60% fine sand, 29% medium sand, 7% silt/clay, 2% coarse sand, 2% gravel	94% fine sand, 5% silt/clay, 1% medium sand, < 1% coarse sand and gravel	70% fine sand, 19% medium sand, 6% silt/clay, 3% coarse sand, 2% gravel	74% fine sand, 17% medium sand, 8% silt/clay, 1% coarse sand, < 1% gravel
Organic Content	0.3 – 2.3%	0.5% - 0.8%	0.2% - 1.4%	0.2% - 0.8%
Number of Species per Sample	14 – 32	25 – 35	14 – 37	19 – 31
Species Richness	101	57	166	81
Species Diversity (H')	1.05 – 3.04	1.46 – 2.87	1.02 – 3.11	1.96 – 2.75
Dominant Phyla	Annelida, Mollusca, Arthropoda	Annelida, Mollusca, Arthropoda	Annelida, Mollusca, Arthropoda	Annelida, Mollusca, Arthropoda
Dominant Species and Approximate % Abundance	<i>Spiophanes bombyx</i> (33%), <i>Oligochaetae</i> spp. (8%), <i>Exogone hebes</i> (4%)	<i>Spiophanes bombyx</i> (50%), <i>Abra longicallus</i> (10%), <i>Nassarius trivittatus</i> (5%)	<i>Spiophanes bombyx</i> (17%), <i>Amastigos caperatus</i> (9%), <i>Ensis</i> sp. (8%)	<i>Prionospio pygmaeus</i> (18%), <i>Branchiostoma</i> sp. (11%), <i>Amastigos caperatus</i> (7%)

Substrate and species composition in the VOWTAP Project Area are consistent with the description of benthic habitats in the Virginia WEA (BOEM 2012), as well as the other studies discussed in Section 1.2 (Existing Benthic Resource Conditions). The coarse-grained sand of the VOWTAP area provides a uniform and rather simple (non-complex) habitat for benthic infaunal organisms typical of this region (Cutter and Diaz 1998). Principal species occurring in this VOWTAP benthic survey included *Spiophanes bombyx*, with other polychaetes including *Prionospio pygmaeus*, *Amastigos caperatus*, *Aricidea (Acмира) catherinae*, *Streblospio benedicti*, and *Scalibregma inflatum*. These findings are consistent with the conclusions of previously published reports on benthic infauna in coastal and offshore Virginia waters (Cutter and Diaz 1998; Diaz et al. 2004; USACE 2009).

This type of sandy substrate provides habitat for infaunal annelids and mollusks, and does not support any seagrasses, hardbottom, livebottom, or any other unique habitat features. Low levels of occurrence of both echinoderms and cnidarians can be attributed to the soft sand substrates within the lease and cable corridor survey sites. Such species are largely associated with hardbottom communities, as they are unable to form “livebottom” communities without a hard substrate to support attachment. No such hardbottom substrate was observed in the VOWTAP Lease Area and cable corridor sites. Polychaetes and other infaunal species typical of soft substrates are able to quickly recolonize disturbed areas, as they are well adapted to highly dynamic environments (BOEM 2012). As expected, all surveyed sites exhibit the type of soft-bottom habitat that is ubiquitous within the Virginia WEA (BOEM 2012), and the project sites did not differ substantially from the reference sites.

## 5 REFERENCES

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## **Attachment A – Sample Photo Log: Underwater and On-deck Imagery**

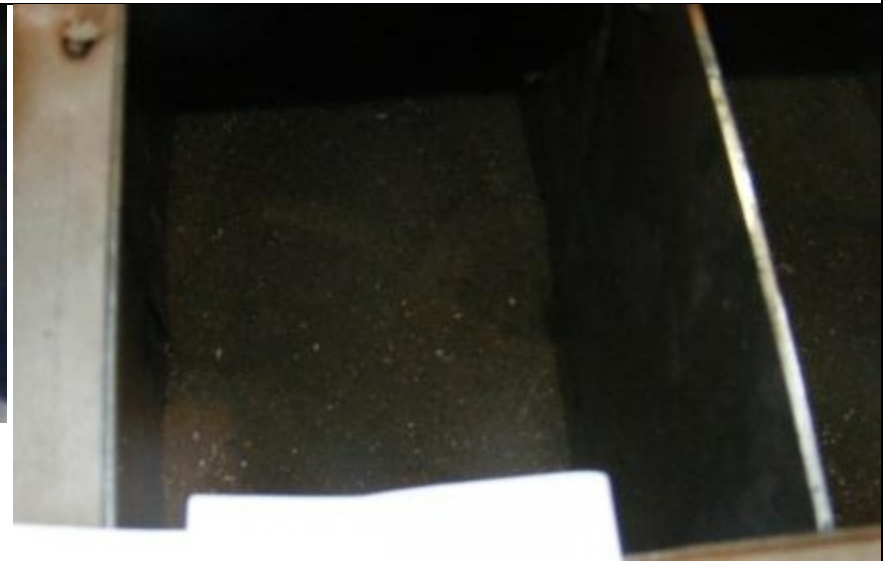
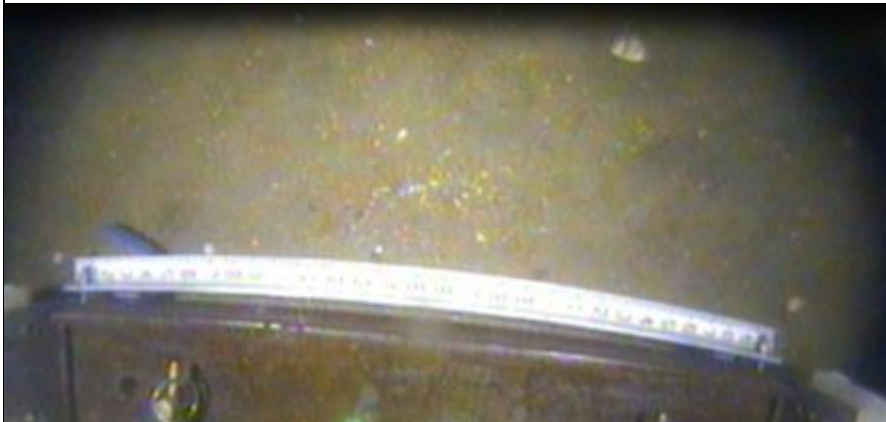


**Camera Still**

**Virginia Offshore Wind Technology Advancement Project**

**Sample ID: GS-001**

**Date: 16 June 2013 Time 04:45 UTC**



**Sediment Description:** Loose gray medium SAND, shell hash

NAD83, UTM Zone 18N, Meters

N: 4084517.8

E: 455996.5

Water Depth: 21.10m MLLW



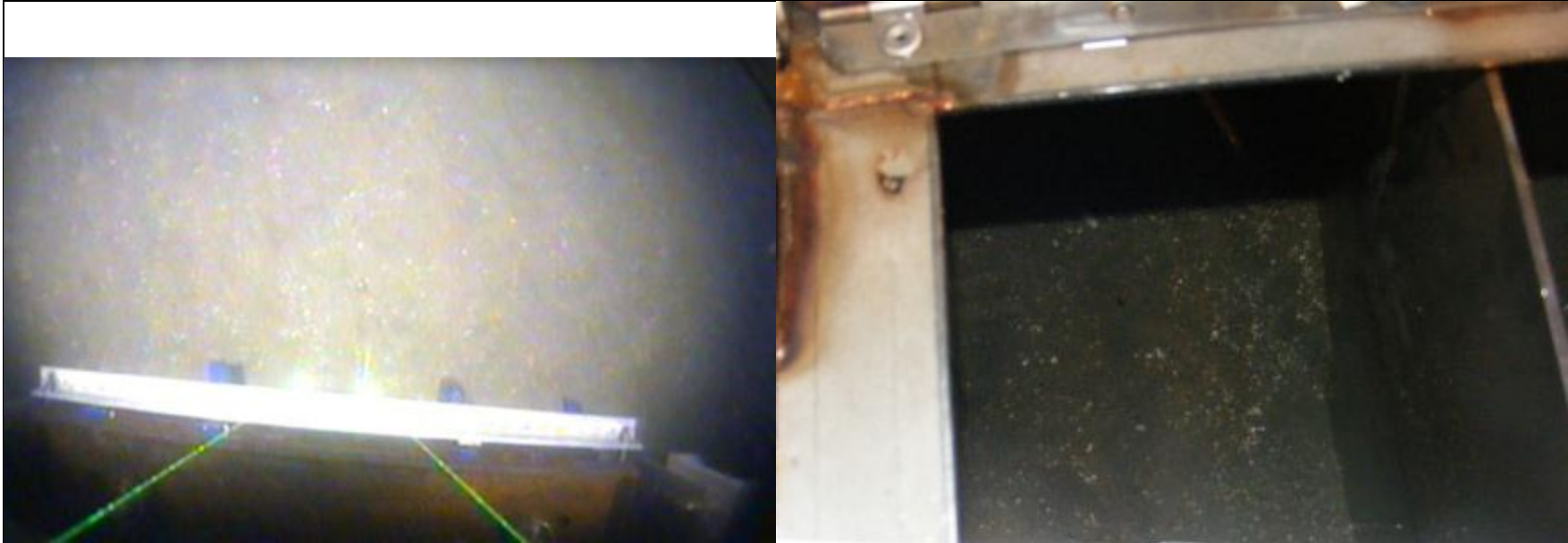


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-002

Date: 16 June 2013 Time 02:42 UTC



**Sediment Description:** Loose gray fine SAND, shell hash

NAD83, UTM Zone 18N, Meters

N: 4083727.9

E: 456216.6

Water Depth 23.78m MLLW

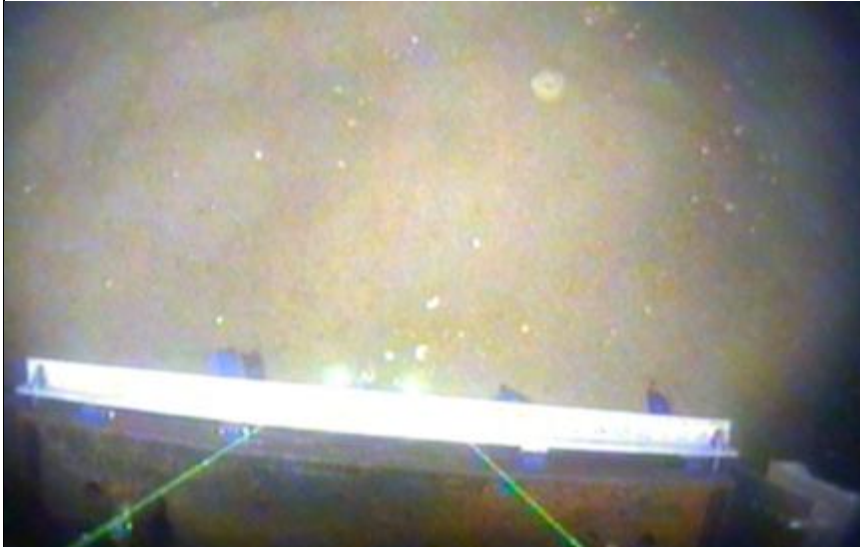


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-003

Date: 16 June 2013 Time 01:56 UTC



**Sediment Description:** Medium dense light yellowish brown medium SAND, worms and shells/shell hash

NAD83, UTM Zone 18N, Meters

N: 4084324.5

E: 456226.2

Water Depth: 25.37m MLLW

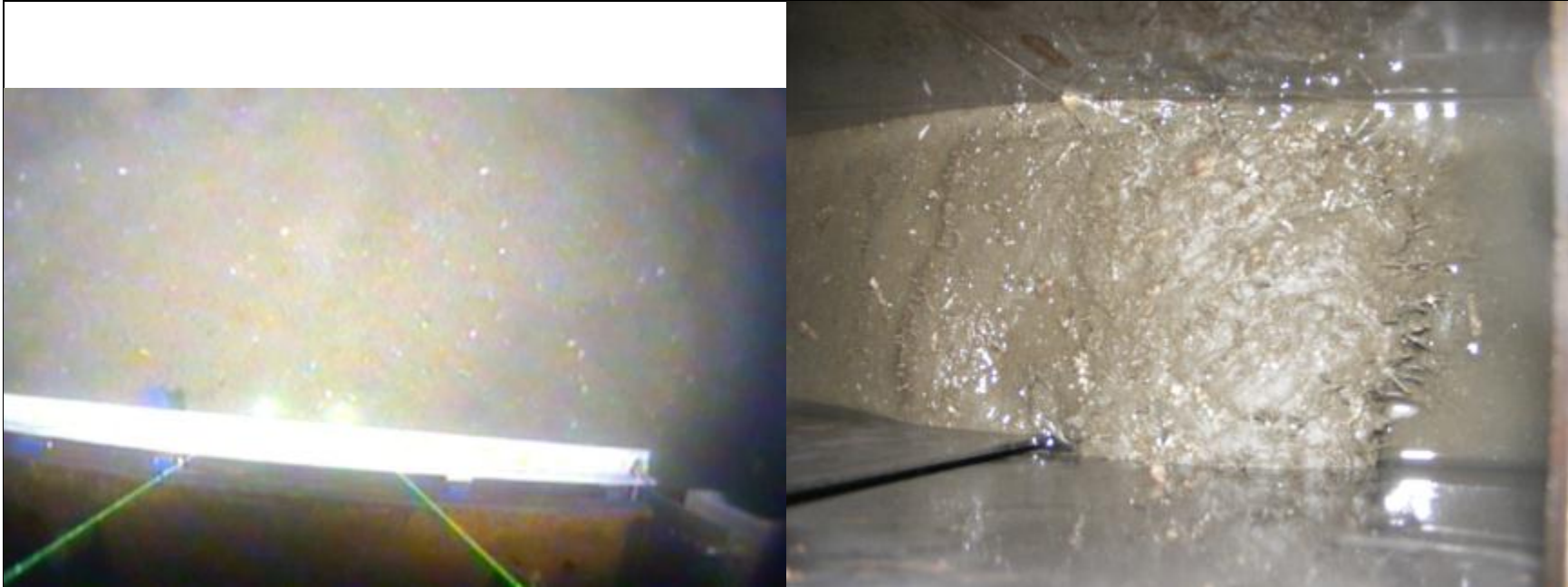


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-004

Date: 16 June 2013 Time 07:25 UTC



**Sediment Description:** Dense grayish brown fine SAND, worms/worm tubes

NAD83, UTM Zone 18N, Meters

N: 4083407.6

E: 455865.7

Water Depth: 24.70 MLLW

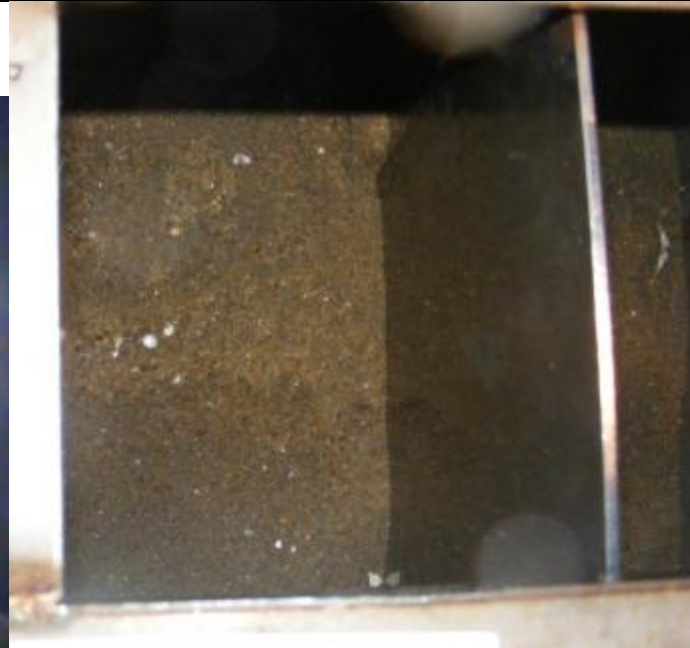


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-005

Date: 16 June 2013 Time 08:03 UTC



**Sediment Description:** Medium dense yellowish brown medium SAND, shell hash, clamshell

NAD83, UTM Zone 18N, Meters

N: 4082871.6

E: 455796.7

Water Depth: 26.15m MLLW

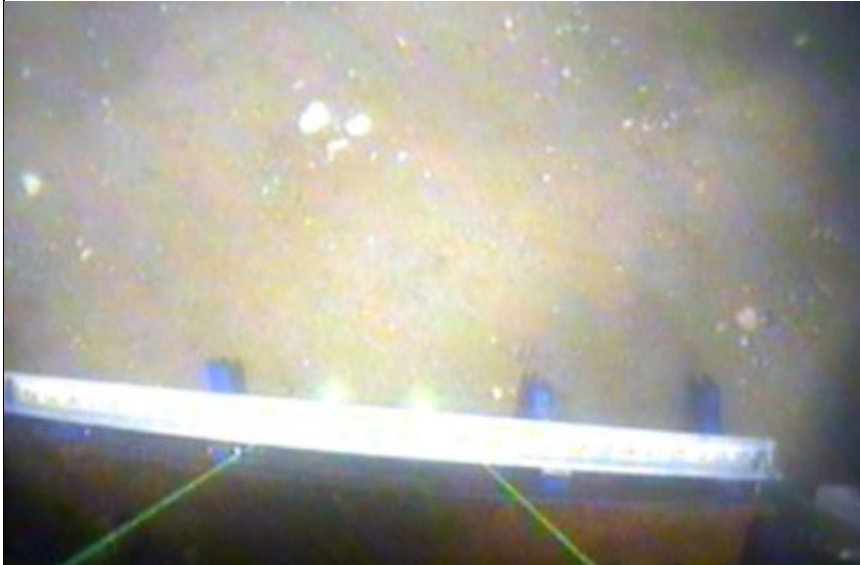


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-006

Date: 16 June 2013 Time 08:45 UTC



**Sediment Description:** Medium dense yellowish brown medium SAND, shell hash, hermit crab

NAD83, UTM Zone 18N, Meters

N: 4082563.0

E: 455927.8

Water Depth: 24.15m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-007

Date: 16 June 2013 Time 09:28 UTC



**Sediment Description:** Dense greenish gray silty fine SAND, worm tubes, hermit crab, shrimp, shell hash

NAD83, UTM Zone 18N, Meters

N: 4082004.1

E: 456561.2

Water Depth: 26.33m MLLW

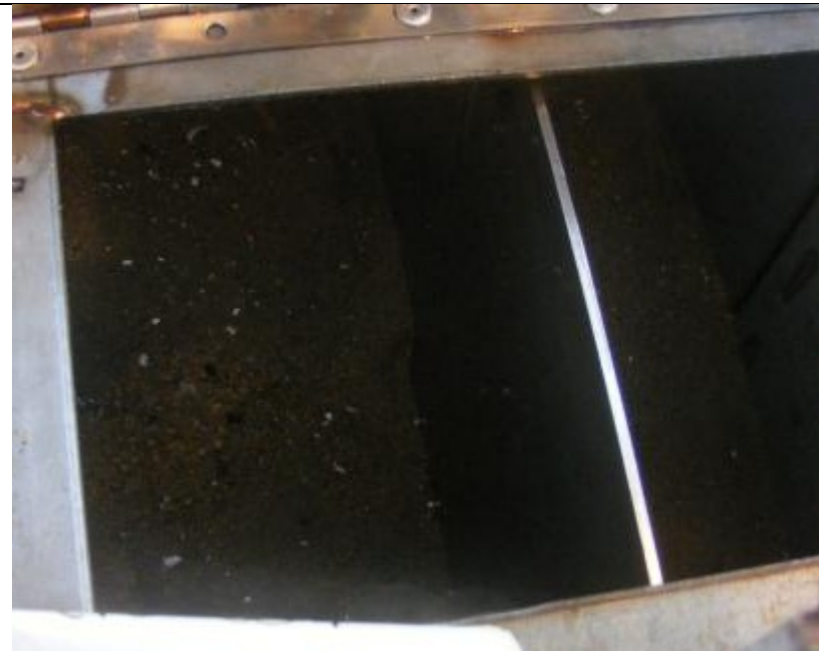
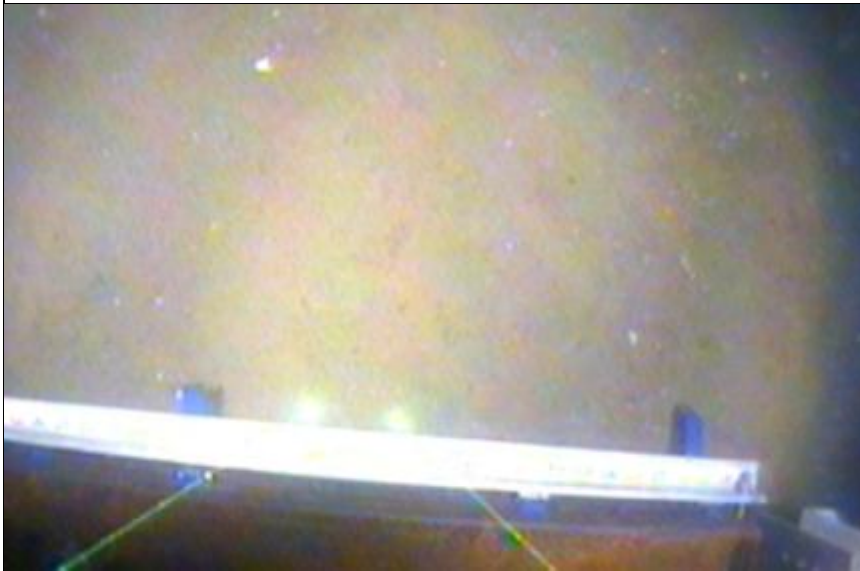


