INTERNAL

Benthic Habitat Mapping to Support Essential Fish Habitat Consultation Revolution Wind Offshore Wind Farm

Prepared for:

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LIST OF ACRONYMS

BOEM	Bureau of Ocean Energy Management
CMECS	Coastal and Marine Ecological Classification Standard
COP	Construction and Operations Plan
EFH	Essential fish habitat
FGDC	Federal Geographic Data Committee
Fugro	Fugro USA Marine, Inc.
GIS	Geographic Information System
HAPC	Habitat Area of Particular Concern
HDD	Horizontal directional drilling
IAC	Inter-Array Cable
INSPIRE	INSPIRE Environmental, LLC
kya	thousand years ago
MBES	Multibeam echosounder
mmu	Minimum mapping unit
NOAA	National Oceanic and Atmospheric Administration
NOAA Habitat	NOAA National Marine Fisheries Greater Atlantic Regional Fisheries Office Habitat Conservation and Ecosystem Services Division
OCS	Outer continental shelf
OSS	Offshore Substation
PV	Plan View
RIMA WEA	Rhode Island Massachusetts Wind Energy Area
RWEC	Revolution Wind Farm Export Cable
RWEC–RI	Revolution Wind Farm Export Cable in Rhode Island state waters
RWEC–OCS	Revolution Wind Farm Export Cable traversing federal waters
RWF	Revolution Wind Farm
SAV	Submerged aquatic vegetation
SPI	Sediment Profile Imaging
SSS	Side-scan sonar
TOY	Time of year
YOY	Young-of-the-year

GLOSSARY

Revolution Wind & Environmental Permitting: Key Terms & Abbreviations

Term	Definition
Benthic Habitat Classification	Benthic habitat classifications with a minimum mapping unit of 2,000 m^2, prepared by INSPIRE
Boulder picks	Isolated boulders, outside boulder field; Boulders >= 50 cm (0.5 m) identified from geophysical data
Coastal and Marine Ecological Classification System (CMECS)	Federal habitat classification standard recommended by BOEM for benthic assessments and applied here using NOAA Habitat's recommended modifications (NOAA Habitat 2021)
EFH Crosswalk	The process of reviewing species with mapped EFH in the Project Area and comparing their habitat preferences with the mapped benthic habitat types described in Sections 3.1 & 3.2 to identify where EFH for those species is likely to be found
Facies	Bodies of sediment that are recognizably distinct from adjacent sediments that resulted from different depositional environments.
Foundation	The bases to which the WTGs and OSS are installed on the seabed. Monopile is the selected foundation type for the WTGs and OSSs.
Hard bottom	Stable cobbles and boulders found predominantly within Glacial Moraine A & B habitats and within Boulder Fields.
horizontal directional drilling (HDD)	Landfall of RWEC will be completed via HDD. HDD is a subsurface installation technique that will create an underground conduit through which the RWEC will be installed through the intertidal zone. The HDD methodology avoids impacts to the beach and nearshore environment.
Minimum mapping unit (mmu)	The smallest size areal seabed or habitat polygon to be mapped as a discrete entity
Modifiers	Additional descriptive terms used to provide further characterization of benthic habitat types; terms consistent with CMECS are used where feasible
NOAA Complexity Category	Indicates habitat complexity using categories of complexity as defined by NOAA Habitat for the purposes of EFH consultation. These categories include: soft bottom, complex, heterogeneous complex, and large-grained complex (large boulders). For purposes of the EFH consultation, complex habitats include submerged aquatic vegetation (SAV) and sediments with >5% gravel of any size (pebbles to boulders; CMECS Substrate of Rock, Groups of Gravelly, Gravel Mixes, and Gravels). Heterogenous complex is used for habitats with a combination of soft bottom and complex features (NOAA Habitat 2021).
Project Area	Inclusive of the areas Revolution Wind surveyed for siting the RWF in the Lease Area, the RWEC–OCS Study Area, and the RWEC–RI Study Area.

Term	Definition
Revolution Wind Farm (RWF)	Located in federal waters off the coast of Rhode Island, within the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS) #OCS-A 0486 (Lease Area). The RWF will consist of up to 100 WTGs, inter-array cables (IAC), up to two offshore substations (OSSs), and an OSS-Link Cable.
Revolution Export Cable (RWEC)	The export cable system from the RWF to the mainland electric grid interconnection includes segments in federal waters (RWEC–OCS) and segments in state waters (RWEC–RI).
Revolution Export Cable – Outer Continental Shelf (RWEC–OCS)	The submarine segment of the export cable system located on the OCS from the RWF to the 3-nautical mile (3.5-mile; 5.6-km) state boundary.
Revolution Export Cable – RI State Waters (RWEC–RI)	The submarine segment of the export cable system located within the state waters of Rhode Island to the landfall location at Quonset Point.
RWEC–OCS Study Area	The area Revolution Wind surveyed for siting the RWEC–OCS in federal waters
RWEC–RI Study Area	The area Revolution Wind surveyed for siting the RWEC–RI in state waters

EXECUTIVE SUMMARY

Revolution Wind, LLC, a 50/50 joint venture between Orsted North America Inc. and Eversource Investment LLC proposes to construct and operate the Revolution Wind Farm Project. The Project will be comprised of both offshore and onshore components, which are described in detail in Section 3 of the Construction and Operations Plan. The Revolution Wind Farm will be located in federal waters on the Outer Continental Shelf in the designated Bureau of Ocean Energy Management Renewable Energy Lease Area OCS-A 0486 and will consist of up to 100 Wind Turbine Generators connected by a network of Inter-Array Cables and up to two Offshore Substations connected by an OSS-Link Cable. The Revolution Wind Farm Export Cable will consist of up two submarine export cables generally co-located within a single corridor traversing federal waters and Rhode Island state waters to a landfall location at Quonset Point in North Kingstown, Rhode Island. Revolution Wind is committed to an indicative layout scenario with foundations sited in a uniform east-west/north-south grid with 1.15 by 1.15-mi (1 by 1-nm; 1.85 by 1.85-km) spacing that aligns with other proposed adjacent offshore wind projects in the Rhode Island - Massachusetts Wind Energy Area and the Massachusetts Wind Energy Area. To support this agreed upon spacing, a diamond shaped micro-siting allowance is provided for each foundation location.

The purpose of this report and associated data is to provide detailed information about the physical and biological characteristics and spatial composition of benthic habitats found within the Project Area (the Revolution Wind Farm and within the corridor studied for siting of the Revolution Wind Farm Export Cable collectively). These data are intended to serve as foundation data for an evaluation of benthic habitat types that may be impacted by the Project and, subsequently, the demersal species with essential fish habitat designated in the Project Area that may be impacted by Project-related disturbances to these seafloor habitats. These results will be used to support the essential fish habitat consultation requested by the Bureau of Ocean Energy Management and performed by the National Oceanic and Atmospheric Administration National Marine Fisheries Greater Atlantic Regional Fisheries Office Habitat Conservation and Ecosystem Services Division (NOAA Habitat).

Revolution Wind has collected extensive geophysical and ground-truth data to support the mapping and characterization of habitats within the Project Area. The geophysical data used to support benthic habitat mapping not only meet the recommended resolution specified in BOEM's Geophysical, Geotechnical, and Geohazard Guidelines and NOAA Habitat's recommendations, but these data were collected with state-of-the-art equipment and are provided at the highest resolution possible. The benthic habitat data provided here should be viewed as the most accurate representation of the seafloor possible using the high-resolution geophysical and ground-truth data collected. In addition to mapping benthic habitats within the Project Area, INSPIRE Environmental has prepared a crosswalk of the delineated benthic habitat types to essential fish habitat for species and life stages of demersal taxa with designated essential fish habitat in the Project Area.

Seven primary benthic habitat types were mapped within the Project Area: Glacial Moraine A, Glacial Moraine B, Mixed-Size Gravel in Muddy Sand, Coarse Sediment, Sand and Muddy Sand, Mud and Sandy Mud, and Bedrock. When habitats were updated with modifiers, a total of twenty-four habitat types were mapped within the Project Area including mobile habitats characterized by ripples, discrete habitat areas with low or medium density boulder fields, and inshore habitats characterized by shell substrate or submerged aquatic vegetation.

Sand and mobile sand and coarse sediment habitats were the most prevalent habitats mapped within the Revolution Wind Farm. Clear spatial patterns in habitat composition were evident at the Revolution Wind Farm with the northern portion primarily composed of sands and muds and the central and southern portions composed of a mix of these habitats and habitats of glacial origin composed of a complex patchwork of variable sediment types and gravels, particularly boulders. Specifically, the northern portion of the Revolution Wind Farm was primarily composed of Sand and Muddy Sand with smaller areas of Mud and Sandy Mud, Coarse Sediment, and Glacial Moraine A and B habitats, and the central and southern portions of the Revolution Wind Farm were primarily composed of a mix of Sand and Muddy Sand, Coarse Sediment, Glacial Moraine A habitats, with smaller areas of Glacial Moraine B habitats. The spatial distribution of Glacial Moraine A and B habitats, as well as boulder fields, correspond well with the previously published locations of the Ronkonkoma Moraine.

The corridor studied for siting of the Revolution Wind Farm Export Cable was primarily composed of dynamic sands offshore and depositional muds within Narragansett Bay in Rhode Island State Waters. Exceptions were an area south of the Jamestown Bridge composed of living and dead shell substrate over muddy sediments and near the Revolution Wind Farm where an area of Mixed-Size Gravel in Muddy Sand with low and medium density boulder fields was mapped; this location was proximal to the modeled location of the Harbor Hill Moraine. In addition, small discrete areas of Coarse Sediment, Bedrock, Glacial Moraine A, and Glacial Moraine B habitats were present in both federal and state waters, and were mostly mapped on the edges of the studied corridor. One submerged aquatic vegetation bed was mapped near the shoreline east of the proposed landfall location.

NOAA Habitat recently provided updated habitat mapping recommendations, which request that the maximum potential acres that may be impacted by the Project be inventoried in terms of the NOAA Habitat Complexity Categories outlined in these recommendations. To provide an impact assessment of the Project Area in terms of NOAA Habitat Complexity Categories, the benthic habitats delineated by Revolution Wind and detailed here have been crosswalked to the NOAA Habitat Complexity Categories. This crosswalk was used to calculate acres of each habitat category that may be impacted by Project activities. For purposes of the essential fish habitat consultation, NOAA has defined complex habitats as submerged aquatic vegetation, shell substrate, and sediments with >5% gravel of any size.

The majority of the habitats mapped within the Revolution Wind Farm were crosswalked to the soft bottom category, approximately 20% crosswalked to the large grained complex category, and over one-quarter crosswalked to the complex category. The foundations are generally sited across the habitats present at the RWF approximately proportional to their spatial prevalence and distribution. The majority of the micro-siting diamonds within the Revolution Wind Farm (64 of 102) are located wholly within dynamic sand, mud, and mobile coarse sediments expected to recover relatively quickly from impacts related to installation of the foundations. In contrast, habitats characterized by boulder fields and diverse complex glacial moraine habitats overlap with fewer than one-third of the micro-siting diamonds. Potential impacts to habitats crosswalked to large grain complex and complex categories are likely to be minimized through layout refinement and micro-siting of foundation positions and cables. Revolution Wind will micro-site foundations within the micro-siting diamonds on a case-by-case basis to avoid significant seabed hazards such as surface and subsurface boulders and to avoid and minimize impacts to complex habitat types to the extent feasible and in consideration of other siting constraints.

Permanent and temporary impacts related to the Revolution Wind Export Cable are anticipated to occur mostly in soft bottom habitats; specifically, 66% of habitats mapped within federal waters and 85% of those mapped within Rhode Island state waters were crosswalked to the soft bottom category. The cables are sited approximately proportional to their spatial prevalence and distribution within the areas surveyed. Revolution Wind will avoid and minimize impacts to complex habitats with siting of the RWEC–OCS and RWEC–RI to the extent feasible and in consideration of other siting constraints. Revolution Wind will also utilize an horizonal directional drilling cable installation methodology, which will avoid direct impacts to documented submerged aquatic vegetation and juvenile cod Habitat Area of Particular Concern near the Project's landfall location. In addition, Revolution Wind will avoid construction in state waters during the peak SAV growing season (i.e., July 1 to September), which will further minimize potential effects due to increased turbidity and sediment deposition associated with cable installation and excavation of the HDD exit pits.

A complete crosswalk of delineated benthic habitat types to essential fish habitat for all demersal species/life stages with designated essential fish habitat in the Project Area provides detailed information to facilitate review of potential impacts to each species/life stage. Primary benthic habitat types were used for the crosswalk with additional columns for boulders, shell substrate, and submerged aquatic vegetation; habitats with modifiers were not used for the crosswalk because the level of detail supporting essential fish habitat designations is rarely available at a level that matches the detail provided by modifiers. In total, 25 benthic/demersal species and 54 life stages with designated essential fish habitat within the Project Area have been crosswalked to mapped benthic habitats: 40 life stages to Glacial Moraine A and B habitats, 35 to Mixed-Size Gravel in Muddy Sand habitats, 47 to Coarse Sediment habitats, 45 to Sand and Muddy Sand habitats, 36 to Mud and Sandy Mud habitats; and 22 to boulders, 14 to SAV habitats, and nine to Shell Substrate within any habitat type. While construction and operation activities may affect essential fish habitat for demersal/benthic life stages, these impacts are also anticipated to be temporary and minor as they will disturb a small portion of available essential fish habitat in the area. Species with a preference for sandy habitats, such as

Atlantic surfclam and ocean quahog, are more likely to experience long-term impacts to their habitats from the conversion of sand habitat into hard bottom habitat with the addition of materials used for cable and scour protection, where needed. Additionally, sessile species or species with benthic eggs such as Atlantic sea scallop, ocean pout, and winter flounder that have limited or no mobility and increased sensitivity to turbidity are likely to be injured, displaced, or experience mortality from these activities. Revolution Wind has proposed a number of environmental protection measures, including time of year restrictions, to minimize and mitigate impacts to these species.

1.0 INTRODUCTION

1.1 Revolution Wind Project Overview and Layout

Revolution Wind, LLC (Revolution Wind), a 50/50 joint venture between Orsted North America Inc. (Orsted NA) and Eversource Investment LLC (Eversource), proposes to construct and operate the Revolution Wind Farm Project (hereinafter referred to as the Project). The wind farm portion of the Project will be located in federal waters on the Outer Continental Shelf (OCS) in the designated Bureau of Ocean Energy Management (BOEM) Renewable Energy Lease Area OCS-A 0486 (Lease Area) (Figure 1-1). The Project consists of the Revolution Wind Farm (RWF), located within the Lease Area, and the Revolution Wind Farm Export Cable (RWEC), traversing federal waters (RWEC–OCS) and Rhode Island state waters (RWEC–RI) (Figure 1-1) to a landfall location at Quonset Point in North Kingstown, Rhode Island (Figure 1-2). The Project will be comprised of both offshore and onshore components, which are described in detail in Section 3 of the Construction and Operations Plan (COP) (Revolution Wind, LLC 2021a). The offshore components are most relevant to the benthic habitat mapping assessment provided here and include (Figure 1-3):

- up to 100 Wind Turbine Generators (WTGs) connected by a network of Inter-Array Cables (IAC);
- up to two Offshore Substations (OSSs) connected by an OSS-Link Cable; and
- up to two submarine export cables (referred to as the Revolution Wind Export Cable [RWEC]), generally co-located within a single corridor.

This report provides a detailed assessment of benthic habitats that have been mapped from geophysical and benthic ground-truth data within the Project Area. The Project Area is inclusive of the areas Revolution Wind surveyed for siting the RWF in the Lease Area, the RWEC–OCS Study Area, and the RWEC–RI Study Area. The RWEC–OCS Study Area is defined as the area Revolution Wind surveyed for siting the RWEC–OCS in federal waters; and the RWEC–RI Study Area is defined as the area Revolution Wind surveyed for siting the RWEC–RI in state waters. The RWEC–OCS Study Area ranges in width from approximately 10,500 ft (3,200 m) at its widest point to approximately 1,360 ft (415 m) at its narrowest. The RWEC–RI Study Area ranges in width from approximately 10,500 ft (3,200 m) at its widest point to approximately 1,300 ft (396 m) at its narrowest. Ultimately, the RWEC route will be sited within these broader Study Areas and direct impacts will be limited to an approximate 131-foot (40-meter) -wide disturbance corridor centered on each cable.

1.2 Benthic Habitat Mapping Assessment Purpose and Objectives

The purpose of this report and associated data is to provide detailed information about the physical and biological characteristics and spatial composition of benthic habitats found within the Project Area. Revolution Wind has collected extensive geophysical data (Revolution Wind, LLC 2021b) and ground-truth data (Attachments A and B) to support the mapping and characterization of habitats within the Project Area. In addition to mapping benthic habitats within the Study Area, INSPIRE has prepared a crosswalk of the delineated benthic habitat types to EFH for species and life stages of demersal taxa with designated EFH in the Project Area (Attachment C).

This report and data are provided to support the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Greater Atlantic Regional Fisheries Office Habitat Conservation and Ecosystem Services Division (NOAA Habitat) in conducting a thorough and complete essential fish habitat (EFH) consultation for the Project. NOAA Habitat developed recommendations for mapping benthic habitats to facilitate EFH consultations (May 2020) in conjunction with BOEM, and BOEM released the recommendations as a supplement to the BOEM Benthic Survey Guidelines (2019). NOAA Habitat recently (March 2021) provided a new version of these habitat mapping recommendations (NOAA Habitat 2021). The updated NOAA Habitat Complexity Categories outlined in these new recommendations have been used to inform discussion of potential Project impacts to benthic habitats.

The geophysical data used to support benthic habitat mapping not only meet the recommended resolution specified in BOEM's Geophysical, Geotechnical, and Geohazard Guidelines (BOEM 2020a) and NOAA Habitat's recommendations (NOAA Habitat 2021), but these data were collected with state-of-the-art equipment and are provided at the highest resolution possible. INSPIRE used these geophysical and ground-truth data to further delineate and refine geological seabed interpretations prepared for the Revolution Wind Marine Site Investigation Report (Revolution Wind LLC 2021b) into a detailed benthic habitat map for the Project Area. The benthic habitat data provided here should be viewed as the most accurate representation of the seafloor possible using the high-resolution geophysical and ground-truth data collected.

Acreage of benthic habitat that may be impacted by construction and installation of each component of the Project (e.g., foundations, cables) are provided in Section 4.0. Formal EFH consultation for the Project is anticipated to be initiated in Summer 2022.

2.0 INPUT DATA AND APPROACH

Multiple sources of geophysical and ground-truth data were used as input data sources for mapping benthic habitats within the Project Area. Brief summaries of these data sources and details pertinent to their use in the habitat mapping process are described here. Full details of geophysical and ground-truth data collection, processing, and analysis are provided in the Marine Site Investigation Report (Revolution Wind, LLC 2021b) and benthic assessment report (Revolution Wind, LLC 2021c) appended to the Revolution Wind COP (Revolution Wind, LLC 2021a).

2.1 Input Data

2.1.1 Geophysical Data

To support Revolution Wind Site Investigations, Fugro USA Marine, Inc. (Fugro) conducted high-resolution multibeam echosounder (MBES) and side-scan sonar (SSS) surveys within the Project Area (Revolution Wind, LLC 2021b). MBES and SSS are collected using different instruments deployed from the same survey vessel (Figure 2-1). The MBES is mounted to the vessel and provides the highest degree of positional accuracy; the MBES can be optimized for either bathymetric or backscatter data, but not for both. The geophysical surveys conducted for offshore wind development are designed to support engineering and construction design and, therefore, the MBES was optimized for bathymetric data, and backscatter data were collected as an ancillary data product.

Bathymetric data were derived from the MBES and processed to a resolution of 50 cm (Revolution Wind, LLC 2021b). Bathymetric data provide information on depth and seafloor topography (Figures 2-2 and 2-3). Bathymetric data were used to create a model of seafloor slope for the Project Area with a cell size of 3 m (Figures 2-4 and 2-5).

Backscatter data were derived from the MBES and processed to a resolution of 25 cm (Revolution Wind, LLC 2021b). Backscatter data are based on the strength of the acoustic return to the instrument and provide information on seafloor sediment composition and texture and are best interpreted in concert with hill-shaded bathymetry (Figures 2-6 and 2-7). Backscatter returns are relative (see below) and referred to in terms of low, medium, and high reflectance rather than absolute decibel values. Nominally, softer, fine-grained sediments absorb more of the acoustic signal and a weaker signal is returned to the MBES. Although backscatter data provide valuable information about sediment grain size, decibel values reflect not only sediment grain size, but also compaction, water content, and texture (Lurton and Lamarche 2015). For example, sand that is hard-packed and sand that has prominent ripples may have higher acoustic returns than sediments of similar grain size that do not exhibit compaction or ripples.

Backscatter decibel values are also influenced by water temperature and salinity, sensor settings, seafloor rugosity, and MBES operating frequency, among others (Lurton and Lamarche 2015; Brown et al. 2019). Differences in backscatter decibel values can also occur when data have been collected over a very large survey area under dynamic conditions, with different instruments, and in different years. This scenario is common and does not nullify the data; methods to optimize processing (as appropriate to the sensors) and to display the data optimal for interpretation are well developed (Lurton and Lamarche 2015; Schimel et al. 2018). Backscatter data products vary based on processing (Lucieer et al. 2017) and data display procedures. Mapping of seafloor composition and habitats, while greatly aided by backscatter data, rarely relies solely on these data (see Table 1 in Brown et al. 2011). The manner in which the suite of data collected were used for habitat delineations is described further in Section 2.2.