**Camera Still**

**Virginia Offshore Wind Technology Advancement Project**

**Sample ID: GS-008**

**Date: 16 June 2013 Time 09:50 UTC**



**Sediment Description:** Medium dense yellowish brown medium SAND, shell hash, worms

NAD83, UTM Zone 18N, Meters

N: 4082105.5

E: 455896.4

Water Depth: 24.59m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-009

Date: 16 June 2013 Time 10:33 UTC



**Sediment Description:** Medium dense yellowish brown medium SAND, shell hash

NAD83, UTM Zone 18N, Meters

N: 4081500.5

E: 456106.9

Water Depth: 26.01m MLLW



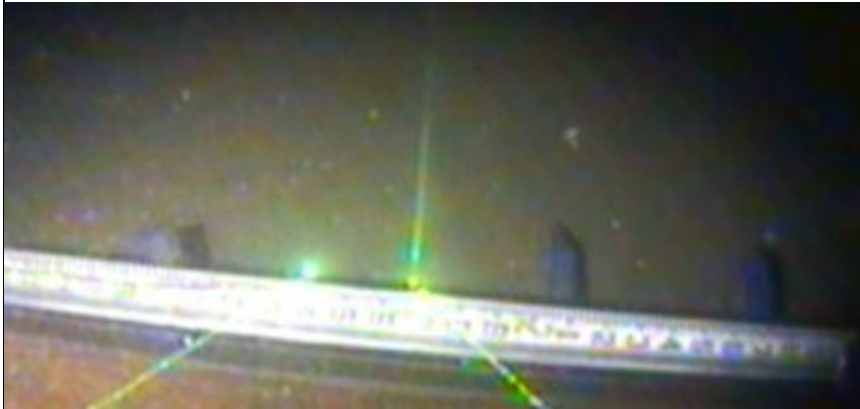


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-010

Date: 17 June 2013 Time 03:58 UTC



**Sediment Description:** Dense grayish brown silty fine SAND, shell hash

NAD83, UTM Zone 18N, Meters

N: 4083427.3

E: 457436.4

Water Depth: 24.97m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-011

Date: 17 June 2013 Time 03:08 UTC



**Sediment Description:** Dense grayish brown silty fine SAND, shell hash, worm tubes

NAD83, UTM Zone 18N, Meters

N: 4082884.7

E: 457013.1

Water Depth: 25.90m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-012

Date: 17 June 2013 Time 04:51 UTC



**Sediment Description:** Dense grayish brown silty fine SAND, shell hash, snail shell

NAD83, UTM Zone 18N, Meters

N: 4083427.5

E: 456973.0

Water Depth: 24.33m MLLW

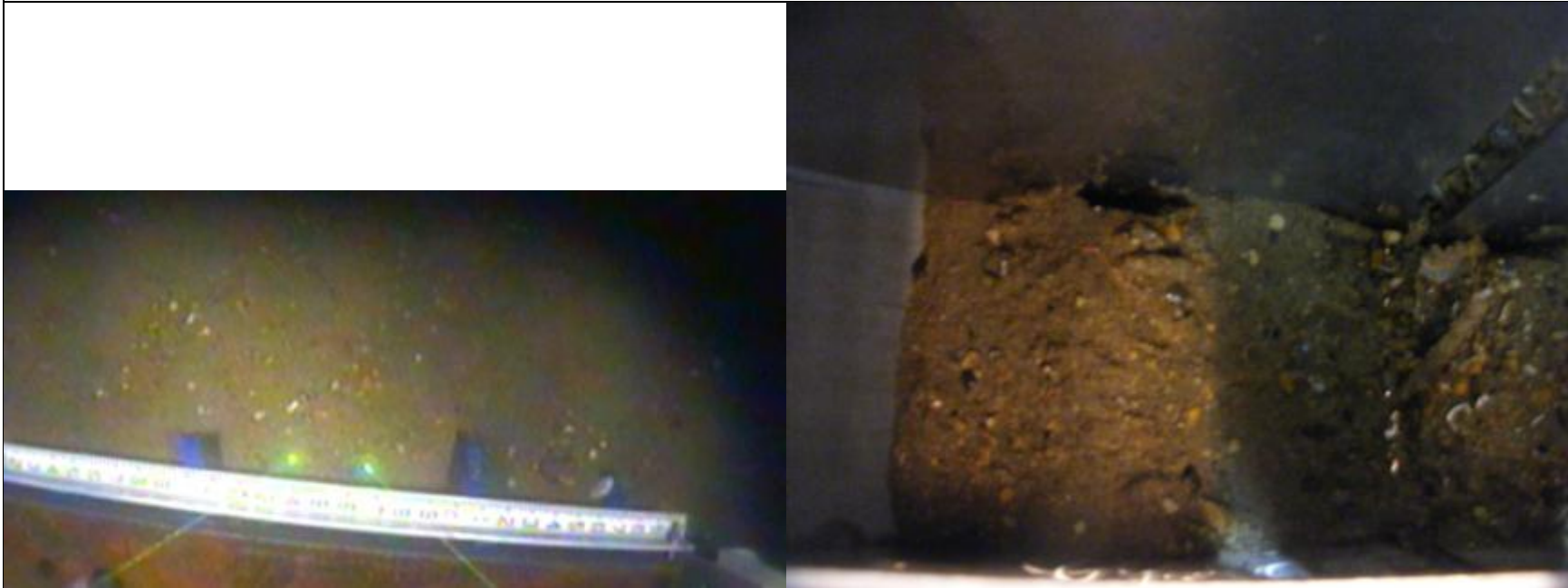


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-013

Date: 17 June 2013 Time 00:55 UTC



**Sediment Description:** Loose yellowish brown gravelly coarse SAND, shell hash, clam tube

NAD83, UTM Zone 18N, Meters

N: 4081371.1

E: 457270.8

Water Depth: 25.38m MLLW

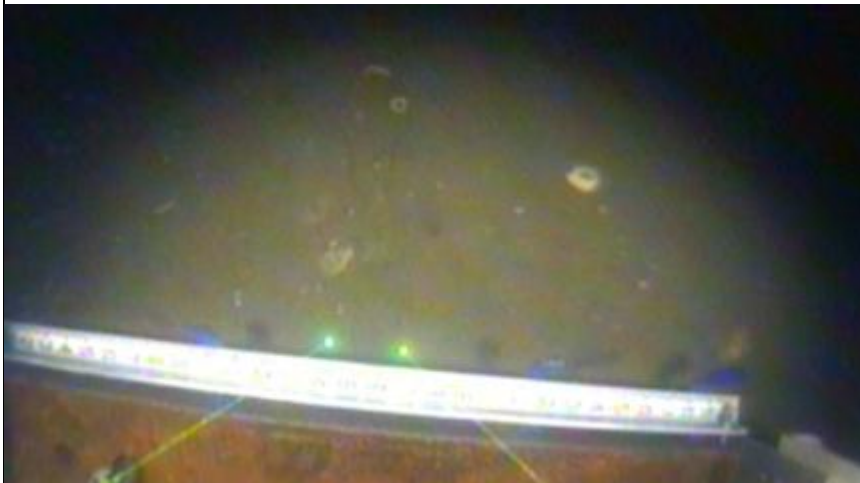


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-014

Date: 17 June 2013 Time 01:25 UTC



**Sediment Description:** Firm gray sandy SILT on surface above Firm dark gray clayey SILT, clamshells, shell hash

NAD83, UTM Zone 18N, Meters

N: 4081882.4

E: 457298.5

Water Depth: 28.11m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-015

Date: 17 June 2013 Time 02:33 UTC



**Sediment Description:** Dense grayish brown fine silty SAND, worm tubes, shell hash

NAD83, UTM Zone 18N, Meters

N: 4082304.9

E: 457667.7

Water Depth: 26.84m MLLW



**Camera Still**

**Virginia Offshore Wind Technology Advancement Project**

**Sample ID: GS-016**

**Date: 19 June 2013 Time 22:48 UTC**



**Sediment Description:** Dense gray silty fine SAND, worms, worm tube, razor clams, shell hash

NAD83, UTM Zone 18N, Meters

N: 4074924.7

E: 414712.4

Water Depth: 7.85m MLLW



**Camera Still**

**Virginia Offshore Wind Technology Advancement Project**

**Sample ID: GS-017**

**Date: 19 June 2013 Time 23:13 UTC**



**Sediment Description:** Dense dark gray silty fine SAND, shell hash

NAD83, UTM Zone 18N, Meters

N: 4074995.2

E: 415747.4

Water Depth: 8.13m MLLW





Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-018

Date: 20 June 2013 Time 00:15 UTC



**Sediment Description:** Dense dark gray silty fine SAND, worms, shell hash, hermit crab, razor clams

NAD83, UTM Zone 18N, Meters

N: 4075063.8

E: 416645.4

Water Depth: 8.41m MLLW



**Camera Still**

**Virginia Offshore Wind Technology Advancement Project**

**Sample ID: GS-019**

**Date: 20 June 2013 Time 02:16 UTC**



**Sediment Description:** Dense dark grayish brown silty fine SAND, shell hash, worms, razor clams

NAD83, UTM Zone 18N, Meters

N: 4075154.5

E: 417719.7

Water Depth: 9.12m MLLW

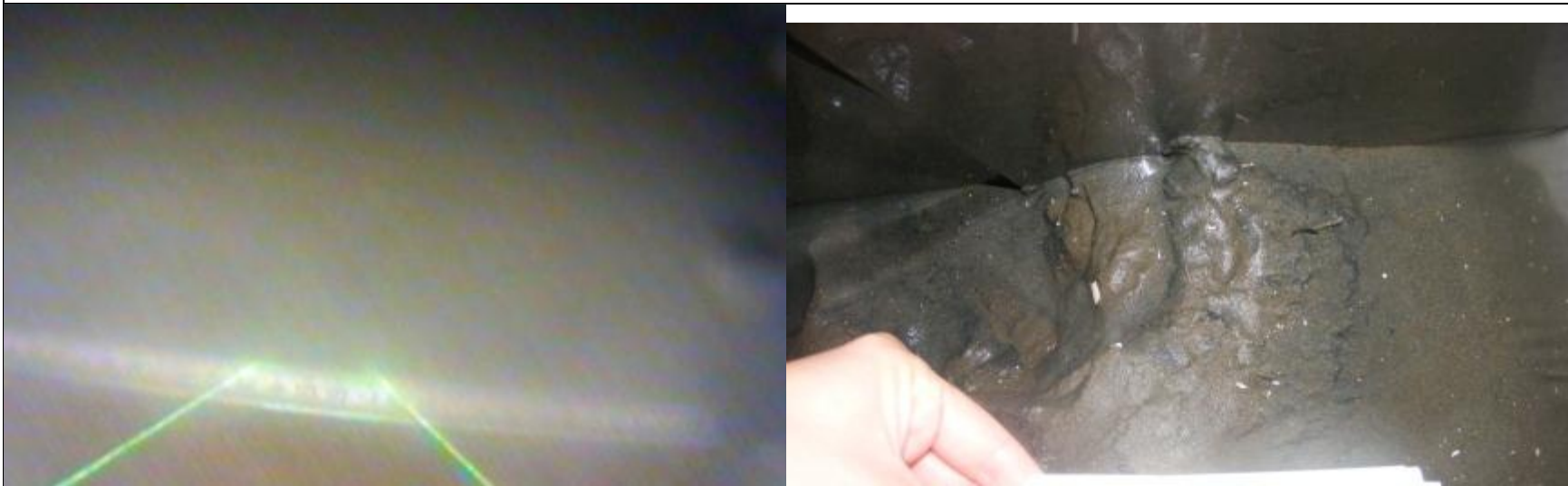


**Camera Still**

**Virginia Offshore Wind Technology Advancement Project**

**Sample ID: GS-020**

**Date: 20 June 2013 Time 02:37 UTC**



**Sediment Description:** Loose dark gray silty fine SAND, shell hash, worms



NAD83, UTM Zone 18N, Meters

N: 4075206.7

E: 419236.6

Water Depth: 11.27m MLLW



<p><b>Camera Still</b></p> <p><b>Sample ID: GS-021</b></p>		<p><b>Virginia Offshore Wind Technology Advancement Project</b></p> <p><b>Date: 20 June 2013 Time 03:00 UTC</b></p>	
			
<p><b>Sediment Description:</b> Loose yellowish brown coarse SAND with SILT, shell hash, sand dollar</p>			
<p>NAD83, UTM Zone 18N, Meters</p>	<p>N: 4075222.9</p>	<p>E: 419670.1</p>	<p>Water Depth: 11.01m MLLW</p>



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-022

Date: 20 June 2013 Time 03:25 UTC



**Sediment Description:** Loose light yellowish brown coarse SAND with SILT, shell hash

NAD83, UTM Zone 18N, Meters

N: 4075221.9

E: 420492.7

Water Depth: 10.98m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-023

Date: 20 June 2013 Time 03:50 UTC



**Sediment Description:** Dense dark gray silty very fine SAND, shell hash, barnacle, razor clam, possible horseshoe crab egg sack

NAD83, UTM Zone 18N, Meters

N: 4075201.8

E: 421680.0

Water Depth: 14.01m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-024

Date: 20 June 2013 Time 04:16 UTC



**Sediment Description:** Loose light yellowish brown coarse SAND with SILT, shell hash, hermit crab, razor clam, bivalves

NAD83, UTM Zone 18N, Meters

N: 4075151.0

E: 422597.9

Water Depth: 14.79m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-025

Date: 20 June 2013 Time 04:47 UTC



**Sediment Description:** Dense dark gray silty very fine SAND, shell hash, razor clam, worm

NAD83, UTM Zone 18N, Meters

N: 4075021.9

E: 423181.2

Water Depth: 15.77m MLLW





Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-026

Date: 20 June 2013 Time 05:12 UTC



**Sediment Description:** Loose light yellowish brown coarse SAND with SILT, shell hash

NAD83, UTM Zone 18N, Meters

N: 4074734.4

E: 424334.9

Water Depth: 16.03m MLLW

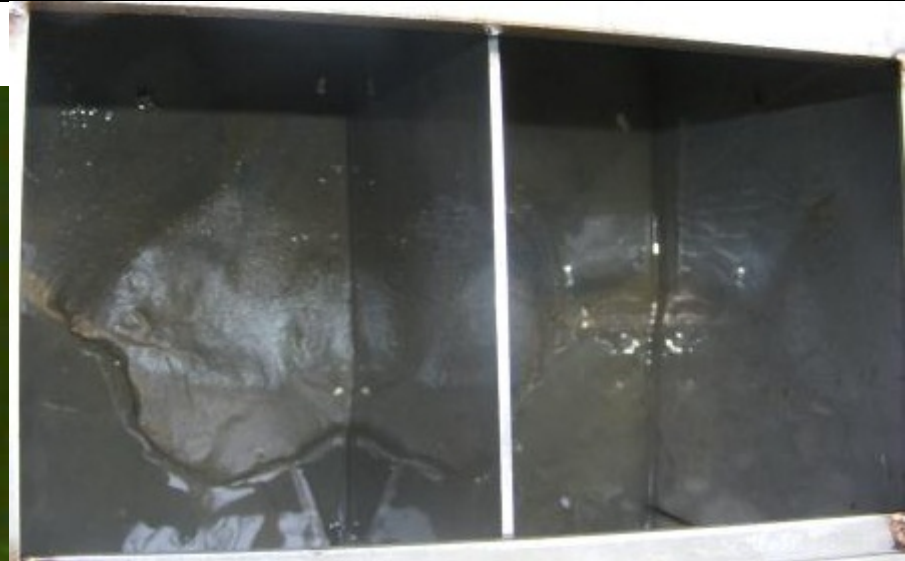


**Camera Still**

**Virginia Offshore Wind Technology Advancement Project**

**Sample ID: GS-027**

**Date: 19 June 2013 Time 21:05 UTC**



**Sediment Description:** Firm dark greenish gray fine sandy SILT, worm tubes, shell hash

NAD83, UTM Zone 18N, Meters

N: 4074584.2

E: 425191.4

Water Depth: 15.65m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-028

Date: 19 June 2013 Time 20:30 UTC

No underwater photo available



**Sediment Description:** Medium dense dark greenish gray silty fine SAND, worm tubes, shell hash

NAD83, UTM Zone 18N, Meters

N: 4074443.7

E: 425738.6

Water Depth: 15.85m MLLW

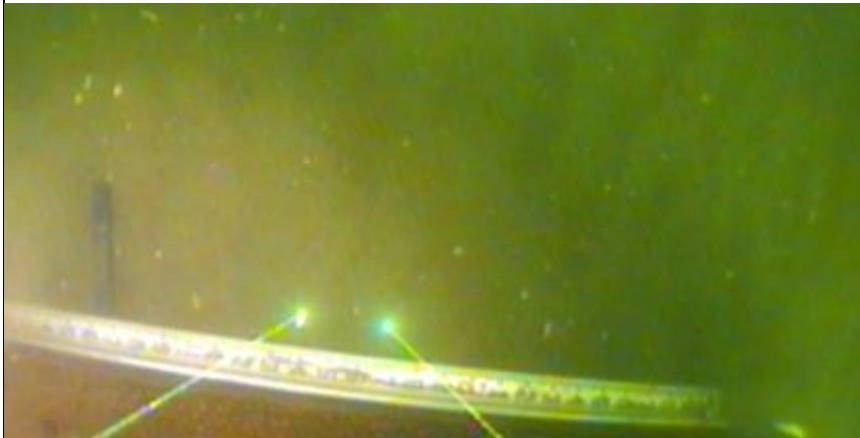


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-029

Date: 19 June 2013 Time 20:08 UTC



**Sediment Description:** Firm greenish gray fine sandy SILT, worm tubes, clam shells, worms, razor clam, shell hash

NAD83, UTM Zone 18N, Meters

N: 4074308.5

E: 426293.3

Water Depth: 16.17m MLLW

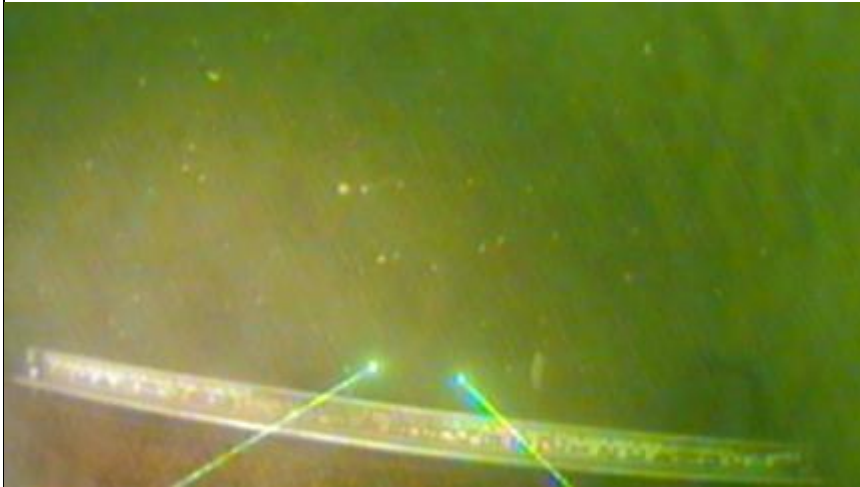


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-030

Date: 19 June 2013 Time 19:49 UTC



**Sediment Description:** Medium dense dark grayish brown silty fine SAND, worms, clam shells, shell hash

NAD83, UTM Zone 18N, Meters

N: 4074028.4

E: 427532.4

Water Depth: 16.12m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-031

Date: 19 June 2013 Time 19:25 UTC



**Sediment Description:** Medium dense grayish brown silty fine SAND, hermit crab, shrimp, worm tubes, razor clam, shell hash

NAD83, UTM Zone 18N, Meters

N: 4073981.9

E: 428389.4

Water Depth: 16.60m MLLW

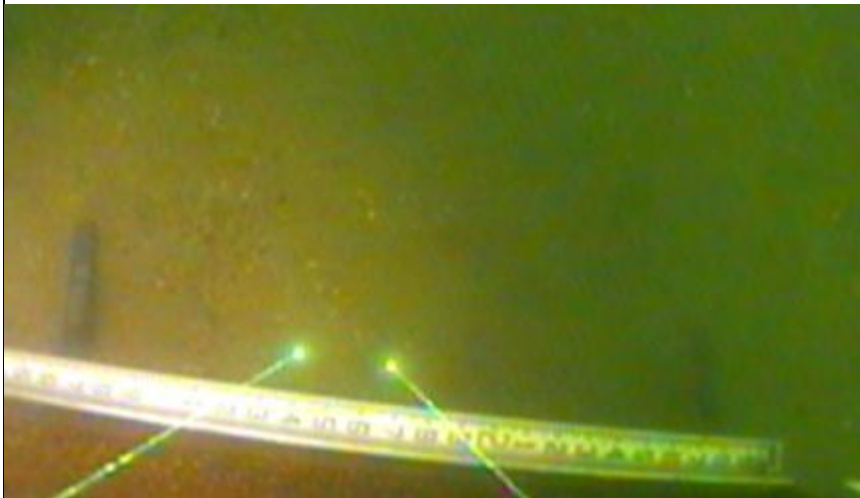


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-032

Date: 19 June 2013 Time 19:02 UTC



**Sediment Description:** Loose grayish brown sandy GRAVEL, hermit crab, shell hash

NAD83, UTM Zone 18N, Meters

N: 4073914.5

E: 429097.6

Water Depth: 18.41m MLLW

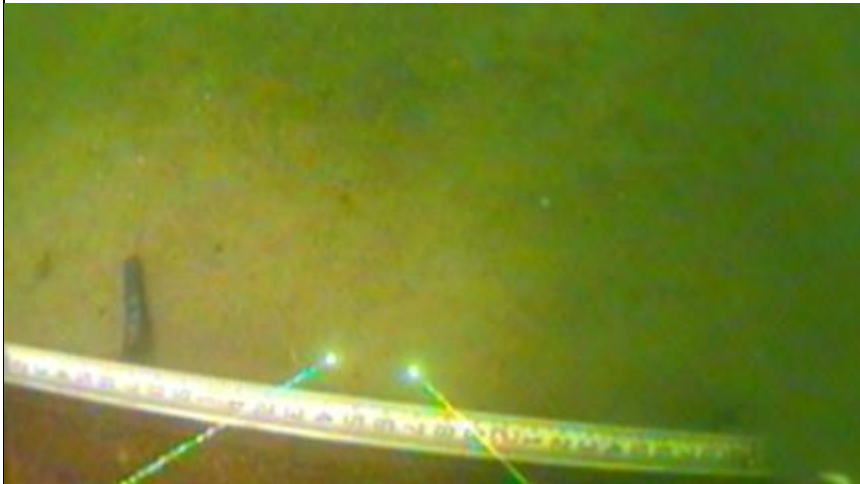


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-033

Date: 19 June 2013 Time 18:12 UTC



**Sediment Description:** Loose pale brown gravelly coarse SAND, shell hash, oyster shells, mollusk

NAD83, UTM Zone 18N, Meters

N: 4073865.4

E: 430379.1

Water Depth: 19.32m MLLW



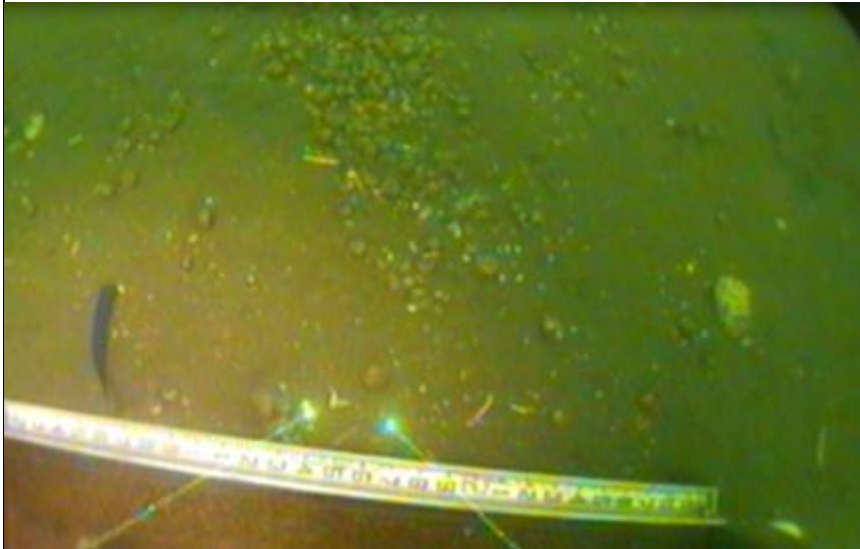


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-034

Date: 19 June 2013 Time 18:40 UTC



**Sediment Description:** Loose grayish brown medium to coarse gravelly SAND, worms, shell hash, clam/oyster shells, pieces of coral, mollusk

NAD83, UTM Zone 18N, Meters

N: 4073818.1

E: 431348.8

Water Depth: 18.53m MLLW

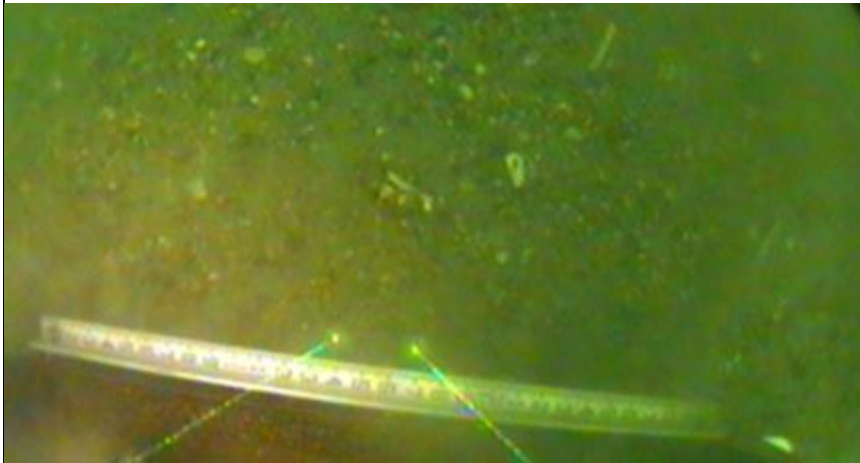


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-035

Date: 19 June 2013 Time 16:55 UTC



**Sediment Description:** Loose gray coarse sandy GRAVEL, worm tubes, snail shells, shell hash

NAD83, UTM Zone 18N, Meters

N: 4073739.6

E: 432141.6

Water Depth: 18.89m MLLW

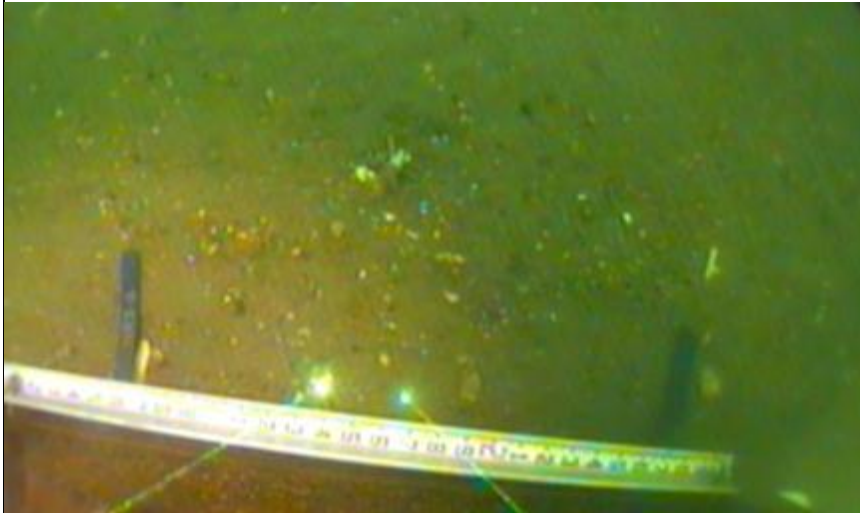


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-036

Date: 19 June 2013 Time 16:05 UTC



**Sediment Description:** Loose gray coarse sandy GRAVEL, worm tubes, shell hash, piece of coral, clam shells

NAD83, UTM Zone 18N, Meters

N: 4073728.9

E: 433006.7

Water Depth: 19.88m MLLW

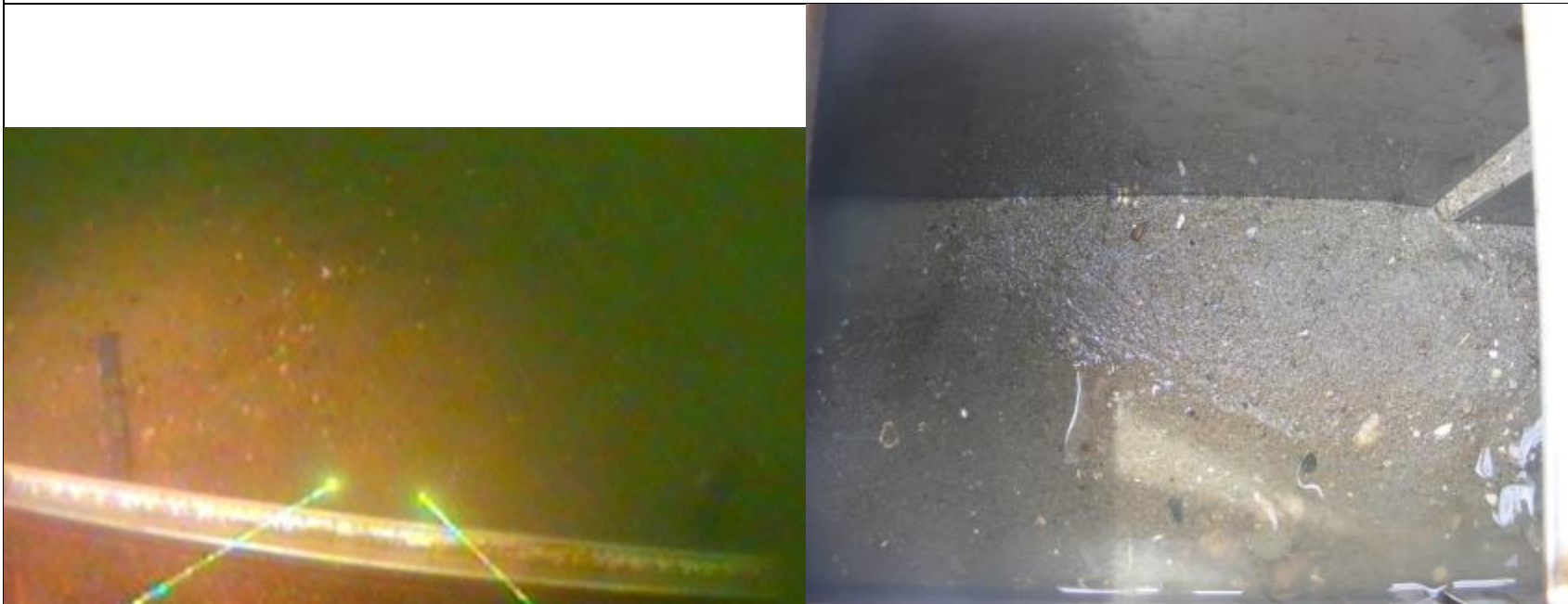


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-037

Date: 19 June 2013 Time 15:28 UTC



**Sediment Description:** Loose grayish brown gravelly coarse SAND, hermit crabs, shell fragments, worms

NAD83, UTM Zone 18N, Meters

N: 4073863.4

E: 433839.7

Water Depth: 21.03m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-038

Date: 18 June 2013 Time 11:10 UTC



**Sediment Description:** Loose yellowish brown coarse SAND, hermit crabs, shell hash, worms

NAD83, UTM Zone 18N, Meters

N: 4074026.6

E: 434609.3

Water Depth: 19.66m MLLW

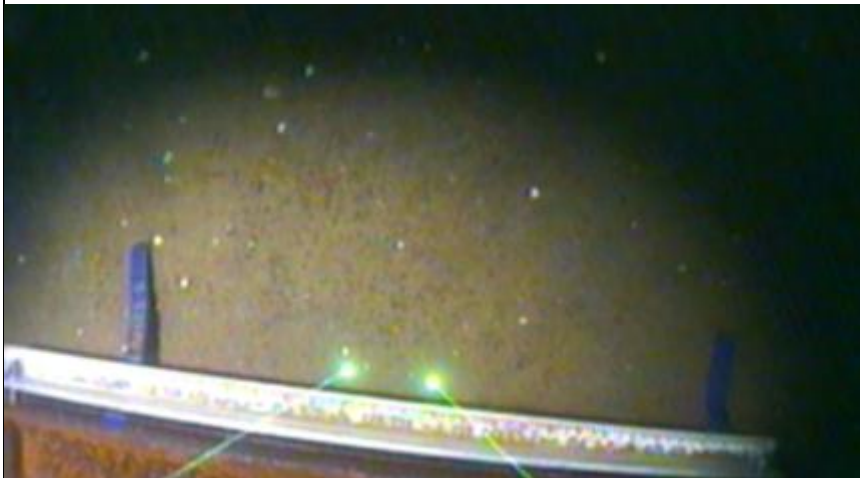


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-039

Date: 18 June 2013 Time 10:45 UTC



**Sediment Description:** Loose yellowish brown medium to coarse SAND, worms, shell fragments, piece of coral

NAD83, UTM Zone 18N, Meters

N: 4074176.4

E: 435375.3

Water Depth: 20.37m MLLW

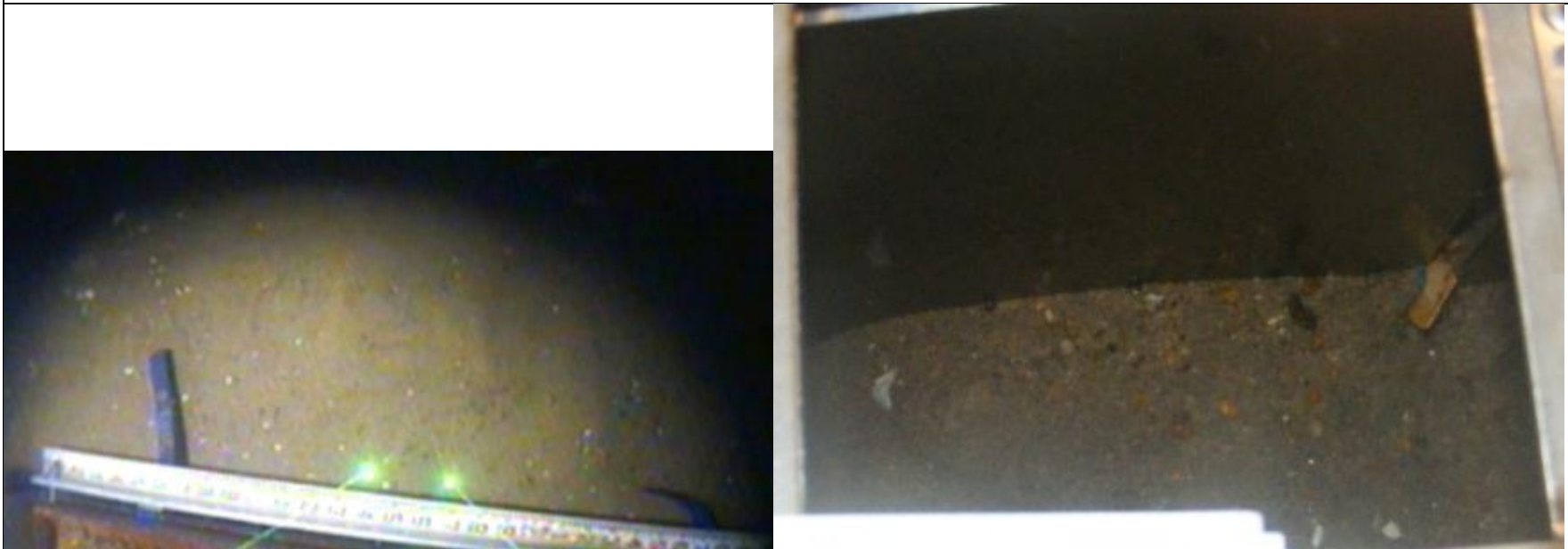


**Camera Still**

**Virginia Offshore Wind Technology Advancement Project**

**Sample ID: GS-040**

**Date: 18 June 2013 Time 09:48 UTC**



**Sediment Description:** Loose yellowish brown coarse SAND, shells/shell hash, worm, clam-like organism

NAD83, UTM Zone 18N, Meters

N: 4074407.0

E: 436429.7

Water Depth: 18.10m MLLW

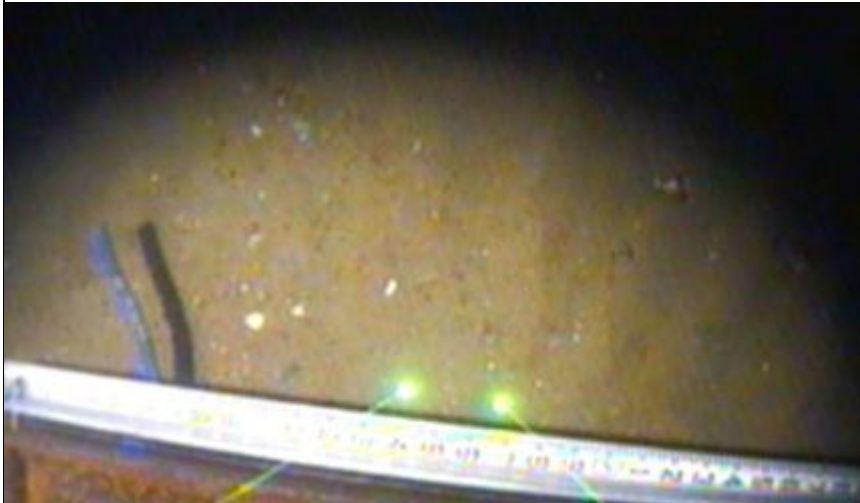


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-041

Date: 18 June 2013 Time 09:16 UTC



**Sediment Description:** Loose yellowish brown coarse SAND, shells/shell hash

NAD83, UTM Zone 18N, Meters

N: 4074615.6

E: 437469.8

Water Depth: 17.18m MLLW



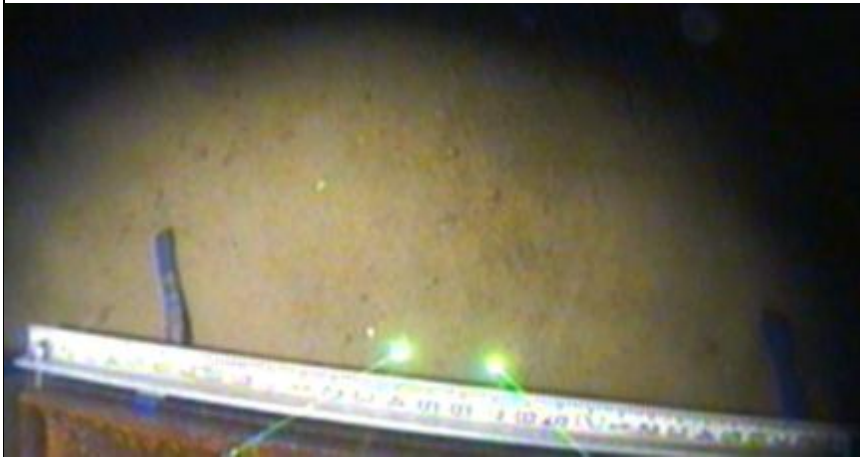


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-042

Date: 18 June 2013 Time 08:50 UTC



**Sediment Description:** Loose yellowish brown coarse SAND, shell hash

NAD83, UTM Zone 18N, Meters

N: 4074817.7

E: 438404.1

Water Depth: 17.82m MLLW

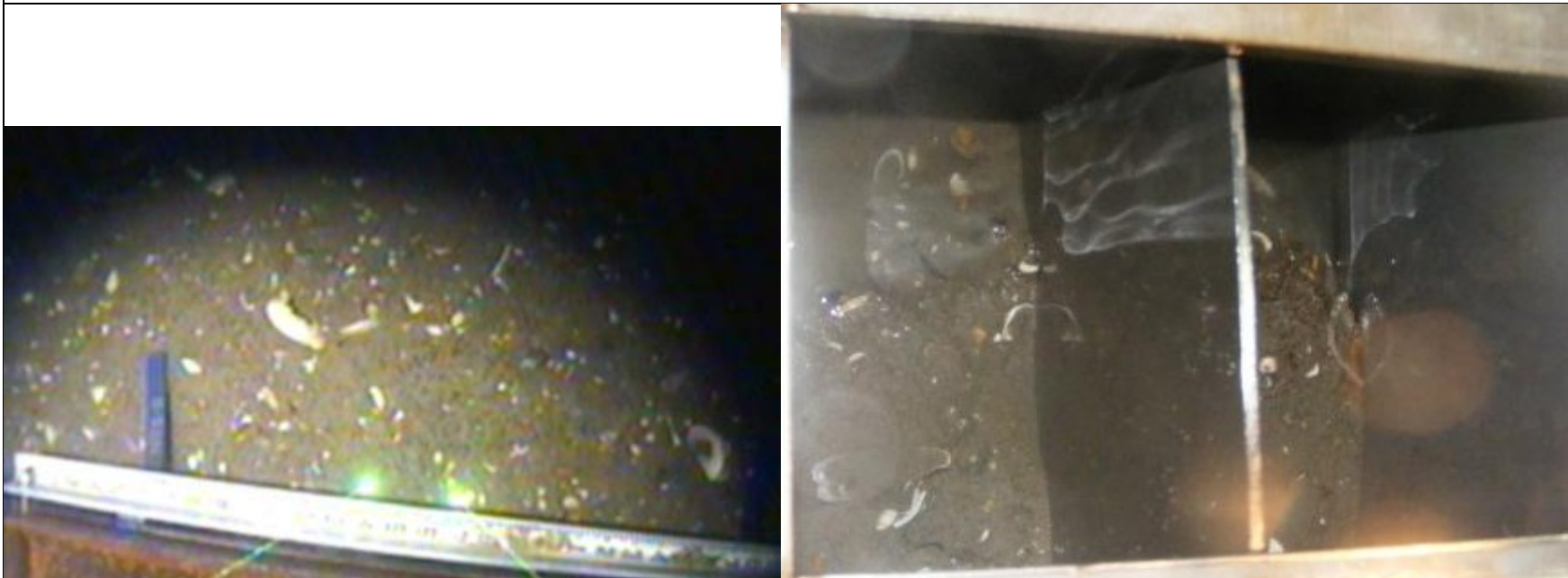


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-043

Date: 18 June 2013 Time 08:21 UTC



**Sediment Description:** Medium dense grayish brown silty coarse SAND, shells/shell hash

NAD83, UTM Zone 18N, Meters

N: 4075027.9

E: 439378.3

Water Depth: 20.03m MLLW

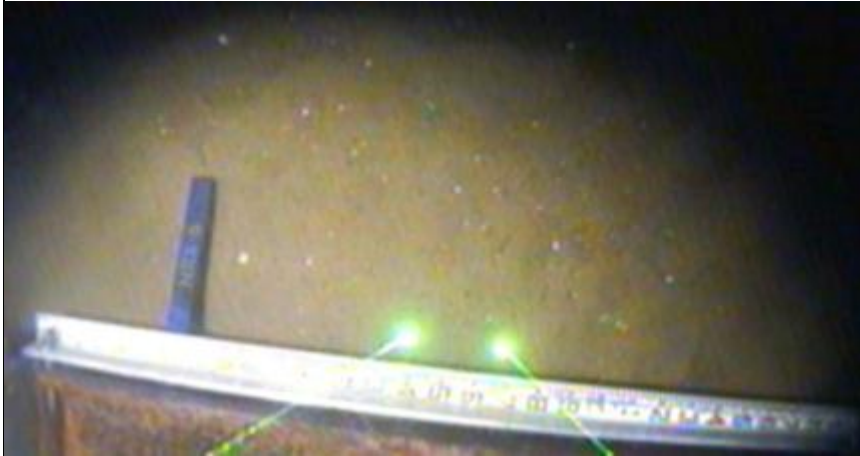


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-044

Date: 18 June 2013 Time 07:56 UTC



**Sediment Description:** Loose yellowish brown coarse SAND, shell hash, worm, oyster shell

NAD83, UTM Zone 18N, Meters

N: 4075238.7

E: 440425.1

Water Depth: 18.52m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-045

Date: 18 June 2013 Time 07:28 UTC



**Sediment Description:** Loose yellowish brown medium SAND, hermit crabs, snail, worms, trace shell hash

NAD83, UTM Zone 18N, Meters

N: 4075549.6

E: 441310.2

Water Depth: 19.17m MLLW



**Camera Still**

**Virginia Offshore Wind Technology Advancement Project**

**Sample ID: GS-046**

**Date: 18 June 2013 Time 06:43 UTC**



**Sediment Description:** Loose yellowish brown medium to coarse SAND, hermit crabs, worms, snails, shell hash

NAD83, UTM Zone 18N, Meters

N: 4075645.7

E: 442325.7

Water Depth: 17.93m MLLW



**Camera Still**

**Virginia Offshore Wind Technology Advancement Project**

**Sample ID: GS-047**

**Date: 18 June 2013 Time 06:07 UTC**



**Sediment Description:** Dense dark grayish brown silty fine SAND, shell hash, clam shell, worm/worm tubes

NAD83, UTM Zone 18N, Meters

N: 4075857.0

E: 443262.5

Water Depth: 23.68m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-048

Date: 18 June 2013 Time 05:40 UTC



**Sediment Description:** Loose yellowish brown medium to coarse SAND, trace shell hash, worm

NAD83, UTM Zone 18N, Meters

N: 4076011.5

E: 443999.1

Water Depth: 19.39m MLLW



**Camera Still**

**Virginia Offshore Wind Technology Advancement Project**

**Sample ID: GS-049**

**Date: 18 June 2013 Time 04:43 UTC**



**Sediment Description:** Loose yellowish brown medium SAND, clam shell, shell hash

NAD83, UTM Zone 18N, Meters

N: 4076427.9

E: 445185.3

Water Depth: 19.90m MLLW



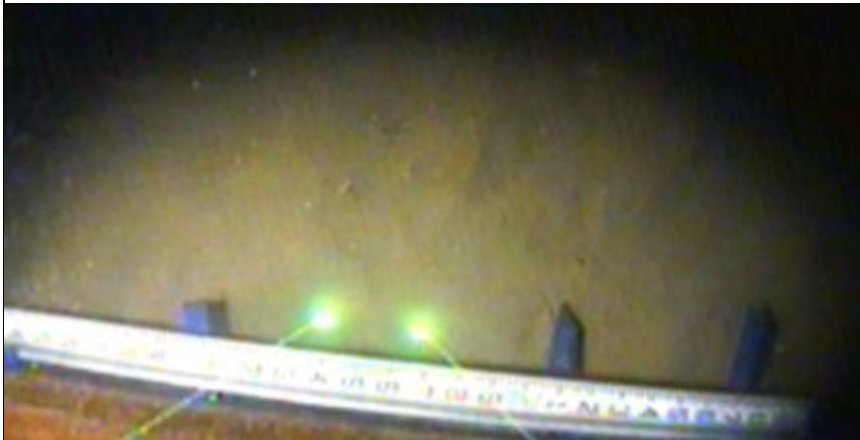


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-050

Date: 18 June 2013 Time 03:52 UTC



**Sediment Description:** Loose yellowish brown medium SAND with SILT, worm, shell hash

NAD83, UTM Zone 18N, Meters

N: 4076967.9

E: 446079.7

Water Depth: 18.03m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-051

Date: 18 June 2013 Time 03:30 UTC



**Sediment Description:** Loose yellowish brown medium to coarse SAND with SILT, shell hash

NAD83, UTM Zone 18N, Meters

N: 4077480.2

E: 446952.9

Water Depth: 18.14m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-052

Date: 18 June 2013 Time 02:58 UTC



**Sediment Description:** Dense dark yellowish brown medium SAND with SILT, worm, shell hash

NAD83, UTM Zone 18N, Meters

N: 4077980.2

E: 447804.3

Water Depth: 18.59m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-053

Date: 18 June 2013 Time 02:28 UTC



**Sediment Description:** Loose yellowish brown medium SAND, crab, worm, shell hash

NAD83, UTM Zone 18N, Meters

N: 4078486.6

E: 448658.8

Water Depth: 19.55m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-054

Date: 17 June 2013 Time 09:12 UTC



**Sediment Description:** Loose yellowish brown coarse SAND, shells/shell hash

NAD83, UTM Zone 18N, Meters

N: 4078980.3

E: 449526.5

Water Depth: 18.38m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-055

Date: 17 June 2013 Time 09:42 UTC



**Sediment Description:** Loose yellowish brown medium SAND, sand dollar, worm, shell hash

NAD83, UTM Zone 18N, Meters

N: 4079494.5

E: 450387.4

Water Depth: 18.68m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-056

Date: 18 June 2013 Time 01:30 UTC



**Sediment Description:** Loose grayish brown medium SAND, worm tubes, snail shell, shell hash

NAD83, UTM Zone 18N, Meters

N: 4080046.6

E: 451211.3

Water Depth: 22.36m MLLW



**Camera Still**

**Virginia Offshore Wind Technology Advancement Project**

**Sample ID: GS-057**

**Date: 17 June 2013 Time 08:35 UTC**



**Sediment Description:** Loose yellowish brown medium SAND, shell hash

NAD83, UTM Zone 18N, Meters

N: 4080539.8

E: 452112.2

Water Depth: 24.29m MLLW





Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-058

Date: 17 June 2013 Time 10:11 UTC



**Sediment Description:** Loose yellowish brown medium SAND, shells, worms, shell hash

NAD83, UTM Zone 18N, Meters

N: 4081277.1

E: 453314.5

Water Depth: 23.54m MLLW



**Camera Still**

**Virginia Offshore Wind Technology Advancement Project**

**Sample ID: GS-059**

**Date: 18 June 2013 Time 00:27 UTC**



**Sediment Description:** Dense grayish brown fine SAND, shell hash

NAD83, UTM Zone 18N, Meters

N: 4082060.3

E: 454649.2

Water Depth: 24.74m MLLW

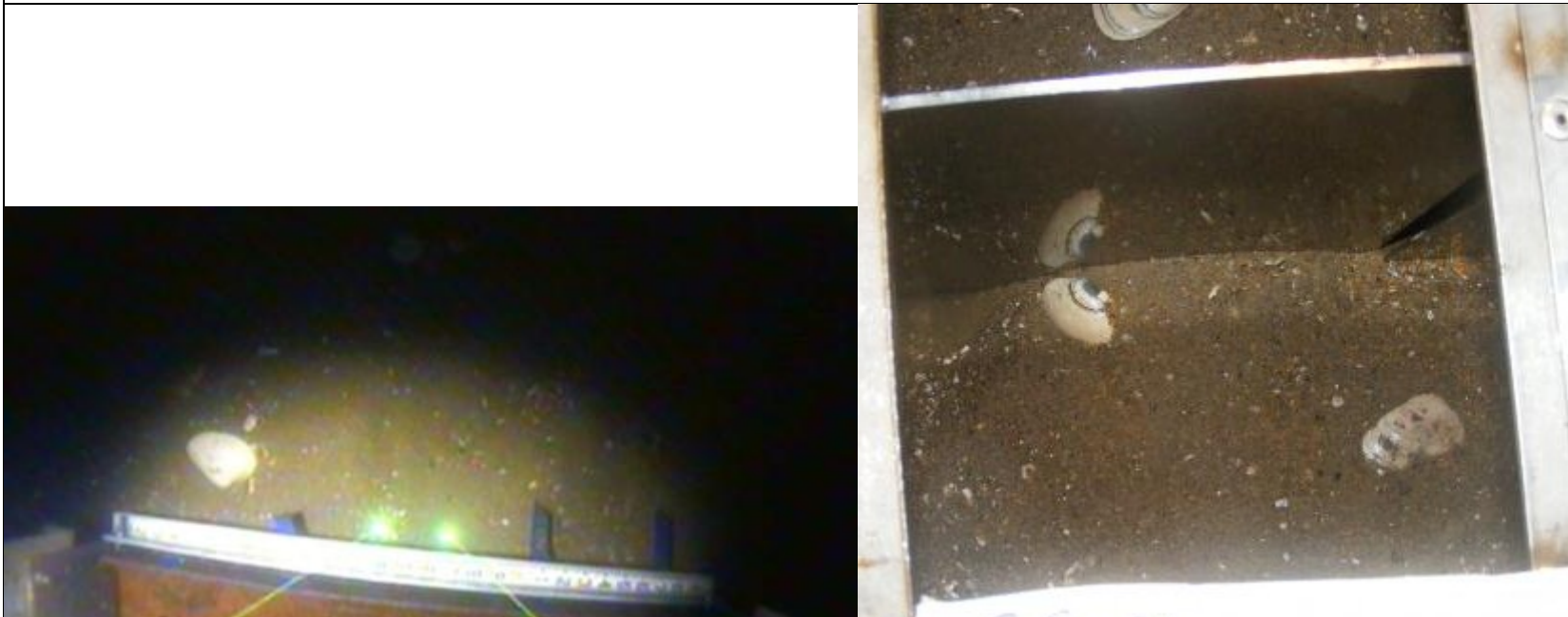


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-060

Date: 17 June 2013 Time 07:48 UTC



**Sediment Description:** Loose yellowish brown coarse SAND, shells/shell hash

NAD83, UTM Zone 18N, Meters

N: 4082587.0

E: 455522.9

Water Depth: 24.59 m MLLW

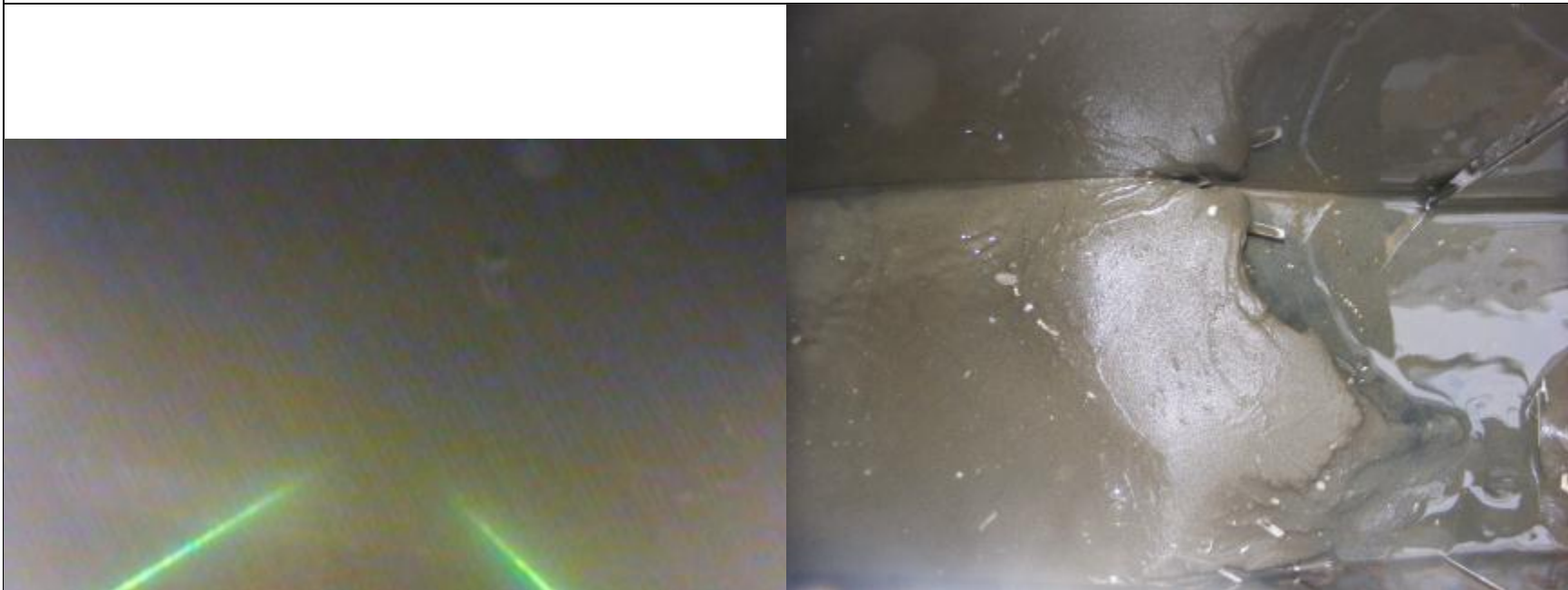


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-REF-001

Date: 19 June 2013 Time 23:40 UTC



**Sediment Description:** Dense dark gray silty fine SAND, worms, razor clam, shell hash

NAD83, UTM Zone 18N, Meters

N: 4075737.7

E: 415683.8

Water Depth: 7.41m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-REF-002

Date: 20 June 2013 Time 05:42 UTC



**Sediment Description:** Dense dark gray silty fine SAND, razor clams, worms, shell hash

NAD83, UTM Zone 18N, Meters

N: 4074384.9

E: 422667.8

Water Depth: 13.82m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-REF-003

Date: 19 June 2013 Time 17:28 UTC



**Sediment Description:** Firm greenish gray fine sandy SILT, worms, hermit crab, shell hash

NAD83, UTM Zone 18N, Meters

N: 4074589.3

E: 430533.9

Water Depth: 18.39m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-REF-004

Date: 18 June 2013 Time 10:20 UTC



**Sediment Description:** Loose yellowish brown coarse SAND, worms, oyster shells, clam shells, shell hash

NAD83, UTM Zone 18N, Meters

N: 4073661.6

E: 436446.9

Water Depth: 14.12m MLLW

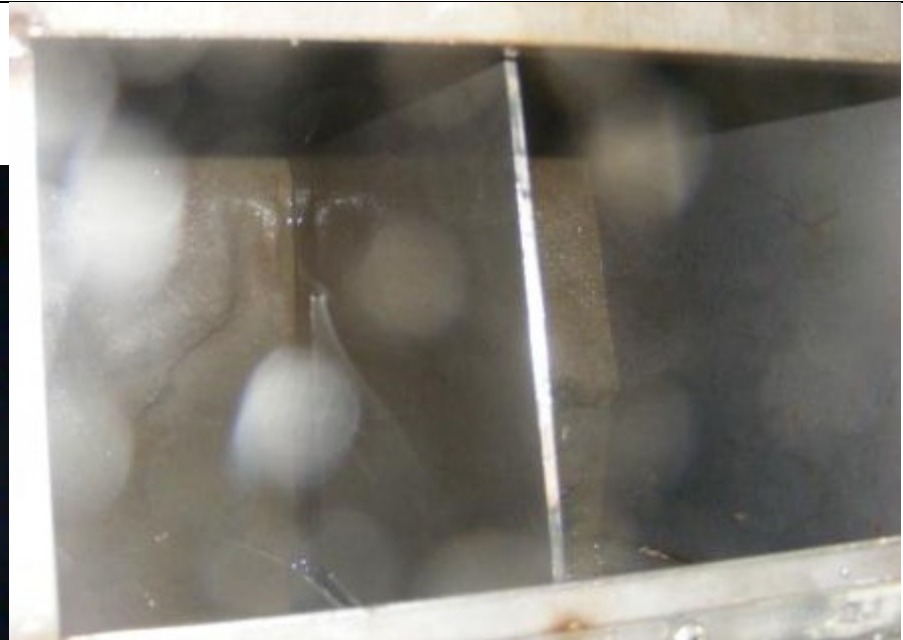


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-REF-005

Date: 18 June 2013 Time 05:10 UTC



**Sediment Description:** Loose yellowish brown silty medium SAND, worm, trace shell hash

NAD83, UTM Zone 18N, Meters

N: 4076825.5

E: 444282.7

Water Depth: 17.17m MLLW



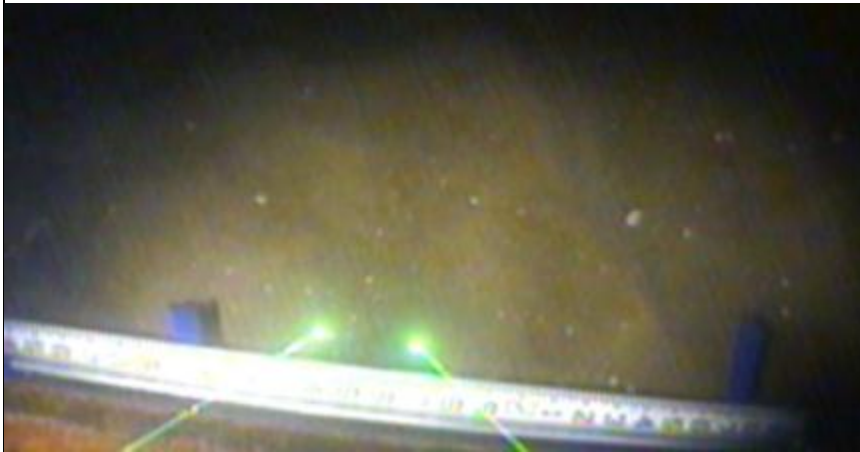


**Camera Still**

**Virginia Offshore Wind Technology Advancement Project**

**Sample ID: GS-REF-006**

**Date: 18 June 2013 Time 01:55 UTC**



**Sediment Description:** Loose yellowish brown medium SAND, worm, shells, shell hash

NAD83, UTM Zone 18N, Meters

N: 4079257.4

E: 451212.3

Water Depth: 17.17m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-REF-007

Date: 17 June 2013 Time 05:25 UTC



**Sediment Description:** Dense grayish brown fine SAND, worms/worm tubes, shell hash

NAD83, UTM Zone 18N, Meters

N: 4084515.9

E: 457169.0

Water Depth: 20.52m MLLW



Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-REF-008

Date: 17 June 2013 Time 06:00 UTC



**Sediment Description:** Dense grayish brown fine SAND, hermit crabs, worm tubes, shell hash

NAD83, UTM Zone 18N, Meters

N: 4083409.5

E: 455249.7

Water Depth: 19.61m MLLW

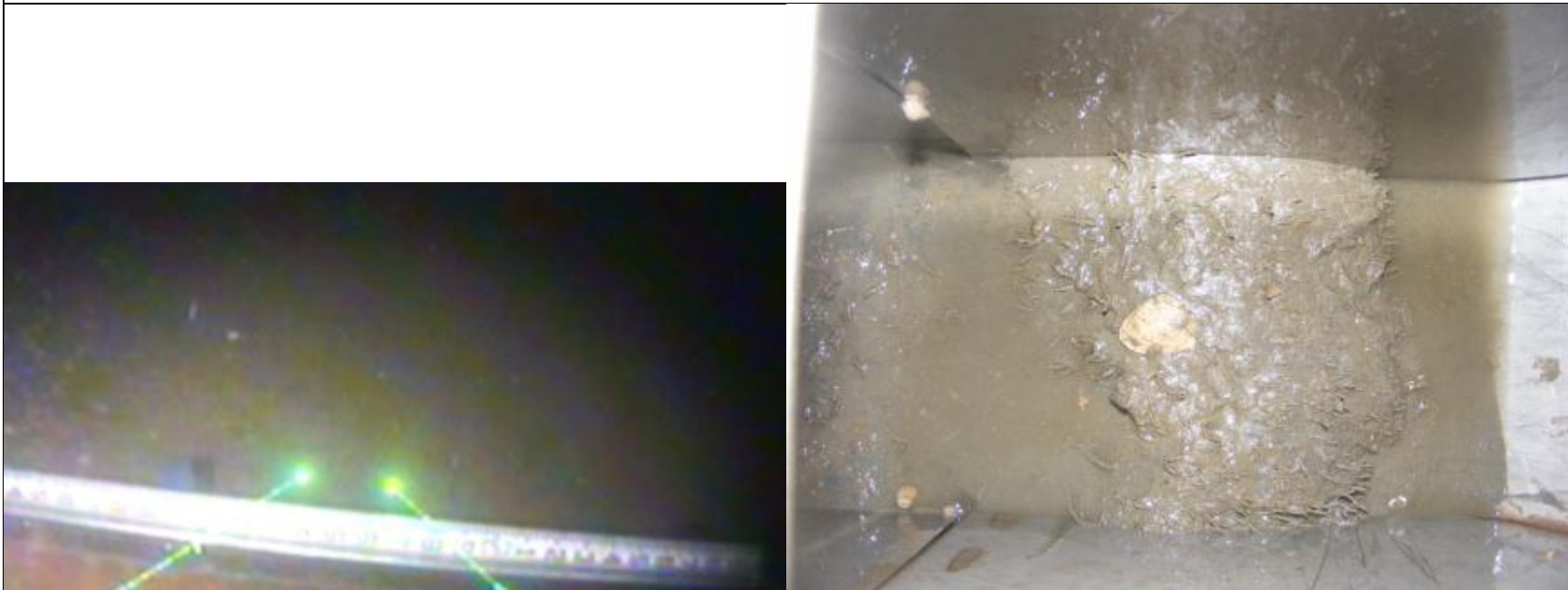


Camera Still

Virginia Offshore Wind Technology Advancement Project

Sample ID: GS-REF-009

Date: 17 June 2013 Time 06:40 UTC



**Sediment Description:** Dense grayish brown fine SAND, worm tubes, hermit crabs, shell hash

NAD83, UTM Zone 18N, Meters

N: 4081896.6

E: 458398.9

Water Depth: 23.57m MLLW



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## **Attachment B – Benthic Taxonomy; Laboratory Data**



	Sample #	GS-001	GS-002	GS-003	GS-004	GS-005	GS-006	GS-007	GS-008	GS-009	GS-010	GS-011	GS-012
	Collection Time	0:45	2:42	1:56	3:25	4:03	4:45	5:28	5:50	6:33	23:58	23:08	0:51
	Collection Date (2013)	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	17 June
	<b>TAXON</b>												
<b>Turbellaria</b>	<i>Bdelloura</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Stylochus oculiferus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Cnidaria</b>	Actinaria sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ceriantharia</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Nemertea</b>	Lineidae spp.	0	0	0	0	0	0	1	0	0	0	0	0
	Palaeonemertea spp.	0	0	0	3	0	0	0	0	0	0	0	0
<b>Annelida-Oligochaeta</b>	Oligochaeta spp.	3	0	16	0	30	13	0	25	75	3	1	3
<b>Annelida-Polychaeta</b>	<i>Abyssoninoe</i> sp.	0	0	3	0	0	0	1	1	0	0	0	0
	<i>Aglaophamus verrilli</i>	0	0	0	0	1	0	0	0	0	0	0	0
	<i>Amastigos caperatus</i>	0	1	0	0	0	0	0	0	0	0	0	0
	<i>Ampharete americana</i>	0	0	0	0	0	0	0	0	0	1	0	1
	<i>Ampharete finmarchica</i>	0	0	1	3	0	2	0	1	1	0	0	0
	<i>Aphelochaeta</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Aphroditella hastata</i>	0	0	0	0	0	0	0	0	0	0	1	0
	<i>Arabella mutans</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Aricidea (Acmira) catherinae</i>	1	0	0	12	0	9	16	1	0	1	8	2
	<i>Aricidea (Acmira) cerrutii</i>	0	0	63	0	0	6	0	19	0	0	0	0
	<i>Aricidea (Aricidea) wassi</i>	11	1	0	7	0	0	5	0	2	4	3	13
	<i>Asabellides oculata</i>	0	0	0	17	0	1	2	0	0	0	2	2
	<i>Asychis carolinae</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Brania wellfleetensis</i>	0	0	6	0	1	0	0	1	27	0	0	0
	<i>Capitella capitata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Capitellidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Carazziella hobsonae</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Cauleriella venefica</i>	1	0	0	9	2	2	0	2	5	4	0	3
	<i>Chaetozone</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	Cirratulidae spp.	1	0	3	14	8	1	7	0	0	12	0	0
	<i>Cirrophorus branchiatus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Clymenella mucosa</i>	0	0	5	0	0	0	0	0	0	0	0	0
	<i>Clymenella torquata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Diopatra cuprea</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Drilonereis filum</i>	0	0	0	0	0	0	0	0	0	1	0	0
	<i>Eteone longa</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Exogone hebes</i>	0	0	0	0	2	8	0	35	123	0	0	0
	<i>Exogone</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Glycera americana</i>	0	0	0	2	0	0	0	0	0	0	0	0
	<i>Glycera capitata</i>	0	0	3	0	0	0	0	0	0	0	0	0
	<i>Glycera</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Harmothoe imbricata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Hesionura elongata</i>	0	0	14	0	0	0	0	7	0	0	0	0
	<i>Hydroides dianthus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Leitoscoloplos fragilis</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Leitoscoloplos robustus</i>	0	0	0	2	0	0	5	0	0	8	2	0
	<i>Leitoscoloplos</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Linopherus paucibranchiata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Lumbrinerides acuta</i>	3	1	2	0	0	0	0	2	0	0	0	0
	<i>Magelona rosea</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Maldanidae sp.	0	0	0	1	0	0	0	0	0	1	0	0



	Sample #	GS-001	GS-002	GS-003	GS-004	GS-005	GS-006	GS-007	GS-008	GS-009	GS-010	GS-011	GS-012
	Collection Time	0:45	2:42	1:56	3:25	4:03	4:45	5:28	5:50	6:33	23:58	23:08	0:51