SSS data were generated from a towed instrument (Figure 2-1) and, thus, have a lower positional accuracy than MBES data. However, because the SSS is closer to the seafloor with a lower angle of incidence, the resolution, signal to noise ratio, and intensity contrast of SSS images are higher than those of MBES backscatter images (Lurton and Jackson 2008). The processed SSS images provide the highest resolution data on sediment textures and objects on the seafloor (boulders, debris) (Figure 2-8). Thermoclines and haline variations affect the acoustic signal and result in data artifacts, presenting as sinuous rippling of alternating low and high returns that cannot be removed from the data; they are visible when viewed at very close range. SSS data were processed to a resolution of 10 cm; this resolution permits detection of boulders but does not permit the reliable detection of individual cobbles (6.4 cm to 25.6 cm). Although individual small boulders and cobbles cannot be detected in 10-cm resolution SSS, SSS textures and patterns can indicate the presence or absence of higher densities of these features.

An artificial intelligence algorithm paired with a manual review step was used to aggregate boulders into boulder fields where they were present in low (20 – 99 per 10,000 m^2), medium (100 – 199 per 10,000 m^2) and high (>199 per 10,000 m^2) densities. (Revolution Wind, LLC 2021b). These density values were set by the Revolution Wind Site Investigations team; boulder fields are defined as a geoform by the federal Coastal and Ecological Marine Classification Standard (CMECS; FGDC 2012), however no density values are provided. Isolated individual boulders greater than or equal to 50 cm (0.5 m) in diameter outside the boulder fields were identified from the MBES and SSS data using automatic and manual detection methods to generate a "boulder pick" data set to accompany the boulder field dataset (Figure 2-9). In addition to individual boulders, other solitary objects (known as "contacts" in geophysical survey terminology), such as various types of debris were identified in this manner. A combination of these geophysical data was used to detect large- and small-scale bedforms, such as mega-ripples and ripples (*sensu* BOEM 2020a) (Figure 2-10).

2.1.2 Ground-Truth Data

Sediment profile and plan view images (SPI/PV; Figure 2-11) were collected at 240 stations within the RWF (Figure 2-12), 19 stations along the RWEC–OCS Study Area, and 34 stations along the RWEC–RI Study Area in July 2019 (Figure 2-13). Stations sampled with the RWF include eight stations surveyed to support the benthic assessment for the South Fork Wind Farm. Summarized data results are presented in Attachment A. SPI/PV images were used to ground-truth sediment types, bedform dynamics, presence of sensitive habitats and taxa, and to characterize benthic biological communities. SPI/PV images were analyzed for a suite of variables (Table 2-1) and were classified using CMECS Substrate and Biotic components (Tables 2-2, 2-3, and 2-4). CMECS Substrate Group/Subgroup was particularly useful as ground-truth data for purposes of delineating seafloor sediments and benthic habitats (Figure 2-14). CMECS Biotic Subclasses and Groups and notations of sessile and mobile epifauna present (Figure 2-15) were used to provide detail about the biological communities observed within each mapped habitat type. Detailed descriptions of each variable analyzed and full data analysis results can be found in the COP Benthic Assessment (Revolution Wind, LLC 2021c).

A towed video survey along 52 transect lines was conducted near the RWEC–RI landfall at Quonset Point (Figure 2-16). This survey focused on nearshore regions around the landfall where there was a higher probability of submerged aquatic vegetation (SAV) presence. Survey planning and analysis followed protocols as outlined in federal agency protocols (Colarusso and Verkade 2016) and in the RI Coastal Resources Management Council's regulations in the Coastal Resources Management Program, or "Red Book", (650-RICR-20-00-1 et seq.). Video transect data were analyzed to identify the presence or absence of SAV in each video file. Additional parameters were analyzed where SAV was present including SAV bed extent and general sediment type, in accordance with federal agency protocols (Colarusso and Verkade 2016).

Table 2-1. SPI/PV Ground-truth Parameters with Corresponding BOEM COP Requirements and Guidelines (BOEM 2019, 2020b; NOAA Habitat 2021)

BOEM COP Guidelines and *NOAA† Recommendations*	Parameters Derived from PV Images	Parameters Derived from SPI Images
Classification of CMECS sediment type Grain size analysis	CMECS Substrate Group CMECS Substrate Subgroup Gravel measurements	CMECS Substrate Subgroup Sediment type (based on grain size major mode)
Identification of distinct horizons in subsurface sediment	None	Sediment type (based on grain size major mode) Apparent Redox Potential Discontinuity (aRPD)*
Delineate hard bottom substrates	CMECS Substrate Group CMECS Substrate Subgroup	Sediment type (based on grain size major mode)
Identification of bedforms Characterization of physical hydrodynamic properties	Bedform type	Boundary roughness
Identification of rock outcrops and boulders Characterization and delineation of any hard bottom gradients of low to high relief such as coral (heads/reefs), rock or clay outcroppings, or other shelter-forming features	CMECS Substrate Group CMECS Substrate Subgroup Gravel measurements	None
Characterization of benthic habitat attributes	Gravel measurements Sediment Descriptor* Macrohabitat	aRPD* Prism penetration depth Sediment oxygen demand and proxies (methane, *Beggiatoa*)
Classification to CMECS Biotic Component to lowest taxonomic unit practicable	CMECS Dominant Biotic Subclass CMECS Co-occurring Biotic Subclass	None
Characterization of benthic community composition (identify and confirm benthic species (flora and fauna) that inhabit the area) Identification of communities of sessile and slow-moving marine invertebrates (clams, quahogs,	CMECS Dominant Biotic Subclass CMECS Co-occurring Biotic Subclass Epifauna* Sensitive taxa Attached Flora/Fauna Percent Cover* Burrows/Tubes/Tracks	Epifauna* Sensitive taxa Tubes/Voids Successional Stage*

BOEM COP Guidelines and *NOAA*† *Recommendations*	**Parameters Derived from PV Images**	**Parameters Derived from SPI Images**
mussels, polychaetes, anemones, sponges, echinoderms) *Identification of potentially sensitive seafloor habitat* *Identification of important biogenic habitats:* • *Hard bottom substrates with epifauna* • *Hard bottom substrates with macroalgae* • *Submerged aquatic vegetation (seagrass)* • *Long-lived and habitat forming taxa (e.g. emergent fauna)*	Macrohabitat	

† NOAA Habitat Recommendations are indicated by use of italicized characters and support BOEM Guidelines with further detail.

* Indicates variable that is a CMECS modifier. CMECS Modifiers provide additional detail to further characterize habitat components using a consistent set of definitions.

Table 2-2. CMECS Classification Levels Used in Analysis and Classifications for the Revolution Wind SPI/PV Survey in the RWF

CMECS Term	Scale of Classification	Classifications
	Substrate Component	
Substrate Origin	Site	Geologic Substrate
Substrate Class	SPI/PV	Unconsolidated Mineral Substrate
+Substrate Subclass	SPI/PV	**Fine Unconsolidated Substrate**; Coarse Unconsolidated Substrate
+Substrate Group	PV	**Sand or finer;** Slightly Gravelly; Gravelly; Gravel Mixes; Gravel
+Substrate Subgroup	SPI/PV	Very Fine Sand; Fine Sand; Medium Sand; Coarse Sand; Slightly Gravelly Sand; Gravelly Sand; Sandy Gravel; Granule, Cobble
	Biotic Component	
Biotic Setting	SPI/PV	Benthic/Attached Biota
Biotic Class	SPI/PV	Faunal Bed
Biotic Subclass	SPI/PV	**Soft Sediment Fauna**; Attached Fauna; Inferred Fauna
+Biotic Group	SPI/PV	**Larger Tube-Building Fauna; Larger Deep-Burrowing Fauna**; Small Tube-Building Fauna; Small Surface-Burrowing Fauna; Attached Hydroids; Mobile Crustaceans on Hard or Mixed Substrates; Diverse Colonizers; Barnacles

+ Indicates variability within the surveyed area at this level of the hierarchy.

Bold text indicates an overwhelming dominant classification across the surveyed area.

Table 2-3. CMECS Classification Levels Used in Analysis and Classifications for the Revolution Wind SPI/PV Survey in the RWEC–OCS Study Area

CMECS Term	Scale of Classification	Classifications
	Substrate Component	
Substrate Origin	Site	Geologic Substrate
Substrate Class	SPI/PV	Unconsolidated Mineral Substrate
+Substrate Subclass	SPI/PV	Fine Unconsolidated Substrate; Coarse Unconsolidated Substrate
+Substrate Group	PV	Sand or finer; Slightly Gravelly; Gravel Mixes; Gravel
+Substrate Subgroup	SPI/PV	Very Fine Sand; Fine Sand; Medium Sand; Coarse Sand; Slightly Gravelly Sand; Sandy Gravel; Pebble, Cobble
	Biotic Component	
Biotic Setting	SPI/PV	Benthic/Attached Biota
Biotic Class	SPI/PV	Faunal Bed
Biotic Subclass	SPI/PV	**Soft Sediment Fauna**; Attached Fauna; Inferred Fauna
+Biotic Group	SPI/PV	Larger Tube-Building Fauna; Larger Deep-Burrowing Fauna; **Small Tube-Building Fauna**; Attached Hydroids; Barnacles

+ Indicates variability within the surveyed area at this level of the hierarchy.
Bold text indicates an overwhelming dominant classification across the surveyed area.

Table 2-4. CMECS Classification Levels Used in Analysis and Classifications for the Revolution Wind SPI/PV Survey in the RWEC–RI Study Area

CMECS Term	Scale of Classification	Classifications
	Substrate Component	
Substrate Origin	Site	Geologic Substrate
+Substrate Class	SPI/PV	**Unconsolidated Mineral Substrate;** Shell Substrate
+Substrate Subclass	SPI/PV	**Fine Unconsolidated Substrate**; Shell Reef Substrate; Shell Hash
+Substrate Group	PV	Sand or finer; Slightly Gravelly
+Substrate Subgroup	SPI	**Very Fine Sand**; Fine Sand; Medium Sand; Coarse Sand; Slightly Gravelly Sand; Shell Hash; Crepidula Reef Substrate
	Biotic Component	
Biotic Setting	SPI/PV	Benthic/Attached Biota
+Biotic Class	SPI/PV	**Faunal Bed;** Aquatic Vegetation Bed
+Biotic Subclass	SPI/PV	**Soft Sediment Fauna**; Attached Fauna; Inferred Fauna; Benthic Macroalgae
+Biotic Group	SPI/PV	**Larger Deep-Burrowing Fauna;** Larger Tube-Building Fauna; Small Tube-Building Fauna; Tracks and Trails; Attached Hydroids; Attached Sponges; Mussel Bed; Sessile Gastropods; Tunneling Megafauna; Filamentous Algal Bed

+ Indicates variability within the surveyed area at this level of the hierarchy.

Bold text indicates an overwhelming dominant classification across the surveyed area.

2.2 Habitat Mapping Approach

Geophysical and ground-truth data were reviewed in an iterative process to delineate benthic habitats. MBES data, viewed as backscatter draped over a hillshaded bathymetric relief model, was used at a "zoomed out" scale (~1:10,000) to identify large-scale facies – areas of sedimentary characteristics (reflectance, bedform, slope) distinct from those adjacent (Figure 2-17). These initial delineations were further refined at "zoomed in" scales (~1:2,000 or finer) using the MBES data in combination with SSS, boulder picks, and ground-truth data (Figure 2-17). Delineations must be of a size appropriate both to the resolution of the data and to the subject of interpretation. For these purposes, a minimum mapping unit (mmu) is defined as "the smallest size areal entity to be mapped as a discrete entity" (Lillesand et al. 2015). Minimum mapping units, the resolution of the geophysical data, and the use the CMECS Substrate Component meet agency recommendations (NOAA Habitat 2021).

2.2.1 Geological Seabed Characterization

Revolution Wind developed information on the geological seabed to characterize the geological provenance and stratigraphic conditions of the seafloor inclusive of surface and subsurface features. Methods used to collect this information included MBES bathymetry and backscatter, SSS, sub-bottom profile, magnetometer, and seismic profile data, along with vibracores. For the purposes of defining geological seabed types present at the sediment surface, the Folk classification (Folk 1954) was used, which aligns with CMECS Substrate classifications (Figure 2-18). Seabed types present within the Project Area based solely on this scheme are Mud and Sandy Mud, Sand and Muddy Sand, Coarse Sediment, and Mixed Sediment. In addition, areas of the seabed of unconsolidated and consolidated glacial drift deposits were mapped as Glacial Moraine and exposed bedrock was mapped as such. Anthropogenic features, such as dredged material and debris from the former Jamestown Bridge were also mapped as such. The geological seabed characterization map was developed using a minimum mapping unit of 4,000 m^2.

2.2.2 Delineation of Benthic Habitat Types

Geological characterizations of seabed conditions are not strictly equivalent to benthic habitats as experienced by benthic biological communities and demersal fish. To map these habitats for the purposes of assessing the potential impacts of the Project on these biotic communities, INSPIRE refined the seabed interpretations to map benthic habitats with a minimum mapping unit of 2,000 m^2 within the Project Area. Multibeam 50-cm resolution bathymetry, 25-cm resolution backscatter, and 10-cm SSS data were examined along with boulder picks and SPI/PV data (Figure 2-19) to delineate new habitat polygons and to refine the seabed classifications for the purposes of evaluating benthic habitats (Figures 2-20 and 2-21).

Specifically, modifiers were used to provide additional descriptive information about the benthic habitats found within the Project Area; CMECS modifiers and Geoform or Substrate terms were used to the extent practicable. These modifiers include features of the seafloor that are relevant to the biota that utilize these habitats and describe the value of the habitats for these biota beyond what is provided in the geological seabed mapping. Modifiers are related to features that describe the mobility, stability, and complexity of the benthic habitats mapped. Where bedforms indicating frequent physical disturbance of the seafloor were observed, the “Mobile” modifier was used. Boulder fields mapped by Fugro were used to refine habitat boundaries and applied as modifiers, except where they overlapped with glacial habitats, as these habitats are all characterized by high densities of boulders. Shell substrate (living or non-living shells) and SAV both provide unique habitats for certain species of benthic invertebrates and demersal fish; modifiers have been applied for both.

Mixed Sediment is a broadly defined category used for the geological seabed interpretation (Figure 2-18). As defined, Mixed Sediment could include Muddy Sand with a small gravel component or a gravel pavement with a thin deposition of mud. In the process of refining seabed interpretations into well-characterized benthic habitats, those areas mapped as Mixed Sediments were examined closely and a more descriptive name (Mixed-Size Gravel in Muddy Sand) was applied.

Glacial moraine habitats do not fit neatly into the Folk or CMECS classification schemes (Figure 2-18) and modifiers were not applied to these habitats as they were to those described above. Glacial moraines are complex and heterogeneous environments with characteristic surface and subsurface features that relate to their glacial origin. The surface benthic habitats associated with glacial moraines often provide valuable habitat for sessile and mobile benthic invertebrates and for demersal fish. Glacial moraine habitats are presented as two types (A and B), in order to distinguish unconsolidated glacial moraine deposits (A) from consolidated moraine habitats that have high structural complexity and structural permanence (B).

All habitats and their distributions within the Project Area are described in more detail in Section 3.0. For the purposes of aiding interpretation and presentation of data in ground-truth tables, individual benthic habitat types with modifiers have been grouped and color-coded to consolidate types of related habitats that are present in very small areas (Table 2-5). In addition to the habitat data present on maps in this report, the geospatial data contain separate attributes to record several other features of each habitat polygon: type of bedforms observed, area, presence of scattered boulders and debris, and refinements of Coarse Sediment habitats. In addition to the natural bedforms defined in the BOEM Geophysical Survey Guidelines (2020a): mega-ripples = 5 - 60 m wavelength and 0.5 - 1.5 m height; ripples = <5 m wavelength and <0.5 m height; other bedforms such as linear depressions and trawl marks were noted where present. The presence of isolated boulders and debris identified by Fugro in the geophysical analysis (boulder picks and debris contacts) were noted as “scattered boulders and debris” in the habitat data. Additionally, further characterizations of Coarse Sediment habitat polygons were recorded as “coarse sediment refinements” to provide additional detail on the nature of coarse sediment (e.g., gravelly sand or sandy gravel) where it could be reliably determined from ground-truth and geophysical data. These refinements were only applied to polygons in which ground-truth SPI/PV stations were located. These data are available in the interactive Popup map, which was made available to BOEM and NOAA Habitat.

2.3 Benthic Habitat to EFH Crosswalk

Essential fish habitat (EFH) is implemented through the Magnuson-Stevens Fishery Conservation and Management Act. In the Mid-Atlantic and northeastern United States, the New England and Mid-Atlantic Fishery Management Councils (Councils) work with NOAA Fisheries to identify and describe EFH in published fisheries management plans. To evaluate the potential impacts to EFH for individual species/life stages resulting from activities that directly impact benthic habitats, it is important to identify which benthic habitat types fit the descriptions of habitat use for each EFH species/life stage. Therefore, a crosswalk between benthic habitat types and EFH was conducted. For the purposes of this analysis, a crosswalk is defined as the process of reviewing species with mapped EFH in the Project Area and comparing their habitat preferences with the mapped benthic habitat types described in Sections 3.1 and 3.2 to identify where EFH for those species are likely to be found. Primary benthic habitat types were used for the crosswalk with additional columns for boulders, shell substrate, and SAV (Attachment C); habitats with modifiers were not used for the crosswalk because the level of detail supporting EFH designations is rarely available at a level that matches the detail provided by modifiers. The crosswalk includes all three offshore components of the Project Area: the RWF, the RWEC–OCS Study Area, and the RWEC–RI Study Area.

EFH maps, data, and text descriptions were downloaded from the NOAA Habitat Conservation EFH Mapper, an online mapping application (NOAA Fisheries 2021a). Additional EFH source information was gathered from the Northeast Fisheries Science Center's series of "EFH source documents" that contain a compilation of available information on the distribution, abundance, and habitat requirements for each species managed by the Councils (NOAA Fisheries 2021b). EFH is defined by temperature, salinity, pH, physical structure, biotic structure, depth, and currents. While all these habitat variables are important to consider in the greater context of fisheries management, the focus for this report was to create a crosswalk among individual species EFH and mapped benthic habitats. The crosswalk focused on the mapped variables of physical structure, biotic structure, and depth. In addition, only demersal species and life stages were crosswalked for this report.

EFH data for all Council-managed species were queried using GIS software to determine where each species' EFH overlaps with the Project Area. Available EFH source information was then reviewed to determine habitat requirements for each demersal species/life stage. These requirements were then crosswalked to each of the Project Area habitats based on detailed characterizations and spatial distributions (See Sections 3.1 and 3.2) to determine if the substrate, biotic structure, and depth requirements for each species/ life stage were likely to be found within a given mapped benthic habitat type.

2.4 Calculating Potential Project Impacts to Benthic Habitats

NOAA Habitat recently provided updated habitat mapping recommendations (March 2021), which requests that the maximum potential acres that may be impacted by the Project be inventoried in terms of the NOAA Habitat Complexity Categories outlined in these recommendations. These habitat complexity categories were defined by NOAA Habitat for the purposes of EFH consultation. The NOAA Habitat Complexity Categories include soft bottom, complex, heterogeneous complex, and large-grained complex (large boulders). For purposes of the EFH consultation, NOAA has defined complex habitats as SAV and sediments with >5% cover of gravel of any size (CMECS Substrate Class Rock, CMECS Substrate Groups of Gravelly, Gravel Mixes, and Gravels, as well as Shell Substrate CMECS classifications). Heterogenous complex is used for habitats with a combination of soft bottom and complex features. To provide an impact assessment of the Study Area in terms of NOAA Habitat Complexity Categories, the benthic habitats delineated by Revolution Wind and detailed here have been crosswalked to the NOAA Habitat Complexity Categories. This crosswalk was used to calculate acres of each habitat category that may be impacted by Project activities.

Project activities with the potential to impact the seafloor during construction include installation of foundations for up to 100 WTGs and 2 OSSs, connected by a network of up to 250 km of IACs plus an OSS-Link Cable that will be a maximum of 15 km in length, and up to two export cables generally co-located within a single corridor up to 67 km long. During Operations & Maintenance, disturbance to the seafloor could result from the presence of infrastructure and temporarily anchored maintenance vessels. Over the life of the Project, the placement of foundations and scour protection will alter the seabed and associated habitat by replacing the existing seabed and habitat with hard structures that create a reefing effect, which results in colonization by assemblages of both sessile and mobile animals. Decommissioning activities will have similar impacts to the seafloor as construction.