	Collection Date (2013)	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	17 June
<i>Mediomastus</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Monticellina baptisteeae</i>	0	0	0	0	0	0	0	0	0	0	0	8	0
<i>Monticellina cf. dorsobranchialis</i>	0	0	0	14	0	0	0	0	0	0	0	0	0
<i>Nephtys bucera</i>	0	0	0	0	0	0	0	0	0	0	1	0	0
<i>Nephtys picta</i>	3	0	0	2	2	0	4	3	2	5	0	0	4
<i>Nephtys</i> sp.	0	0	0	0	0	0	0	0	0	0	4	0	0
<i>Ninoe nigripes</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Notocirrus spinifera</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Notomastus hemipodus</i>	10	3	0	1	1	0	0	1	1	0	0	0	1
Onuphidae sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Onuphis eremita</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Ophelia denticulata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Owenia fusiformis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Paleanotus heteroseta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Paraehlersia ferrugina</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
Paraonidae sp.	0	0	2	0	0	0	0	0	0	0	0	0	0
<i>Paraonis pygoenigmatica</i>	4	0	2	0	0	1	0	1	8	0	0	0	0
<i>Pectinaria gouldi</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pherusa affinis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pholoe minuta</i>	0	0	0	0	0	0	0	3	0	0	0	0	0
<i>Phyllodoce arenae</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Phyllodoce groenlandica</i>	0	0	0	0	0	0	1	0	0	0	0	0	0
<i>Phylo felix</i>	0	0	0	5	0	0	1	0	0	3	3	1	1
<i>Pilargis</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pisione</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pista cristata</i>	0	0	2	0	0	0	0	0	0	0	0	0	0
<i>Podarkeopsis levifuscina</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Polycirrus eximius</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Polydora cornuta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Polygordius jouinae</i>	2	0	1	3	11	15	0	19	16	2	0	0	0
Polynoidae sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Prionospio pygmaeus</i>	0	0	0	4	0	0	0	0	0	0	0	0	0
<i>Prionospio</i> sp.	0	0	0	0	1	0	3	0	0	0	0	0	0
<i>Protodorvillea kefersteini</i>	1	0	6	0	1	2	0	6	4	0	1	0	0
<i>Rhodine</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Salvatoria clavata</i>	2	0	5	0	3	1	0	2	4	0	0	0	0
<i>Samythella elongata</i>	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>Scalibregma inflatum</i>	2	0	11	40	9	0	3	4	12	2	5	0	0
<i>Scoletoma fragilis</i>	2	0	0	4	0	0	5	0	2	2	4	1	1
<i>Scoletoma verrilli</i>	0	0	0	0	0	0	0	0	0	1	0	0	0
<i>Scoloplos acmeceps</i>	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>Scoloplos rubra</i>	0	0	0	0	0	1	1	0	0	0	0	0	0
<i>Sigalion arenicola</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Sigambra tentaculata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
Sphaerodoridae sp.	0	0	0	0	0	1	0	0	0	0	0	0	0
<i>Sphaerosyllis taylori</i>	0	0	1	0	0	0	0	0	0	0	0	0	0
<i>Spio filicornis</i>	0	0	2	9	5	1	6	1	1	0	1	0	0
<i>Spiochaetopterus oculatus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.	0	0	0	0	0	0	0	0	0	0	0	0	0

	Sample #	GS-001	GS-002	GS-003	GS-004	GS-005	GS-006	GS-007	GS-008	GS-009	GS-010	GS-011	GS-012
	Collection Time	0:45	2:42	1:56	3:25	4:03	4:45	5:28	5:50	6:33	23:58	23:08	0:51
	Collection Date (2013)	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	17 June
	<i>Spiophanes bombyx</i>	1	4	13	344	1	0	465	2	1	8	119	0
	<i>Sthenelais limicola</i>	0	0	0	5	0	0	1	0	0	1	1	0
	<i>Streblospio benedicti</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Streptosyllis websteri</i>	1	0	0	0	0	0	0	2	0	0	0	0
	<i>Syllis cornuta</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Terebellidae sp.	0	0	0	0	0	0	0	1	0	0	0	0
	<i>Tharyx acutus</i>	0	8	0	0	0	0	2	0	0	0	1	2
	<i>Tharyx</i> sp. A sensu MWRA, 2007	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Travisia forbesii</i>	0	0	1	0	0	0	0	0	0	1	0	0
	<i>Travisia</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Sipuncula</b>	<i>Golfingia margaritacea</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Mollusca-Bivalvia</b>	<i>Abra lioica</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Abra longicallus</i>	6	6	9	8	3	1	15	0	0	13	12	3
	<i>Abra</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	Bivalvia spp.	1	0	0	1	4	1	0	0	0	0	0	0
	<i>Corbula contracta</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crassinella lunulata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crenella decussata</i>	1	0	4	0	0	0	0	2	0	0	0	0
	<i>Divalinga quadrisulcata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ensis directus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ensis</i> sp.	0	1	0	1	4	1	6	2	5	0	0	2
	<i>Lucinoma filosa</i>	0	0	0	0	0	0	0	0	0	1	0	0
	<i>Lyonsia hyalinata</i>	0	0	0	0	0	0	0	1	0	0	0	0
	<i>Macoma calcarea</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Mysella planulata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Mytilidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Nucula proxima</i>	0	0	0	0	0	0	0	0	0	0	2	0
	<i>Nucula</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Pandora bushiana</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Parvicardium pinnulatum</i>	0	0	2	2	0	0	2	0	0	0	0	0
	Pectinidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Periploma</i> sp.	0	0	2	1	0	0	0	0	0	0	0	0
	<i>Pitar morrhuanus</i>	0	0	0	5	0	0	0	0	0	0	2	0
	<i>Siliqua costata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Tellina</i> sp.	0	0	0	0	0	0	0	0	0	0	1	0
	<i>Tellina versicolor</i>	2	1	1	3	1	0	0	2	1	0	1	0
	Veneridae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Yoldia limatula</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Yoldia</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Mollusca-Gastropoda</b>	<i>Busycotypus canaliculatus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Caecum johnsoni</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crepidula convexa</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crepidula fornicata</i>	0	0	1	0	0	0	0	0	0	0	0	0
	<i>Euspira immaculata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Gastropoda sp.	0	0	0	0	1	0	0	0	0	0	0	0
	<i>Haminoea solitaria</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Marginellidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Nassarius trivittatus</i>	0	2	1	8	0	0	18	0	1	6	19	0
	Naticidae sp.	0	0	0	0	0	0	0	0	0	0	0	1

	Sample #	GS-001	GS-002	GS-003	GS-004	GS-005	GS-006	GS-007	GS-008	GS-009	GS-010	GS-011	GS-012
	Collection Time	0:45	2:42	1:56	3:25	4:03	4:45	5:28	5:50	6:33	23:58	23:08	0:51
	Collection Date (2013)	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	17 June
	Neogastropoda sp.	0	0	0	2	0	0	0	0	0	2	0	0
	<i>Neverita duplicata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Nudibranchia sp.	0	0	0	0	0	0	0	0	0	0	0	0
	Rissoidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Tectonatica pusilla</i>	0	0	0	0	0	1	0	0	0	0	0	0
	<i>Turbonilla</i> sp.	0	0	0	0	0	0	1	0	0	4	4	0
	Turridae sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Crustacea-Amphipoda</b>	<i>Acanthohaustorius intermedius</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Acanthohaustorius millsii</i>	3	0	0	0	0	0	0	0	0	0	0	0
	<i>Acanthohaustorius shoemakeri</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Americhelidium americanum</i>	0	0	1	0	2	0	0	0	2	1	0	0
	<i>Ampelisca</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ampelisca vadorum</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ampelisca verrilli</i>	0	0	0	14	0	0	4	0	0	9	8	0
	Amphipoda sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Apocorophium simile</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Argissa hamatipes</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Bathyporeia parkeri</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Bathyporeia quoddyensis</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Byblis serrata</i>	0	8	0	0	0	0	0	0	15	1	1	14
	<i>Byblis</i> sp.	0	0	1	1	5	0	1	0	0	0	0	0
	<i>Dyopedos monacanthus</i>	0	0	0	1	0	0	0	0	0	0	0	0
	<i>Listriella barnardi</i>	0	0	0	0	0	0	0	0	1	0	0	0
	<i>Metharpinia floridana</i>	12	0	6	0	8	3	0	3	4	0	0	0
	<i>Microprotopus</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Monocorophium</i> sp.	0	0	0	0	0	0	1	0	0	0	0	0
	<i>Photis</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	Phoxocephalidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Protohaustorius deichmannae</i>	0	61	0	0	0	0	0	0	0	0	0	12
	<i>Protohaustorius wigleyi</i>	13	0	0	0	0	0	0	0	0	0	0	0
	<i>Rhepoxynius epistomus</i>	0	3	0	0	0	0	1	0	0	2	0	5
	<i>Unciola irrorata</i>	0	0	0	7	0	2	0	0	0	2	1	0
	<i>Unciola serrata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Unciola</i> sp.	0	0	0	0	1	0	0	2	0	0	0	0
<b>Crustacea-Cumacea</b>	Bodotriidae sp.	0	1	0	0	0	0	0	0	0	0	0	0
	<i>Oxyurostylis smithi</i>	0	0	0	0	1	0	0	0	0	0	0	0
	<i>Pseudoleptocuma minus</i>	1	0	0	0	0	0	0	0	1	0	0	0
<b>Crustacea-Decapoda</b>	Brachyura sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Cancer borealis</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crangon septemspinosa</i>	1	0	0	1	0	0	0	0	0	1	0	0
	<i>Euceramus praelongus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Lepidopa websteri</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Pagurus politus</i>	0	0	0	0	0	0	5	0	0	1	6	0
	<i>Pinnixa chaetoptera</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Pinnixa cylindrica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Crustacea-Isopoda</b>	<i>Amakusanthura magnifica</i>	0	0	0	0	0	1	0	1	1	1	0	0
	<i>Ancinus depressus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Chiridotea arenicola</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Edotea montosa</i>	0	0	1	7	0	0	4	0	0	2	4	0

	Sample #	GS-001	GS-002	GS-003	GS-004	GS-005	GS-006	GS-007	GS-008	GS-009	GS-010	GS-011	GS-012
	Collection Time	0:45	2:42	1:56	3:25	4:03	4:45	5:28	5:50	6:33	23:58	23:08	0:51
	Collection Date (2013)	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	16 June	17 June
	<i>Flabellifera</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Politolana polita</i>	0	0	0	0	0	0	0	1	0	0	0	0
<b>Crustacea-Mysidacea</b>	<i>Neomysis americana</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Crustacea-Tanaidacea</b>	<i>Tanaissus psammophilus</i>	24	0	0	0	1	4	0	2	0	0	0	0
<b>Crustacea-Cephalocarida</b>	<i>Hutchinsoniella macracantha</i>	0	0	0	0	0	1	0	0	0	0	0	0
<b>Echinodermata-Echinoidea</b>	<i>Clypeasteroida</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Echinoida</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Lophophorata</b>	<i>Phoronida</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Urochordata</b>	<i>Molgula</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Cephalochordata</b>	<i>Branchiostoma</i> sp.	0	0	8	0	2	0	0	0	0	1	1	0
<b>Hemichordata</b>	<i>Enteropneusta</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
		<b>112</b>	<b>101</b>	<b>199</b>	<b>563</b>	<b>111</b>	<b>79</b>	<b>587</b>	<b>156</b>	<b>315</b>	<b>108</b>	<b>226</b>	<b>71</b>

	Sample #	GS-013	GS-014	GS-015	GS-016	GS-017	GS-018	GS-019	GS-020	GS-021	GS-022	GS-023	GS-024
	Collection Time	20:55	21:25	20:33	18:48	19:13	20:15	22:16	22:37	23:00	23:25	23:50	0:16
	Collection Date (2013)	16 June	16 June	16 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	20 June
	<b>TAXON</b>												
<b>Turbellaria</b>	<i>Bdelloura</i> sp.	0	0	0	0	1	0	0	0	0	0	0	0
	<i>Stylochus oculiferus</i>	0	0	0	11	13	0	0	0	0	0	0	0
<b>Cnidaria</b>	Actinaria sp.	0	0	0	3	0	0	0	0	0	0	0	0
	<i>Ceriantharia</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Nemertea</b>	Lineidae spp.	0	0	1	0	3	0	0	0	0	0	0	0
	Palaeonemertea spp.	0	0	0	1	4	0	16	1	1	0	0	2
<b>Annelida-Oligochaeta</b>	Oligochaeta spp.	84	0	0	0	0	0	2	0	1	26	1	0
<b>Annelida-Polychaeta</b>	<i>Abyssoninoe</i> sp.	6	6	0	0	0	0	0	0	0	0	0	0
	<i>Aglaophamus verrilli</i>	0	0	0	3	6	2	3	0	0	0	2	0
	<i>Amastigos caperatus</i>	0	0	0	8	66	36	15	107	7	0	192	0
	<i>Ampharete americana</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ampharete finmarchica</i>	9	0	0	0	0	0	0	0	0	0	0	2
	<i>Aphelochaeta</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Aphroditella hastata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Arabella mutans</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Aricidea (Acmira) catherinae</i>	25	1	0	1	0	0	0	0	0	0	3	0
	<i>Aricidea (Acmira) cerrutii</i>	27	0	0	0	0	0	0	0	0	1	0	2
	<i>Aricidea (Aricidea) wassi</i>	0	0	0	0	0	0	0	0	1	0	0	3
	<i>Asabellides oculata</i>	0	5	4	3	0	3	9	4	0	0	24	8
	<i>Asychis carolinae</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Brania wellfleetensis</i>	17	0	0	0	0	0	0	0	1	9	0	2
	<i>Capitella capitata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Capitellidae sp.	0	0	0	0	1	0	0	1	0	0	0	0
	<i>Carazziella hobsonae</i>	0	0	0	3	0	0	0	0	0	0	0	0
	<i>Cauleriella venefica</i>	0	0	0	0	0	0	0	0	2	0	0	3
	<i>Chaetozone</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	Cirratulidae spp.	22	5	1	0	2	1	0	0	0	15	0	19
	<i>Cirrophorus branchiatus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Clymenella mucosa</i>	2	0	1	0	2	0	1	0	0	0	7	0
	<i>Clymenella torquata</i>	0	4	0	0	0	0	0	0	0	0	0	0
	<i>Diopatra cuprea</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Drilonereis filum</i>	0	0	0	4	7	2	0	2	0	0	1	0
	<i>Eteone longa</i>	0	0	0	0	4	1	0	3	0	0	2	0
	<i>Exogone hebes</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Exogone</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Glycera americana</i>	2	0	0	0	0	0	1	1	0	0	2	0
	<i>Glycera capitata</i>	0	0	0	1	1	0	0	2	0	0	1	0
	<i>Glycera</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Harmothoe imbricata</i>	2	0	0	0	0	0	0	0	0	0	0	0
	<i>Hesionura elongata</i>	6	0	0	0	0	0	0	0	0	1	0	0
	<i>Hydroides dianthus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Leitoscoloplos fragilis</i>	0	0	0	0	2	0	0	0	0	0	0	0
	<i>Leitoscoloplos robustus</i>	0	0	1	0	0	0	0	0	0	0	0	1
	<i>Leitoscoloplos</i> sp.	0	1	0	0	0	0	0	0	0	0	0	0
	<i>Linopherus paucibranchiata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Lumbrinerides acuta</i>	0	0	0	0	0	0	0	0	0	1	0	0
	<i>Magelona rosea</i>	0	0	0	0	0	2	0	1	1	1	0	3
	Maldanidae sp.	0	0	0	0	0	0	0	0	0	0	0	0

	Sample #	GS-013	GS-014	GS-015	GS-016	GS-017	GS-018	GS-019	GS-020	GS-021	GS-022	GS-023	GS-024
	Collection Time	20:55	21:25	20:33	18:48	19:13	20:15	22:16	22:37	23:00	23:25	23:50	0:16
	Collection Date (2013)	16 June	16 June	16 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	20 June
<i>Mediomastus</i> sp.	0	0	0	23	17	10	5	4	0	0	8	0	
<i>Monticellina baptisteeae</i>	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Monticellina cf. dorsobranchialis</i>	0	2	0	0	0	0	0	0	0	0	0	0	
<i>Nephtys bucera</i>	0	0	0	0	0	0	0	0	1	0	0	0	
<i>Nephtys picta</i>	0	1	1	2	2	3	2	4	1	0	1	2	
<i>Nephtys</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Ninoe nigripes</i>	0	5	1	0	0	0	0	0	0	0	0	0	
<i>Notocirrus spinifera</i>	0	0	0	0	0	0	0	0	0	0	1	0	
<i>Notomastus hemipodus</i>	0	0	0	1	0	0	0	0	0	0	0	0	
Onuphidae sp.	0	0	0	0	2	0	0	0	0	0	0	0	
<i>Onuphis eremita</i>	0	0	0	1	0	0	0	0	0	0	0	0	
<i>Ophelia denticulata</i>	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Owenia fusiformis</i>	0	0	0	0	0	1	0	0	0	0	0	0	
<i>Paleanotus heteroseta</i>	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Paraehlersia ferrugina</i>	0	13	0	0	0	0	0	0	0	0	0	0	
Paraonidae sp.	11	0	1	0	0	0	0	0	0	0	0	0	
<i>Paraonis pygoenigmatica</i>	1	0	0	0	0	0	0	0	0	0	0	0	
<i>Pectinaria gouldi</i>	0	0	0	2	1	1	0	0	0	0	0	0	
<i>Pherusa affinis</i>	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Pholoe minuta</i>	1	0	0	0	0	0	0	0	0	0	0	0	
<i>Phyllodoce arenae</i>	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Phyllodoce groenlandica</i>	0	0	1	0	0	0	0	0	0	0	1	0	
<i>Phylo felix</i>	0	0	8	0	0	0	0	0	0	0	0	0	
<i>Pilargis</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Pisione</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Pista cristata</i>	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Podarkeopsis levifuscina</i>	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Polycirrus eximius</i>	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Polydora cornuta</i>	0	0	0	0	0	0	0	0	0	0	3	0	
<i>Polygordius jouinae</i>	10	0	1	0	1	0	0	0	0	0	0	0	
Polynoidae sp.	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Prionospio pygmaeus</i>	0	0	0	9	65	101	106	21	0	0	88	0	
<i>Prionospio</i> sp.	0	0	0	0	0	0	0	0	2	0	0	0	
<i>Protodorvillea kefersteini</i>	30	0	0	0	0	0	0	0	0	0	0	0	
<i>Rhodine</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Salvatoria clavata</i>	61	0	0	0	0	0	0	0	0	0	0	1	
<i>Samythella elongata</i>	0	0	0	0	7	0	0	0	0	0	0	0	
<i>Scalibregma inflatum</i>	2	6	4	0	0	0	0	2	0	0	5	1	
<i>Scoletoma fragilis</i>	1	8	3	0	0	0	0	0	0	0	0	0	
<i>Scoletoma verrilli</i>	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Scoloplos acmeceps</i>	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Scoloplos rubra</i>	0	0	0	0	0	0	0	0	0	2	0	0	
<i>Sigalion arenicola</i>	0	0	0	0	0	0	0	0	0	1	0	0	
<i>Sigambra tentaculata</i>	0	0	0	5	1	0	0	0	0	0	1	0	
Sphaerodoridae sp.	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Sphaerosyllis taylori</i>	0	0	0	0	0	0	0	0	0	0	0	0	
<i>Spio filicornis</i>	15	1	0	0	0	0	0	0	0	0	0	0	
<i>Spiochaetopterus oculatus</i>	0	0	0	0	1	0	0	1	0	1	0	0	
Spionidae sp.	0	1	0	0	0	0	0	0	0	0	0	0	

	Sample #	GS-013	GS-014	GS-015	GS-016	GS-017	GS-018	GS-019	GS-020	GS-021	GS-022	GS-023	GS-024
	Collection Time	20:55	21:25	20:33	18:48	19:13	20:15	22:16	22:37	23:00	23:25	23:50	0:16
	Collection Date (2013)	16 June	16 June	16 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	20 June
	<i>Spiophanes bombyx</i>	1	0	145	0	58	43	68	10	5	0	4	0
	<i>Sthenelais limicola</i>	0	0	1	0	0	0	0	0	0	0	0	0
	<i>Streblospio benedicti</i>	0	0	0	3	63	18	0	61	0	0	57	3
	<i>Streptosyllis websteri</i>	0	0	0	0	0	0	0	0	1	0	0	0
	<i>Syllis cornuta</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Terebellidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Tharyx acutus</i>	0	0	0	0	1	0	0	0	0	0	0	0
	<i>Tharyx</i> sp. A sensu MWRA, 2007	0	0	0	25	0	0	2	12	0	0	6	0
	<i>Travisia forbesii</i>	0	0	0	0	0	0	0	0	0	1	0	2
	<i>Travisia</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Sipuncula</b>	<i>Golfingia margaritacea</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Mollusca-Bivalvia</b>	<i>Abra lioica</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Abra longicallus</i>	0	3	0	0	0	0	0	0	5	10	0	6
	<i>Abra</i> sp.	0	0	1	0	0	0	0	0	0	0	0	0
	Bivalvia spp.	0	0	0	0	3	3	0	0	0	0	0	0
	<i>Corbula contracta</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crassinella lunulata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crenella decussata</i>	3	0	0	0	0	0	0	0	0	0	0	0
	<i>Divalinga quadrisulcata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ensis directus</i>	0	0	0	0	0	0	0	0	0	0	2	0
	<i>Ensis</i> sp.	0	0	0	10	29	43	10	2	0	0	3	20
	<i>Lucinoma filosa</i>	0	0	2	1	0	0	0	0	0	0	0	0
	<i>Lyonsia hyalinata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Macoma calcarea</i>	0	0	0	2	1	1	0	0	0	0	0	0
	<i>Mysella planulata</i>	2	0	0	1	0	0	0	0	0	0	0	0
	Mytilidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Nucula proxima</i>	0	1	0	0	0	0	0	0	0	0	0	1
	<i>Nucula</i> sp.	0	1	0	0	0	0	0	0	0	0	0	0
	<i>Pandora bushiana</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Parvicardium pinnulatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Pectinidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Periploma</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Pitar morrhuanus</i>	0	4	0	0	0	1	0	0	0	0	0	0
	<i>Siliqua costata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Tellina</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Tellina versicolor</i>	1	1	0	12	23	21	12	11	0	0	55	13
	Veneridae sp.	0	0	0	1	0	0	0	0	0	0	0	0
	<i>Yoldia limatula</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Yoldia</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Mollusca-Gastropoda</b>	<i>Busycotypus canaliculatus</i>	0	0	0	0	0	0	1	0	0	0	0	0
	<i>Caecum johnsoni</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crepidula convexa</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crepidula fornicata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Euspira immaculata</i>	0	0	0	0	0	0	1	0	0	0	0	0
	Gastropoda sp.	0	1	0	0	0	0	0	0	0	0	0	0
	<i>Haminoea solitaria</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Marginellidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Nassarius trivittatus</i>	0	21	13	0	0	0	0	0	0	0	0	0
	Naticidae sp.	0	0	0	0	0	0	0	0	0	0	0	0

	Sample #	GS-013	GS-014	GS-015	GS-016	GS-017	GS-018	GS-019	GS-020	GS-021	GS-022	GS-023	GS-024
	Collection Time	20:55	21:25	20:33	18:48	19:13	20:15	22:16	22:37	23:00	23:25	23:50	0:16
	Collection Date (2013)	16 June	16 June	16 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	20 June
	Neogastropoda sp.	0	0	0	0	0	0	0	0	0	0	1	0
	<i>Neverita duplicata</i>	0	0	0	0	0	0	0	0	0	0	0	1
	Nudibranchia sp.	0	0	0	0	0	0	0	0	0	0	0	0
	Rissoidae sp.	0	0	0	0	0	1	0	0	0	0	0	0
	<i>Tectonatica pusilla</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Turbonilla</i> sp.	0	0	5	0	1	1	0	0	0	0	3	0
	Turridae sp.	0	0	0	0	1	0	0	0	0	0	1	0
<b>Crustacea-Amphipoda</b>	<i>Acanthohaustorius intermedius</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Acanthohaustorius millsii</i>	0	0	0	0	0	0	0	0	1	0	0	5
	<i>Acanthohaustorius shoemakeri</i>	0	0	0	0	0	0	0	0	9	0	0	0
	<i>Americhelidium americanum</i>	0	0	0	0	0	2	0	2	2	0	0	1
	<i>Ampelisca</i> sp.	0	1	0	0	0	0	0	0	0	0	1	0
	<i>Ampelisca vadorum</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ampelisca verrilli</i>	1	0	11	0	0	0	0	0	0	0	0	0
	Amphipoda sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Apocorophium simile</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Argissa hamatipes</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Bathyporeia parkeri</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Bathyporeia quoddyensis</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Byblis serrata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Byblis</i> sp.	3	0	0	0	0	0	0	0	0	0	0	5
	<i>Dyopedos monacanthus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Listriella barnardi</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Metharpinia floridana</i>	3	0	0	0	0	0	0	0	0	2	0	3
	<i>Microprotopus</i> sp.	0	0	0	1	0	0	0	0	0	0	0	0
	<i>Monocorophium</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Photis</i> sp.	0	0	0	0	0	0	0	1	0	0	0	0
	Phoxocephalidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Protohaustorius deichmannae</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Protohaustorius wigleyi</i>	0	0	0	0	0	0	0	0	8	0	0	2
	<i>Rhepoxynius epistomus</i>	0	0	0	0	15	21	6	0	0	0	0	0
	<i>Unciola irrorata</i>	2	3	1	0	0	0	2	2	0	0	15	45
	<i>Unciola serrata</i>	0	0	0	0	0	0	0	0	21	0	0	0
	<i>Unciola</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Crustacea-Cumacea</b>	Bodotriidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Oxyurostylis smithi</i>	0	0	0	1	0	0	0	0	0	0	0	0
	<i>Pseudoleptocuma minus</i>	1	0	0	0	1	0	0	0	0	0	0	0
<b>Crustacea-Decapoda</b>	Brachyura sp.	0	0	3	0	0	0	0	0	0	0	0	0
	<i>Cancer borealis</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crangon septemspinosa</i>	0	0	0	0	0	0	1	1	0	0	2	0
	<i>Euceramus praelongus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Lepidopa websteri</i>	0	0	0	0	0	0	0	0	0	0	0	2
	<i>Pagurus politus</i>	0	8	10	0	0	0	1	0	0	0	1	1
	<i>Pinnixa chaetoptera</i>	0	0	0	4	0	0	0	0	0	0	0	0
	<i>Pinnixa cylindrica</i>	0	0	0	1	1	0	0	0	0	0	0	0
<b>Crustacea-Isopoda</b>	<i>Amakusanthura magnifica</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ancinus depressus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Chiridotea arenicola</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Edotea montosa</i>	0	0	0	1	0	0	0	0	0	0	3	0



	Sample #	GS-013	GS-014	GS-015	GS-016	GS-017	GS-018	GS-019	GS-020	GS-021	GS-022	GS-023	GS-024
	Collection Time	20:55	21:25	20:33	18:48	19:13	20:15	22:16	22:37	23:00	23:25	23:50	0:16
	Collection Date (2013)	16 June	16 June	16 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	20 June
	<i>Flabellifera</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Politolana polita</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Crustacea-Mysidacea</b>	<i>Neomysis americana</i>	0	0	0	0	0	0	1	0	0	0	0	0
<b>Crustacea-Tanaidacea</b>	<i>Tanaissus psammophilus</i>	0	0	0	0	0	0	0	0	14	0	0	1
<b>Crustacea-Cephalocarida</b>	<i>Hutchinsoniella macracantha</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Echinodermata-Echinoidea</b>	<i>Clypeasteroida</i> sp.	0	0	0	0	0	0	0	0	1	0	0	0
	<i>Echinoida</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Lophophorata</b>	<i>Phoronida</i> sp.	0	0	0	0	0	0	0	0	0	0	4	0
<b>Urochordata</b>	<i>Molgula</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Cephalochordata</b>	<i>Branchiostoma</i> sp.	6	0	0	2	0	0	0	0	0	10	0	5
<b>Hemichordata</b>	<i>Enteropneusta</i> sp.	0	0	0	1	1	0	1	0	0	0	0	0
		<b>357</b>	<b>103</b>	<b>220</b>	<b>147</b>	<b>407</b>	<b>318</b>	<b>266</b>	<b>256</b>	<b>85</b>	<b>81</b>	<b>501</b>	<b>165</b>

	Sample #	GS-025	GS-026	GS-027	GS-028	GS-029	GS-030	GS-031	GS-032	GS-033	GS-034	GS-035	GS-036
	Collection Time	0:47	1:12	17:05	16:30	16:08	15:49	15:25	15:02	14:12	14:40	12:55	12:05
	Collection Date (2013)	20 June	20 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June
	<b>TAXON</b>												
<b>Turbellaria</b>	<i>Bdelloura</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Stylochus oculiferus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Cnidaria</b>	Actinaria sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ceriantharia</i> sp.	0	0	0	0	0	0	0	0	0	0	2	0
<b>Nemertea</b>	Lineidae spp.	1	0	0	0	3	0	0	0	0	0	0	0
	Palaeonemertea spp.	2	4	8	6	3	5	8	1	0	0	1	0
<b>Annelida-Oligochaeta</b>	Oligochaeta spp.	2	1	0	0	7	0	0	28	17	5	31	82
<b>Annelida-Polychaeta</b>	<i>Abyssoninoe</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Aglaophamus verrilli</i>	1	0	2	2	0	7	5	0	0	1	0	0
	<i>Amastigos caperatus</i>	106	0	55	96	97	34	15	0	0	0	0	0
	<i>Ampharete americana</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ampharete finmarchica</i>	0	0	0	0	0	0	0	2	2	3	10	0
	<i>Aphelochaeta</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Aphroditella hastata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Arabella mutans</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Aricidea (Acmira) catherinae</i>	0	0	0	0	0	1	4	1	5	3	26	0
	<i>Aricidea (Acmira) cerrutii</i>	0	0	0	0	0	0	0	9	4	0	3	0
	<i>Aricidea (Aricidea) wassi</i>	0	0	0	3	0	0	0	0	0	0	0	0
	<i>Asabellides oculata</i>	14	0	10	9	11	7	8	0	0	0	0	0
	<i>Asychis carolinae</i>	0	0	0	0	0	0	1	0	0	1	0	2
	<i>Brania wellfleetensis</i>	0	0	0	0	0	0	0	1	5	1	1	4
	<i>Capitella capitata</i>	10	0	0	0	4	2	0	0	1	0	0	0
	Capitellidae sp.	0	0	4	4	0	0	0	0	0	0	0	0
	<i>Carazziella hobsonae</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Cauleriella venefica</i>	0	1	0	0	0	1	0	0	3	0	0	1
	<i>Chaetozone</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	Cirratulidae spp.	0	1	0	0	2	0	0	5	2	4	4	12
	<i>Cirrophorus branchiatus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Clymenella mucosa</i>	0	0	0	0	5	0	1	2	0	3	11	0
	<i>Clymenella torquata</i>	0	0	0	0	0	0	0	0	0	0	3	4
	<i>Diopatra cuprea</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Drilonereis filum</i>	5	0	1	1	4	2	4	1	1	5	1	5
	<i>Eteone longa</i>	4	0	0	0	0	0	0	0	0	0	0	0
	<i>Exogone hebes</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Exogone</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Glycera americana</i>	1	0	1	0	1	0	0	1	3	0	0	1
	<i>Glycera capitata</i>	1	0	0	0	0	0	0	0	0	0	3	0
	<i>Glycera</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Harmothoe imbricata</i>	0	0	0	0	0	0	0	0	0	0	1	0
	<i>Hesionura elongata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Hydroides dianthus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Leitoscoloplos fragilis</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Leitoscoloplos robustus</i>	1	0	0	0	2	0	2	0	0	0	0	0
	<i>Leitoscoloplos</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Linopherus paucibranchiata</i>	0	0	0	0	0	0	0	1	0	1	0	3
	<i>Lumbrinerides acuta</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Magelona rosea</i>	0	1	0	0	0	1	1	0	0	0	0	0
	Maldanidae sp.	0	0	0	0	0	0	0	0	0	0	0	0

	Sample #	GS-025	GS-026	GS-027	GS-028	GS-029	GS-030	GS-031	GS-032	GS-033	GS-034	GS-035	GS-036
	Collection Time	0:47	1:12	17:05	16:30	16:08	15:49	15:25	15:02	14:12	14:40	12:55	12:05
	Collection Date (2013)	20 June	20 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June
<i>Mediomastus</i> sp.	2	0	0	0	0	5	0	0	2	0	0	4	0
<i>Monticellina baptisteeae</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Monticellina</i> cf. <i>dorsobranchialis</i>	0	0	0	0	0	0	0	0	0	0	0	6	3
<i>Nephtys bucera</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Nephtys picta</i>	3	1	6	10	11	3	4	1	1	1	1	0	3
<i>Nephtys</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Ninoe nigripes</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Notocirrus spinifera</i>	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>Notomastus hemipodus</i>	1	0	0	0	0	0	1	0	1	0	0	0	1
Onuphidae sp.	0	0	0	0	0	2	0	0	0	0	0	0	0
<i>Onuphis eremita</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Ophelia denticulata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Owenia fusiformis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Paleanotus heteroseta</i>	0	0	0	0	0	0	0	0	3	0	0	1	0
<i>Paraehlersia ferrugina</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
Paraonidae sp.	0	0	0	0	0	0	0	0	0	0	0	0	2
<i>Paraonis pygoenigmatica</i>	0	0	0	0	0	0	0	0	0	0	0	1	0
<i>Pectinaria gouldi</i>	3	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pherusa affinis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pholoe minuta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Phyllodoce arenae</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Phyllodoce groenlandica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Phylo felix</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pilargis</i> sp.	0	0	0	0	0	1	0	0	0	0	0	0	0
<i>Pisione</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pista cristata</i>	0	0	0	0	0	0	0	0	2	0	0	0	0
<i>Podarkeopsis levifuscina</i>	0	0	0	0	0	0	0	0	1	0	0	1	0
<i>Polycirrus eximius</i>	0	0	0	0	0	0	0	0	0	0	0	1	0
<i>Polydora cornuta</i>	0	0	0	0	0	0	0	0	0	0	0	4	0
<i>Polygordius jouinae</i>	0	0	0	1	2	3	2	10	21	3	1	7	7
Polynoidae sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Prionospio pygmaeus</i>	98	0	7	4	21	71	23	0	0	0	0	0	1
<i>Prionospio</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Protodorvillea kefersteini</i>	0	0	0	0	0	0	0	14	0	0	4	0	0
<i>Rhodine</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Salvatoria clavata</i>	0	0	0	0	0	0	0	2	3	0	1	1	1
<i>Samythella elongata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Scalibregma inflatum</i>	3	0	1	4	24	0	7	172	27	25	79	11	11
<i>Scoletoma fragilis</i>	0	0	0	0	1	0	0	1	0	2	0	1	1
<i>Scoletoma verrilli</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Scoloplos acmeceps</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Scoloplos rubra</i>	0	0	0	1	1	0	1	0	0	0	0	0	0
<i>Sigalion arenicola</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Sigambra tentaculata</i>	0	0	0	0	1	0	4	1	0	0	1	0	0
Sphaerodoridae sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Sphaerosyllis taylori</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Spio filicornis</i>	0	0	0	0	0	0	0	28	0	1	37	4	4
<i>Spiochaetopterus oculatus</i>	2	1	5	1	1	0	3	0	0	1	0	0	0
Spionidae sp.	0	0	0	0	0	0	0	0	0	0	0	0	0

	Sample #	GS-025	GS-026	GS-027	GS-028	GS-029	GS-030	GS-031	GS-032	GS-033	GS-034	GS-035	GS-036
	Collection Time	0:47	1:12	17:05	16:30	16:08	15:49	15:25	15:02	14:12	14:40	12:55	12:05
	Collection Date (2013)	20 June	20 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June
	<i>Spiophanes bombyx</i>	10	1	13	9	4	5	4	0	1	0	2	1
	<i>Sthenelais limicola</i>	0	0	0	0	0	1	0	0	0	0	0	0
	<i>Streblospio benedicti</i>	82	1	94	21	131	10	4	0	0	0	0	0
	<i>Streptosyllis websteri</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Syllis cornuta</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Terebellidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Tharyx acutus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Tharyx</i> sp. A sensu MWRA, 2007	4	0	3	0	0	0	1	0	0	0	0	0
	<i>Travisia forbesii</i>	0	4	0	0	0	0	0	1	0	0	0	0
	<i>Travisia</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Sipuncula</b>	<i>Golfingia margaritacea</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Mollusca-Bivalvia</b>	<i>Abra lioica</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Abra longicallus</i>	0	0	0	0	0	1	0	0	0	0	1	0
	<i>Abra</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	Bivalvia spp.	0	0	2	1	1	1	0	0	0	0	1	0
	<i>Corbula contracta</i>	0	0	0	0	0	0	0	0	0	1	0	0
	<i>Crassinella lunulata</i>	0	0	0	0	0	0	0	0	0	0	1	0
	<i>Crenella decussata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Divalinga quadrisulcata</i>	0	0	0	1	0	0	0	0	0	0	0	0
	<i>Ensis directus</i>	0	0	1	0	1	0	1	0	0	0	0	0
	<i>Ensis</i> sp.	4	1	37	41	155	119	133	1	1	1	0	0
	<i>Lucinoma filosa</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Lyonsia hyalinata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Macoma calcarea</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Mysella planulata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Mytilidae sp.	0	0	1	0	0	0	0	0	0	0	0	0
	<i>Nucula proxima</i>	0	0	0	0	0	0	0	0	0	1	0	0
	<i>Nucula</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Pandora bushiana</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Parvicardium pinnulatum</i>	0	0	0	0	0	0	0	0	0	0	1	0
	Pectinidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Periploma</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Pitar morrhuanus</i>	1	0	0	0	0	0	2	0	0	0	0	0
	<i>Siliqua costata</i>	0	0	0	0	0	1	0	0	0	0	0	0
	<i>Tellina</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Tellina versicolor</i>	13	1	15	8	12	15	8	0	0	0	0	2
	Veneridae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Yoldia limatula</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Yoldia</i> sp.	0	0	0	0	0	1	0	0	0	0	0	0
<b>Mollusca-Gastropoda</b>	<i>Busycotypus canaliculatus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Caecum johnsoni</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crepidula convexa</i>	0	0	0	0	0	0	0	0	4	1	1	0
	<i>Crepidula fornicata</i>	0	0	0	0	0	0	0	0	0	8	0	0
	<i>Euspira immaculata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Gastropoda sp.	0	0	0	0	0	1	0	0	0	0	0	0
	<i>Haminoea solitaria</i>	0	0	1	1	1	2	2	0	0	0	0	0
	Marginellidae sp.	0	1	0	0	0	0	1	0	0	0	0	0
	<i>Nassarius trivittatus</i>	0	0	0	1	0	6	7	0	0	0	0	0
	Naticidae sp.	0	0	0	0	0	0	0	0	0	0	0	0

	Sample #	GS-025	GS-026	GS-027	GS-028	GS-029	GS-030	GS-031	GS-032	GS-033	GS-034	GS-035	GS-036
	Collection Time	0:47	1:12	17:05	16:30	16:08	15:49	15:25	15:02	14:12	14:40	12:55	12:05
	Collection Date (2013)	20 June	20 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June
	Neogastropoda sp.	5	0	7	0	5	0	2	0	0	0	0	0
	<i>Neverita duplicata</i>	2	0	0	0	0	0	0	0	0	0	0	0
	Nudibranchia sp.	0	0	0	0	0	0	0	0	0	0	0	0
	Rissoidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Tectonatica pusilla</i>	0	0	1	0	0	0	0	0	0	0	0	0
	<i>Turbonilla</i> sp.	0	0	2	0	0	1	2	0	0	0	0	0
	Turridae sp.	0	0	0	0	0	0	1	0	0	0	0	0
<b>Crustacea-Amphipoda</b>	<i>Acanthohaustorius intermedius</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Acanthohaustorius millsii</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Acanthohaustorius shoemakeri</i>	0	1	0	0	0	0	0	0	0	0	0	0
	<i>Americhelidium americanum</i>	1	0	0	0	0	0	1	0	0	0	0	0
	<i>Ampelisca</i> sp.	1	0	0	0	0	0	0	0	0	0	0	0
	<i>Ampelisca vadorum</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ampelisca verrilli</i>	0	0	3	2	0	1	3	0	0	0	0	0
	Amphipoda sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Apocorophium simile</i>	0	0	0	0	0	0	0	0	0	0	1	0
	<i>Argissa hamatipes</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Bathyporeia parkeri</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Bathyporeia quoddyensis</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Byblis serrata</i>	0	18	0	0	0	0	0	0	3	0	0	0
	<i>Byblis</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Dyopedos monacanthus</i>	0	0	0	0	1	0	0	0	0	0	0	0
	<i>Listriella barnardi</i>	0	1	0	0	0	0	1	0	0	0	0	0
	<i>Metharpinia floridana</i>	0	2	0	0	0	0	0	0	2	0	0	0
	<i>Microtopopus</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Monocorophium</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Photis</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	Phoxocephalidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Protohaustorius deichmannae</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Protohaustorius wigleyi</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Rhepoxynius epistomus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Unciola irrorata</i>	3	1	5	2	3	2	2	2	5	2	4	2
	<i>Unciola serrata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Unciola</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Crustacea-Cumacea</b>	Bodotriidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Oxyurostylis smithi</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Pseudoleptocuma minus</i>	0	0	0	0	0	0	0	0	1	0	0	0
<b>Crustacea-Decapoda</b>	Brachyura sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Cancer borealis</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crangon septemspinosa</i>	1	0	1	0	0	0	0	0	0	0	0	0
	<i>Euceramus praelongus</i>	0	0	0	0	0	0	0	0	0	0	0	1
	<i>Lepidopa websteri</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Pagurus politus</i>	0	1	0	1	0	0	1	1	6	2	6	1
	<i>Pinnixa chaetoptera</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Pinnixa cylindrica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Crustacea-Isopoda</b>	<i>Amakusanthura magnifica</i>	0	0	0	0	0	0	0	0	3	0	0	0
	<i>Ancinus depressus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Chiridotea arenicola</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Edotea montosa</i>	0	0	0	0	0	0	0	0	0	1	0	0