Project activities, design parameters, and associated potential impacts through seafloor disturbance are presented in detail in the Volume I, Section 3 of the COP (Revolution Wind, LLC 2021a). Specific Project components evaluated for seafloor disturbance include:

- RWF:
  - Foundations (see Figure 2-22):
    - Up to 100 WTG monopile foundations, each with a 12-m diameter
    - 2 OSS foundations, each with a 15-m diameter
    - Scour Protection and Cable Protection System (CPS) stabilization for IACs associated with each foundation (extending in a ring around the foundation up to 30 m from the foundation center point in each direction (24-m ring around each WTG, 22.5-m ring around each OSS, the CPS stabilization would extend an additional 12 m from the edge of the scour protection and would be 12 m wide. The number of IACs per foundation will vary)
    - Seafloor preparation area for each foundation inclusive of planned permanent structures; 200-m radius from the center point of each foundation
  - IACs, including OSS-Link Cable:

    - Cable protection, where needed, 12-m width across cable centerline
    - Cable installation and seafloor preparation corridor, inclusive of and boulder clearance where needed, 40-m width across cable centerline (inclusive of area where cable protection may be placed)
    - Cable burial trials may also be performed; these trials would occur within the 40-m wide cable installation and seafloor preparation corridor
    - Support activities, such as anchoring or use of barges, may be needed to support installation. Revolution Wind anticipates using pull ahead anchoring for installation of the OSS-Link cable. For these activities Revolution Wind anticipates using a single anchor 14.8 feet by 18 feet (4.5 by 5.5 meters) in size with a maximum penetration depth of 15 feet (4.6 meters) for each anchoring event. These specifications are comparable to those for the Vryhof model STEVIN Mk3 5-metric ton anchor in medium clay (Vryhof 2018). Conservative calculations using an anchor size of 5.5 m x 5.5 m and applying the drag distance to penetration depth parameters for this model anchor in sand and medium clay substrates (Vryhof 2018) were used to calculate maximum potential impacts for a total of up to 40 anchoring events. At this time, anchoring (or a pull ahead anchor) is not anticipated during cable installation for the IAC; if needed, it will occur within the area surveyed and mapped to support the Project.

- RWEC–OCS:
  - Export cable, 2 cables generally co-located within a single corridor up to 30 km long, but typically spaced greater than 164 ft (50 m) apart where practical
    - Cable protection, where needed, 12-m width across each cable centerline
    - Cable installation and seafloor preparation area, inclusive of boulder clearance where needed, 40-m width across each cable centerline (inclusive of area where cable protection may be placed)
    - Additional preparation area for installation of up to 2 omega joints (one per cable), each up to 250m in length, within a 205-m wide corridor (165-m in addition to the standard 40-m corridor)
    - Cable burial trials within the RWEC–OCS Study Area; up to 5 trial locations (a maximum of 10 for the entire RWEC, division between federal and state waters is not yet determined and an even split is assumed), each up to 250m in length, within a 40-m wide corridor
    - Support activities, such as anchoring or use of barges, may be needed to support installation. Revolution Wind anticipates using pull ahead anchoring for installation of the RWEC-OCS. For these activities

Revolution Wind anticipates using a single anchor 14.8 feet by 18 feet (4.5 by 5.5 meters) in size with a maximum penetration depth of 15 feet (4.6 meters) for each anchoring event. These specifications are comparable to those for the Vryhof model STEVIN Mk3 5-metric ton anchor in medium clay (Vryhof 2018). Conservative calculations using an anchor size of 5.5 m x 5.5 m and applying the drag distance to penetration depth parameters for this model anchor in sand and medium clay substrates (Vryhof 2018) were used to calculate maximum potential impacts for a total of up to 150 anchoring events (75 per cable).

- RWEC–RI:
  - Export cable, 2 cables generally co-located within a single corridor up to 37 km long, but typically spaced greater than 164 ft (50 m) apart where practical
    - Cable protection, where needed, 12-m width across each cable centerline
    - Cable installation and seafloor preparation area, inclusive of boulder clearance where needed, 40-m width across each cable centerline (inclusive of area where cable protection may be placed)
    - Additional preparation area for installation of up to 2 omega joints (one per cable), each up to 250 m in length, within a 205-m wide corridor (165-m in addition to the standard 40-m corridor)
    - Cable burial trials within the RWEC–OCS Study Area; up to 5 trial locations (a maximum of 10 for the entire RWEC, division between federal and state waters is not yet determined and an even split is assumed), each up to 250 m in length, within a 40-m wide corridor
    - Support activities, such as anchoring or use of barges, may be needed to support installation. Revolution Wind anticipates using pull ahead anchoring for installation of the RWEC-RI. For these activities Revolution Wind anticipates using a single anchor 14.8 feet by 18 feet (4.5 by 5.5 meters) in size with a maximum penetration depth of 15 feet (4.6 meters) for each anchoring event. These specifications are comparable to those for the Vryhof model STEVIN Mk3 5-metric ton anchor in medium clay (Vryhof 2018). Conservative calculations using an anchor size of 5.5 m x 5.5 m and applying the drag distance to penetration depth parameters for this model anchor in sand and medium clay substrates (Vryhof 2018) were used to calculate maximum potential impacts for a total of up to 200 anchoring events (100 per cable).
  - Landfall HDD
    - Up to two HDD exit pits, each extending over approximate 0.4 acres, , including grading from the seafloor surface to the base of the pit

- Support activities, such as anchoring or use of barges, may be needed to support installation. If anchoring (or a pull ahead anchor) is necessary during cable installation it will occur within the area surveyed and mapped to support the Project.

Table 2-5. Color-coded key to Benthic Habitat Types with Modifiers and Related Groupings for Ground-truth Tables and Plot

Habitat Type	Color	Grouped Color	Grouped Habitat Type
Glacial Moraine B			Glacial Moraine
Glacial Moraine A			
Mixed-Size Gravel in Muddy Sand with Medium Density Boulder Field			Mixed-Size Gravel in Muddy Sand with Boulder Field
Mixed-Size Gravel in Muddy Sand with Low Density Boulder Field			
Mixed-Size Gravel in Muddy Sand			not grouped
Coarse Sediment with Medium Density Boulder Field			Coarse Sediment with Boulder Field
Coarse Sediment with Low Density Boulder Field			
Coarse Sediment - Mobile with Medium Density Boulder Field			
Coarse Sediment - Mobile with Low Density Boulder Field			
Coarse Sediment - Mobile			not grouped
Coarse Sediment			not grouped
Sand and Muddy Sand with Medium Density Boulder Field			Sand and Muddy Sand with Boulder Field
Sand and Muddy Sand with Low Density Boulder Field			
Sand and Muddy Sand - Mobile with Medium Density Boulder Field			
Sand and Muddy Sand - Mobile with Low Density Boulder Field			
Sand and Muddy Sand - Mobile			not grouped
Sand and Muddy Sand - Delta			not grouped
Sand and Muddy Sand			not grouped
Mud and Sandy Mud with Low Density Boulder Field			not grouped
Mud and Sandy Mud with Shell Substrate			not grouped
Mud and Sandy Mud with SAV			not grouped
Mud and Sandy Mud - Mobile			Mud and Sandy Mud
Mud and Sandy Mud			
Bedrock			not grouped
Anthropogenic			not grouped

Individual benthic habitat types with modifiers have been grouped and color-coded to consolidate types of relative habitats that are present in very small amounts within the respective project areas (RWF, RWEC–RI, or RWEC–OCS); grouped colors are also used in statistical plots and ground-truth tables.

3.0 RESULTS

3.1 Benthic Habitat Types

Seven primary benthic habitat types were mapped within the Project Area: Glacial Moraine A, Glacial Moraine B, Mixed-Size Gravel in Muddy Sand, Coarse Sediment, Sand and Muddy Sand, Mud and Sandy Mud, and Bedrock. When habitats were updated with modifiers, a total of 24 habitat types were mapped within the Project Area (15 within the RWF, 15 within the RWEC–OCS Study Area, and 16 within the RWEC–RI Study Area). In addition, Anthropogenic Features were mapped in several locations near the proposed landfall location, near the Jamestown Bridge, and in one small discrete area in the RWF. Overall descriptions of each habitat type as observed across the Project Area are provided below and descriptions of spatial distribution within the RWF, the RWEC–OCS Study Area, and the RWEC–RI, respectively, are provided in Section 3.2. Spatial distributions and characteristics of the benthic habitat types are summarized in Table 3-1 for the RWF, in Table 3-3 for the RWEC–OCS Study Area, and Table 3-5 for the RWEC–RI Study Area. CMECS Substrate and Biotic component classifications derived from SPI/PV ground-truth data at stations located within the various benthic habitats are presented in Table 3-2 for the RWF, Table 3-4 for the RWEC–OCS Study Area, and in Table 3-6 for the RWEC–RI Study Area. The color key presented in Table 2-5 is utilized in all of these tables. A range of substrate and biotic communities were present within each benthic habitat category as expected, given the differences in observation scale between geophysical data and ground-truth point samples (Tables 3-2, 3-4, and 3-6). Full data results by station are provided in Attachment A.

3.1.1 Glacial Habitats: Bedrock, Moraine A & B, & Mixed-Size Gravel in Muddy Sand

Many of the habitats within the Project Area have their origin in the region's glacial history. Glaciation results in characteristic geologic remnants indicate how glaciers sculpted the landscape and seascape. Four of the primary benthic habitat types mapped for the present assessment are direct remnants of glaciation that remain present at the seafloor surface. These habitat types are Bedrock, Glacial Moraine A, Glacial Moraine B, and Mixed-Size Gravel in Muddy Sand.

In offshore federal waters at and near the Project Area, moraine deposits related to various glacial events have been recognized. Glacial moraines are complex landforms associated with deposition of sediment carried by glaciers during advance and retreat. Typically, they consist of unstratified drift (till or diamicton) but may have a complex structure with stratified drift interbedded with till and abundant erratic boulders (Bennet and Glasser 2009). Till is characteristically composed of a poorly sorted mix of pebbles, cobbles and/or boulders within a fine-grained matrix of silt and clay. Till has a wide range of origins including supraglacial and subglacial that affect the nature of the deposits (Bennet and Glasser 2009). It displays distinctive patterns in geophysical data with a wide range of geotechnical properties depending upon the processes that formed it (O´Cofaigh et al. 2007). In southern New England, the glacial moraine landform has a topographic pattern where higher topographic areas can be formed by coarser grained sediment (e.g., cobbles and boulders) derived from patches of basal till deposited when the ice advanced across the moraine prior to retreat (Oldale and O'Hara 1984). Deposits on the surface of glacial moraine landforms can be a mix of till, stratified drift, and reworked sediments derived from the glacial deposits and subsequent marine transgression. Subsurface expressions of glaciation are present in the Project Area and are reviewed in detail in the Marine Site Investigation Report (Revolution Wind, LLC 2021b); only the surface expression of these geologic features represent benthic habitats and are of relevance to the assessment presented here.

It is generally accepted that Cox Ledge, located near the RWF, represents part of a terminal, or end, moraine of Late Wisconsinan glaciation, a complex structure of glacial-tectonic origin that may have heterogeneous patterns of seabed types (Oldale and O'Hara 1984). This terminal moraine complex is known as the Ronkonkoma Moraine and dates to 23,000 thousand years ago (kya), and another end moraine complex, the Harbor Hill Moraine, dating to ~18,000 kya is located northwest of the RWF and intersects the RWEC–OCS Study Area (Revolution Wind, LLC 2021b). Benthic habitats related to both of these moraines were mapped in offshore waters, with Glacial Moraines A and B mapped in the RWF coincident and proximal to the modeled location of the Ronkonkoma Moraine and Mixed-Size Gravel in Muddy Sand mapped proximal to the modeled location of the Harbor Hill Moraine (Figure 3-1). The physical and biological characteristics of each of these habitats is discussed below.

In state waters, Narragansett Bay and Rhode Island Sound were once both glacial lakes and Narragansett Bay is a drowned river valley that was shaped by actions of the Laurentide ice sheet during the last glacial period (~18,000 years ago). Channels cut by the ice are evident in the channels of the West and East Passages of the Bay on either side of Conanicut Island. Deglaciation and modern geological action have continued to influence the seafloor and benthic habitats found within Narragansett Bay and Rhode Island Sound. Within Rhode Island state waters, moraine and bedrock features were generally present as discrete surface outcroppings and reefs.

Glacial Moraine A, Glacial Moraine B, and Bedrock all have distinct geophysical signatures (Figure 3-2). Due to the presence of very coarse and poorly sorted sediment, the seabed of these habitat types generally exhibits high reflectance in backscatter data, and SSS data reveal distinct characteristics of each glacial habitat. Bedrock habitats consist of exposed outcroppings of bedrock, either present as solitary outcrops or in groupings of large bedrock outcrops (Figure 3-2). Glacial Moraine habitats, on the other hand, are complex habitat classification categories composed of consolidated and unconsolidated geologic debris directly deposited by glacial movement (rather than reworking from meltwaters or transgressive seas) and are limited in distribution along the outer continental shelf near New England.

A distinction was made between Glacial Moraine A and Glacial Moraine B habitats to distinguish between areas of unconsolidated geological debris (A) and consolidated geological debris (B). The surface of Glacial Moraine B deposits appeared poorly sorted and dense with very high boulder densities resulting in greater structural complexity and permanence. By comparison, the surfaces of Glacial Moraine A units have been reworked with sand and gravel deposits resulting in less structural complexity and permanence. More specifically, Glacial Moraine B habitats are characterized by marked topographic relief, highly consolidated cobble and boulder features that commonly lack loose / mobile cover sediments (Figure 3-2), and, in locations further offshore, evidence of topographic striations oriented NNW-SSE. In contrast, densities of boulders are generally lower and distribution of cobbles and boulders is more dispersed and patchy within Glacial Moraine A habitats (Figures 3-2 and 3-3). The seabed of Glacial Moraine A habitats is typically irregular and contains loose mobile sediments near/at the boulders, which can also display morphological features (ripples) (Figure 3-3). Generally, however, boulders appear chaotic with no apparent structural pattern (Figure 3-3). Because medium to high density boulder fields are typically a characteristic of both of these moraine habitats, boulder field modifiers were not applied to Glacial Moraine A and B habitat types.

Sediments sampled with SPI/PV within Glacial Moraine A and B habitat types include sand, mixed sand and gravel, small gravel, and areas with medium to high densities of cobbles and boulders (Tables 3-2 and 3-6). Ripples were also present within these habitats, with a higher percentage of habitat polygons containing ripples in the offshore waters, where glacial moraine habitats were larger than in state waters (Tables 3-1 and 3-5). Although the density of cobbles and boulders was generally high in areas designated as Glacial Moraine A, the areas of high density are rarely continuous; rather, distribution of cobbles and boulders is patchy; therefore, a high degree of heterogeneity was observed among ground-truth sampling within Glacial Moraine A and B habitat types (Tables 3-2 and 3-5). The 34 ground-truth stations sampled within Glacial Moraine A and B habitats in the RWF capture the range and heterogeneity of sediment types and biota found within these habitats (Table 3-2). Notably, the highest percent cover of Attached Fauna was Complete (90-100%) and a range of sessile and mobile epifauna were observed, including the sensitive taxa of the northern star coral (Table 3-2).

Glacial Moraine A habitats were prevalent, representing 19% of the mapped area of the RWF (Table 3-1), and Glacial Moraine B habitat type was limited in distribution in the RWF (0.2%; Table 3-1). Glacial Moraine A and B habitats were also limited in distribution in the RWEC–OCS Study Area (0.6% for Glacial Moraine A and 0.04% for Glacial Moraine B; Table 3-3) and in the RWEC–RI Study Area (1.5% for Glacial Moraine A and 0.9% for Glacial Moraine B; Table 3-5). Within Rhode Island state waters, these moraine habitats were generally present as discrete surface outcroppings and reefs. No ground-truth SPI/PV stations were sampled in Glacial Moraine A habitats and only one was sampled in Glacial Moraine B habitats (Table 3-6). At that one station, the CMECS Substrate Subgroup was Slightly Gravelly Sand and a mix of CMECS Biotic Subclasses Soft Sediment Fauna and Attached Fauna (barnacles, sponges) were observed (Table 3-4).

The Mixed-Size Gravel in Muddy Sand habitat is a unique habitat composed of gravels ranging from pebbles to boulders embedded in a muddy sand matrix (Table 3-4; Figure 3-4). The seafloor of this habitat type exhibited generally medium-high to high reflectance values in backscatter data and a mix of reflectance and textures in SSS data, with occasional ripples and linear depressions (Table 3-3; Figure 3-4). Three SPI/PV ground-truth stations were sampled within Mixed-Size Gravel in Muddy Sand habitats, all Substrate Subgroups included high percent cover of gravel components and supported Attached Fauna with a maximum coverage of Dense (70 – 90%) (Table 3-4). In addition, one very small (~0.01 acres) area of Mixed-Sized Gravel in Muddy Sand habitat was identified from aerial imagery along the shoreline west of the landfall location in Quonset Point.

3.1.2 Coarse Sediment Habitats

Coarse Sediment habitat types encompass sands with varying degrees of gravel. The Coarse Sediment – Mobile habitat type describes these sand and gravel habitats where the seafloor is subjected to small, but frequent currents and storm events and is common on the outer continental shelf. The seafloor within these habitats is characterized by distinct and regular ripples visible in the SSS data (Figure 3-5). The seafloor of these Coarse Sediment habitat types exhibited generally medium to high reflectance values in backscatter and SSS data (Figure 3-6). The Coarse Sediment – Mobile habitat type was prevalent at the RWF, representing 21% of the mapped area of the RWF (Table 3-1). Coarse Sediment and Coarse Sediment – Mobile habitats were prevalent within the RWEC–OCS Study Area representing a combined ~21% of the mapped area (12% Mobile, 9.3% Coarse Sediment; Table 3-3). Coarse Sediment habitats within the RWEC–RI Study Area were limited in distribution (<3%, Table 3-5) and were generally discrete in size, often present as depressions on the seafloor surrounded by sand (Figure 3-7); depressions were most evident in bathymetric data and the coarser nature of the sediment was evident in backscatter data. Coarse Sediment habitats with Low or Medium Density Boulder Field were limited in distribution throughout the Project Area (<6% at RWF, <2% in RWEC–OCS, <0.1% in RWEC–RI; Tables 3-1, 3-3, and 3-5). Examples of Low and Medium Density Boulder Fields are provided in Figure 3-8. In a number of cases in the offshore waters of the Project Area, ground-truth data supported a refinement of coarse sediment to Gravelly Sand (Figure 3-9) and, in fewer instances, Sandy Gravel (Figure 3-10).

Coarse Sediment habitats were well sampled by SPI/PV in the RWF with a total of 61 stations sampled (40 in Coarse Sediment – Mobile; 18 in Coarse Sediment with Boulder Fields, and three in Coarse Sediment; Table 3-2). These stations were categorized by a range of sandy and gravelly sediments with variable cover of gravel (as expected per definition, see Section 2.2) and support a variety of sessile and mobile epifauna (Table 3-2). The maximum percent cover of Attached Fauna ranged from Sparse in Coarse Sediment – Mobile habitats to Moderate and Dense in Coarse Sediment with Boulder Fields and Coarse Sediment habitats (Table 3-2). Four ground-truth SPI/PV stations sampled Coarse Sediment habitats along the RWEC, two each in the RWEC–OCS and RWEC–RI Study Areas, respectively (Tables 3-4 and 3-6). These stations were characterized by the CMECS Substrate Subgroups Fine Sand, Coarse Sand, and Slightly Gravely Sand, as well as a mix of CMECS Biotic Subclasses Soft Sediment Fauna and Inferred Fauna (tracks and trails of mobile epifauna) (Tables 3-4 and 3-6). Taxa were generally comprised of amphipods (infauna; Attachment A), and mobile crustaceans and mollusks (epifauna; Tables 3-2, 3-4, and 3-6; Figure 2-15).

3.1.3 Sand and Muddy Sand Habitats

The Sand and Muddy Sand habitat types consist of sand that has been subjected to a wide range of oceanic processes. These habitat types are very common on the outer continental shelf and were widespread at the RWF, in the RWEC–OCS Study Area, and in the RWEC–RI Study Area (Tables 3-1, 3-3, and 3-5). The Muddy Sand included in this category has a high sand to mud ratio, ranging from an 8:2 sand to mud ratio to 100% sand (Figure 2-18). The seafloor of these habitats exhibited a range of values in backscatter and SSS data reflectance but were predominantly low to medium (Figures 3-6 and 3-11). The Sand and Muddy Sand – Mobile habitat type describes these sandy habitats where the seafloor is subjected to small but frequent currents and storm events where ripples and/or mega-ripples are prevalent (Figure 3-5).

Sand and Muddy Sand habitats comprise close to half of the area mapped at the RWF (38% Sand and Muddy Sand, 10% - Mobile, and <3% with Boulder Fields; Table 3-1), the majority of the area mapped with the RWEC–OCS Study Area (37% - Mobile, 17% Sand and Muddy Sand, and <5% with Boulder Fields; Table 3-3), and approximately 40% of the area mapped within the RWEC–RI Study Area (23% - Mobile, 15% Sand and Muddy-Sand, and <1% with Boulder Fields; Table 3-5). In addition, sandy habitats within the RWEC–RI Study Area also included a small delta near the shoreline at Quonset Point (Table 3-5).

Sand and Muddy Sand habitats were well sampled by SPI/PV in the Project Area (131 stations RWF, 8 stations RWEC–OCS, 13 stations RWEC–RI; Tables 3-2, 3-4, and 3-6).

The sediments within these habitats were generally composed of Fine and Medium Sands, with fewer ground-truth stations classified as Very Fine, Coarse, or Slightly Gravelly Sand, and four stations classified as Gravelly Sand and one as Sandy Gravel (Attachment A; Tables 3-2, 3-4, and 3-6). The CMECS Biotic Subclasses of Soft Sediment Fauna was the predominant Biotic Subclass within the Sand and Muddy Sand habitats and Benthic Macroalgae was the predominant Subclass at one station in Narragansett Bay; Attached Fauna and Inferred Fauna (epifaunal tracks and trails) were also observed as co-occurring Subclasses (Attachment A; Tables 3-2, 3-4, and 3-6). Soft Sediment Taxa were generally comprised of large and small burrowing taxa, large and small tube-building taxa, amphipods (infauna; Attachment A), and mobile crustaceans and mollusks epifauna; Tables 3-2, 3-4, and 3-6; Figure 2-15).

3.1.4 Mud and Sandy Mud Habitats

The Mud and Sandy Mud habitat types consist of relatively featureless mud and sand, except where described by modifiers for boulder fields, shell substrate, and SAV. The sand to silt/clay ratio within these habitat types is expected to be less than 8:2 (Figure 2-18). The seafloor of these habitats exhibited predominantly low backscatter and SSS data reflectance (Figure 3-11) indicating that the surface is less dense and the sediments more fine-grained compared to other habitat types. Mud and Sandy Mud habitat was limited at the RWF (2.5%; Table 3-1), relatively prevalent within the RWEC–OCS Study Area (~13%; Table 3-3), and represented the majority of the seafloor mapped within the RWEC–RI Study Area (44% Mud and Sandy Mud, 11% with

Shell Substrate, <1% with Boulder Fields, <1% with SAV; Table 3-5). Backscatter values were higher and of medium reflectance in one area in Narragansett Bay where Shell Substrate was evident in ground-truth data and was used as a modifier to these habitats (11% of RWEC–RI; Tables 3-5 and 3-6; Figure 3-12). These Shell Substrates were composed of both living and dead mollusks (Table 3-6; Figures 2-14I, 2-15C, and 2-15D) namely blue mussels and Crepidula. These habitats also support mobile mollusks and crustaceans (Table 3-6). A very small area of Mud and Sandy Mud with SAV habitat was observed and mapped near the shoreline at Quonset Point in Narragansett Bay based on aerial imagery and ground-truth video data (0.2 acres Table 3-5; Figure 3-13). Trawl marks related to fishing activity were also observed within many of the Mud and Sandy Mud habitats mapped (Tables 3-1, 3-3, and 3-5; see Figure 3-10 for an example).

Mud and Sandy Mud Habitats were well-sampled with six SPI/PV ground-truth stations sampled at the RWF, four within the RWEC–OCS Study Area, and 13 in the RWEC–RI Study Area (Tables 3-2, 3-4, and 3-6). Five stations were sampled within Mud and Sandy Mud with Shell Substrate habitats within the RWEC–RI Study Area (Table 3-6). The sediments within these habitats were generally composed of very fine sands and silt/clay (Attachment A; Tables 3-2, 3-4, and 3-6). The CMECS Biotic Subclasses of Soft Sediment Fauna and Inferred Fauna were observed within Mud and Sandy Mud habitats (Tables 3-2, 3-4, and 3-6). Of these, Soft Sediment Fauna were observed most frequently, with Inferred Fauna (epifaunal tracks and trails) generally observed as the co-occurring Subclass (Attachment A). Soft Sediment Taxa were generally comprised of large and small burrowing taxa, large and small tube-building taxa, amphipods, and mobile crustaceans and mollusks (Attachment A; Tables 3-2, 3-4, and 3-6; Figure 2-15). In the Mud and Sandy Mud with Shell Substrate habitats, CMECS Substrate Subgroups included Crepidula Reef Substrate and Shell Hash and the Biotic Subclasses included Soft Sediment Fauna, Inferred Fauna, and Attached Fauna (Table 3-6). Sessile and mobile epifauna characteristic of these habitats were observed, namely blue mussels, barnacles, Crepidula, and mobile crustaceans and mollusks (Table 3-6; Figures 2-15C and 2-15D).

3.1.5 Anthropogenic Features

Distinct features of anthropogenic origin were mapped on the seafloor within the RWF and in RWEC–RI Study Area (Tables 3-1 and 3-5). These features may provide some habitat value but are considered separately from the primary habitats evaluated. A small area (0.6 acres; Table 3-1) of debris that appeared to be shipping containers and contents was identified in the SSS data within the RWF. A series of structural objects and debris associated with the demolition of the old Jamestown Bridge were identified in geophysical data (Figure 3-14). A number of shoreline-related structures such as boat ramps and revetment walls along the shoreline in Quonset Point were identified in aerial imagery. Two areas of dredged material were also identified, one near the landfall location and one just south of the Jamestown Bridge. These areas within RWEC–RI total 26 acres, 0.5% of the area mapped (Table 3-5).

3.2 Benthic Habitat Distributions

Distributions of benthic habitat types in the Project Area are related to a combination of ancient and modern geological events in the region. The geophysical and benthic survey data collected by Revolution Wind have refined the understanding of the distribution of the habitats within the Project Area. While seven primary benthic habitat types were mapped, 24 with modifiers, not all types were present in each portion of the Project Area. In addition, a few anthropogenic features were also mapped within the RWF (shipping container and contents) and the RWEC–RI Study Area (dredged material, demolition debris, revetment walls). Habitat composition and characteristics and corresponding ground-truth data within the RWF Study Area in Rhode Island Sound are provided in Tables 3-1 and 3-2. Habitat composition and characteristics, and corresponding ground-truth data within the RWF, RWEC–OCS Study Area, and RWEC–RI Study Area are provided in Tables 3-1 through 3-6.

3.2.1 Revolution Wind Farm

A total of 59,247 acres were mapped at the RWF. All primary habitats, with the exceptions of Bedrock and Mixed-Size Gravel in Muddy Sand, were mapped at the RWF (Table 3-1; Figure 3-15). The northern portion of the RWF was primarily composed of Sand and Muddy Sand with smaller areas of Mud and Sandy Mud, Coarse Sediment, and Glacial Moraine A and B habitats (Figure 3-15). The central and southern portions of the RWF were primarily composed of a mix of Sand and Muddy Sand, Coarse Sediment, Glacial Moraine A habitats, with smaller areas of Glacial Moraine B habitats (Figure 3-15). Seafloor areas dominated by sands and muds in the northern portion of the RWF generally had lower slope compared to those in the central and southern portion of the RWF dominated by Coarse Sediment and Glacial Moraine A and B habitats (Figure 2-4).

When habitats with modifiers are considered, Sand and Muddy Sand was the most prevalent habitat type mapped at the RWF (22,477 acres, 38%), followed by Coarse Sediment – Mobile (12,310 acres, 21%), Glacial Moraine A (11,395 acres, 19%), and Sand and Muddy Sand – Mobile (6,084 acres, 10%) (Table 3-1; Figure 3-16). High density boulder fields aligned with Glacial Moraine A and B habitats and proximal areas of the seafloor (Figure 3-17). Coarse Sediment with Low or Medium Density Boulder Fields were present on the edges of Glacial Moraine habitats primarily the southern portion of the RWF, with more areas of Medium Density Boulder Fields present in the southwestern compared to southeastern section of the RWF (Figure 3-17). The spatial distribution of Glacial Moraine A and B habitats, as well as boulder fields, correspond well with the previously published locations of the Ronkonkoma Moraine (Figure 3-1).

A total of 240 ground-truth SPI/PV stations were sampled at the RWF (Table 3-2) and were distributed relatively evenly across the area mapped. Generally, CMECS Substrate Subgroups defined by >30% gravel composition (Sandy Gravel, Granule, and Cobble) corresponded with Glacial Moraine habitats, while those with <30% gravel (Gravelly Sand, Slightly Gravelly Sand) and coarser sands (Coarse Sand) predominated in Coarse Sediment habitats (Table 3-2; Figure 3-18). Fine and Medium Sands generally were observed within the Sand and Muddy Sand habitats and Very Fine Sand was recorded in the Mud and Sandy Mud habitats (Table 3-2; Figure 3-18). Although all habitat types were dominated by Soft Sediment Fauna (Attachment A), a few patterns are evident at the Biotic Group classification level (Figure 3-19). These communities in sand and mud habitats were characterized by Larger Deep-Burrowing Fauna, Larger and Small Tube-Building Fauna (Figure 3-19), in addition mobile epifauna, such as sand dollars, mobile crustaceans and mollusks, and sea scallops were also observed (Table 3-2). These soft sediment communities were also documented within Coarse Sediment and Glacial Moraine A habitats, in addition multiple stations were characterized by Biotic Groups of sessile taxa, such as Barnacles, Attached Hydroids, and Diverse Colonizers (Figure 3-19). In addition, the presence/absence of the sea pen *Halipteris finmarchia* was recorded in SPI/PV analysis, as the presence of this emergent taxa may be relevant to demersal species (Revolution Wind, LLC 2021c). Sea pens are known to create structural complexity on the seafloor when present in dense aggregations or “fields”, provide food and shelter resources to invertebrates and demersal fish, and some species are sensitive to suspended sediment and human activities such as trawling (Downie et al. 2021). Sea pens observed at RWF were not observed in these densities; they were sparse in distribution with one to a few visible in the SPI/PV images where observed (Figure 3-20; Revolution Wind, LLC 2021c). There was a high degree of spatial correlation between presence of these taxa and Glacial Moraine A habitats, as well as some records outside but proximal to these habitats (Figure 3-20).

Table 3-1. Composition & Characteristics of Mapped Benthic Habitat Types at the RWF

Revolution Wind Farm *(~59,247 acres mapped)*	**Presence in RWF**		**Bedforms** *Type Present in Given Percentage of Habitats*			
	Area (acres)	**Percentage**	**Mega-ripples**	**Ripples**	**Linear Depression**	**Trawl marks**
Glacial Moraine B	102	0.2%	0%	57%	0%	0%
Glacial Moraine A	11,395	19%	8.1%	98%	0.5%	0.04%
Coarse Sediment with Medium Density Boulder Field	107	0.2%	0%	100%	0%	0%
Coarse Sediment with Low Density Boulder Field	168	0.3%	0%	93%	0%	0%
Coarse Sediment - Mobile with High Density Boulder Field	1	0.002%	0%	100%	0%	0%
Coarse Sediment - Mobile with Medium Density Boulder Field	511	0.9%	0%	100%	0.6%	0.0%
Coarse Sediment - Mobile with Low Density Boulder Field	2,663	4.5%	0%	100%	0.1%	0.9%
Coarse Sediment - Mobile	12,310	21%	3.3%	99.9%	1.2%	3.3%
Coarse Sediment	555	0.9%	5.5%	82%	0%	0.8%
Sand and Muddy Sand with Medium Density Boulder Field	270	0.5%	16%	67%	7.1%	0%
Sand and Muddy Sand with Low Density Boulder Field	954	1.6%	22%	83%	20%	0%
Sand and Muddy Sand - Mobile with Medium Density Boulder Field	16	0.03%	97%	100%	0%	0%
Sand and Muddy Sand - Mobile with Low Density Boulder Field	125	0.2%	94%	100%	0%	0%
Sand and Muddy Sand - Mobile	6,084	10%	91%	100%	49%	0%
Sand and Muddy Sand	22,477	38%	8.2%	89%	77%	68%
Mud and Sandy Mud	1,509	2.5%	0%	0%	0%	94%
Anthropogenic	0.6	0.001%	0%	100%	0%	0%

Table 3-2. Characteristics of Mapped Benthic Habitat Types as Informed by SPI/PV Ground-truth Data at the RWF

Revolution Wind Farm *(~59,247 acres mapped)*		**Glacial Moraine**	**Coarse Sediment with Boulder Field**	**Coarse Sediment - Mobile**	**Coarse Sediment**	**Sand and Muddy Sand with Boulder Field**	**Sand and Muddy Sand - Mobile**	**Sand and Muddy Sand**	**Mud and Sandy Mud**
SPI/PV Ground-truth Values	Number of SPI/PV stations	35	18	40	3	6	20	110	8
	CMECS Substrate Subgroups Observed in Ground-truth Data[1]	Cobble, Sandy Gravel, Gravelly Sand, Slightly Gravelly Sand, Medium Sand, Fine Sand	Sandy Gravel, Granule, Gravelly Sand, Slightly Gravelly Sand, Medium Sand	Sandy Gravel, Granule, Gravelly Sand, Slightly Gravelly Sand, Coarse Sand, Medium Sand, Fine Sand	Sandy Gravel	Gravelly Sand, Slightly Gravelly Sand, Medium Sand, Fine Sand	Gravelly Sand, Coarse Sand, Medium Sand, Fine Sand	Sandy Gravel, Slightly Gravelly Sand, Muddy Sand, Coarse Sand, Medium Sand, Fine Sand, Very Fine Sand	Sand, Muddy Sand, Fine Sand, Very Fine Sand
	CMECS Biotic Subclasses Observed in Ground-truth Data	Attached Fauna, Inferred Fauna, Soft Sediment Fauna	Attached Fauna, Inferred Fauna, Soft Sediment Fauna	Attached Fauna, Inferred Fauna, Soft Sediment Fauna	Attached Fauna, Soft Sediment Fauna	Attached Fauna, Inferred Fauna, Soft Sediment Fauna	Attached Fauna, Inferred Fauna, Soft Sediment Fauna	Attached Fauna, Inferred Fauna, Soft Sediment Fauna	Inferred Fauna, Soft Sediment Fauna
	Maximum Percent Cover of Attached Fauna Observed in Ground-truth Data	Complete (90-100%)	Moderate (30 to < 70%)	Sparse (1 to <30%)	Dense (70 to <90%)	Sparse (1 to <30%)	Sparse (1 to <30%)	Trace (<1%)	None
	Sessile Epifauna Observed in Ground-truth Data	Anemone, Attached Tubes, Barnacle(s), Bryozoan, Colonial Tunicate(s), Hydroids, Northern Star Coral, Polymastia Sponge, Sponges, Tubes, Tunicate(s)	Attached Tubes, Barnacle(s), Bryozoan, Colonial Tunicate(s), Hydroids, Sponge(s), Tunicate(s)	Barnacle(s), Bryozoan, Cerianthid, Colonial Tunicate, Corymorpha, Hydroid(s), Tunicate(s)	Anemone, Barnacle(s), Bryozoan, Cerianthid, Colonial Tunicate, Hydroids	Barnacles, Colonial Tunicate(s), Hydroids, Tunicates	Barnacles, Bryozoan, Cerianthid, Corymorpha, Hydroids, Tunicate(s)	Barnacle(s), Bryozoan, Cerianthid, Corymorpha, Hydroid(s), Tunicate(s)	None
	Mobile Epifauna Observed in Ground-truth Data	Crab(s), Gastropod(s), Moon Snail, Nudibranchs, Paguroid(s), Sea Star(s), Shrimp	Gastropod(s), Paguroid(s), Sea Scallop, Sea Star, Shrimp	Gastropod, Isopod, Moon Snail, Paguroid(s), Sea Star(s), Shrimp	Crab(s), Nudibranchs, Shrimp	Crab, Paguroid, Sand Dollar, Shrimp	Gastropod(s), Nudibranch, Paguroid, Shrimp	Crab(s), Gastropod(s), Isopod(s), Jonah Crab, Nudibranch, Paguroid(s), Sand Dollar, Sea Scallop, Sea Star(s), Shrimp	Crab, Nudibranch, Sea Star(s), Shrimp

Notes:
1 Substrate Subgroup determined from combined SPI/PV analysis.

3.2.2 RWEC–OCS Study Area

A total of 5,029 acres were mapped in the RWEC–OCS Study Area. All primary habitats, with the exceptions of Bedrock, were mapped in the RWEC–OCS Study Area (Table 3-3; Figure 3-21). The northern portion of the RWEC–OCS Study Area was primarily composed of interspersed Sand and Muddy Sand and Coarse Sediment habitats, with a small area of Mud and Sandy Mud habitats (Figure 3-21). Near the RWF the seafloor was composed of primarily Mud and Sandy Mud habitats (Figure 3-21), coincident with a deeper channel (Figure 2-3); and, on the other side of the channel, a region dominated by Mixed-Size Gravel in Muddy Sand habitat (Figure 3-21), spatially coincident with the previously mapped Harbor Hill Moraine (Figure 3-1). Seafloor slopes were generally low throughout the RWEC–OCS Study Area (Figure 2-5).

When habitats with modifiers are considered, Sand and Muddy Sand - Mobile was the most prevalent habitat type mapped in the RWEC–OCS Study Area (1,876 acres, 37%), followed by Sand and Muddy Sand (847 acres, 17%), Mud and Sandy Mud (647 acres, 13%), and Coarse Sediment – Mobile (579 acres, 12%) (Table 3-3; Figure 3-22). Medium and high-density boulder fields aligned with Glacial Moraine A and B and Mixed-Size Gravel in Muddy Sand habitats and proximal areas of the seafloor (Figure 3-23). Smaller discrete areas of medium and low boulder fields overlapped with Coarse Sediment and Sand and Muddy Sand habitats in offshore federal waters in Rhode Island Sound (Figure 3-23).

A total of 19 ground-truth SPI/PV stations were sampled in the RWEC–OCS Study Area (Table 3-4) and were distributed evenly across the area mapped. CMECS Substrate Subgroups defined by >30% gravel composition (Sandy Gravel, Pebble, and Cobble) corresponded with Mixed-Size Gravel in Muddy Sand habitats, and those with <5% gravel (Slightly Gravelly Sand) and coarser sands (Coarse Sand) predominated in Coarse Sediment habitats (Table 3-4; Figure 3-24). Very Fine to Coarse Sands were observed within the Sand and Muddy Sand habitats and Very Fine Sand was recorded in the Mud and Sandy Mud habitats (Table 3-2; Figure 3-24). Attached Fauna were the dominant Subclass in Mixed-Size Gravel in Muddy Sand habitats (Attachment A), with Biotic Groups of Attached Hydroids and Barnacles (Figure 3-25); additional sessile taxa, namely anemones and sponges, were also observed in these habitats (Table 3-4). All other habitat types were dominated by Soft Sediment Fauna (Attachment A), classified at the Biotic Group classification level by Larger Deep-Burrowing Fauna, Larger and Small Tube-Building Fauna (Figure 3-25), in addition, mobile epifauna, such as sand dollars, mobile crustaceans and mollusks, and sea stars were observed (Table 3-4).

Table 3-3. Composition & Characteristics of Mapped Benthic Habitat Types within the RWEC–OCS Study Area

Revolution Wind Export Cable - Outer Continental Shelf ***(~5,029 acres mapped)***	**Presence in RWEC–OCS Study Area**		**Bedforms** *Type Present in Given Percentage of Habitats*			
	Area (acres)	**Percentage**	**Mega-ripples**	**Ripples**	**Linear Depression**	**Trawl marks**
Glacial Moraine B	2.3	0.04%	0%	0%	0%	0%
Glacial Moraine A	30	0.6%	0%	2.2%	0%	0%
Mixed-Size Gravel in Muddy Sand with Medium Density Boulder Field	181	3.6%	0%	53%	33%	0%
Mixed-Size Gravel in Muddy Sand with Low Density Boulder Field	74	1.5%	0%	0%	0%	0%
Coarse Sediment with Low Density Boulder Field	14	0.3%	0%	78%	29%	0%
Coarse Sediment - Mobile with Medium Density Boulder Field	33	0.7%	0%	100%	0%	0%
Coarse Sediment - Mobile with Low Density Boulder Field	24	0.5%	0%	100%	13%	0%
Coarse Sediment - Mobile	579	12%	0%	100%	1.0%	5.7%
Coarse Sediment	469	9.3%	23%	1.8%	0.9%	0%
Sand and Muddy Sand with Medium Density Boulder Field	76	1.5%	45%	58%	58%	0%
Sand and Muddy Sand with Low Density Boulder Field	166	3.3%	0%	36%	1.8%	0%
Sand and Muddy Sand - Mobile	1,876	37%	100%	80%	51%	0.5%
Sand and Muddy Sand	847	17%	0.7%	17%	16%	28%
Mud and Sandy Mud - Mobile	10	0.2%	100%	100%	0%	0%
Mud and Sandy Mud	647	13%	0%	0%	0%	88%

Table 3-4. Characteristics of Mapped Benthic Habitat Types as Informed by SPI/PV Ground-truth Data within the RWEC–OCS Study Area

Revolution Wind Export Cable - Outer Continental Shelf *(~5,029 acres mapped)*		Mixed-Size Gravel in Muddy Sand with Boulder Field	Coarse Sediment	Sand and Muddy Sand with Boulder Field	Sand and Muddy Sand - Mobile	Sand and Muddy Sand	Mud and Sandy Mud
SPI/PV Ground-truth Values	Number of SPI/PV stations	3	2	2	5	3	4
	CMECS Substrate Subgroups Observed in Ground-truth Data[1]	Cobble, Sandy Gravel, Pebble	Slightly Gravelly Sand, Coarse Sand	Slightly Gravelly Sand	Slightly Gravelly Sand, Medium Sand, Fine Sand	Slightly Gravelly Sand, Coarse Sand, Very Fine Sand	Very Fine Sand
	CMECS Biotic Subclasses Observed in Ground-truth Data	Attached Fauna, Soft Sediment Fauna	Soft Sediment Fauna	Inferred Fauna, Soft Sediment Fauna	Attached Fauna, Inferred Fauna, Soft Sediment Fauna	Inferred Fauna, Soft Sediment Fauna	Inferred Fauna, Soft Sediment Fauna
	Maximum Percent Cover of Attached Fauna Observed in Ground-truth Data	Dense (70 to < 90%)	None	None	Trace (<1%)	None	None
	Sessile Epifauna Observed in Ground-truth Data	Anemone, Barnacle(s), Hydroids, Sponges	None	None	Hydroids, Tunicates	Tunicate(s)	Corymorpha
	Mobile Epifauna Observed in Ground-truth Data	Crab, Paguroid, Sea Star, Shrimp	Gastropod, Paguroid, Sand Dollar	Shrimp	Paguroid(s), Sand Dollar, Shrimp	Crab, Sea Star(s)	Sea Star(s), Shrimp

Notes:
1 Substrate Subgroup determined from combined SPI/PV analysis.