	Sample #	GS-025	GS-026	GS-027	GS-028	GS-029	GS-030	GS-031	GS-032	GS-033	GS-034	GS-035	GS-036
	Collection Time	0:47	1:12	17:05	16:30	16:08	15:49	15:25	15:02	14:12	14:40	12:55	12:05
	Collection Date (2013)	20 June	20 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June	19 June
	<i>Flabellifera</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Politolana polita</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Crustacea-Mysidacea</b>	<i>Neomysis americana</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Crustacea-Tanaidacea</b>	<i>Tanaissus psammophilus</i>	0	2	0	0	0	0	0	0	0	0	0	0
<b>Crustacea-Cephalocarida</b>	<i>Hutchinsoniella macracantha</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Echinodermata-Echinoidea</b>	<i>Clypeasteroida</i> sp.	0	1	0	0	0	0	0	0	0	0	0	0
	<i>Echinoida</i> sp.	0	0	0	0	0	0	1	0	0	0	0	0
<b>Lophophorata</b>	<i>Phoronida</i> sp.	1	0	0	1	0	0	2	0	0	0	0	0
<b>Urochordata</b>	<i>Molgula</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Cephalochordata</b>	<i>Branchiostoma</i> sp.	0	2	0	0	0	3	1	2	7	1	0	2
<b>Hemichordata</b>	<i>Enteropneusta</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
		<b>388</b>	<b>48</b>	<b>286</b>	<b>231</b>	<b>523</b>	<b>308</b>	<b>274</b>	<b>297</b>	<b>128</b>	<b>78</b>	<b>256</b>	<b>157</b>

	Sample #	GS-037	GS-038	GS-039	GS-040	GS-041	GS-042	GS-043	GS-044	GS-045	GS-046	GS-047	GS-048
	Collection Time	11:28	7:10	6:45	5:48	5:16	4:50	4:21	3:56	3:28	2:43	2:07	1:40
	Collection Date (2013)	19 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June
	<b>TAXON</b>												
<b>Turbellaria</b>	<i>Bdelloura</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Stylochus oculiferus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Cnidaria</b>	Actiniaria sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ceriantharia</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Nemertea</b>	Lineidae spp.	0	0	0	0	0	0	0	0	0	0	1	0
	Palaeonemertea spp.	0	0	0	0	0	2	0	0	0	0	0	0
<b>Annelida-Oligochaeta</b>	Oligochaeta spp.	16	34	0	39	23	10	40	3	0	3	2	0
<b>Annelida-Polychaeta</b>	<i>Abyssoninoe</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Aglaophamus verrilli</i>	0	0	0	0	0	0	0	0	0	0	1	0
	<i>Amastigos caperatus</i>	0	0	0	0	0	0	1	0	0	0	1	0
	<i>Ampharete americana</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ampharete finmarchica</i>	2	0	2	4	0	0	2	0	0	0	1	0
	<i>Aphelochaeta</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Aphroditella hastata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Arabella mutans</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Aricidea (Acmira) catherinae</i>	1	0	1	1	3	1	0	0	0	1	2	0
	<i>Aricidea (Acmira) cerrutii</i>	0	0	0	5	15	10	2	0	0	0	0	0
	<i>Aricidea (Aricidea) wassi</i>	0	4	0	0	0	0	1	0	1	0	0	0
	<i>Asabellides oculata</i>	1	1	1	0	0	0	0	0	0	0	1	0
	<i>Asychis carolinae</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Brania wellfleetensis</i>	0	7	1	8	11	5	5	0	0	0	0	0
	<i>Capitella capitata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Capitellidae sp.	0	0	2	0	0	0	1	0	0	0	0	0
	<i>Carazziella hobsonae</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Cauleriella venefica</i>	0	4	1	2	0	0	0	2	2	0	0	0
	<i>Chaetozone</i> sp.	0	4	0	0	0	0	0	0	0	0	0	0
	Cirratulidae spp.	2	2	1	3	8	6	5	1	0	0	4	0
	<i>Cirrophorus branchiatus</i>	0	3	0	0	0	0	0	0	0	0	0	0
	<i>Clymenella mucosa</i>	1	0	0	0	0	0	4	0	0	0	1	0
	<i>Clymenella torquata</i>	4	0	0	0	0	0	0	0	0	0	0	0
	<i>Diopatra cuprea</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Drilonereis filum</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Eteone longa</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Exogone hebes</i>	0	0	0	2	0	0	0	0	0	0	0	0
	<i>Exogone</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Glycera americana</i>	1	0	0	0	0	0	1	0	0	0	1	0
	<i>Glycera capitata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Glycera</i> sp.	0	1	0	0	0	0	0	0	0	0	0	0
	<i>Harmothoe imbricata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Hesionura elongata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Hydroides dianthus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Leitoscoloplos fragilis</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Leitoscoloplos robustus</i>	0	0	0	0	0	0	0	0	0	0	4	0
	<i>Leitoscoloplos</i> sp.	0	0	0	0	0	0	2	0	0	0	0	0
	<i>Linopherus paucibranchiata</i>	3	0	0	0	0	0	0	0	0	0	0	0
	<i>Lumbrinerides acuta</i>	0	1	1	3	0	3	0	1	0	0	0	3
	<i>Magelona rosea</i>	0	1	0	0	0	0	0	0	0	0	0	0
	Maldanidae sp.	0	0	0	0	0	0	0	0	0	0	0	0

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	Collection Date (2013)	19 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June
<i>Mediomastus</i> sp.	0	0	0	0	0	0	0	0	0	0	0	3	0
<i>Monticellina baptisteeae</i>	0	0	0	0	0	0	0	0	0	0	1	0	0
<i>Monticellina cf. dorsobranchialis</i>	0	0	0	2	6	3	3	0	0	0	0	0	0
<i>Nephtys bucera</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Nephtys picta</i>	3	1	3	0	0	0	1	0	0	0	0	0	0
<i>Nephtys</i> sp.	0	0	0	0	0	0	0	0	0	0	0	4	1
<i>Ninoe nigripes</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Notocirrus spinifera</i>	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>Notomastus hemipodus</i>	5	0	0	1	0	0	1	0	0	0	0	0	0
Onuphidae sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Onuphis eremita</i>	0	0	0	0	1	0	0	0	0	0	0	0	0
<i>Ophelia denticulata</i>	0	0	0	0	0	0	0	0	0	0	1	0	0
<i>Owenia fusiformis</i>	0	0	0	0	0	0	0	0	0	0	0	1	0
<i>Paleanotus heteroseta</i>	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>Paraehlersia ferrugina</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
Paraonidae sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Paraonis pygoenigmatica</i>	0	0	0	0	0	0	1	0	0	0	0	0	0
<i>Pectinaria gouldi</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pherusa affinis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pholoe minuta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Phyllodoce arenae</i>	0	0	0	0	0	0	1	0	0	0	0	0	0
<i>Phyllodoce groenlandica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Phylo felix</i>	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>Pilargis</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pisione</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pista cristata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Podarkeopsis levifuscina</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Polycirrus eximius</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Polydora cornuta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Polygordius jouinae</i>	1	18	10	2	0	1	15	2	0	5	0	0	0
Polynoidae sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Prionospio pygmaeus</i>	0	0	2	0	0	0	0	0	0	0	0	0	0
<i>Prionospio</i> sp.	0	0	0	0	0	0	0	0	0	0	0	1	0
<i>Protodorvillea kefersteini</i>	0	2	0	0	3	0	5	0	0	0	0	0	0
<i>Rhodine</i> sp.	0	0	0	0	0	0	1	0	0	0	0	0	0
<i>Salvatoria clavata</i>	1	0	0	1	0	0	0	0	0	2	0	0	0
<i>Samythella elongata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Scalibregma inflatum</i>	92	1	5	1	0	0	37	0	0	0	30	0	0
<i>Scoletoma fragilis</i>	2	0	0	0	0	0	0	0	0	0	0	0	1
<i>Scoletoma verrilli</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Scoloplos acmeiceps</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Scoloplos rubra</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Sigalion arenicola</i>	0	0	0	1	0	1	0	0	0	1	0	0	0
<i>Sigambra tentaculata</i>	1	0	0	0	0	0	0	0	0	0	1	0	0
Sphaerodoridae sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Sphaerosyllis taylori</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Spio filicornis</i>	8	0	30	0	0	0	52	0	0	0	1	0	0
<i>Spiochaetopterus oculatus</i>	0	0	0	0	0	0	0	0	1	0	0	0	0
Spionidae sp.	0	0	0	0	0	0	0	0	0	1	0	0	0



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	Collection Date (2013)	19 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June
	<i>Spiophanes bombyx</i>	0	0	170	0	0	1	611	12	1	2	25	0
	<i>Sthenelais limicola</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Streblospio benedicti</i>	0	0	1	0	0	0	0	0	0	0	0	0
	<i>Streptosyllis websteri</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Syllis cornuta</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Terebellidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Tharyx acutus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Tharyx</i> sp. A sensu MWRA, 2007	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Travisia forbesii</i>	0	0	1	4	0	0	1	0	1	0	0	0
	<i>Travisia</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Sipuncula</b>	<i>Golfingia margaritacea</i>	2	0	0	0	0	0	0	0	0	0	0	0
<b>Mollusca-Bivalvia</b>	<i>Abra lioica</i>	0	0	0	0	0	0	0	0	0	0	1	0
	<i>Abra longicallus</i>	1	3	0	0	0	0	1	6	3	0	0	4
	<i>Abra</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	Bivalvia spp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Corbula contracta</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crassinella lunulata</i>	0	0	1	1	0	0	0	0	1	0	0	0
	<i>Crenella decussata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Divalinga quadrisulcata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ensis directus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ensis</i> sp.	0	8	5	3	0	1	13	2	7	0	6	1
	<i>Lucinoma filosa</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Lyonsia hyalinata</i>	0	0	0	1	0	0	0	0	0	0	0	0
	<i>Macoma calcarea</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Mysella planulata</i>	1	0	0	0	0	0	0	0	0	0	0	0
	Mytilidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Nucula proxima</i>	1	0	0	0	0	0	0	0	0	0	0	0
	<i>Nucula</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Pandora bushiana</i>	0	0	0	1	0	0	0	0	0	0	0	0
	<i>Parvicardium pinnulatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Pectinidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Periploma</i> sp.	0	0	0	1	0	1	0	0	0	0	0	0
	<i>Pitar morrhuanus</i>	0	0	0	0	0	0	0	0	1	0	12	0
	<i>Siliqua costata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Tellina</i> sp.	0	1	0	0	0	0	0	0	0	0	0	0
	<i>Tellina versicolor</i>	3	0	2	7	2	12	9	1	1	4	29	3
	Veneridae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Yoldia limatula</i>	0	0	0	0	0	0	0	0	0	0	1	0
	<i>Yoldia</i> sp.	0	0	0	0	0	0	0	0	0	0	1	0
<b>Mollusca-Gastropoda</b>	<i>Busycotypus canaliculatus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Caecum johnsoni</i>	0	0	0	0	0	4	0	0	0	0	0	0
	<i>Crepidula convexa</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crepidula fornicata</i>	9	0	0	0	0	0	0	0	0	0	0	0
	<i>Euspira immaculata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Gastropoda sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Haminoea solitaria</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Marginellidae sp.	0	0	0	1	0	0	0	0	0	0	0	0
	<i>Nassarius trivittatus</i>	3	0	2	0	0	0	1	0	2	1	17	0
	Naticidae sp.	0	0	0	0	0	0	0	0	0	0	0	0

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	Collection Date (2013)	19 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June
	Neogastropoda sp.	0	0	0	0	0	0	0	0	1	0	0	0
	<i>Neverita duplicata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Nudibranchia sp.	0	0	0	0	0	0	0	0	0	0	0	0
	Rissoidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Tectonatica pusilla</i>	0	0	0	2	0	0	0	1	1	0	0	0
	<i>Turbonilla</i> sp.	0	0	0	0	0	0	0	0	1	0	0	0
	Turridae sp.	1	0	0	0	0	0	0	0	0	0	0	0
<b>Crustacea-Amphipoda</b>	<i>Acanthohaustorius intermedius</i>	0	0	0	0	0	0	0	0	0	1	0	0
	<i>Acanthohaustorius millsii</i>	0	0	2	2	0	0	0	2	94	2	0	0
	<i>Acanthohaustorius shoemakeri</i>	0	0	0	0	0	0	0	0	0	1	0	0
	<i>Americhelidium americanum</i>	1	0	0	0	0	1	0	0	1	1	0	0
	<i>Ampelisca</i> sp.	0	0	1	0	0	0	0	0	0	0	0	0
	<i>Ampelisca vadorum</i>	3	0	0	0	0	0	0	0	0	0	0	0
	<i>Ampelisca verrilli</i>	0	0	0	0	0	0	0	1	2	1	0	0
	<i>Amphipoda</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Apocorophium simile</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Argissa hamatipes</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Bathyporeia parkeri</i>	0	0	0	0	0	4	0	0	1	2	0	0
	<i>Bathyporeia quoddyensis</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Byblis serrata</i>	0	21	0	0	0	0	0	1	11	0	0	7
	<i>Byblis</i> sp.	0	0	0	1	0	0	0	0	0	1	0	0
	<i>Dyopedos monacanthus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Listriella barnardi</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Metharpinia floridana</i>	1	0	5	5	4	5	1	10	4	2	0	12
	<i>Microprotopus</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Monocorophium</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Photis</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	Phoxocephalidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Protohaustorius deichmannae</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Protohaustorius wigleyi</i>	0	0	0	0	0	0	0	0	26	43	0	2
	<i>Rhepoxynius epistomus</i>	0	6	0	0	0	0	0	0	0	0	0	0
	<i>Unciola irrorata</i>	17	0	6	0	0	0	5	0	0	0	0	0
	<i>Unciola serrata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Unciola</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Crustacea-Cumacea</b>	Bodotriidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Oxyurostylis smithi</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Pseudoleptocuma minus</i>	0	1	0	0	0	0	0	0	0	0	0	0
<b>Crustacea-Decapoda</b>	Brachyura sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Cancer borealis</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crangon septemspinosa</i>	0	0	0	0	0	0	0	0	1	0	0	0
	<i>Euceramus praelongus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Lepidopa websteri</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Pagurus politus</i>	1	1	4	0	0	1	0	0	2	0	0	0
	<i>Pinnixa chaetoptera</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Pinnixa cylindrica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Crustacea-Isopoda</b>	<i>Amakusanthura magnifica</i>	0	1	1	1	0	0	0	0	0	1	0	0
	<i>Ancinus depressus</i>	0	0	0	0	0	0	0	0	0	1	0	0
	<i>Chiridotea arenicola</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Edotea montosa</i>	0	0	0	0	0	0	0	0	0	0	0	0

	Sample #	GS-037	GS-038	GS-039	GS-040	GS-041	GS-042	GS-043	GS-044	GS-045	GS-046	GS-047	GS-048
	Collection Time	11:28	7:10	6:45	5:48	5:16	4:50	4:21	3:56	3:28	2:43	2:07	1:40
	Collection Date (2013)	19 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June	18 June
	<i>Flabellifera</i> sp.	0	1	0	0	0	0	0	0	0	0	0	0
	<i>Politolana polita</i>	0	0	0	1	3	0	0	0	0	0	0	0
<b>Crustacea-Mysidacea</b>	<i>Neomysis americana</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Crustacea-Tanaidacea</b>	<i>Tanaissus psammophilus</i>	0	7	0	0	0	0	0	3	0	1	0	1
<b>Crustacea-Cephalocarida</b>	<i>Hutchinsoniella macracantha</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Echinodermata-Echinoidea</b>	<i>Clypeasteroida</i> sp.	0	0	0	0	0	0	0	0	5	0	0	0
	<i>Echinoida</i> sp.	0	3	0	0	0	0	0	0	0	0	0	0
<b>Lophophorata</b>	<i>Phoronida</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Urochordata</b>	<i>Molgula</i> sp.	0	0	0	1	1	3	0	0	0	0	0	0
<b>Cephalochordata</b>	<i>Branchiostoma</i> sp.	6	1	3	3	0	1	1	1	9	2	0	3
<b>Hemichordata</b>	<i>Enteropneusta</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
		<b>196</b>	<b>139</b>	<b>264</b>	<b>110</b>	<b>80</b>	<b>76</b>	<b>824</b>	<b>49</b>	<b>181</b>	<b>80</b>	<b>152</b>	<b>38</b>

	Sample #	GS-049	GS-050	GS-051	GS-052	GS-053	GS-054	GS-055	GS-056	GS-057	GS-058	GS-059	GS-060
	Collection Time	0:43	23:52	23:30	22:58	22:28	5:12	5:42	21:30	4:35	6:11	20:27	3:48
	Collection Date (2013)	18 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June
	<b>TAXON</b>												
<b>Turbellaria</b>	<i>Bdelloura</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Stylochus oculiferus</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Cnidaria</b>	Actinaria sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ceriantharia</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Nemertea</b>	Lineidae spp.	0	0	0	0	0	0	0	0	0	0	0	0
	Palaeonemertea spp.	0	0	0	0	0	0	0	2	0	1	3	2
<b>Annelida-Oligochaeta</b>	Oligochaeta spp.	7	0	0	0	0	1	0	5	12	11	0	4
<b>Annelida-Polychaeta</b>	<i>Abyssoninoe</i> sp.	0	0	0	0	0	0	0	15	0	0	0	0
	<i>Aglaophamus verrilli</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Amastigos caperatus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ampharete americana</i>	2	0	0	0	0	0	0	0	0	0	0	0
	<i>Ampharete finmarchica</i>	0	0	0	0	0	0	1	19	5	1	6	0
	<i>Aphelochaeta</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Aphroditella hastata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Arabella mutans</i>	0	0	0	0	0	0	0	0	0	0	1	0
	<i>Aricidea (Acmira) catherinae</i>	0	0	0	0	0	0	0	3	1	0	7	0
	<i>Aricidea (Acmira) cerrutii</i>	0	0	0	0	0	0	0	0	2	6	0	1
	<i>Aricidea (Aricidea) wassi</i>	5	1	1	0	3	0	1	0	0	0	10	0
	<i>Asabellides oculata</i>	0	0	0	0	0	0	0	0	0	0	4	0
	<i>Asychis carolinae</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Brania wellfleetensis</i>	7	0	0	0	0	2	0	2	5	3	0	2
	<i>Capitella capitata</i>	0	0	0	0	0	0	0	1	3	0	0	0
	Capitellidae sp.	14	0	0	0	0	0	0	0	0	1	1	0
	<i>Carazziella hobsonae</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Cauleriella venefica</i>	2	0	1	0	1	0	0	4	18	0	0	1
	<i>Chaetozone</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	Cirratulidae spp.	1	0	1	0	0	0	0	0	10	0	11	0
	<i>Cirrophorus branchiatus</i>	0	0	0	0	0	0	0	0	0	0	1	0
	<i>Clymenella mucosa</i>	0	0	0	0	0	0	0	7	0	0	0	0
	<i>Clymenella torquata</i>	0	0	0	0	0	0	0	4	0	0	0	0
	<i>Diopatra cuprea</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Drilonereis filum</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Eteone longa</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Exogone hebes</i>	0	0	1	0	0	0	0	0	0	9	0	2
	<i>Exogone</i> sp.	0	0	1	0	0	0	0	0	0	0	0	0
	<i>Glycera americana</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Glycera capitata</i>	0	0	0	0	0	0	0	0	0	0	1	1
	<i>Glycera</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Harmothoe imbricata</i>	0	0	0	0	0	0	0	0	0	0	0	1
	<i>Hesionura elongata</i>	0	0	1	0	0	0	0	0	0	0	0	0
	<i>Hydroides dianthus</i>	0	0	0	0	0	0	0	0	0	0	0	1
	<i>Leitoscoloplos fragilis</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Leitoscoloplos robustus</i>	0	0	0	1	1	0	0	0	0	1	3	0
	<i>Leitoscoloplos</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Linopherus paucibranchiata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Lumbrinerides acuta</i>	0	0	0	0	0	0	0	0	2	1	0	1
	<i>Magelona rosea</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Maldanidae sp.	0	0	0	0	0	0	0	0	0	0	0	0

	Sample #	GS-049	GS-050	GS-051	GS-052	GS-053	GS-054	GS-055	GS-056	GS-057	GS-058	GS-059	GS-060
	Collection Time	0:43	23:52	23:30	22:58	22:28	5:12	5:42	21:30	4:35	6:11	20:27	3:48
	Collection Date (2013)	18 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June
<i>Mediomastus</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Monticellina baptisteeae</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Monticellina cf. dorsobranchialis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Nephtys bucera</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Nephtys picta</i>	6	0	0	0	0	0	0	0	0	3	0	7	0
<i>Nephtys</i> sp.	0	0	0	0	0	0	1	0	0	0	0	0	0
<i>Ninoe nigripes</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Notocirrus spinifera</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Notomastus hemipodus</i>	2	1	0	0	0	0	0	0	0	0	0	1	0
Onuphidae sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Onuphis eremita</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Ophelia denticulata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Owenia fusiformis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Paleanotus heteroseta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Paraehlersia ferrugina</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
Paraonidae sp.	0	0	0	0	0	0	0	0	1	0	0	0	0
<i>Paraonis pygoenigmatica</i>	0	0	0	0	0	0	0	0	0	8	1	0	3
<i>Pectinaria gouldi</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pherusa affinis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pholoe minuta</i>	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>Phyllodoce arenae</i>	0	0	0	0	0	0	0	0	7	0	0	0	0
<i>Phyllodoce groenlandica</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Phylo felix</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pilargis</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pisione</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Pista cristata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Podarkeopsis levifuscina</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Polycirrus eximius</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Polydora cornuta</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Polygordius jouinae</i>	8	1	0	0	0	2	1	0	5	28	2	3	13
Polynoidae sp.	0	0	0	0	0	0	0	0	0	0	0	1	0
<i>Prionospio pygmaeus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Prionospio</i> sp.	0	0	0	0	0	0	0	0	0	0	0	3	0
<i>Protodorvillea kefersteini</i>	1	0	0	0	0	0	0	0	3	3	0	0	6
<i>Rhodine</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Salvatoria clavata</i>	4	0	0	0	0	0	0	0	0	0	0	0	1
<i>Samythella elongata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Scalibregma inflatum</i>	4	0	0	6	0	0	0	0	23	14	1	53	3
<i>Scoletoma fragilis</i>	1	0	0	2	0	0	0	1	3	9	2	1	0
<i>Scoletoma verrilli</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Scoloplos acmeceps</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Scoloplos rubra</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Sigalion arenicola</i>	0	0	1	0	0	1	0	0	0	0	0	0	0
<i>Sigambra tentaculata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
Sphaerodoridae sp.	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Sphaerosyllis taylori</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Spio filicornis</i>	0	0	0	6	0	0	0	0	21	0	0	5	5
<i>Spiochaetopterus oculatus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
Spionidae sp.	0	0	0	0	0	0	0	0	0	0	0	0	0

	Sample #	GS-049	GS-050	GS-051	GS-052	GS-053	GS-054	GS-055	GS-056	GS-057	GS-058	GS-059	GS-060
	Collection Time	0:43	23:52	23:30	22:58	22:28	5:12	5:42	21:30	4:35	6:11	20:27	3:48
	Collection Date (2013)	18 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June
	<i>Spiophanes bombyx</i>	7	1	0	98	2	16	3	310	4	0	32	2
	<i>Sthenelais limicola</i>	0	0	0	0	0	0	0	0	0	0	5	0
	<i>Streblospio benedicti</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Streptosyllis websteri</i>	0	0	0	0	0	0	0	0	0	0	0	2
	<i>Syllis cornuta</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Terebellidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Tharyx acutus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Tharyx</i> sp. A sensu MWRA, 2007	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Travisia forbesii</i>	0	0	0	1	0	0	3	0	0	0	0	0
	<i>Travisia</i> sp.	0	0	0	0	1	0	0	0	0	0	0	0
<b>Sipuncula</b>	<i>Golfingia margaritacea</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Mollusca-Bivalvia</b>	<i>Abra lioica</i>	0	0	0	0	0	0	0	0	0	0	5	0
	<i>Abra longicallus</i>	14	3	0	16	11	3	1	1	1	0	4	0
	<i>Abra</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	Bivalvia spp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Corbula contracta</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crassinella lunulata</i>	0	0	0	0	0	0	0	0	0	0	0	1
	<i>Crenella decussata</i>	0	0	0	0	0	0	0	0	1	0	2	1
	<i>Divalinga quadrisulcata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ensis directus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ensis</i> sp.	13	3	0	20	0	0	1	4	2	0	4	2
	<i>Lucinoma filosa</i>	0	0	0	0	0	0	0	0	0	0	3	0
	<i>Lyonsia hyalinata</i>	0	0	0	0	0	0	0	2	1	0	0	0
	<i>Macoma calcarea</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Mysella planulata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Mytilidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Nucula proxima</i>	0	0	0	0	0	0	0	0	0	0	2	0
	<i>Nucula</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Pandora bushiana</i>	0	0	0	0	0	0	2	0	0	1	0	0
	<i>Parvicardium pinnulatum</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Pectinidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Periploma</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Pitar morrhuanus</i>	0	0	0	0	0	0	0	0	0	0	5	0
	<i>Siliqua costata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Tellina</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Tellina versicolor</i>	4	1	6	4	0	2	2	0	2	6	5	0
	Veneridae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Yoldia limatula</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Yoldia</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Mollusca-Gastropoda</b>	<i>Busycotypus canaliculatus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Caecum johnsoni</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crepidula convexa</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crepidula fornicata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Euspira immaculata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Gastropoda sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Haminoea solitaria</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Marginellidae sp.	0	0	0	0	0	0	0	0	0	1	0	0
	<i>Nassarius trivittatus</i>	10	1	0	11	0	0	0	5	3	1	20	2
	Naticidae sp.	0	0	0	0	0	0	0	0	0	0	0	0