3.2.3 RWEC–RI Study Area

A total of 5,729 acres were mapped in the RWEC–RI Study Area. All seven primary habitats were mapped in the RWEC–RI Study Area (Table 3-5; Figure 3-21). The habitats mapped within the RWEC–RI Study Area offshore in Rhode Island Sound were primarily dynamic sands and muds typical of offshore environments in Southern New England (Figure 3-21). The benthic habitats mapped within the RWEC–RI Study Area in Narragansett Bay, from the West Passage to Quonset Point, were primarily depositional muds and sandy mud (Figure 3-21). Mud and Sandy Mud habitats comprised more than half of the area mapped within the RWEC–RI Study Area (Table 3-5; Figure 3-21). Sand and Muddy Sand habitats were located on the northwestern side of Conanicut Island north of the Jamestown Bridge and near the mouth of the Bay at Brenton Reef where Coarse Sediment habitats were interspersed within the sand matrix, as well as near the state waters line (Figure 3-21).

When habitats with modifiers are considered, Mud and Sandy Mud was the most prevalent habitat type in the RWEC–RI Study Area (2,510 acres, 4%), followed by Sand and Muddy Sand – Mobile (1,322 acres, 23%), Sand and Muddy Sand (877 acres, 15%), and Mud and Sandy Mud with Shell Substrate (620 acres, 11%) (Table 3-3; Figures 3-22). Sand and Muddy Sand – Mobile was mapped at the mouth of the Bay, whereas Sand and Muddy Sand habitats in the West Passage were not assigned the Mobile modifier because ripples did not dominate the habitat features, although there was some evidence of ripples in these habitats (Table 3-6; Figure 3-12). Smaller areas with distinct characteristics were captured with modifiers as well. Additional habitats mapped within the RWEC–RI Study Area were small areas of Coarse Sediment, Glacial Moraine A and B, Bedrock, and non-moraine habitats with Low or Medium Density Boulder Fields interspersed within the predominant sand and mud habitats (Table 3-3; Figure 3-22). A Sand and Muddy Sand – Delta was evident in aerial imagery along the shoreline at Quonset Point west of the landfall, as were areas of Coarse Sediment – Mobile and a very small area of Mixed-Sized Gravel in Muddy Sand (Figure 3-26). Mud and Sandy Mud with SAV was mapped to the east of the proposed landfall location (Figure 3-26). Anthropogenic features were mapped near the Jamestown Bridge (Figure 3-14) and near the shoreline at Quonset Point (Figure 3-26). Boulder fields were generally associated with areas of coarse sediment and bedrock, particularly offshore in the region of Brenton Reef and at the edges of the RWEC–RI Study Area near Conanicut and Dutch Islands within the West Passage of Narragansett Bay (Figure 3-23). Discrete areas of Sand and Muddy Sand and Mud and Sandy Mud with Low Density Boulder Fields were mapped near the Glacial Moraine habitats on the edges of Conanicut and Dutch Islands (Figures 3-22 and 3-23).

A total of 34 SPI/PV ground-truth stations were sampled within the RWEC–RI Study Area (Table 3-6) and were distributed evenly across the area mapped. All Mud and Sandy Mud habitats were characterized by the CMECS Substrate Group of Very Fine Sand, except in habitats modified with Shell Substrate, where Shell Hash was recorded and at Station 450 where Crepidula Reef Substrate was observed (Figure 3-24). The sediment type measured with SPI below the surface shells was silt/clay (Attachment A; Figure 2-14I). Ground-truth samples in Sand and Muddy Sand and Coarse Sediment habitat types were characterized by a range of sands, from Fine Sand to Slightly Gravelly Sand, with Fine Sand recorded most frequently (Table 3-6; Figure 3-24). The Substrate Subgroup of Slightly Gravelly Sand was observed in Glacial Moraine B habitat (Table 3-6; Figure 3-24).

The depositional Mud and Sandy Mud habitats that dominated the portion of the RWEC–RI Study Area in Narragansett Bay support a combination of small and large tube-building and burrowing infauna, as well as mobile epifauna (mollusks and crustaceans) (Table 3-6; Figure 3-25). Most habitat types were dominated by Soft Sediment Fauna, with Attached Fauna dominating in Glacial Moraine B and Mud and Sandy Mud with Shell Substrate habitats (Attachment A; Table 3-6). Benthic Macroalgae was the dominant Subclass at one Sand and Muddy Sand station (Attachment A), and additional patterns were evident at the Biotic Group classification level (Figure 3-25). Small and Larger Tube-Building Fauna were the predominant Biotic Group observed in the sand and mud habitats furthest offshore (Figure 3-25). Biotic Groups of Larger Deep-Burrowing Fauna were prevalent across the sand and mud habitats at the mouth of the Bay and within the West Passage, except in the section of Mud and Sandy Mud with Shell Substrate habitats where Sessile Gastropods, Mussel Bed, Attached Hydroids, and Small Tube-Building Fauna were the predominant Biotic Groups (Attachment A; Figure 3-25). Attached Sponges were observed at Station 452 (north of the Jamestown Bridge) coincident with Glacial Moraine B habitats (Attachment A; Figure 3-25). Other Biotic Groups observed within sand and mud habitats included Tunneling Megafauna, Small and Larger Tube-Building Fauna and Tracks and Trails related to mobile epifauna (Attachment A; Figure 3-25). The benthic habitats and their characterizing sediments and benthic biological communities as mapped for this Revolution Wind assessment within Narragansett Bay generally agree with recent biotopes mapped from a SPI survey conducted throughout Narragansett Bay (Shumchenia and King 2019).

Offshore dynamic sand and mud habitats provide a mix of mobile sands and depositional muddy environments that support a combination of small and large tube-building and burrowing infauna, as well as mobile epifauna (mollusks and crustaceans) (Table 3-6; Figure 3-25). Small and Larger Tube-building Fauna were the predominant Biotic Group observed in the sand and mud habitats furthest offshore (Figure 3-25). Larger Deep-Burrowing Fauna were the predominant group in the Sand and Muddy Sand – Mobile habitats at Brenton Reef where a mix of sandy and coarse sediment habitats were observed (Figure 3-25). Small Tube-Building Fauna were also the predominant Biotic Group in Sand and Muddy Sand near Brenton Reef and within Coarse Sediment - Mobile habitats (Attachment A; Figure 3-25)

Table 3-5. Composition & Characteristics of Mapped Benthic Habitat Types within the RWEC–RI Study Area

Revolution Wind Export Cable - Rhode Island ***(~5,729 acres mapped)***	**Presence in RWEC–RI Study Area**		**Bedforms** *Type Present in Given Percentage of Habitats*			
	Area (acres)	**Percentage**	**Mega-ripples**	**Ripples**	**Linear Depression**	**Trawl marks**
Glacial Moraine B	50	0.9%	0%	3.0%	0%	0%
Glacial Moraine A	88	1.5%	0%	1.7%	0%	0%
Mixed-Size Gravel in Muddy Sand	0.01	0.0001%	0%	0%	0%	0%
Coarse Sediment with Medium Density Boulder Field	0.6	0.01%	0%	100%	0%	0%
Coarse Sediment with Low Density Boulder Field	0.5	0.01%	0%	54%	0%	0%
Coarse Sediment - Mobile	149	2.6%	0%	99%	10%	0%
Sand and Muddy Sand with Medium Density Boulder Field	5.1	0.09%	0%	0%	0%	0%
Sand and Muddy Sand with Low Density Boulder Field	22	0.4%	0%	8.1%	0%	0%
Sand and Muddy Sand - Mobile	1,322	23%	99%	100%	63%	0%
Sand and Muddy Sand - Delta	0.3	0.01%	0%	0%	0%	0%
Sand and Muddy Sand	877	15%	0%	75%	0.4%	3.6%
Mud and Sandy Mud with Low Density Boulder Field	19	0.3%	0%	0%	0%	45%
Mud and Sandy Mud with Shell Substrate	620	11%	0%	0%	0%	100%
Mud and Sandy Mud with SAV	0.2	0.003%	0%	0%	0%	0%
Mud and Sandy Mud	2,510	44%	0%	0%	0%	75%
Bedrock	38	0.7%	0%	21%	0%	0%
Anthropogenic	26	0.5%	0%	0%	0%	0%

Table 3-6. Characteristics of Mapped Benthic Habitat Types as Informed by SPI/PV Ground-truth Data within the RWEC–RI Study Area

Revolution Wind Export Cable - Rhode Island ***(~5,729 acres mapped)***		**Glacial Moraine**	**Coarse Sediment - Mobile**	**Sand and Muddy Sand - Mobile**	**Sand and Muddy Sand**	**Mud and Sandy Mud with Shell Substrate**	**Mud and Sandy Mud**
SPI/PV Ground-truth Values	Number of SPI/PV stations	1	2	10	3	5	13
	CMECS Substrate Subgroups Observed in Ground-truth Data[1]	Slightly Gravelly Sand	Coarse Sand, Fine Sand	Coarse Sand, Fine Sand, Very Fine Sand	Slightly Gravelly Sand, Medium Sand, Fine Sand	Crepidula Reef Substrate, Shell Hash	Very Fine Sand
	CMECS Biotic Subclasses Observed in Ground-truth Data	Attached Fauna, Soft Sediment Fauna	Inferred Fauna, Soft Sediment Fauna	Inferred Fauna, Soft Sediment Fauna	Benthic Macroalgae, Soft Sediment Fauna	Attached Fauna, Soft Sediment Fauna	Attached Fauna, Inferred Fauna, Soft Sediment Fauna
	Maximum Percent Cover of Attached Fauna Observed in Ground-truth Data	Sparse (1 to <30%)	None	None	Moderate (30 to < 70%)	Complete (90-100%)	Sparse (1 to <30%)
	Sessile Epifauna Observed in Ground-truth Data	Barnacles, Sponge(s)	None	None	Sponge(s)	Barnacles, Crepidula, Hydroids, Mussels, Sponges	Barnacles, Hydroids
	Mobile Epifauna Observed in Ground-truth Data	Gastropod(s)	Gastropod(s), Paguroid(s)	Gastropod(s), Moon Snail, Paguroid(s), Shrimp	Gastropod, Whelk	Crab, Gastropod, Jonah Crab	Crab(s), Gastropod(s), Paguroid(s), Shrimp

Notes:
1 Substrate Subgroup determined from combined SPI/PV analysis.

3.3 Benthic Habitats Crosswalked to NOAA Habitat Complexity Categories

The NOAA Habitat Complexity Categories were defined by NOAA Habitat for the purposes of EFH consultation (NOAA Habitat 2021). The NOAA Habitat Complexity Categories include soft bottom, complex, heterogeneous complex, and large grained complex (large boulders). For purposes of the EFH consultation, NOAA has defined complex habitats as SAV, shell substrate, and sediments with >5% gravel of any size (pebbles to boulders; CMECS Substrate of Rock, Groups of Gravelly, Gravel Mixes, and Gravels) (NOAA Habitat 2021). Heterogenous complex is used for habitats with a combination of soft bottom and complex features (NOAA Habitat 2021). A crosswalk between benthic habitat types with modifiers mapped within the Study Area and NOAA Habitat Complexity Categories is provided in Table 3-7. The three benthic habitat types of Bedrock, Glacial Moraine A, and Glacial Moraine B were crosswalked to the "large grained complex" category and twelve benthic habitat types were crosswalked to the "complex" category, based on having >5% gravel or on the presence of Shell Substrate or SAV or on the presence of boulder fields. In addition, on request from NOAA Habitat, sand and mud habitats with boulder fields that were previously crosswalked to the "heterogeneous complex" category, were crosswalked to "complex." Sand and mud habitats were crosswalked to the "soft bottom" category.

Approximately half of the RWF was categorized as soft bottom, approximately 20% categorized as large grained complex, and over one-quarter categorized as complex (Figure 3-27). Habitats crosswalked to the large grained complex category were found in the central and southern portions of the RWF (Figure 3-27) where Glacial Moraine A and B habitats were mapped (Figure 3-16). Habitats crosswalked to the complex category were located predominantly in the southeast portion of the RWF and in discrete areas in the central and northern portions of the RWF (Figure 3-27). Habitats crosswalked to soft bottom habitats were generally found in central and northern portions of the RWF and in discrete areas in the southeast portion of the RWF (Figure 3-27). Boulder fields were found coincident with and proximal to Glacial Moraine A and B habitats. A high incidence of low density boulder fields was mapped in the central and southeast portions of the RWF in habitats crosswalked to the complex category; scattered boulders were also present and dispersed in soft bottom habitats in the northern portion of the RWF (Figure 3-27).

The RWEC–OCS Study Area was primarily categorized as soft bottom, just over a quarter was categorized as complex, and a small portion was categorized as large grained complex (Figure 3-28). Habitats crosswalked to the complex category proximal to the RWF were Mixed-Size Gravel in Muddy Sand (Figure 3-22), a relatively stable matrix of pebbles and cobbles with boulder fields of varying density that support attached fauna (Figure 3-4). The remainder of the habitats within the RWEC–OCS Study Area crosswalked to the complex category were comprised of Coarse Sediment and Coarse Sediment–Mobile habitats interspersed with Sand and Muddy Sand–Mobile habitats (Figure 3-22), often mobile gravelly sands within linear depressions (Figure 3-7).

Approximately 80% of the RWEC–RI Study Area was classified as soft bottom, approximately 15% was classified as complex, and a small portion was categorized as large grained complex (Figure 3-28). Habitats crosswalked to the large grained complex category were small outcroppings of Glacial Moraine A and B and Bedrock found along the edges of the RWEC–RI Study Area near Breton Reef and within the West Passage of Narragansett Bay (Figure 3-22). One large section of seafloor within the southern portion of the West Passage of Narragansett Bay was crosswalked to the complex category (Figure 3-28) due to the presence of Mud and Sandy Mud with Shell Substrate habitat (Figure 3-22), composed of living and dead shells on top of a mud matrix (Figure 3-12). SAV near the landfall at Quonset Point (Figure 3-13) was also crosswalked to the complex category.

Table 3-7. Crosswalk of Benthic Habitat Types with Modifiers Mapped at the Project to NOAA Habitat Complexity Categories

Benthic Habitat Type with Modifiers	Color	Complex Color	NOAA Habitat Complexity Category
Anthropogenic			Anthropogenic
Bedrock			Large Grained Complex
Glacial Moraine B			Large Grained Complex
Glacial Moraine A			Large Grained Complex
Mixed-Size Gravel in Muddy Sand with Medium Density Boulder Field			Complex
Mixed-Size Gravel in Muddy Sand with Low Density Boulder Field			Complex
Mixed-Size Gravel in Muddy Sand			Complex
Coarse Sediment (- Mobile) with Medium Density Boulder Field			Complex
Coarse Sediment (- Mobile) with Low Density Boulder Field			Complex
Coarse Sediment – Mobile			Complex
Coarse Sediment			Complex
Sand and Muddy Sand (- Mobile) with Medium Density Boulder Field			Complex
Sand and Muddy Sand (- Mobile) with Low Density Boulder Field			Complex
Sand and Muddy Sand – Mobile			Soft Bottom
Sand and Muddy Sand – Delta			Soft Bottom
Sand and Muddy Sand			Soft Bottom
Mud and Sandy Mud with Low Density Boulder Field			Complex
Mud and Sandy Mud with Shell Substrate			Complex
Mud and Sandy Mud with SAV			Complex
Mud and Sandy Mud – Mobile			Soft Bottom
Mud and Sandy Mud			Soft Bottom

3.4 EFH Crosswalk to Benthic Habitats

The results of the full EFH benthic habitat crosswalk are presented in Attachment C. All species are presented in the table with an EFH presence determination for each project study area and primary benthic habitat type. Gray cells in the table indicate that NOAA-mapped EFH does not overlap with the specified project area and dashed cells indicate that even though the NOAA mapped EFH does overlap with that project area, the species/ life stage is not anticipated to utilize the given habitat type as EFH. There were various levels of EFH information available to support the crosswalk depending on the species. Some species have more explicitly identified preferred and essential substrates, while others, such as ocean quahog and spiny dogfish, have limited information. For species with limited information, or broader substrate preferences, a conservative approach was taken when crosswalking EFH to specific habitats. For example, scup adults are associated with soft, sandy bottoms; mixed sand; and mud; but prefer soft bottoms near structure. Habitats with scattered boulders or SAV are much more likely to have sand near structure than other primary benthic habitat types, and thus may have a “higher value” for these species than others. However, because sandy bottom is found in portions of all the primary habitats within the Study Area, adult scup EFH has been crosswalked to all mapped habitat types (Attachment C).

In total, 25 benthic/demersal species and 54 life stages with designated essential fish habitat within the Project Area have been crosswalked to mapped benthic habitats: 40 life stages to Glacial Moraine A and B habitats, 35 to Mixed-Size Gravel in Muddy Sand habitats, 47 to Coarse Sediment habitats, 45 to Sand and Muddy Sand habitats, 36 to Mud and Sandy Mud habitats; and 22 to boulders, 14 to SAV habitats, and nine to Shell Substrate regardless of underlying substrate. A list of ten priority species and their specific habitat preferences are highlighted and discussed in Section 4.4.

4.0 DISCUSSION

A complete summary of anticipated impacts to the seafloor is provided in Table 4-1, along with associated information related to the Project Design Envelope and related assumptions; additional information can be found in the COP (Revolution Wind, LLLC 2021a). Per NOAA Habitat recommendations (NOAA Habitat 2021), proportional representation of benthic habitats within each potential area of impact have been summarized by the NOAA Habitat Complexity Category to which they have been crosswalked. These proportional representations of benthic habitats have been calculated across the entire potential area of impact for each project component footprint (see Section 2.4 for details). Importantly, these calculated values and proportions are conservative estimates; the actual total anticipated areas of impact in acres along with Project Design Envelope context are provided in Table 4-1. For example, 23% of the foundation seafloor preparation area is a conservative estimate for anticipated boulder clearance at foundation locations based on worst case boulder densities at the foundation locations and this value, along with anticipated use of jack-up vessels, has been utilized to calculate a realistic estimate of the total area within the seafloor preparation footprints that may be directly, but temporarily, impacted by the Project (Table 4-1). Certain impacts may be more likely to occur in particular habitat types; for example, boulder clearance is more likely to be needed in habitats that have been crosswalked to the NOAA Habitat "complex" category. Where differential impacts are anticipated, these have also been noted in Table 4-1.

With few exceptions, the composition of benthic habitats crosswalked to NOAA Habitat Complexity Categories included in potential permanent and temporary impact footprints (Table 4-1) was similar to the composition documented within the given project component area (RWF: Figure 3-27; RWEC: Figure 3-28). These results indicate that significantly altered layouts would do little to measurably shift the overall composition of benthic habitats impacted by the Project. However, Revolution Wind has, and will continue to, micro-site foundations within the micro-siting allowances that support the agreed upon regional uniform east-west/north-south grid with 1.15 by 1.15-mi (1 by 1-nm; 1.85 by 1.85-km) spacing on a case-by-case basis to avoid significant seabed hazards such as surface and subsurface boulders and to avoid and minimize impacts to complex habitat types to the extent feasible and in consideration of other siting constraints.

Table 4-1. Maximum Potential Impacts to Benthic Habitats by NOAA Habitat Complexity Category from Proposed Project Design and Associated Assumptions and Information from the COP related to Areas of Anticipated Impact*

* The current indicative GIS layout was used to determine the distribution of benthic habitat types crosswalked to NOAA Complexity Categories within the total maximum footprint of each Project element. This may result in different total numbers from those presented in the COP, for example the current indicative IAC network is 224.5 km in GIS; the project design envelope presented in the COP allows for an approximately 12% increase on this value for a total of 250 km, this approach allows for some changes to the length of the IAC as Revolution Wind further refines its design and construction plans. The total allowable values presented in the COP have been used to calculate the values presented in the "Total Area of Anticipated Impacts to the Seafloor" column.

Revolution Wind Offshore Wind Farm Project Design Envelope			Unit of Measure	Acres of Maximum Potential Impact to Benthic Habitats Crosswalked to NOAA Habitat Complexity Categories Calculated from Current Indicative GIS Layout *				Total Area of Anticipated Impacts to the Seafloor
				Large Grained Complex	Complex	Soft Bottom	Total	
WTG & OSS Foundations	PERMANENT	Foundations	acres	0.62	0.89	1.57	3.08	up to 3.08 acres
			%	20%	29%	51%	100%	up to 100%
		Associated Assumptions and Context Estimates are based on 0.03 acre for each 12-m diameter monopile WTG foundation and 0.04 acre for each 15-m diameter monopile OSS foundation, resulting in totals of 3 acres for all 100 WTGs, 0.08 acres for the 2 OSSs, and 3.08 acres inclusive of all 100 WTG and 2 OSS foundations. This area may be disturbed by seabed preparation activities before being permanently impacted by the physical structure of the foundations. **Anticipated Activities or Structures that would cause Impact** Physical structure - WTG and OSS vertical hard substrate Minimal seafloor preparation required (e.g., boulder clearance and/or seafloor leveling) Impacts to habitats categorized as large grained complex and complex habitats will likely be minimized through layout refinement and micro-siting.						

<table>
<tr><th colspan="3" rowspan="2">Revolution Wind Offshore Wind Farm Project Design Envelope</th><th rowspan="2">Unit of Measure</th><th colspan="4">Acres of Maximum Potential Impact to Benthic Habitats Crosswalked to NOAA Habitat Complexity Categories Calculated from Current Indicative GIS Layout *</th><th rowspan="2">Total Area of Anticipated Impacts to the Seafloor</th></tr>
<tr><th>Large Grained Complex</th><th>Complex</th><th>Soft Bottom</th><th>Total</th></tr>
<tr><td rowspan="3">WTG & OSS Foundations</td><td rowspan="3">PERMANENT</td><td rowspan="2">Maximum Scour Protection & Cable Protection System (CPS) Stabilization for IACs and OSS-Link Cable</td><td>acres</td><td>14.96</td><td>22.62</td><td>37.86</td><td>75.4</td><td>up to 75.4 acres</td></tr>
<tr><td>%</td><td>20%</td><td>30%</td><td>50%</td><td>100%</td><td>up to 100%</td></tr>
<tr><td colspan="7">Associated Assumptions and Context
Scour protection and Cable Protection System (CPS) stabilization for IACs associated with each foundation.

The maximum extent of scour protection for each WTG foundation would be in a ring around the foundation up to 24 m in each direction (22.5 m for OSS foundations), covering 0.67 acres per WTG foundation and 0.66 acres for each OSS foundation; the CPS stabilization would extend an additional 12 m from the edge of the scour protection and would be 12 m wide. The number of IACs per WTG foundation will vary and there will be more IACs at each OSS than at each WTG; each IAC CPS stabilization would be 0.04 acres. The maximum total scour protection (68.3 acres) + CPS stabilization (7.1 acres) across the 102 foundations would be 75.4 acres.

This area may be disturbed by seabed preparation activities before being permanently impacted by physical structures.

Anticipated Activities or Structures that would cause Impact
Physical structure - foundation, scour protection and CPS stabilization, specific type of material to be selected at final design

Minimal seafloor preparation required (e.g., boulder clearance and/or seafloor leveling)

Impacts to habitats categorized as large grained complex and complex will likely be minimized through layout refinement and micro-siting.</td></tr>
<tr><td rowspan="3">WTG & OSS Foundations</td><td rowspan="3">PERMANENT</td><td rowspan="2">Total - Foundations + Maximum Scour Protection & CPS Stabilization for IACs and OSS-Link Cable</td><td>acres</td><td>15.6</td><td>23.5</td><td>39.4</td><td>78.5</td><td>up to 78.5 acres</td></tr>
<tr><td>%</td><td>20%</td><td>30%</td><td>50%</td><td>100%</td><td>up to 100%</td></tr>
<tr><td colspan="7">Associated Assumptions and Context

Estimates are based on 0.7 acre per monopile foundation for foundations + scour protection (30 m radius from the foundation center point), with CPS stabilization for IACs resulting in additional permanent impacts where needed. The maximum total area that may be permanently impacted by foundations, scour protection and CPS stabilization totals 78.5 acres.

Anticipated Activities or Structures that would cause Impact
Physical structure - foundation, scour protection and CPS stabilization, specific type of material to be selected at final design

Minimal seafloor preparation required (e.g., boulder clearance and/or seafloor leveling)

Impacts to habitats categorized as large grained complex and complex will likely be minimized through layout refinement and micro-siting.</td></tr>
</table>

<table>
<tr><th colspan="3" rowspan="2">Revolution Wind Offshore Wind Farm Project Design Envelope</th><th rowspan="2">Unit of Measure</th><th colspan="4">Acres of Maximum Potential Impact to Benthic Habitats Crosswalked to NOAA Habitat Complexity Categories Calculated from Current Indicative GIS Layout *</th><th rowspan="2">Total Area of Anticipated Impacts to the Seafloor</th></tr>
<tr><th>Large Grained Complex</th><th>Complex</th><th>Soft Bottom</th><th>Total</th></tr>
<tr><td rowspan="3">WTG & OSS Foundations</td><td rowspan="3">TEMPORARY</td><td rowspan="2">Seafloor Disturbance around Permanent Structures</td><td>acres</td><td>591.0</td><td>928.7</td><td>1574.0</td><td>3,093.7</td><td>up to 755.5 acres</td></tr>
<tr><td>%</td><td>19%</td><td>30%</td><td>51%</td><td>100%</td><td>up to 24.4%</td></tr>
<tr><td colspan="7">Associated Assumptions and Context
Represents wide area around permanent features in which temporary disturbance is anticipated, up to a 200-m radius from foundation center point. This 200-m radius equates to 31.1 acres per foundation; the area of seafloor preparation only that surrounds the maximum permanent foo tprint of the foundation, scour protection, and CPS stabilization varies based on the number of cables pulled into each foundation, each is approximately between 30 and 30.4 acres. The total area for all 102 foundations is 3,093.7 acres.

Approximately 23% of the 31.1-acre area (7.2 acres per foundation) may be disturbed during boulder clearance. This is a conservative estimate based on worst case boulder densities at foundation locations. Across 102 foundation locations, the total maximum acres would be 734.4 acres.

The total area of seabed disturbance per jack-up will be approximately 724.4 sq m (0.18 acre). Based on assumption of using a jack-up at each of up to 102 foundations (18.36 acres) and using a second jack-up at up to 15% of the foundations (2.75 acres), up to 21.1 acres of seabed disturbance will occur from jack-up activity during WTG installation. Jack-up activities will occur within the 200-m radius surrounding each foundation location.

Therefore, the total anticipated maximum area of seafloor disturbance is estimated to be 755.5 acres (734.4 + 21.1), which is 24.4% of the total 3,093.7-acre seafloor preparation area around the permanent structures.

Anticipated Activities or Structures that would cause Impact
Boulder clearance activities; Jack-up barges/spud cans to support installation activities

Boulder clearance will occur where boulders are present and cannot be avoided with micro-siting; these impacts are more likely to occur in habitats categorized as large grained complex and complex.</td></tr>
<tr><td rowspan="3">WTG & OSS Foundations</td><td colspan="2" rowspan="2">TOTAL
Permanent + Temporary
400-m diameter (200-m radius) circle around center point of foundations</td><td>acres</td><td>606.6</td><td>952.2</td><td>1613.4</td><td>3,172.2</td><td>up to 834.0 acres</td></tr>
<tr><td>%</td><td>19%</td><td>30%</td><td>51%</td><td>100%</td><td>up to 26.3%</td></tr>
<tr><td colspan="8">Associated Assumptions and Context
Represents wide area in which permanent features will be installed and in which temporary disturbance is anticipated. Up to a 200-m radius from foundation center point for WTG and OSS foundations. This 200-m radius equates to 31.1 acres per foundation, a total of 3,172.2 acres across all 102 foundations.

The total area anticipated to be impacted is 834.0 acres, equal to the maximum potential permanent impact (78.5 acres) and the maximum total temporary impact (755.5 acres), which represents 26.3% of the total 3,172.2 acres.

Anticipated Activities or Structures that would cause Impact
See above rows for details on each foundation component</td></tr>
</table>

Revolution Wind Offshore Wind Farm Project Design Envelope			Unit of Measure	Acres of Maximum Potential Impact to Benthic Habitats Crosswalked to NOAA Habitat Complexity Categories Calculated from Current Indicative GIS Layout *				Total Area of Anticipated Impacts to the Seafloor
				Large Grained Complex	Complex	Soft Bottom	Total	
Inter-Array Cables & OSS-Link Cable	PERMANENT	**Cable Protection Inter-Array Cables**	**acres**	121.9	177.4	365.8	665.1	**up to 74.1 acres**
			%	18%	27%	55%	100%	**up to 10%**
		Cable Protection OSS-Link Cable	**acres**	0.0	8.3	29.5	37.8	**up to 4.4 acres**
			%	0%	22%	78%	100%	**up to 10%**

Associated Assumptions and Context

Up to 265 km of cable are anticipated to connect foundations; up to 250 km for the IACs and up to 15 km for the OSS-Link Cable.

Up to 26.5 km (25 km for the IAC, 1.5 km for the OSS-Link Cable) may require cable protection. Cable protection will measure up to 39 ft (12 m) wide. Therefore, an area of up to 78.5 acres (74.1 acres for the IAC and 4.4 acres for the OSS-Link Cable) may require cable protection; no cable crossings are anticipated that would require additional cable protection.

Anticipated Activities or Structures that would cause Impact

Physical structure - concrete mattresses, frond mattresses, rock bags, and/or rock berms; specific cable protection material will be selected at final design

Cable protection will be used where burial cannot occur, sufficient burial depth cannot be achieved due to seabed conditions or to avoid risk of interaction with external hazards. These locations may occur in areas of complex habitats, where siting in these habitats cannot be avoided.

Revolution Wind Offshore Wind Farm Project Design Envelope			Unit of Measure	Acres of Maximum Potential Impact to Benthic Habitats Crosswalked to NOAA Habitat Complexity Categories Calculated from Current Indicative GIS Layout *				Total Area of Anticipated Impacts to the Seafloor
				Large Grained Complex	Complex	Soft Bottom	Total	
Inter-Array Cables & OSS-Link Cable	TEMPORARY	**Cable Installation & Seafloor Preparation Inter-Array Cables**	**acres**	407.4	589.9	1215.6	2,213	**up to 2,471 acres**
			%	18%	27%	55%	100%	**< 100%**
		Cable Installation & Seafloor Preparation OSS-Link Cable	**acres**	0.0	27.0	99.3	126.3	**up to 148 acres**
			%	0%	21%	79%	100%	**< 100%**

Associated Assumptions and Context

Represents 40-m wide corridor for the IAC network (up to 250 km) and OSS-Link Cable (up to 15 km) in which seafloor preparation and installation activities are anticipated; these corridors encompass a total of approximately 2,619 acres (2,471 acres for the IAC, 148 acres for the OSS-Link Cable). Seafloor preparation activities will not extend beyond the 40-m installation and preparation corridor. Additional cable burial trials may be performed; these trials would occur within the 40-m cable installation and seafloor preparation corridor.

Up to 80% of the IAC network, 200 km, and 60% of the OSS-Link Cable, 9 km, may require boulder clearance. The maximum area that may be temporarily disturbed by these activities would be 2,065.8 acres (1,976.8 acres for the IAC, 89.0 acres for the OSS-Link).

In addition to seafloor preparation activities, temporary disturbance related to installation of the cable is anticipated along the entire length of the IAC network and OSS-Link Cable. It is expected that up to a maximum of 40 anchor events could occur for the OSS-Link cable, potentially impacting up to 1.4 acres.

The area of the full seafloor preparation and installation corridor represents a conservative assumption for maximum temporary seafloor disturbance, as noted above these areas total approximately **2,619 acres**.

Anticipated Activities or Structures that would cause Impact

Cable laying activities will involve boulder clearance and pre-lay grapnel runs to locate and clear remaining obstructions prior to cable installation; cable laying installation activities may involve use of jet-plow, mechanical plowing, or mechanical cutters.

Dynamic Positioning (DP) vessels will generally be used for cable burial activities. If anchoring (or a pull ahead anchor) is necessary during cable installation it will occur within the area surveyed and mapped to support the Project.

Boulder clearance will occur where boulders are present and cannot be avoided with micro-siting; these impacts are more likely to occur in complex habitats.

Revolution Wind Offshore Wind Farm Project Design Envelope			Unit of Measure	Acres of Maximum Potential Impact to Benthic Habitats Crosswalked to NOAA Habitat Complexity Categories Calculated from Current Indicative GIS Layout *				Total Area of Anticipated Impacts to the Seafloor
				Large Grained Complex	Complex	Soft Bottom	Total	
RWEC	PERMANENT	**Cable Protection RWEC–OCS**	**acres**	1.5	53.5	108.7	163.7	**up to 17.8 acres**
			%	1%	33%	66%	100%	**up to 10%**
		Cable Protection RWEC–RI	**acres**	0.0	30.6	176.6	207.2	**up to 32.9 acres**
			%	0%	15%	85%	100%	**up to 15%**

Associated Assumptions and Context

The RWEC is anticipated to include up to 134 km of cable, comprised of up to two export cables co-located within a single corridor up to 67 km in length (up to 30 km in federal waters RWEC–OCS and 37 km in state waters RWEC–RI).

Up to 10% of the up to 60-km RWEC–OCS, 6 km, and up to 5% of the up to 74-km long RWEC–RI, 3.7 km, may require cable protection. Cable protection will measure up to 39 ft (12 m) wide. Therefore, a total area of up to 28.8 acres (17.8 acres for the RWEC–OCS; 11.0 acres for the RWEC–RI) may require cable protection.

Up to 14 crossings of existing submarine assets (e.g., existing submarine cables) along the RWEC–RI (7 per cable) are anticipated and will require protection. It is assumed up to 1,640 ft (500 m) of cable protection will be required per crossing, for a total of 1.48 acres per crossing. A total of up to 21.9 acres of additional cable protection may be needed for these crossings. Cable protection for cable crossing plus the assumed 5% needed for the remainder of the RWEC–RI would result in a maximum of 32.9 acres of cable protection for the RWEC–RI.

If cable protection were needed across the entire up to 60-km RWEC–OCS, 177.9 acres would be needed; therefore 17.8 acres represents 10%; for the up to 74-km long RWEC–RI, 219.4 acres would be needed, therefore 32.9 acres represents 15%. For the entire 134-km long RWEC a total of 397.3 acres would be needed; therefore, 50.7 acres (17.8 acres for the RWEC–OCS, 32.9 acres for the RWEC–RI,) represents 13% of the entire RWEC.

Anticipated Activities or Structures that would cause Impact

Physical structure - concrete mattresses, frond mattresses, rock bags, and/or rock berms; specific cable protection material will be selected at final design

Cable protection will be used where burial cannot occur, sufficient burial depth can not be achieved due to seabed conditions or to avoid risk of interaction with external hazards. These locations may occur in areas of complex habitats, where siting through these habitats cannot be avoid ed. Cable protection will also be used where cable crossings occur.

Revolution Wind Offshore Wind Farm Project Design Envelope			Unit of Measure	Acres of Maximum Potential Impact to Benthic Habitats Crosswalked to NOAA Habitat Complexity Categories Calculated from Current Indicative GIS Layout *				Total Area of Anticipated Impacts to the Seafloor
				Large Grained Complex	Complex	Soft Bottom	Total	
RWEC	TEMPORARY	Cable Installation & Seafloor Preparation RWEC–OCS	acres	5.0	179.0	361.0	545.0	**up to 625.9 acres**
			%	1%	33%	66%	100%	**< 100%**
		Cable Installation & Seafloor Preparation RWEC–RI	acres	0.0	101.8	588.0	689.8	**up to 764.2 acres**
			%	0%	15%	85%	100%	**< 100%**

Associated Assumptions and Context

Represents 40-m wide corridor for the RWEC (up to 134 km) in which seafloor preparation and installation activities are anticipated; this corridor encompasses a total of 1,324.5 acres (593.1 acres for the RWEC–OCS and 731.4 acres for the RWEC–RI). Seafloor preparation activities will not extend beyond the 40-m installation and preparation corridor. Additional cable burial trials may occur outside of this particular 40-m cable disturbance corridor; these trials will occur within the area surveyed and mapped and will occur within a 40-m corridor. Up to 10 trials over a 250-m length each may be conducted for the RWEC; at present, the division of these trials between the RWEC–OCS and the RWEC–RI is unknown and an even split (5 per) is assumed for these calculations. These trials would add an additional maximum area of seafloor preparation of approximately 24.7 acres (12.36 acres for the RWEC–OCS and 12.36 acres for the RWEC–RI). Further, four omega joints will be required for the RWEC, two will be required per cable, one each along the RWEC–OCS and along the RWEC–RI; these will be buried and will require a seafloor preparation corridor that is 250-m long and 205-m in width, 165-m in addition to the standard 40-m width. These 4 omega joints will add an additional maximum area of seafloor preparation of 40.8 (20.4 acres for the RWEC–OCS and 20.4 acres for the RWEC–RI). Therefore, the total maximum area of seafloor disturbance would be approximately 1,390 acres (1,324.5 acres for the 40-m seafloor preparation and installation corridor, 24.7 acres for cable burial trials, and 40.8 acres for omega joints), 625.9 acres associated with the RWEC–OCS and 764.2 acres associated with the RWEC–RI.

Up to 40% of the RWEC–OCS, 24 km, and 70% of the RWEC–RI, 51.8 km, may require boulder clearance. The maximum area that may be temporarily disturbed by these activities would be 749.2 acres (237.2 acres for the RWEC–OCS, 512.0 acres for the RWEC–RI). As noted above, an additional 24.7 acres along the RWEC may be disturbed through cable burial trials and an additional 40.8 acres may be disturbed by additional seafloor preparation activity for omega joints.

In addition to seafloor preparation activities, temporary disturbance related to installation of the cable is anticipated along the entire length of the RWEC. At this time, it is expected that up to a maximum of 75 pull-ahead anchor events for each cable (maximum of 150 events) could occur for the RWEC-OCS, resulting in a maximum potential area of impact equal to 5.4 acres. For the RWEC-RI, up to 100 pull-ahead anchor events for each cable (maximum of 200 events) could occur, resulting in a maximum potential area of impact equal to 9.4 acres.

The area of the full seafloor preparation and installation corridor, plus the maximum area that may be disturbed for cable burial trials and the omega joints, represents a conservative assumption for maximum temporary seafloor disturbance, as noted above these areas total approximately 1,390 acres.

Anticipated Activities or Structures that would cause Impact

Cable laying activities will involve boulder clearance and pre-lay grapnel runs to locate and clear remaining obstructions prior to cable installation; cable laying installation activities may involve use of jet-plow, mechanical plowing, or mechanical cutters.

Dynamic Positioning (DP) vessels will generally be used for cable burial activities. If anchoring (or a pull ahead anchor) is necessary during cable installation it will occur within the area surveyed and mapped to support the Project.

Boulder clearance will occur where boulders are present and cannot be avoided with micro-siting; these impacts are more likely to occur in complex habitats.

Revolution Wind Offshore Wind Farm Project Design Envelope			Unit of Measure	Acres of Maximum Potential Impact to Benthic Habitats Crosswalked to NOAA Habitat Complexity Categories Calculated from Current Indicative GIS Layout *				Total Area of Anticipated Impacts to the Seafloor
				Large Grained Complex	Complex	Soft Bottom	Total	
Landfall HDD	TEMPORARY	HDD Exit Pits	acres	0	0	0.8	0.8	up to 0.8 acres
			%	0%	0%	100%	100%	< 100%

Associated Assumptions and Context

Excavation of up to two HDD exit pits, each covering a seafloor area of approximately 0.4 acres, including grading from the s eafloor surface to the base of the pit, will temporarily impact up to 0.8 acres.

Cofferdams, measuring up to 50 m x 10 m, may be required to keep the excavation free of debris and from silting back in. These areas are contained within those assessed for seafloor disturbance from the exit pits.

Anticipated Activities or Structures that would cause Impact

Support activities, such as anchoring or use of barges, may be needed to support installation. If anchoring (or a pull ahead anchor) is necessary during cable installation it will occur within the area surveyed and mapped to support the Project.

Exit pits will be backfilled post-construction.

Most temporary impacts related to the HDD exit pits and associated support activities will occur in soft bottom habitats. The HDD cable installation methodology will avoid direct impacts to documented SAV and juvenile cod HAPC near the Project's landfall location. In addition, Revolution Wind will avoid construction in state waters during the peak SAV growing season (i.e., July 1 to September), which will further minimize potential effects due to increased turbidity and sediment deposition associated with cable installation and excavation of the HDD exit pits.

4.1 Project Impacts to Benthic Habitats within the RWF

Revolution Wind is committed to an indicative layout scenario with WTG and OSS foundations sited in a uniform east-west/north-south grid with 1.15 by 1.15-mi (1 by 1-nm; 1.85 by 1.85-km) spacing that aligns with other proposed adjacent offshore wind projects in the RI-MA WEA and MA WEA. To support this agreed upon spacing, a diamond shaped micro-siting allowance is provided for each foundation location (102 total, 100 WTGs, 2 OSSs) (Figure 1-3). The center point of each of these diamonds represents the default position of each foundation. Revolution Wind will micro-site foundations within the micro-siting diamonds on a case-by-case basis to avoid significant seabed hazards such as surface and subsurface boulders and to avoid and minimize impacts to complex habitat types to the extent feasible and in consideration of other siting constraints. Scour protection and CPS stabilization for IACs associated with each foundation will be used as required for engineering purposes.

The WTG and OSS foundations are generally sited across the habitats present at the RWF approximately proportional to their spatial prevalence and distribution (roughly 50% soft bottom, 30% complex, 20% large grained complex) (Table 4-1; Figure 4-1). Anticipated impacts calculated for the IAC network and OSS-Link Cable were skewed toward soft bottom habitats in higher proportions than their distribution with the RWF, 55 – 79 % compared to ~ 50 % spatial distribution (Table 4-1). Potential impacts to habitats crosswalked to large grain complex and complex NOAA Habitat Complexity categories are likely to be minimized through layout refinement and micro-siting of foundation positions and cables.

The majority of the micro-siting diamonds within the RWF (64 of 102) are located wholly within dynamic sand, mud, and mobile coarse sediments expected to recover relatively quickly from impacts related to installation of the foundations (Figure 4-2). A portion of another 15 micro-siting diamonds overlap with dynamic sand, mud, and mobile coarse sediment habitats. In contrast, habitats characterized by boulder fields and diverse complex glacial moraine habitats overlap with fewer than one-third of the micro-siting diamonds (Figure 4-2). Two micro-siting diamonds are located wholly in sand, mud, or coarse sediment habitats coincident with low or medium density boulder fields and 29 micro-siting diamonds partially coincide with these habitats (Figure 4-2). Five micro-siting diamonds are located wholly within Glacial Moraine A habitats and none within Glacial Moraine B habitats (Figure 4-2). Twenty-seven micro-siting diamonds partially overlap with Glacial Moraine A habitats and four with Glacial Moraine B habitats (Figure 4-2). There are over 70 micro-siting diamonds that do not overlap at all with boulder fields or Glacial Moraine A and B habitats.