	Sample #	GS-049	GS-050	GS-051	GS-052	GS-053	GS-054	GS-055	GS-056	GS-057	GS-058	GS-059	GS-060
	Collection Time	0:43	23:52	23:30	22:58	22:28	5:12	5:42	21:30	4:35	6:11	20:27	3:48
	Collection Date (2013)	18 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June
	Neogastropoda sp.	0	0	0	1	1	0	0	0	0	0	2	0
	<i>Neverita duplicata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	Nudibranchia sp.	0	0	0	0	0	0	0	0	0	0	0	0
	Rissoidea sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Tectonatica pusilla</i>	0	2	1	0	0	0	1	0	0	0	0	0
	<i>Turbonilla</i> sp.	1	0	0	0	0	0	0	0	1	0	1	0
	Turridae sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Crustacea-Amphipoda</b>	<i>Acanthohaustorius intermedius</i>	0	1	0	1	2	0	0	0	0	0	0	0
	<i>Acanthohaustorius millsii</i>	9	14	0	0	10	1	13	0	1	0	0	0
	<i>Acanthohaustorius shoemakeri</i>	0	0	5	0	0	0	0	0	0	0	0	0
	<i>Americhelidium americanum</i>	1	1	0	0	1	0	2	0	0	0	0	0
	<i>Ampelisca</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ampelisca vadorum</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Ampelisca verrilli</i>	0	0	1	1	1	0	0	0	0	0	9	0
	<i>Amphipoda</i> sp.	0	0	0	0	0	0	0	0	0	0	0	1
	<i>Apocorophium simile</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Argissa hamatipes</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Bathyporeia parkeri</i>	0	1	1	0	4	0	7	0	0	1	0	0
	<i>Bathyporeia quoddyensis</i>	0	0	0	1	0	0	0	0	0	0	0	0
	<i>Byblis serrata</i>	4	0	0	0	0	1	0	0	77	24	0	1
	<i>Byblis</i> sp.	0	0	1	2	0	0	0	0	0	0	0	0
	<i>Dyopetos monacanthus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Listriella barnardi</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Metharpinia floridana</i>	2	6	7	0	14	1	8	0	18	1	1	4
	<i>Microtopopus</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Monocorophium</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Photis</i> sp.	0	0	0	0	0	0	0	0	0	0	0	0
	Phoxocephalidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Protohaustorius deichmannae</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Protohaustorius wigleyi</i>	21	18	9	4	34	3	13	1	6	17	0	0
	<i>Rhepoxynius epistomus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Unciola irrorata</i>	0	1	0	0	0	1	0	4	0	0	0	0
	<i>Unciola serrata</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Unciola</i> sp.	0	0	0	1	0	0	0	0	0	0	1	1
<b>Crustacea-Cumacea</b>	Bodotriidae sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Oxyurostylis smithi</i>	0	0	0	1	0	0	0	0	0	0	0	0
	<i>Pseudoleptocuma minus</i>	0	0	0	0	2	0	1	0	0	0	0	0
<b>Crustacea-Decapoda</b>	Brachyura sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Cancer borealis</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Crangon septemspinosa</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Euceramus praelongus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Lepidopa websteri</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Pagurus politus</i>	0	0	0	1	0	0	1	2	0	0	1	0
	<i>Pinnixa chaetoptera</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Pinnixa cylindrica</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Crustacea-Isopoda</b>	<i>Amakusanthura magnifica</i>	0	0	0	0	0	0	0	3	0	1	0	0
	<i>Ancinus depressus</i>	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Chiridotea arenicola</i>	0	0	0	0	0	0	0	0	0	0	0	1
	<i>Edotea montosa</i>	0	1	0	10	0	0	0	3	0	0	2	0

	Sample #	GS-049	GS-050	GS-051	GS-052	GS-053	GS-054	GS-055	GS-056	GS-057	GS-058	GS-059	GS-060
	Collection Time	0:43	23:52	23:30	22:58	22:28	5:12	5:42	21:30	4:35	6:11	20:27	3:48
	Collection Date (2013)	18 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June	17 June
	Flabellifera sp.	0	0	0	0	0	0	0	0	0	0	0	0
	<i>Politolana polita</i>	0	0	0	0	0	0	0	0	1	0	0	1
<b>Crustacea-Mysidacea</b>	<i>Neomysis americana</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Crustacea-Tanaidacea</b>	<i>Tanaissus psammophilus</i>	0	0	14	0	1	4	0	0	1	4	0	0
<b>Crustacea-Cephalocarida</b>	<i>Hutchinsoniella macracantha</i>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Echinodermata-Echinoidea</b>	Clypeasteroida sp.	0	0	0	0	1	0	0	0	0	0	0	0
	Echinoida sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Lophophorata</b>	Phoronida sp.	0	0	0	0	0	0	0	0	0	0	0	0
<b>Urochordata</b>	<i>Molgula</i> sp.	0	5	0	0	0	0	0	0	5	0	0	1
<b>Cephalochordata</b>	<i>Branchiostoma</i> sp.	2	0	1	3	0	2	1	1	5	5	0	5
<b>Hemichordata</b>	Enteropneusta sp.	0	0	0	0	0	0	0	0	0	0	0	0
		<b>152</b>	<b>62</b>	<b>53</b>	<b>191</b>	<b>93</b>	<b>39</b>	<b>62</b>	<b>461</b>	<b>252</b>	<b>102</b>	<b>226</b>	<b>73</b>



	Sample #	GS-REF-001	GS-REF-002	GS-REF-003	GS-REF-004	GS-REF-05	GS-REF-06	GS-REF-007	GS-REF-008	GS-REF-009
	Collection Time	19:40	1:42	13:28	6:20	1:10	21:55	1:25	2:00	2:40
	Collection Date	19 June	20 June	19 June	18 June	18 June	17 June	17 June	17 June	17 June
	<b>TAXON</b>									
<b>Turbellaria</b>	<i>Bdelloura</i> sp.	0	0	0	0	0	0	0	0	0
	<i>Stylochus oculiferus</i>	1	0	0	0	0	0	0	0	0
<b>Cnidaria</b>	Actiniaria sp.	0	0	0	0	0	0	0	0	0
	<i>Ceriantharia</i> sp.	0	0	0	0	0	0	0	0	0
<b>Nemertea</b>	Lineidae spp.	3	0	0	0	0	0	0	0	0
	Palaeonemertea spp.	7	0	0	0	0	0	3	2	3
<b>Annelida-Oligochaeta</b>	Oligochaeta spp.	0	0	3	53	0	3	0	2	0
<b>Annelida-Polychaeta</b>	<i>Abyssoninoe</i> sp.	0	0	0	0	0	0	0	0	16
	<i>Aglaophamus verilli</i>	4	3	8	0	0	0	0	0	0
	<i>Amastigos caperatus</i>	0	63	3	0	0	0	0	0	0
	<i>Ampharete americana</i>	0	0	0	0	0	0	0	0	0
	<i>Ampharete finmarchica</i>	0	0	0	1	0	0	2	0	0
	<i>Aphelochaeta</i> sp.	1	0	0	0	0	0	0	0	0
	<i>Aphroditella hastata</i>	0	0	0	0	0	0	1	0	0
	<i>Arabella mutans</i>	0	0	0	0	0	0	0	0	0
	<i>Aricidea (Acmira) catherinae</i>	1	0	0	16	3	0	0	12	27
	<i>Aricidea (Acmira) cerrutii</i>	0	0	0	11	0	2	0	0	0
	<i>Aricidea (Aricidea) wassi</i>	0	0	0	0	10	1	0	20	0
	<i>Asabellides oculata</i>	0	11	2	1	0	0	4	2	4
	<i>Asychis carolinae</i>	0	0	2	0	0	0	0	0	0
	<i>Brania wellfleetensis</i>	0	0	0	14	0	5	0	0	1
	<i>Capitella capitata</i>	0	11	0	0	0	0	0	0	0
	Capitellidae sp.	0	0	0	0	0	0	0	0	0
	<i>Carazziella hobsonae</i>	0	0	0	0	0	0	0	0	0
	<i>Cauleriella venefica</i>	0	0	0	0	1	1	2	0	0
	<i>Chaetozone</i> sp.	0	0	0	0	0	0	0	0	0
	Cirratulidae spp.	0	0	0	15	0	0	0	0	0
	<i>Cirrophorus branchiatus</i>	0	0	0	0	0	0	0	0	0
	<i>Clymenella mucosa</i>	0	1	3	0	0	0	0	0	0
	<i>Clymenella torquata</i>	0	0	0	0	0	0	0	0	0
	<i>Diopatra cuprea</i>	0	0	0	1	0	0	0	0	0
	<i>Drilonereis filum</i>	1	0	0	0	0	0	0	1	1
	<i>Eteone longa</i>	0	0	0	0	0	0	0	0	0
	<i>Exogone hebes</i>	0	0	0	0	0	1	0	0	0
	<i>Exogone</i> sp.	0	0	0	0	0	0	0	0	0
	<i>Glycera americana</i>	0	0	0	0	0	0	0	0	0
	<i>Glycera capitata</i>	1	3	0	0	0	0	0	0	1
	<i>Glycera</i> sp.	0	0	0	0	0	0	0	0	0
	<i>Harmothoe imbricata</i>	0	0	0	0	0	0	0	0	0
	<i>Hesionura elongata</i>	0	0	0	1	0	0	0	0	0
	<i>Hydroides dianthus</i>	0	0	0	0	0	0	0	0	0
	<i>Leitoscoloplos fragilis</i>	0	0	0	0	1	0	0	0	0
	<i>Leitoscoloplos robustus</i>	0	4	1	0	0	0	1	5	1
	<i>Leitoscoloplos</i> sp.	0	0	0	0	0	0	0	0	0
	<i>Linopherus paucibranchiata</i>	0	0	0	0	0	0	0	0	0
	<i>Lumbrinerides acuta</i>	0	0	0	19	0	0	0	0	0
	<i>Magelona rosea</i>	1	0	0	0	0	0	0	0	0
	Maldanidae sp.	0	0	0	0	0	0	0	0	1

	Sample #	GS-REF-001	GS-REF-002	GS-REF-003	GS-REF-004	GS-REF-005	GS-REF-006	GS-REF-007	GS-REF-008	GS-REF-009
	Collection Time	19:40	1:42	13:28	6:20	1:10	21:55	1:25	2:00	2:40
	Collection Date	19 June	20 June	19 June	18 June	18 June	17 June	17 June	17 June	17 June
<i>Mediomastus</i> sp.	1	0	0	0	0	0	0	0	0	0
<i>Monticellina baptisteeae</i>	0	0	0	0	2	0	0	0	0	0
<i>Monticellina cf. dorsobranchialis</i>	0	0	1	8	0	0	0	0	0	0
<i>Nephtys bucera</i>	0	0	0	0	0	0	0	0	0	0
<i>Nephtys picta</i>	1	5	1	0	2	0	7	3	0	0
<i>Nephtys</i> sp.	0	0	0	0	0	0	0	0	0	1
<i>Ninoe nigripes</i>	0	0	0	0	0	0	0	0	0	1
<i>Notocirrus spinifera</i>	0	0	1	0	0	0	0	0	0	0
<i>Notomastus hemipodus</i>	0	0	0	0	1	1	0	0	0	0
Onuphidae sp.	0	0	0	0	0	0	0	0	0	0
<i>Onuphis eremita</i>	0	0	0	1	0	0	0	0	0	0
<i>Ophelia denticulata</i>	0	0	0	0	0	0	0	0	0	0
<i>Owenia fusiformis</i>	0	0	0	0	0	0	0	0	0	0
<i>Paleanotus heteroseta</i>	0	0	0	0	0	0	0	0	0	0
<i>Paraehlersia ferrugina</i>	0	0	0	0	0	0	0	0	0	0
Paraonidae sp.	0	0	0	0	0	0	0	0	0	0
<i>Paraonis pygoenigmatica</i>	0	0	0	0	0	0	0	0	0	0
<i>Pectinaria gouldi</i>	0	0	0	0	0	0	0	0	0	0
<i>Pherusa affinis</i>	0	0	0	0	0	0	0	0	0	1
<i>Pholoe minuta</i>	0	0	0	0	0	0	0	0	0	0
<i>Phyllodoce arenae</i>	0	0	0	0	0	0	2	0	1	0
<i>Phyllodoce groenlandica</i>	0	0	0	0	0	0	0	0	0	0
<i>Phylo felix</i>	0	0	0	0	0	0	0	4	0	0
<i>Pilargis</i> sp.	0	1	0	0	0	0	0	0	0	0
<i>Pisione</i> sp.	0	0	0	6	0	0	0	0	0	0
<i>Pista cristata</i>	0	0	0	2	0	0	0	0	0	0
<i>Podarkeopsis levifuscina</i>	0	0	0	0	0	0	0	0	0	0
<i>Polycirrus eximius</i>	0	0	0	0	0	0	0	0	0	0
<i>Polydora cornuta</i>	0	0	2	1	0	0	0	0	0	0
<i>Polygordius jouinae</i>	0	0	1	3	0	4	0	0	0	0
Polynoidae sp.	0	0	0	0	0	0	0	0	0	0
<i>Prionospio pygmaeus</i>	17	135	23	0	0	0	0	0	0	0
<i>Prionospio</i> sp.	0	0	0	0	0	0	0	1	1	0
<i>Protodorvillea kefersteini</i>	0	0	0	0	0	0	0	0	0	0
<i>Rhodine</i> sp.	0	0	0	0	0	0	0	0	0	0
<i>Salvatoria clavata</i>	0	0	0	1	0	0	0	0	0	0
<i>Samythella elongata</i>	0	0	0	0	0	0	0	0	0	0
<i>Scalibregma inflatum</i>	0	1	19	1	0	1	9	2	1	0
<i>Scoletoma fragilis</i>	0	0	0	0	0	1	4	5	3	0
<i>Scoletoma verrilli</i>	0	0	0	0	0	0	0	1	0	0
<i>Scoloplos acmeceps</i>	0	0	0	0	0	0	0	0	0	0
<i>Scoloplos rubra</i>	0	0	1	0	0	0	0	0	1	0
<i>Sigalion arenicola</i>	0	0	0	0	0	1	0	0	0	0
<i>Sigambra tentaculata</i>	1	0	0	0	0	0	0	0	0	0
Sphaerodoridae sp.	0	0	0	0	0	0	0	0	0	0
<i>Sphaerosyllis taylori</i>	0	0	0	0	0	0	0	0	0	0
<i>Spio filicornis</i>	0	0	0	0	0	0	16	0	0	0
<i>Spiochaetopterus oculatus</i>	1	1	0	0	0	0	0	0	0	0
Spionidae sp.	0	0	0	0	0	0	0	0	0	0

	Sample #	GS-REF-001	GS-REF-002	GS-REF-003	GS-REF-004	GS-REF-005	GS-REF-006	GS-REF-007	GS-REF-008	GS-REF-009
	Collection Time	19:40	1:42	13:28	6:20	1:10	21:55	1:25	2:00	2:40
	Collection Date	19 June	20 June	19 June	18 June	18 June	17 June	17 June	17 June	17 June
	<i>Spiophanes bombyx</i>	8	9	0	0	0	1	268	25	139
	<i>Sthenelais limicola</i>	0	0	0	0	0	0	0	0	2
	<i>Streblospio benedicti</i>	6	38	7	0	0	0	0	0	0
	<i>Streptosyllis websteri</i>	0	0	0	0	0	1	0	0	0
	<i>Syllis cornuta</i>	0	0	0	0	0	0	0	0	1
	Terebellidae sp.	0	0	0	10	0	0	0	0	0
	<i>Tharyx acutus</i>	0	0	0	0	0	0	0	0	0
	<i>Tharyx</i> sp. A sensu MWRA, 2007	0	6	0	0	0	0	0	6	0
	<i>Travisia forbesii</i>	0	0	0	3	1	0	0	0	0
	<i>Travisia</i> sp.	0	0	0	0	0	0	0	0	0
<b>Sipuncula</b>	<i>Golfingia margaritacea</i>	0	0	0	0	0	0	0	0	0
<b>Mollusca-Bivalvia</b>	<i>Abra lioica</i>	0	0	0	0	0	0	0	0	0
	<i>Abra longicallus</i>	1	0	0	0	2	1	29	7	49
	<i>Abra</i> sp.	0	0	0	0	0	0	0	0	0
	Bivalvia spp.	0	0	0	0	0	1	2	1	0
	<i>Corbula contracta</i>	0	0	0	0	0	0	0	0	0
	<i>Crassinella lunulata</i>	0	0	0	2	0	0	0	0	0
	<i>Crenella decussata</i>	0	0	0	7	0	0	0	0	0
	<i>Divalinga quadrisulcata</i>	0	0	0	0	0	0	0	0	0
	<i>Ensis directus</i>	0	0	0	0	0	0	0	0	0
	<i>Ensis</i> sp.	27	0	10	1	7	2	4	3	6
	<i>Lucinoma filosa</i>	0	0	0	0	0	0	0	1	1
	<i>Lyonsia hyalinata</i>	0	0	0	1	0	1	0	0	0
	<i>Macoma calcarea</i>	0	0	0	0	0	0	0	0	0
	<i>Mysella planulata</i>	0	0	0	0	0	0	0	0	0
	Mytilidae sp.	0	0	0	0	0	0	0	0	0
	<i>Nucula proxima</i>	0	0	0	0	0	0	0	0	1
	<i>Nucula</i> sp.	0	0	0	0	0	0	1	0	0
	<i>Pandora bushiana</i>	0	0	0	0	0	0	0	0	0
	<i>Parvicardium pinnulatum</i>	0	0	0	0	0	0	5	1	3
	Pectinidae sp.	0	0	0	0	0	0	0	1	0
	<i>Periploma</i> sp.	0	0	0	0	0	0	0	0	0
	<i>Pitar morrhuanus</i>	0	1	0	0	0	0	0	4	12
	<i>Siliqua costata</i>	0	0	0	0	0	0	0	0	0
	<i>Tellina</i> sp.	0	0	0	0	0	0	0	1	0
	<i>Tellina versicolor</i>	9	16	6	0	0	6	8	0	1
	Veneridae sp.	0	0	0	0	0	0	0	1	0
	<i>Yoldia limatula</i>	0	0	0	0	0	0	0	0	0
	<i>Yoldia</i> sp.	0	0	0	0	0	0	0	0	0
<b>Mollusca-Gastropoda</b>	<i>Busycotypus canaliculatus</i>	0	1	0	0	0	0	0	0	0
	<i>Caecum johnsoni</i>	0	0	0	3	0	0	0	0	0
	<i>Crepidula convexa</i>	0	0	0	0	0	0	0	0	0
	<i>Crepidula fornicata</i>	0	0	0	0	0	0	0	0	0
	<i>Euspira immaculata</i>	1	0	0	0	0	0	0	0	0
	Gastropoda sp.	0	0	0	0	0	0	0	0	0
	<i>Haminoea solitaria</i>	0	0	0	0	0	0	0	0	1
	Marginellidae sp.	0	0	0	0	0	0	0	0	0
	<i>Nassarius trivittatus</i>	0	0	7	1	4	2	8	12	22
	Naticidae sp.	0	0	0	0	0	0	0	0	0

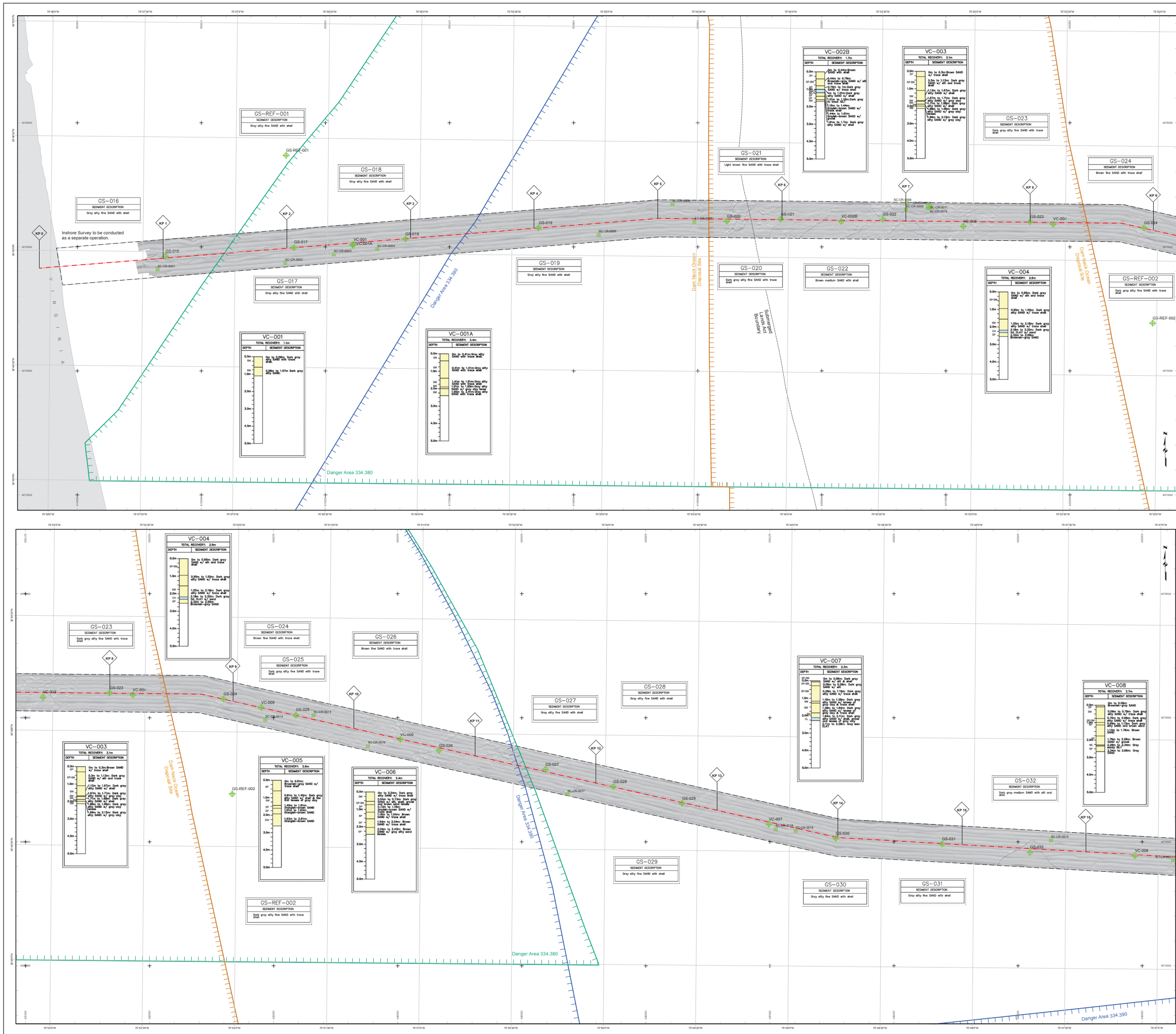
	Sample #	GS-REF-001	GS-REF-002	GS-REF-003	GS-REF-004	GS-REF-005	GS-REF-006	GS-REF-007	GS-REF-008	GS-REF-009
	Collection Time	19:40	1:42	13:28	6:20	1:10	21:55	1:25	2:00	2:40
	Collection Date	19 June	20 June	19 June	18 June	18 June	17 June	17 June	17 June	17 June
	Neogastropoda sp.	0	1	0	0	0	0	0	0	0
	<i>Neverita duplicata</i>	0	0	0	0	0	0	0	0	0
	Nudibranchia sp.	0	0	0	0	0	0	0	0	1
	Rissoidae sp.	0	0	0	0	0	0	0	0	0
	<i>Tectonatica pusilla</i>	0	0	0	0	0	0	0	1	0
	<i>Turbonilla</i> sp.	2	2	1	0	2	0	0	5	5
	Turridae sp.	1	4	0	0	0	0	0	0	0
<b>Crustacea-Amphipoda</b>	<i>Acanthohaustorius intermedius</i>	0	0	0	0	0	0	0	0	0
	<i>Acanthohaustorius millsii</i>	0	0	0	0	29	0	0	0	0
	<i>Acanthohaustorius shoemakeri</i>	0	0	0	0	0	3	0	0	0
	<i>Americhelidium americanum</i>	2	0	0	0	1	0	0	0	0
	<i>Ampelisca</i> sp.	0	0	0	0	0	0	0	0	0
	<i>Ampelisca vadorum</i>	0	0	0	0	0	0	1	0	0
	<i>Ampelisca verrilli</i>	0	2	4	0	0	0	1	7	7
	<i>Amphipoda</i> sp.	0	0	0	0	0	0	0	0	0
	<i>Apocorophium simile</i>	0	0	0	0	0	0	0	0	0
	<i>Argissa hamatipes</i>	0	0	0	0	0	1	0	0	0
	<i>Bathyporeia parkeri</i>	0	0	0	0	2	3	0	0	0
	<i>Bathyporeia quoddyensis</i>	0	0	0	0	0	0	0	0	0
	<i>Byblis serrata</i>	0	0	0	0	0	0	0	6	0
	<i>Byblis</i> sp.	0	0	0	0	0	2	1	0	0
	<i>Dyopodos monacanthus</i>	0	1	0	0	0	0	0	0	0
	<i>Listriella barnardi</i>	0	0	0	0	0	0	0	0	0
	<i>Metharpinia floridana</i>	0	0	0	2	8	3	0	0	1
	<i>Microprotopus</i> sp.	0	0	0	0	0	0	0	0	0
	<i>Monocorophium</i> sp.	0	0	0	0	0	0	0	0	0
	<i>Photis</i> sp.	0	0	0	0	0	0	0	0	0
	Phoxocephalidae sp.	0	0	0	0	0	0	1	0	0
	<i>Protohaustorius deichmannae</i>	0	0	0	0	0	0	0	0	0
	<i>Protohaustorius wigleyi</i>	0	0	0	0	2	17	0	0	0
	<i>Rhepoxynius epistomus</i>	9	0	0	0	4	0	0	3	0
	<i>Unciola irrorata</i>	0	2	1	0	0	0	2	0	1
	<i>Unciola serrata</i>	0	0	0	0	0	0	0	0	0
	<i>Unciola</i> sp.	0	0	0	0	0	0	0	0	0
<b>Crustacea-Cumacea</b>	Bodotriidae sp.	0	0	0	0	0	0	0	0	0
	<i>Oxyurostylis smithi</i>	0	0	0	0	0	0	0	1	0
	<i>Pseudoleptocuma minus</i>	0	0	0	2	0	0	0	0	0
<b>Crustacea-Decapoda</b>	Brachyura sp.	0	0	0	0	0	0	0	0	0
	<i>Cancer borealis</i>	0	0	0	1	0	0	0	0	0
	<i>Crangon septemspinosa</i>	0	0	0	0	0	0	2	0	0
	<i>Euceramus praelongus</i>	0	0	0	0	0	0	0	0	0
	<i>Lepidopa websteri</i>	0	0	0	0	0	0	0	0	0
	<i>Pagurus politus</i>	0	0	1	0	1	0	1	0	4
	<i>Pinnixa chaetoptera</i>	0	0	0	0	0	0	0	0	0
	<i>Pinnixa cylindrica</i>	0	0	0	0	0	0	0	0	0
<b>Crustacea-Isopoda</b>	<i>Amakusanthura magnifica</i>	0	0	0	2	0	0	0	0	0
	<i>Ancinus depressus</i>	0	0	0	0	0	0	0	0	0
	<i>Chiridotea arenicola</i>	0	0	0	0	0	0	0	0	0
	<i>Edotea montosa</i>	0	0	0	0	0	1	13	1	6

	Sample #	GS-REF-001	GS-REF-002	GS-REF-003	GS-REF-004	GS-REF-05	GS-REF-06	GS-REF-007	GS-REF-008	GS-REF-009
	Collection Time	19:40	1:42	13:28	6:20	1:10	21:55	1:25	2:00	2:40
	Collection Date	19 June	20 June	19 June	18 June	18 June	17 June	17 June	17 June	17 June
	Flabellifera sp.	0	0	0	0	0	0	0	0	0
	<i>Politolana polita</i>	0	0	0	0	0	0	0	0	0
<b>Crustacea-Mysidacea</b>	<i>Neomysis americana</i>	0	0	0	0	0	0	0	0	0
<b>Crustacea-Tanaidacea</b>	<i>Tanaissus psammophilus</i>	0	0	0	0	0	0	0	0	0
<b>Crustacea-Cephalocarida</b>	<i>Hutchinsoniella macracantha</i>	0	0	0	0	0	0	0	0	0
<b>Echinodermata-Echinoidea</b>	Clypeasteroida sp.	0	0	0	1	0	0	0	0	0
	Echinoida sp.	0	0	0	0	0	0	0	0	0
<b>Lophophorata</b>	Phoronida sp.	0	0	0	0	0	0	0	0	1
<b>Urochordata</b>	<i>Molgula</i> sp.	0	0	0	3	0	1	0	0	0
<b>Cephalochordata</b>	<i>Branchiostoma</i> sp.	0	0	1	104	3	0	0	0	0
<b>Hemichordata</b>	Enteropneusta sp.	0	0	0	0	0	0	0	0	0
		<b>107</b>	<b>322</b>	<b>109</b>	<b>300</b>	<b>84</b>	<b>67</b>	<b>398</b>	<b>147</b>	<b>329</b>

**Attachment C – Surface Sediments within the VOWTAP; Plate 7, Sheets 1 –  
4 from the Marine Site Characterization Survey**

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### LEGEND

- Sesbed Sample Location with reference number
- GS (Grab Sample)
- VC (Vibra Core)
- PC (Piston Core)
- Sonar Contacts
- Fine-grained sediment (SILT/CLAY)
- Coarse-grained sediment (SAND)
- Very coarse-grained sediment (GRAVEL)
- Reflectivity
- Low
- High
- Survey Centerline
- Maritime Boundaries
- Dam Neck Ocean Disposal Site
- Danger Area 334-380
- Danger Area 334-390
- Survey Corridor
- Research Lease Area

\*33 CFR 334.380 - ATLANTIC OCEAN SOUTH OF ENTRANCE TO CHESAPEAKE BAY OFF DAM NECK, VIRGINIA; NAVAL FIRING RANGE.