4.2 Project Impacts to Benthic Habitats within the RWEC

Permanent and temporary impacts related to the RWEC are anticipated to occur mostly in soft bottom habitats; specifically, 66% of the RWEC–OCS and 85% of the RWEC–RI 40-m corridor in which cable preparation and installation activities are planned is represented by benthic habitats crosswalked to the soft bottom category (Table 4-1). The cables are sited approximately proportional to their spatial prevalence and distribution (Figure 3-28). Temporary impacts related to the HDD exit pits and support area would be primarily contained within habitats crosswalked to the soft bottom category (Table 4-1). With a few exceptions, the RWEC is generally composed of soft bottom sand and mud habitats (Figure 3-21), with few areas of scattered boulders (Figure 3-22).

The areas of complex habitat nearest to the RWF (Mixed-Size Gravel in Muddy Sand) and in the West Passage of Narragansett Bay (Mud and Sandy Mud with Shell Substrate) are notable in that they span the width of the RWEC–OCS and RWEC–RI Study Areas (Figure 3-28). Therefore, impacts to these habitats cannot be altered by micro-siting the cable routes within the RWEC–RI Study Area. Revolution Wind will avoid and minimize impacts to complex habitats with siting of the RWEC–OCS and RWEC–RI to the extent feasible and in consideration of other siting constraints.

4.2.1 Impacts to Shell Substrate Habitats

A large area of Mud and Sandy Mud habitat south of the Jamestown Bridge was characterized by a seafloor surface of Shell Substrate and comprised approximately 620 acres and 11% of the habitats mapped within the RWEC–RI Study Area (Table 3-5; Figures 3-12 and 3-22). The shells in these habitats included both live and dead shells (Figures 2-14I, 2-15C, and 2-15D). Live blue mussels, such as those observed with patchy cover on the seafloor at Station 448 (Figure 2-15C) provide filtration ecosystem services. Shells and shell hash are included in the EFH designations of several priority species in the region, such as black sea bass and ocean pout (for more detail on demersal fish species habitat utilization see Section 4.4). The Mud and Sandy Mud with Shell Substrate habitat extends across nearly the entire width of an approximately 14,000-ft (4,267-m) section of the RWEC–RI Study Area south of the Jamestown Bridge (Figure 3-22). Therefore, impacts to these habitats cannot be avoided by micro-siting the cable routes within the RWEC–RI Study Area. However, Shell Substrate and live mussels and/or gastropods are likely to reestablish the Mud and Sandy Mud with Shell Substrate after the cables have been installed. Shells and shell hash are generated where bivalves are living and blue mussels and gastropods rapidly recolonize suitable habitat. The cable will be buried with trenching or jet plows which will leave some shell material on the surface. The surface environment is expected to return to pre-construction conditions through the same processes that created the habitat. Should cable protection be needed along these stretches of the RWEC, a permanent benefit may result as the converted habitat may provide useful substrate for mussel attachment or other epifauna.

4.2.2 Impacts to Submerged Aquatic Vegetation

SAV beds, dominated by *Zostera marina*, represent unique habitats throughout the shallow coastal waters of Narragansett Bay and their distribution is periodically mapped across the Bay using aerial imagery and field verification by the URI Environmental Data Center (URI Environmental Data Center and RIGIS). SAV extent varies over time and these aquatic plants experience peak growth during late summer months. SAV are found in mud and muddy sand sediments, and a single Mud and Sandy Mud with SAV habitat was mapped within the area east of the landfall location. SAV habitats are defined by NOAA as complex habitats (NOAA Habitat

2021) and are widely known to provide important ecosystem services related to water clarity and nutrient cycling, and provide habitat for invertebrates and demersal fish, particularly juveniles. Mud and Sandy Mud with SAV habitats comprising 0.2 acres were mapped within the RWEC–RI Study Area in Narragansett Bay.

The western edge of the SAV habitat mapped at Compass Rose Beach is approximately 845 feet (257 m) east of the center point of nearest proposed HDD exit pit work area. SAV beds are found in shallow coastal areas throughout the Bay, including along the western shores of Conanicut and Dutch Islands, proximal to the RWEC–RI route. The nearest SAV bed within the West Passage is approximately 142 ft (43 m) from the edge of the RWEC–RI Study Area and 1,150 ft (350 m) from the indicative RWEC–RI route, on the western side of Dutch Island. At a distance of 1,150 ft (350 m), SAV habitat near the indicative cable route is 115 ft (35 m) beyond the projected impact distance for deposition and is within the projected impact distance for elevated turbidity (RPS 2021). The SAV bed mapped at the landfall location during the 2020 video survey is 105 ft (32 m) beyond the projected impact distance for deposition and is within the projected impact distance for elevated turbidity (RPS 2021). Turbidity levels elevated above background concentrations are not predicted to persist for more than 70.2 hrs and most of the affected area is expected to return to ambient levels within 6 hrs (RPS 2021); thereby minimizing potential negative impacts to SAV. Revolution Wind will utilize an HDD cable installation methodology to avoid documented SAV near the Project's landfall location. In addition, Revolution Wind will avoid construction in state waters during the peak SAV growing season (i.e., July 1 to September), which will further minimize potential effects due to increased turbidity and sediment deposition associated with cable installation and excavation of the HDD exit pits.

4.3 Impacts to Glacial Habitats

Bedrock, Glacial Moraine A and B, and Mixed-Size Gravel in Muddy Sand habitats, as well as nearby Low or Medium Density Boulder Fields coincident with sand and mud habitats, provide structure that supports attached fauna such as hydroids and sponges and, in shallower photic waters (West Passage of Narragansett Bay), flora such as benthic macroalgae, as well as demersal fish, such as black sea bass and tautog, that utilize hard bottom substrates and structure (for more detail on demersal fish species habitat utilization see Section 4.4). A distinction was made between Glacial Moraine A and Glacial Moraine B habitats to distinguish between areas of unconsolidated geological debris (A) and consolidated geological debris (B). The surface of Glacial Moraine B deposits appeared poorly sorted and dense with very high boulder densities resulting in greater structural complexity and permanence. By comparison, the surface of Glacial Moraine A units was reworked with sand and gravel deposits resulting in less structural complexity and permanence.

Glacial Moraine A habitats are prevalent in the central and southern portions of the RWF, coincident with the Ronkonkoma Moraine (Figures 3-1 and 3-15). Glacial Moraine A habitats comprise the total area of five micro-siting diamonds and part of the area of another 27; these habitats are not found within 70 of the 102 micro-siting diamonds at RWF. Glacial Moraine B habitats were more limited in distribution within the RWF (Figure 3-15) and do not comprise the total habitat composition of any micro-siting diamond; however, Glacial Moraine B habitats are present within four micro-siting diamonds, and were not found within the remaining 98 micro-siting diamonds. Low and Medium Density Boulder Fields coincident with sand and mud or coarse sediment habitats were generally present proximal to Glacial Moraine A habitat (Figure 3-15). Two micro-siting diamonds are located wholly in sand, mud, or coarse sediment habitats coincident with low or medium density boulder fields, 29 micro-siting diamonds partially coincide with these habitats; a total of 71 micro-siting diamonds did not overlap with these habitats. Revolution Wind will micro-site foundations within the micro-siting diamond on a case-by-case basis to avoid significant seabed hazards such as surface and subsurface boulders and to avoid and minimize impacts to complex glacial habitat types to the extent feasible and in consideration of other siting constraints.

Both Glacial Moraine A and B habitats were limited in their distribution along the RWEC and are found mostly on the edges of the RWEC–OCS and RWEC–RI Study Areas (Figure 3-21). Mixed-Size Gravel in Muddy Sand habitats was present across most of the width of the RWEC–OCS Study Area near the RWF (Figure 3-21). Also, as described in Section 1.1, the RWEC–OCS and RWEC–RI Study Areas represent broad areas evaluated by Revolution Wind for siting of the export cables in federal and state waters, respectively. Revolution Wind will avoid and minimize impacts to glacial habitats with siting of the RWEC–OCS and RWEC–RI to the extent feasible and in consideration of other siting constraints.

4.4 Project Impacts to Benthic EFH for Priority Species

Species with demersal/benthic life stages are more vulnerable to project impacts than species with pelagic life stages. Specifically, demersal/benthic life stages are vulnerable to impacts from project activities that permanently or temporarily disturb the seafloor and/or result in temporary sediment suspension and deposition, such as seafloor preparation, impact pile driving and/or vibratory pile driving/foundation installation, cable installation, and vessel anchoring (detailed impacts to EFH are outlined in Section 3.1 of the Essential Fish Habitat Technical Report, Appendix L of the Revolution Wind Construction and Operations Plan (Revolution Wind, LLC. 2021d). While construction and operation activities may affect EFH for demersal/benthic life stages, these impacts are also anticipated to be temporary (except as noted below) and minor as they will disturb a small portion of available EFH in the area. Species with a preference for sandy habitats, such as Atlantic surfclam and ocean quahog, are more likely to experience long-term impacts to their habitats from the conversion of sand habitat into hard bottom habitat with the addition of materials used for cable and scour protection, where needed. Additionally, sessile species or species with benthic eggs such as Atlantic sea scallop, ocean pout, and winter flounder that have limited or no mobility and increased sensitivity to turbidity are likely to be injured, displaced, or experience mortality from these activities. Many of the potential impacts from these Project activities will be mitigated with procedures outlined in Section 4.5 Proposed Environmental Protection Measures.

In total, 25 benthic/demersal species and 54 life stages with designated essential fish habitat within the Project Area have been crosswalked to mapped benthic habitats: 40 life stages to Glacial Moraine A and B habitats, 35 to Mixed-Size Gravel in Muddy Sand habitats, 47 to Coarse Sediment habitats, 45 to Sand and Muddy Sand habitats, 36 to Mud and Sandy Mud habitats; and 22 to boulders, 14 to SAV habitats, and nine to Shell Substrate within any habitat type. A list of ten priority species and their specific habitat preferences are highlighted and discussed in more detail below. Only impact producing factors related to physical habitat disturbance (i.e., habitat conversion, seafloor disturbance and suspended sediment deposition) are considered here. Due to the conservative approach used in crosswalking species EFH to benthic habitat types and, in a number of cases, the limited information on species' sediment preferences, it should be kept in mind that there are likely much smaller areas within each mapped habitat type that may be more valuable for each species/life stage than others. Because of the conservative crosswalk approach utilized, impacts to a given habitat may not necessarily affect all species with EFH crosswalked to that habitat type.

Atlantic Cod

EFH for both juvenile and adult cod consists of hard bottom habitats, with juveniles preferring cobble substrates, and adults preferring structurally complex hard bottom habitats composed of gravel, cobble, and boulder substrates (Lough 2004). Cobble habitats are essential for the survival of juvenile cod in that they may assist with avoiding predation by older year classes (Gotceitas and Brown 1993) and recent studies suggest that rocky, hard bottom habitats may be important for reproduction (DeCelles et al. 2017; Siceloff and Howell 2012). An active Atlantic cod winter spawning ground has been identified in a broad geographical area that includes Cox Ledge and surrounding locations (Zemeckis et al. 2014b; Dean et al., 2020). Adult and juvenile cod EFH is likely to occur within the Glacial Moraine (A&B), Mixed-Size Gravel in Muddy Sand, and Coarse Sediment habitats within the Revolution Wind project areas, primarily found in large patches in the southern portion of the RWF and smaller patches in the northern portion of the RWF and RWEC–OCS and RWEC–RI Study Areas. In addition, the RWEC–RI Study Area crosses a Habitat Area of Particular Concern (HAPC) for juvenile cod which includes vegetated and structurally complex rocky-bottom habitats at depths under 66 feet (20m) that likely to be found in the Glacial Moraine, Mixed-size Gravel in Muddy Sand, and SAV habitats (Figure 4-3) that provide juvenile cod with protection from predation and support a wide variety of prey items (NEFMC 2017).

As mentioned above, cod are expected to experience some impacts to their habitat from project activities that permanently or temporarily disturb the seafloor. In southern New England, cod spawn primarily from December through May (Dean et al., 2020; Langan et al., 2020), so they could be more susceptible to a disturbance to their preferred spawning habitats during that time. Given the availability of similar surrounding habitat, Project activities are not expected to result in long term adverse impacts to spawning habitat or adult or juvenile EFH; conversely, the use of gravel, boulders, and/or concrete mats for cable or scour protection will create new hard substrate. This substrate is expected to be initially colonized by barnacles, tube-forming species, hydroids, and other fouling species found on existing hard bottom habitat in the region, which may ultimately provide additional preferred cod habitat (Reubens et al. 2013). Impacts to juvenile cod HAPC from nearshore project activities will be avoided by use of HDD for cable landfall, thus avoiding direct impacts to nearshore habitats (Figure 4-3). In addition, most temporary impacts related to the HDD exit pits and associated support activities will occur in soft bottom habitats not preferred by cod.

Atlantic Sea Scallop

Atlantic sea scallops are likely to be found throughout the Project area and were collected in the majority of NEFSC seasonal trawls from 2003 to 2016 in the Rhode Island Massachusetts Wind Energy Area (RIMA WEA) (Guida et al. 2017). Due to their benthic existence and limited mobility, scallops have been identified as a species of concern for habitat disturbance in the RIMA WEA by Guida et al. (2017).

Atlantic sea scallop eggs likely remain on the seafloor as they develop into free-swimming larvae, which settle to the seafloor (as “spat”) before metamorphosing into juveniles (Hart and Chute 2004). Hard surfaces are essential for the survival of the spat, including sedentary branching plants or animals, shells, small pebbles, or adult scallops (Stokesbury and Himmelman 1995). Because of these associations with the seafloor, egg and larval scallop EFH is likely to be found in Glacial Moraine (A&B), Mixed-Size Gravel in Muddy Sand, Coarse Sediment, and Sand and Muddy Sand habitats within the RWF, RWEC–OCS, and RWEC–RI Study Areas, although larvae are less likely to be found on mobile bottom habitats. Similarly, juvenile scallops are primarily found on gravel, shells, and silt (Thouzeau et al. 1991; Parsons et al. 1992), or attached to branching bryozoans, hydroids or algae (Stokesbury and Himmelman 1995), and adult scallops are generally found on firm sand, gravel, shells and rock (MacKenzie et al. 1978; Langton and Robinson 1990; Thouzeau et al. 1991; Stewart and Arnold 1994). EFH for juvenile and adult scallops is also likely to be found in Glacial Moraine (A&B), Mixed-Size Gravel in Muddy Sand, Coarse Sediment, and Sand and Muddy Sand habitats within the RWF, RWEC–OCS, and RWEC–RI Study Areas.

All life stages of scallops may experience temporary direct impacts from the construction and operation of the project. Seafloor preparation may cause injury, displacement, or mortality to scallops of all life stages. These impacts are expected to be temporary as the direct impacts will cease after seafloor preparation is completed in an area, and minor as they will disturb a small portion of available EFH in the area. Scallops will be able to recolonize most areas once construction is complete.

Atlantic Surfclam and Ocean Quahog

Atlantic surfclams are found in medium to coarse sand and gravel substrates and can also be found in fine or silty sand, but not in mud (Dames and Moore, Inc. 1993; MacKenzie et al. 1985; Cargnelli et al. 1999b). They are most abundant in water depths between 26 and 217 ft (8 and 66 m) beyond the surf zone (Fay et al. 1983). EFH for adult surfclams is likely to be found in the

Glacial Moraine (A&B), Mixed-Size Gravel in Muddy Sand, Coarse Sediment, and Sand and Muddy Sand habitats within the RWEC–OCS Study Area, and for juveniles and adults within the same habitats in the RWEC–RI Study Area.

Ocean quahogs are generally distributed just below the sediment surface in medium to fine grain sand, sandy mud, silty sand, and fine to medium grained sand primarily at depths between 82 and 200 ft (25 and 61 m) (Cargnelli et al. 1999c; Merrill and Ropes 1969; Serchuk et al. 1982). Mapped EFH for adult and juvenile ocean quahogs only intersects with the Project area in the RWF and EFH occurs within all habitats in the RWF area that contain sand or mud, including Glacial Moraine (A&B), Coarse Sediment, Sand and Muddy Sand, and Mud and Sandy Mud habitats.

Atlantic surfclam and ocean quahog are likely to be similarly impacted from project activities. Due to their lack of mobility, it is possible that seafloor preparation could cause injury, displacement, or mortality to these species. Shellfish will be able to recolonize most areas once construction is complete, however they may experience small amounts of permanent habitat loss in areas around the WTGs where scour protection is needed and sections of the array and substation interconnection and export cables where cable protection may be required as they will not be able to colonize the new structured habitat. Detailed impacts to benthic and shellfish resources are discussed in Revolution Wind COP Section 4.3.2.2 (Revolution Wind, LLC 2021a).

Black Sea Bass

Black sea bass juveniles and adults are well documented as having strong associations with structured habitats, including natural and artificial reefs, shellfish beds, shell hash, vegetated bottom, cobble, gravel, and boulder habitats (Drohan et al. 2007). Within the Project area, existing structure consists primarily of boulders and cobbles and the attached epifauna that grows on them. These habitat features are found within the RWF, RWEC–OCS, and RWEC–RI Study Areas in the Glacial Moraine (A&B), Mixed-Size Gravel in Muddy Sand, and Coarse Sediment habitats, as well as in any habitat with boulders, shell substrate, or SAV. Both juveniles and adults have shown strong site fidelity (Able and Hales 1997; Briggs 1979) so may be vulnerable to disruptions to structured habitats.

Black sea bass may experience temporary impacts to their habitat from project activities that permanently or temporarily disturb the seafloor or result in temporary sediment suspension and deposition. Long term adverse impacts to both adult and juvenile EFH are expected to be minor as the species is expected to recolonize the area post construction. Beneficial impacts are expected with the creation of additional structured habitats from WTGs and conversion of sandy and gravelly sediments into structured hard bottom habitat as was demonstrated at the Block Island Wind Farm where a dramatic increase in black sea bass occurred post-construction (HDR 2020)

Little Skate and Winter Skate

Little skate and winter skate are discussed together for the purposes of this report as they share similar habitat requirements, are frequently co-occurring (McEachran and Musick 1975), and are expected to experience similar impacts from Project activities. Both species are expected to occur throughout the Project area and were dominant species during the winter and spring NEFSC Trawl Surveys within the RIMA WEA between 2003 and 2016 (with little skate being dominant in both cold and warm seasons) (Guida et al. 2017).

Little skate and winter skate juveniles and adults are found throughout southern New England on sandy or gravelly substrate but have also been found on mud (Bigelow and Schroeder 1953; McEachran and Musick 1975; Langton et al. 1995; Tyler 1971). These species are likely to be associated with all habitats within the RWF, RWEC–OCS, and RWEC–RI as all habitats have some component with sand, gravel, or mud.

Given the broad distribution of these species throughout all Project areas, there are likely to be temporary and permanent impacts to their preferred habitats. These species may be temporarily displaced by seafloor disturbing activities but are anticipated to recolonize most areas once construction is complete. However, they may experience permanent habitat loss in areas that are converted from sandy and gravelly sediments to hard bottom habitats around the WTGs and sections of the inter-array and export cables where scour and cable protection may be required. Loss of habitat due to conversion to hard bottom is not expected to have a significant impact on these species due the large amount of alternate suitable habitat available.

Longfin Squid

Little information is available on egg habitat locations for longfin squid (Jacobson 2005); however, egg mops are often found attached to cobbles and boulders on sandy or muddy bottoms or attached to aquatic vegetation (Arnold et al. 1974; Griswold and Prezioso 1981; Summers 1983). Due to the limited information available on suitable egg habitat, it is assumed that egg mops could be present on any substrates within adult spawning habitat and EFH for longfin squid eggs has been mapped to all project habitats. Specifically, EFH for eggs may be found during the spawning months of May to August (Summers 1971; Macy 1980) within the RWF, RWEC–OCS and RWEC–RI Study Areas. Depending on timing, longfin squid egg mops could experience injury, displacement, or mortality from construction and cable laying activities in their immediate vicinity, but most impacts are expected to be minimal as only a small amount of available spawning habitat will be disturbed. Furthermore, as described in the proposed environmental protection measures laid out in Section 4.5, Revolution Wind is coordinating with NOAA Fisheries and RIDEM to develop time of year (TOY) restrictions that would restrict cable laying activities and result in reduced likelihood of impacts to spawning squid.

Ocean Pout

Ocean pout eggs are demersal and laid in gelatinous masses, generally in sheltered nests, holes, or rocky crevices within hard bottom habitats (NEFMC 2017). These essential habitats are expected within the Glacial Moraine (A&B), Mixed-Size Gravel in Muddy Sand, and Coarse Sediment habitats within the Project area, specifically where found in large patches throughout the RWF and in smaller sections of the RWEC–OCS and RWEC–RI Study Areas.

Juvenile and adult ocean pout occur on a wide variety of substrates, including shells, rocks, algae, soft sediments, sand, and gravel (NEFMC 2017). Rocky shelter is shown to be especially important for spawning adults in the autumn when they lay their eggs (Smith 1898). EFH for juveniles and adults is expected to occur within all habitat types in the Project area, specifically throughout the RWF and RWEC–OCS. Essential adult habitats may also be found in deeper (> 66 ft (20 m)) portions of the RWEC–RI cable routes (Figure 2-3).