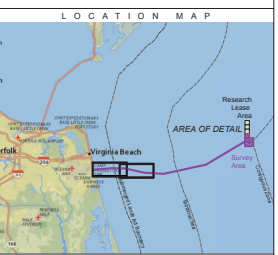
\*33 CFR 334.390 - ATLANTIC OCEAN SOUTH OF ENTRANCE TO CHESAPEAKE BAY; FIRING RANGE.

### SURVEY NOTES

Survey Dates: June 1 - June 28, 2013  
 Survey Vessel: RV Sea Lion V  
 Surface Positioning: Trimble SP5651 with MarineStar  
 Surface Positioning: DEUCE CAPS  
 Heading/Motion Sensor: Deluge PHENS 6000  
 Bathymetry Sensor: RESON Seabat 7125 SV2  
 Sidescan Sonar Sensor: EdgeTech 2000-DSS 110 kHz/540 kHz  
 Sub-bottom Profiler: EdgeTech 2000-DSS 2-16 kHz  
 Magnetometer Sensor: Marine Magnetics SeaQuest  
 Sound Speed Profilers: OceanScience LUCTD  
 Seismic System 1: AAE 300 Boomer  
 Seismic System 2: DataSonic Bubble Pulser  
 RPL Issue: CableRoute\_04222013 (DRAFT)

### GEODEIC PARAMETERS

Horizontal Datum: NAD 83  
 Projection: UTM Zone 18 North  
 Horizontal Units: Meters  
 Vertical Units: Meters  
 Vertical Datum: MLLW EPOCH 1987-2001  
 GPS L1/L2 Corrections: Marine Star



SCALE 1:10,000

0 125 250 500 750 1,000  
 Meters

0 400 800 1,600 2,400 3,200  
 Feet

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 Glen Allen, VA 23060

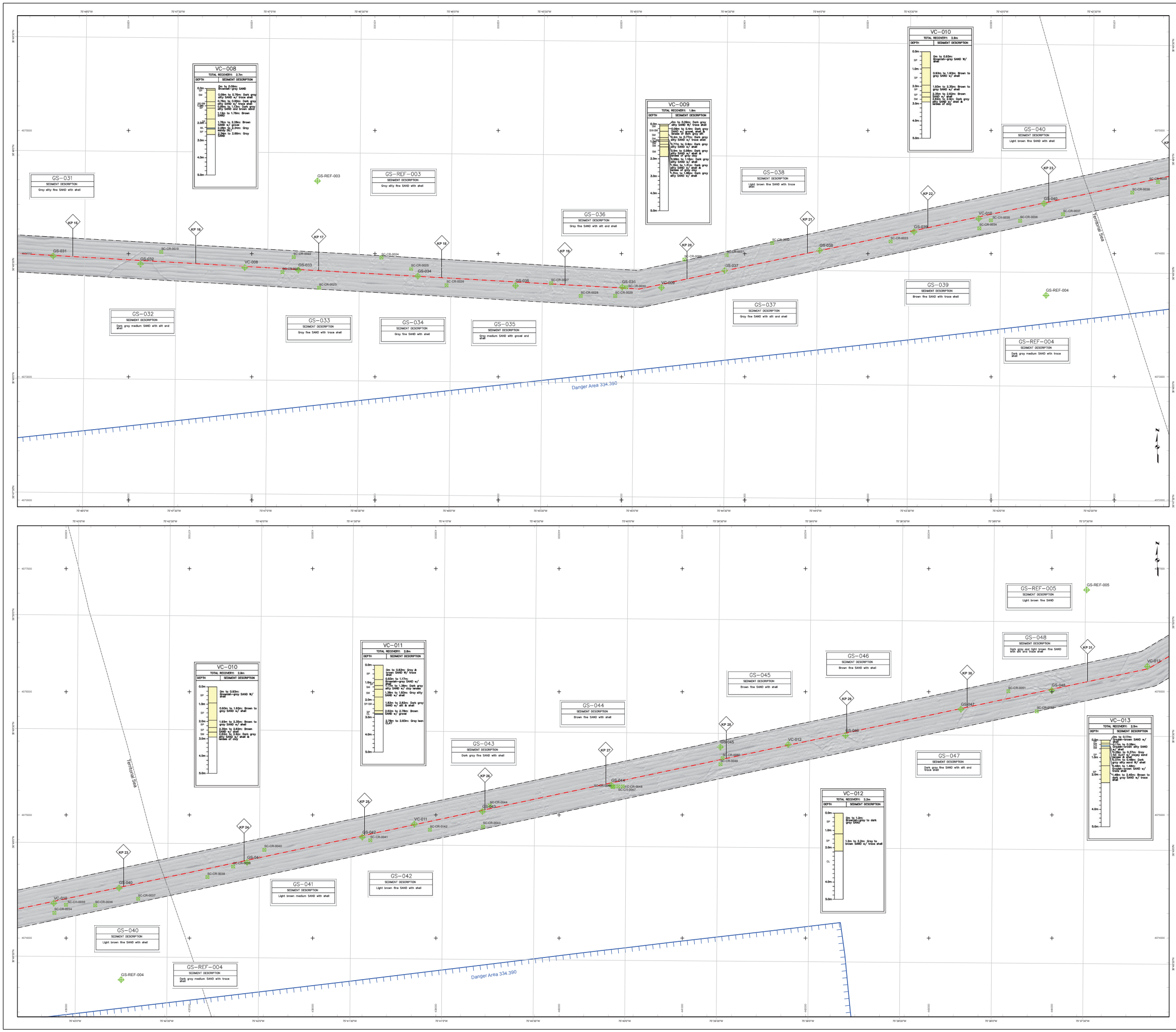
Virginia Offshore Wind Technology Advancement Project (VOWTAP)

North-Up - Sidescan Sonar

Revision No.	Date	Description	Prepared by	Checked by	Approved by
01	10/27/13	Draft	MMW	JH	BJP
02	08/11/14	Final	MMW	JH	BJP

0007 File Name: RPL\_20130601\_CableRoute\_04222013.dwg  
 Scale: 1:10,000  
 Plot Size: A3C  
 Sheet Number: 7  
 Total Sheets: 1 of 4





### LEGEND

- Sesbed Sample Location with reference number
- GS (Grab Sample)
- VC (Vibra Core)
- PC (Piston Core)
- Sonar Contacts
- Fine-grained sediment (SILT/CLAY)
- Coarse-grained sediment (SAND)
- Very coarse-grained sediment (GRAVEL)
- Reflectivity: Low, High
- Survey Centerline
- Maritime Boundaries
- Dam Neck Ocean Disposal Site
- Danger Area 334.380'
- Danger Area 334.390'
- Survey Corridor
- Research Lease Area

\*33 CFR 334.380 - ATLANTIC OCEAN SOUTH OF ENTRANCE TO CHESAPEAKE BAY OFF DAM NECK, VIRGINIA; NAVAL FIRING RANGE.

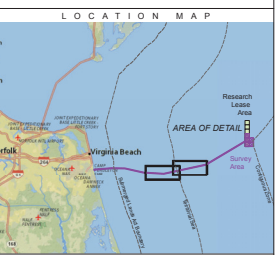
\*33 CFR 334.390 - ATLANTIC OCEAN SOUTH OF ENTRANCE TO CHESAPEAKE BAY; FIRING RANGE.

### SURVEY NOTES

Survey Dates: June 1 - June 28, 2013  
 Survey Vessel: RV Sea Lion V  
 Surface Positioning: Trimble SP5651 with MarineStar  
 Surface Positioning: DEUCE CAPS  
 Heading/Motion Sensor: DEUCE PHINS 6000  
 Bathymetry Sensor: RESON Seabat 7125 SV2  
 Sidescan Sonar Sensor: EdgeTech 2000-DSS 110 kHz/540 kHz  
 Sub-bottom Profiler: EdgeTech 2000-DSS 2-16 kHz  
 Magnetometer Sensor: Marine Magnetics SeaQuest  
 Sound Speed Profilers: OceanScience LCTD  
 Seismic System 1: AAE 300 Boomer  
 Seismic System 2: Datasonic Bubble Pulser  
 RPL Issue: CableRoute\_04222013 (DRAFT)

### GEODEIC PARAMETERS

Horizontal Datum: NAD 83  
 Projection: UTM Zone 18 North  
 Horizontal Units: Meters  
 Vertical Units: Meters  
 Vertical Datum: MLLW EPOCH 1987-2001  
 GPS L1/L2 Corrections: Marine Star



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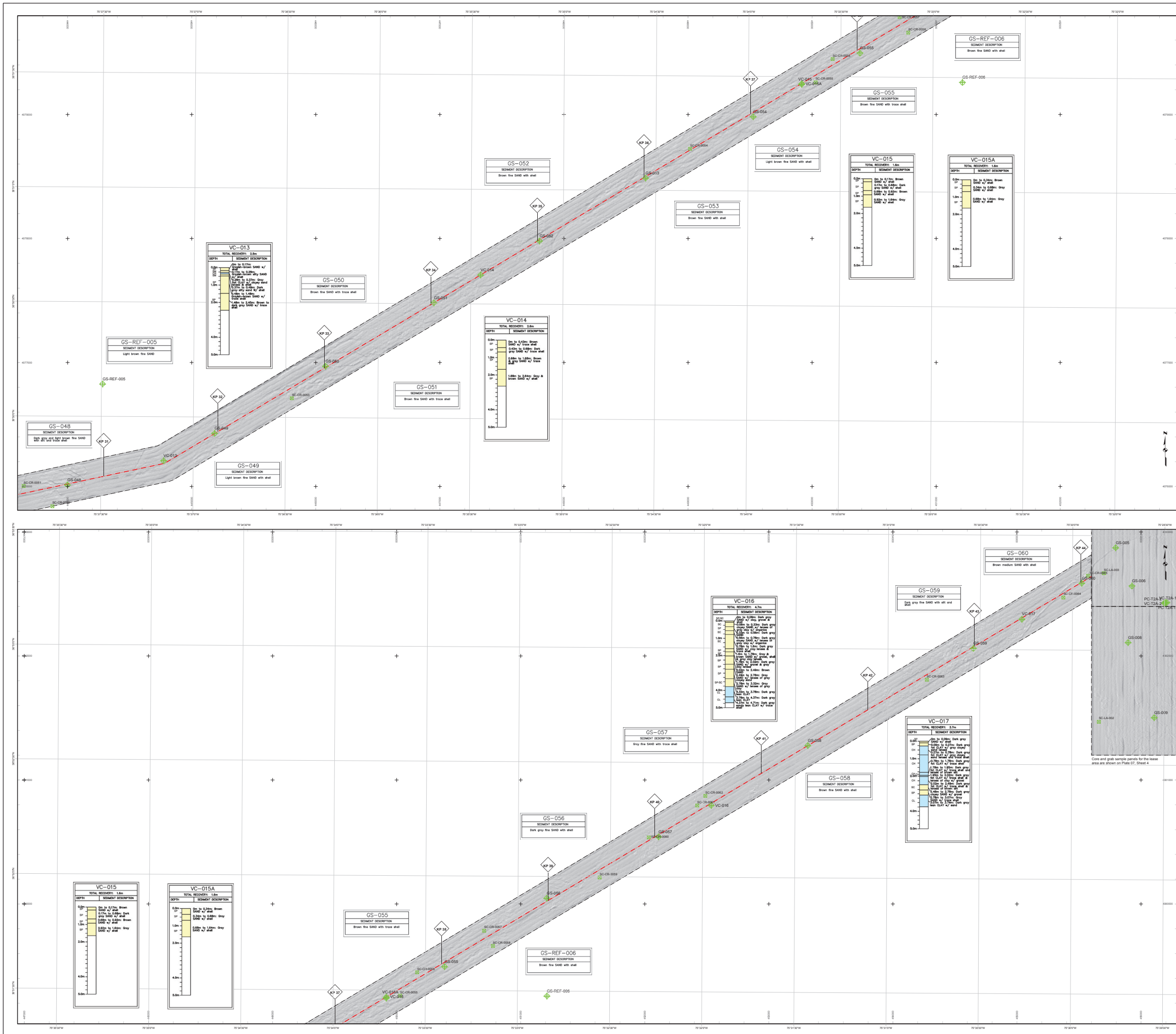
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 4101 Cox Road, Suite 120  
 Glen Allen, VA 23060  
 www.tetratech.com

Virginia Offshore Wind Technology Advancement Project (VOWTAP)

North-Up - Sidescan Sonar

Revision No.	Date	Description	Prepared by	Checked by	Approved by
01	10/27/13	Draw	MMW	JH	BJP
02	08/11/14	Final	MMW	JH	BJP

0007 File Name: RFP\_201306\_Consulting\_Consulting\_Consulting  
 Scale: 1:10000  
 Date: 7/2/14  
 Sheet Number: 2 of 4



### LEGEND

- Sabbed Sample Location with reference number
- GS (Grab Sample)
- VC (Vibra Core)
- PC (Piston Core)
- Sonar Contacts
- Fine-grained sediment (SILT/CLAY)
- Coarse-grained sediment (SAND)
- Very coarse-grained sediment (GRAVEL)
- Reflectivity: Low to High
- Survey Centerline
- Maritime Boundaries
- Dam Neck Ocean Disposal Site
- Danger Area 334.380'
- Danger Area 334.390'
- Survey Corridor
- Research Lease Area

\*33 CFR 334.380 - ATLANTIC OCEAN SOUTH OF ENTRANCE TO CHESAPEAKE BAY OFF DAM NECK, VIRGINIA; NAVAL FIRING RANGE.

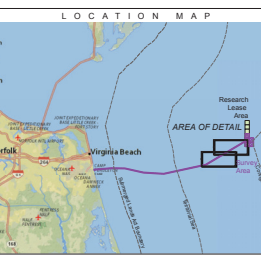
\*33 CFR 334.390 - ATLANTIC OCEAN SOUTH OF ENTRANCE TO CHESAPEAKE BAY; FIRING RANGE.

### SURVEY NOTES

Survey Dates: June 1 - June 28, 2013  
 Survey Vessel: RV Sea Lion V  
 Surface Positioning: Trimble SP5651 with MarineStar  
 Sound Surface Positioning: DEUCE CARS  
 Heading/Motion Sensor: Blue PHINS 6000  
 Bathymetry Sensor: RESON Seabat 7125 SV2  
 Sidescan Sonar Sensor: EdgeTech 2000-DSS 110 kHz/540 kHz  
 Sub-bottom Profiler: EdgeTech 2000-DSS 2-16 kHz  
 Magnetometer Sensor: Marine Magnetics SeaQuest  
 Sound Speed Profilers: OceanScience LUCTD  
 Seismic System 1: AAE 300 Boomer  
 Seismic System 2: Datasonics Bubble Pulser  
 RPL Issue: CableRoute\_04222013 (DRAFT)

### GEODETTIC PARAMETERS

Horizontal Datum: NAD 83  
 Projection: UTM Zone 18 North  
 Horizontal Units: Meters  
 Vertical Units: Meters  
 Vertical Datum: MLLW EPOCH 1987-2001  
 GPS L1/L2 Corrections: Marine Star



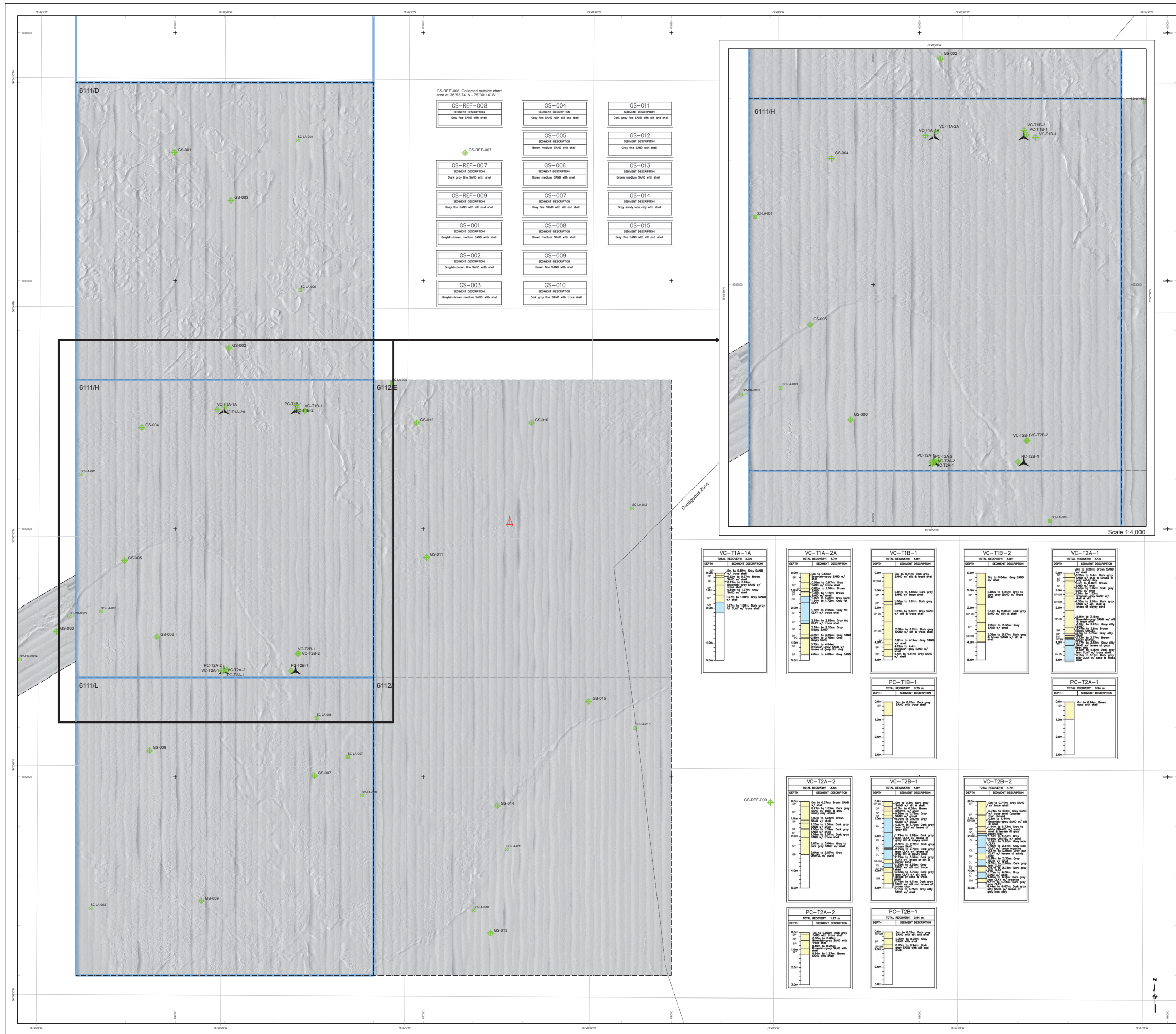
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 Glen Allen, VA 23060

Tetra Tech, Inc.  
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 Glen Allen, VA 23060

Virginia Offshore Wind Technology Advancement Project (VOWTAP)

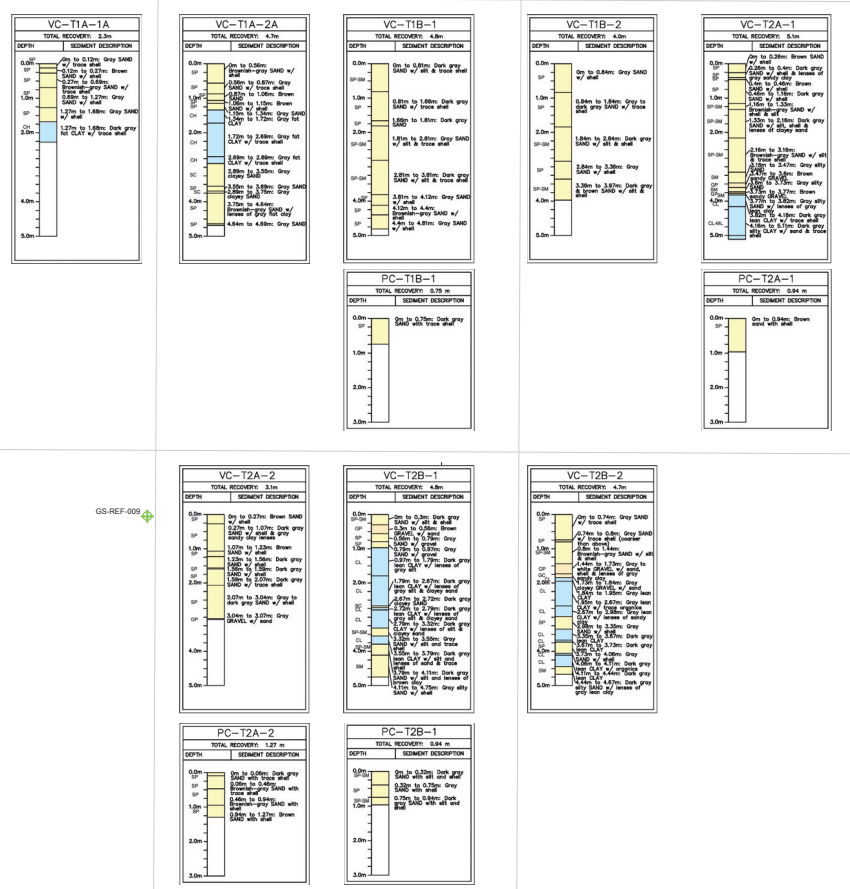
Revision No.	Date	Description	Prepared by	Checked by	Approved by
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02	08/11/14	Final	MMW	JH	BJP

0007 File Name: RCP\_20130601\_Cross\_Correlations\_Cat1.mxd  
 Scale: 1:10,000  
 Date: 8/11/14  
 Page: 7  
 Sheet Number: 3 of 4



GS-REF-008 Collected outside chart area at 30°53.74' N - 75°36.14' W

<b>GS-REF-008</b> SEMENT DESCRIPTION Gray fine SAND with shell	<b>GS-004</b> SEMENT DESCRIPTION Gray fine SAND with shell	<b>GS-011</b> SEMENT DESCRIPTION Dark gray fine SAND with shell
<b>GS-REF-007</b> SEMENT DESCRIPTION Dark gray fine SAND with shell	<b>GS-005</b> SEMENT DESCRIPTION Brown medium SAND with shell	<b>GS-012</b> SEMENT DESCRIPTION Gray fine SAND with shell
<b>GS-REF-009</b> SEMENT DESCRIPTION Gray fine SAND with shell	<b>GS-006</b> SEMENT DESCRIPTION Brown medium SAND with shell	<b>GS-013</b> SEMENT DESCRIPTION Brown medium SAND with shell
<b>GS-001</b> SEMENT DESCRIPTION Drab-brown medium SAND with shell	<b>GS-007</b> SEMENT DESCRIPTION Gray fine SAND with shell	<b>GS-014</b> SEMENT DESCRIPTION Gray sandy tan clay with shell
<b>GS-002</b> SEMENT DESCRIPTION Drab-brown fine SAND with shell	<b>GS-008</b> SEMENT DESCRIPTION Brown medium SAND with shell	<b>GS-015</b> SEMENT DESCRIPTION Dark gray fine SAND with shell
<b>GS-003</b> SEMENT DESCRIPTION Drab-brown medium SAND with shell	<b>GS-009</b> SEMENT DESCRIPTION Brown fine SAND with shell	
	<b>GS-010</b> SEMENT DESCRIPTION Dark gray fine SAND with shell	



### LEGEND

- Preliminary Turbine Sites
- Busy Avoided 06/05/13 per Survey Log
- Seabed Sample Location with reference number
  - GS (Grab Sample)
  - VC (Vibra Core)
  - PC (Piston Core)
- Sonar Contacts
- Fine-grained sediment (SILT/CLAY)
- Coarse-grained sediment (SAND)
- Very coarse-grained sediment (GRAVEL)
- Reflectivity
  - Low
  - High
- Maritime Boundaries
- Survey Corridor
- Research Lease Area

#### SURVEY NOTES

Survey dates: June 1 - June 28, 2013  
 Survey Vessel: RV Sea Lion V  
 Surface Positioning: Trimble SP5651 with MarineStar  
 Sounding Positioning: DEUCE CARS  
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 Sidescan Sonar Sensor: EdgeTech 2000-DSS 110 kHz/540 kHz  
 Sub-bottom Profiler: EdgeTech 2000-DSS 2-16 kHz  
 Magnetometer Sensor: Marine Magnetics SeaQuest  
 Sound Speed Profilers: OceanScience LCTD  
 Seismic System 1: AEC 300 Boomer  
 Seismic System 2: Datasonics Bubble Pulser  
 RPL Issue: CableRoute\_04222013 (DRAFT)

#### GEODETIC PARAMETERS

Horizontal Datum: NAD 83  
 Projection: UTM Zone 18 North  
 Horizontal Units: Meters  
 Vertical Units: Meters  
 Vertical Datum: MLLW EPOCH 1987-2001  
 GPS L1/L2 Corrections: Marine Star



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01	10/07/13	Draw	MMW	JH	BJP
02	08/11/14	Final	MMW	JH	BJP

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 Date: 11/05/14  
 Page: 7  
 Sheet Number: 4 of 4