All life stages of ocean pout may experience temporary impacts from the construction, operations and maintenance, and decommissioning phases of the Project. Eggs are particularly vulnerable to impacts due to their inability to vacate the Project area during construction. These impacts are expected to be temporary as the direct impacts will cease after seafloor preparation is completed, and minor as they will disturb a small portion of available EFH in the area. Ocean pout are expected to recolonize the area once construction is complete and may experience permanent beneficial impacts from the creation of additional preferred habitats for eggs, juveniles, and spawning adults from the conversion of sandy and gravelly sediments into structured hard bottom habitat.

Winter Flounder

Winter flounder egg clusters stick to the substrates on which they are laid, which include mud, muddy sand, gravel, macroalgae and submerged aquatic vegetation (NEFMC 2017). Essential habitats for winter flounder eggs, young-of-the-year (YOY) juveniles, and spawning adults are likely to be found in waters less than 16.4 ft (5 m) in depth (NEFMC 2017) in Mixed-Size Gravel in Muddy Sand, Coarse Sediment, Sand and Muddy Sand, or Mud and Sandy Mud habitats, as well as any benthic substrate with SAV. Eggs and spawning adults are most likely to be found in these habitats from January through June (Massie 1998). Non-spawning winter flounder adults and older juveniles are found in continental shelf benthic habitats and deeper coastal waters than eggs and YOY (Phelan 1992; NEFMC 2017), therefore juveniles and non-spawning adults are likely to utilize these habitats within all Project areas, however EFH for eggs and spawning adults is only expected within habitats less than 16.4 ft (5 m) of water, occurring in approximately 1.6 mi (2.6 km) of the RWEC–RI Study Area.

Impacts from project activities related to installation of the RWEC–RI may temporarily directly affect winter flounder eggs, YOY, and spawning adults. Eggs could be entrained within the jet plow or experience increased mortality due to sediment suspension (Berry et al. 2011), however as there will be very little project activity in shallow (< 16.4 ft) inshore areas, the impact to spawning habitat is expected to be minimal. These impacts are expected to be minor as they will disturb a small portion of available EFH in the area and temporary because the substrates within the RWEC–RI are expected to remain fundamentally the same as pre-existing conditions and would therefore allow for continued use by spawning winter flounder, YOY, and eggs.

Juveniles and adult flounder are also likely to be temporarily displaced by seafloor disturbing activities. Flounder are expected to recolonize most areas once construction is complete, however similar to other species that utilize sandy habitats, they may experience permanent habitat loss in areas that are converted from sandy and gravelly sediments to hard bottom habitats around the WTGs and sections of the inter-array and export cables where scour and cable protection may be required. Loss of habitat due to conversion to hard bottom is not expected to have a significant impact on these species due to the large area of alternate suitable habitat available. In addition to mitigation measures laid out in Section 4.5 Revolution Wind has coordinated with RIDEM and NOAA Fisheries regarding TOY restrictions in state waters. Based on the coordination conducted to-date, in general, offshore site preparation and installation of the RWEC–RI north of the Convention on the International Regulations for Preventing Collisions at Sea ("COLREGS") line of demarcation will occur between the day after Labor Day and February 1 to avoid and minimize impacts to winter flounder (*Pseudopleuronectes americanus*).

4.5 Proposed Environmental Protection Measures

Revolution Wind will implement the following environmental protection measures to reduce potential impacts on benthic resources and shellfish. These measures are based on protocols and procedures successfully implemented for similar offshore projects.

- The RWF and RWEC will be sited to avoid and minimize impacts to sensitive habitats (e.g., hard bottom habitats) to the extent practicable.
- To the extent feasible, installation of the IACs, OSS-Link Cable and RWEC will be buried using equipment such subsea cable trenchers such as jet trenchers or mechanical cutting trenchers, simultaneous lay and burial using a cable plow, or jet plow. The feasibility of cable burial equipment will be determined based on an assessment of seabed conditions and the Cable Burial Risk Assessment.
- To the extent feasible, the RWEC, IAC, and OSS-Link Cable will typically target a burial depth of 4 to 6 ft (1.2 to 1.8 m) below seabed. The target burial depth will be determined based on an assessment of seabed conditions, seabed mobility, the risk of interaction with external hazards such as fishing gear and vessel anchors, and a site-specific Cable Burial Risk Assessment.
- Dynamic positioning vessels will be used for installation of the IACs, OSS-Link Cable, and RWEC to the extent practicable.
- A plan for vessels will be developed prior to construction to identify no-anchorage areas to avoid documented sensitive resources.
- Revolution Wind is committed to collaborative science with the commercial and recreational fishing industries pre-, during, and post-construction. Fisheries monitoring studies are being planned to assess the impacts associated with the Project on

economically and ecologically important fisheries resources. These studies will be conducted in collaboration with the local fishing industry and will build upon monitoring efforts being conducted by affiliates of Revolution Wind at other wind farms in the region.

- Revolution Wind intends to conduct an as-built survey/bathymetry survey along the entirety of the cable routes in state waters within ninety (90) days of completed installation. Bathymetry surveys will be performed one year after commissioning, two years after commissioning, and every five years thereafter for the operational life of the Project. The need for additional surveys will depend on the findings of the initial surveys (i.e., site seabed dynamics and soil conditions).

- A preconstruction SAV survey will be completed to identify any new or expanded SAV beds. The Project design will be refined to avoid impacts to SAV to the greatest extent practicable.

- Revolution Wind is coordinating with RIDEM and NOAA Fisheries regarding time of year restrictions for cable laying activities in RI State Waters and will comply with such restrictions.

- Anchoring will not occur outside of the Area of Potential Effects (surveyed area) for the Project. Prior to construction, a plan for vessels will be developed to identify no anchorage areas to avoid documented sensitive resources and no anchoring will occur within areas of archaeological significance.

5.0 REFERENCES

Able, K.W. and L.S. Hales, Jr. 1997. Movements of juvenile black sea bass *Centropristis striata* (Linnaeus) in a southern New Jersey estuary. J. Exp. Mar. Biol. Ecol. 213: 153-167.

Arnold, J.M., W.C. Summers, D.L. Gilbert, R.S. Manalis, N.W. Daw, and R.J. Lasek. 1974. A guide to laboratory use of the squid, *Loligo pealei*. Marine Biological Laboratory, Woods Hole, MA. 74 p.

Atlantic Wolffish Biological Review Team (BRT). 2009. Status review of Atlantic wolffish (*Anarhichas lupus*). Report to the National Marine Fisheries Service, Northeast Regional Office. 161pp.

Bennett M.R. and N.F. Glasser. 2009. Glacial Geology. Ice Sheets and Landforms, 2nd ed. xii + 385 pp. Wiley-Blackwell.

Berry, W.J., N.I. Rubinstein, E.K. Hinchey, K.G. Klein-MacPhee, and D.G. Clarke. 2011. Assessment of Dredging-Induced Sedimentation Effects on Winter Flounder (*Pseudopleuronectes americanus*) Hatching Success: Results of Laboratory Investigations. Proceedings of the Western Dredging Association Technical Conference and Texas A&M Dredging Seminar. Nashville, TN.

Bigelow, H.B. and W.C. Schroeder. 1953. Fishes of the Gulf of Maine. U.S. Fish Wildl. Serv., Fish. Bull. 53. 577 p.

Briggs, P.T. 1979. Black sea bass in New York waters. N.Y. Fish Game J. 25: 45-58.

Brodziak, J.K.T. 2005. Essential Fish Habitat Source Document: Haddock, *Melanogrammus aeglefinus*, Life History and Habitat Characteristics, Second Edition. NOAA Tech Memo NMFS-NE-196; 78 pp.

Brown, C.J., J. Beaudoin, M. Brissette, and V. Gazzola. 2019. Multispectral Multibeam Echo Sounder Backscatter as a Tool for Improved Seafloor Characterization. Geosciences 9(3):126.

Brown, C.J., S.J. Smith, P. Lawton, and J.T. Anderson. 2011. Benthic habitat mapping: A review of progress towards improved understanding of the spatial ecology of the seafloor using acoustic techniques. Estuarine, Coastal and Shelf Science 92(3): 502–520.

Bureau of Ocean Energy Management (BOEM) Office of Renewable Energy Programs. 2019. Guidelines for Providing Benthic Habitat Survey Information for Renewable Energy Development on the Atlantic Outer Continental Shelf Pursuant to 30 CFR Part 585. June 2019.

Bureau of Ocean Energy Management (BOEM) Office of Renewable Energy Programs. 2020a. Guidelines for Providing Geophysical, Geotechnical, and Geohazard Information Pursuant to 30 CFR Part 585. May 27, 2020.

Bureau of Ocean Energy Management (BOEM) Office of Renewable Energy Programs. 2020b. Guidelines for Information Requirements for a Renewable Energy Construction and Operations Plan (COP). Version 4.0: May 27, 2020.

Cargnelli, L.M., S.J. Griesbach, D.B. Packer, P.L. Berrien, D.L. Johnson, and W.W. Morse. 1999a. Essential Fish Habitat Source Document: Pollock*, Pollachius virens*, Life History and Habitat Characteristics. NOAA Tech Memo NMFS-NE-131; 38 pp.

Cargnelli, L.M., S.J. Griesbach, D.B. Packer, and E. Weissberger. 1999b. Essential fish habitat source document: Atlantic surfclam, *Spisula solidissima*, life history and habitat characteristics. NOAA Tech Memo NMFSNE-142; 13 pp.

Cargnelli, L.M., S.J. Griesbach, D.B. Packer, and E. Weissberger. 1999c. Essential Fish Habitat Source Document: Ocean Quahog, *Arctica islandica*, Life History and Habitat Characteristics. NOAA Tech Memo NMFS-NE-148; 20 pp.

Chang, S., W.W. Morse, and P.L. Berrien. 1999a. Essential Fish Habitat Source Document: White Hake, *Urophycis tenuis*, Life History and Habitat Characteristics. NOAA Tech Memo NMFS-NE-136; 32 pp.

Chang, S., P.L. Berrien, D.L. Johnson, and W.W. Morse. 1999b. Essential Fish Habitat Source Document: Windowpane, *Scophthalmus aquosus*, Life History and Habitat Characteristics. NOAA Tech Memo NMFS-NE-137; 40 pp.

Colarusso, P. and A. Verkade. 2016. Joint Federal Agency Submerged Aquatic Vegetation Survey Guidance for the New England Region. Prepared by NOAA Habitat, EPA R2, and USACE NAE. Updated August 11, 2016.

Dames and Moore, Inc. 1993. Benthic animal-sediment assessment of potential beach fill borrow source for the Rehoboth/Dewey Beach, Delaware interim feasibility study. Report to U.S. Army Corps of Engineers, Philadelphia District. Contract No. DACW61-93-D-0001.

Dean, M., G. DeCelles, D. Zemeckis, and T. Ames. 2020. Early Life History. In: An Interdisciplinary Review of Atlantic Cod (*Gadus morhua*) Stock Structure in the Western North Atlantic Ocean. R.S. McBride and R.K. Smedbol, eds. NOAA Tech Memo NMFS-NE-XXX. June 2020.

DeCelles, G.R., D. Martins, D.R. Zemeckis, and S.X. Cadrin. 2017. Using Fishermen's Ecological Knowledge to map Atlantic cod spawning ground on Georges Bank. ICES Journal of Marine Science, 74: 1587–1601.

Downie, A-L., T. Noble-James, A. Chaverra, K.L. Howell. 2021. Predicting sea pen (Pennatulacea) distribution on the UK continental shelf: evidence of range modification by benthic trawling. Mar Ecol Prog Ser. 670: 75–91.

Drohan, A.F., J.P. Manderson, and D.B. Packer. 2007. Essential Fish Habitat Source Document: Black sea bass, *Centropristis striata*, life history and habitat characteristics, 2nd edition. NOAA Tech. Memo. NMFS-NE-200, 68 pp.

Fay, C.W., R.J. Neves, and G.B. Pardue. 1983. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Mid- Atlantic): surf clam. U.S. Fish Wildl. Serv., Div. Biol. Serv., FWS/OBS-82/11.13.23.

Federal Geographic Data Committee (FGDC). 2012. Coastal and Marine Ecological Classification Standard. Federal Geographic Data Committee. FGDC-STD-018-2012. 337 pages.

Folk, R.L. 1954. The distinction between grain size and mineral composition in sedimentary rock nomenclature. Journal of Geology 62 (4), 344-359.

Guida, V., A. Drohan, H. Welch, J. McHenry, D. Johnson, V. Kentner, J. Brink, D. Timmons, and E. Estela-Gomez. 2017. Habitat Mapping and Assessment of Northeast Wind Energy Areas. Sterling, VA: US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2017-088. 312 p.

Gotceitas, V. and J.A. Brown. 1993. Substrate selection by juvenile Atlantic cod (*Gadus morhua*): effects of predation risk. Oecologia 93: 31-37.

Griswold, C.A. and J. Prezioso. 1981. In-situ observations on reproductive behavior of the longfinned squid, *Loligo pealei*. Fish. Bull. (U.S.) 78: 945-947.

Hart, D.R. and A.S. Chute. 2004. Essential Fish Habitat Source Document: Sea Scallop, *Placopecten magellanicus*, Life History and Habitat Characteristics. NOAA Tech Memo NMFS-NE-189. 32 p.

Jacobson, L.D. 2005. Essential Fish Habitat Source Document: Longfin Inshore Squid, *Loligo pealeii*, life history and habitat characteristics, 2nd edition. NOAA Tech Memo NMFS-NE-193; 42 pp.

Langan, J.A., M.C. McManus, D.R. Zemeckis, and J.S. Collie. 2020. Abundance and distribution of Atlantic cod (*Gadus morhua*) in a warming southern New England. Fishery Bulletin 118: 145-156.

Langton, R.W. and W.E. Robinson. 1990. Faunal associations on scallop grounds in the western Gulf of Maine. J. Exp. Mar. Biol. Ecol. 144: 157-171.

Langton, R.W., P.J. Auster, and D.C. Schneider. 1995. A spatial and temporal perspective on research and management of groundfish in the northwest Atlantic. Rev. Fish. Sci. 3: 201-229.

Lillesand, T.W., R.W. Kiefer, and J. Chipman. 2015. Remote Sensing and Image Interpretation, 7th Edition. New York: Wiley. 736 pp.

Lock, M.C. and D.B. Packer. 2004. Essential Fish Habitat Source Document: Silver Hake, *Merluccius bilinearis*, Life History and Habitat Characteristics. NOAA Tech Memo NMFS-NE-186. 78 p.

Lough, R.G. 2004. Essential fish habitat source document: Atlantic cod, *Gadus morhua*, life history and habitat characteristics. NOAA Tech Memo NMFS-NE-190.

Lucieer, V., M. Roche, K. Degrendele, M. Malik, M. Dolan, and G. Lamarche. 2017. User expectations for multibeam echo sounders backscatter strength data-looking back into the future. Marine Geophysical Research 39:23–40.

Lurton, X. and G. Lamarche (Eds). 2015. Backscatter measurements by seafloor-mapping sonars. Guidelines and Recommendations. 200p. http://geohab.org/wp-content/uploads/2014/05/BSWGREPORT-MAY2015.pdf

Lurton, X. and D. Jackson. 2008. An Introduction to Underwater Acoustics, 2nd ed.; Springer-Praxis: New York, NY, USA. ISBN 3540429670.

MacKenzie, C.L., Jr., A.S. Merrill, and F.M. Serchuk. 1978. Sea scallop resources off the northeastern U.S. coast, 1975. Mar. Fish. Rev. 40(2): 19-23.

MacKenzie, C.L. Jr., D.J. Radosh, and R.N. Reid. 1985. Densities, growth, and mortalities of juveniles of the surf clam (*Spisula solidissima*) (Dillwyn) in the New York Bight. J. Shellfish Res. 5: 81-84.

Macy, W.K., III. 1980. The ecology of the common squid, *Loligo pealei* (LeSueur 1821), in Rhode Island waters. Ph.D. dissertation, Dalhousie Univ. Halifax, Nova Scotia.

Massie, F.D. 1998. The Uncommon Guide to Common Life on Narragansett Bay. Providence, Rhode Island: Save The Bay.

McEachran, J.D. and J.A. Musick. 1975. Distribution and relative abundance of seven species of skates (Pisces: Rajidae) which occur between Nova Scotia and Cape Hatteras. Fish. Bull. (U.S.) 73: 110-136.

Merrill, A.S. and J.W. Ropes. 1969. The general distribution of the surf clam and ocean quahog. Proc. Natl. Shellfish. Assoc. 59: 40-45.

National Marine Fisheries Service (NOAA Fisheries). 2017. Amendment 10 to the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan: Essential Fish Habitat. Office of Sustainable Fisheries, Atlantic Highly Migratory Species Management Division. 442 pp.

New England Fishery Management Council (NEFMC). 2017. Omnibus essential fish habitat amendment 2. Volume 2: EFH and HAPC designation alternatives and environmental impacts. October 25, 2017.

NOAA Habitat (NOAA National Marine Fisheries Greater Atlantic Regional Fisheries Office Habitat Conservation and Ecosystem Services Division). 2021. Recommendations for Mapping Fish Habitat. March 2021. https://media.fisheries.noaa.gov/2021-03/March292021_NMFS_Habitat_Mapping_Recommendations.pdf?null

NOAA Fisheries. 2021a. NOAA Habitat Conservation Essential Fish Habitat Mapper. https://www.habitat.noaa.gov/application/efhmapper/index.html. Accessed June 2021.

NOAA Fisheries. 2021b. Essential Fish Habitat (EFH) In the Northeast - Life history and habitat characteristics of Northeastern U.S. species. https://www.fisheries.noaa.gov/newengland-mid-atlantic/habitat-conservation/essential-fish-habitat-efh-northeast. Accessed June 2021.

O´Cofaigh, C., J. Evans, J. A. Dowdeswell, and R.D. Larter. 2007. Till characteristics, genesis and transport beneath Antarctic paleo-ice streams, J. Geophys. Res., 112, F03006, doi:10.1029/2006JF000606.

Oldale, R.N. and C.J. O'Hara. 1984. Glaciotectonic origin of the Massachusetts coastal end moraines and a fluctuating late Wisconsinan ice margin. Geological Society of America Bulletin, v. 95, p. 61-74.

Packer, D.B., S.J. Griesbach, P.L. Berrien, C.A. Zetlin, D.L. Johnson, and W.W. Morse. 1999. Essential Fish Habitat Source Document: Summer Flounder, *Paralichthys dentatus*, Life History and Habitat Characteristics. NOAA Tech Memo NMFS-NE-151; 98 pp.

Packer, D.B., C.A. Zetlin, and J.J. Vitaliano. 2003a. Essential Fish Habitat Source Document: Little Skate, *Leucoraja erinacea*, Life History and Habitat Characteristics. NOAA Tech Memo NMFS-NE-175; 76 pp.

Packer, D.B., C.A. Zetlin, and J.J. Vitaliano. 2003b. Essential Fish Habitat Source Document: Winter Skate, *Leucoraja ocellata*, Life History and Habitat Characteristics. NOAA Tech Memo NMFS-NE-179; 68 pp.

Parsons, G.J., C.R. Warren-Perry, and M.J. Dadswell. 1992. Movements of juvenile sea scallops Placopecten magellanicus (Gmelin, 1791) in Passamaquoddy Bay, New Brunswick. J. Shellfish Res. 11: 295-297.

Pereira, J.J., R. Goldberg. J.J. Ziskowski, P.L. Berrien, W.W. Morse, and D.L. Johnson. 1999. Essential Fish Habitat Source Document: Winter Flounder, *Pseudopleuronectes americanus*, Life History and Habitat Characteristics. NOAA Tech Memo NMFS-NE-138; 48 pp.

Phelan, B.A. 1992. Winter flounder movements in the inner New York Bight. Trans. Am. Fish. Soc. 121: 777-784.

Revolution Wind, LLC. 2021a. Construction and Operations Plan, Revolution Wind Farm. Submitted to the Bureau of Ocean Energy Management, Sterling, VA. Submitted by Revolution Wind, LLC. April 12, 2021.

Revolution Wind, LLC. 2021b. Revolution Wind Integrated Geotechnical and Geophysical Site Characterization Study. Appendix O1 of the Construction and Operations Plan, Revolution Wind Farm. Submitted to the Bureau of Ocean Energy Management, Sterling, VA. Submitted by Revolution Wind, LLC. April 12, 2021.

Revolution Wind, LLC. 2021c. Benthic Assessment. Appendix X of the Construction and Operations Plan, Revolution Wind Farm. Submitted to the Bureau of Ocean Energy Management, Sterling, VA. Submitted by Revolution Wind, LLC. April 12, 2021.

Revolution Wind, LLC. 2021d. Essential Fish Habitat Technical Report. Appendix L of the Construction and Operations Plan, Revolution Wind Farm. Submitted to the Bureau of Ocean Energy Management, Sterling, VA. Submitted by Revolution Wind, LLC. April 12, 2021.

RPS. 2021. Hydrodynamic and Sediment Transport Modeling Report – Rhode Island State Waters Draft Technical Report. In preparation for Revolution Wind, LLC by RPS, South Kingstown, RI.

Schimel, A.C.G., J. Beaudoin, I.M. Parnum, T. Le Bas, V. Schmidt, G. Keith, and D. Ierodiaconou. 2018. Multibeam sonar backscatter data processing. Marine Geophysical Research 39:121–137.

Serchuk, F.M., S.A. Murawski, and J.W. Ropes. 1982. Ocean quahog *Arctica islandica*. In M.D. Grosslein and T.R. Azarovitz eds. Fish distribution. p. 144-146.

Shumchenia, E. and J. King. 2019. Sediment profile imagery survey to evaluate benthic habitat quality in Narragansett Bay – 2018. Prepared for the Narragansett Bay Estuary Program (NBEP). July 2019.

Siceloff, L. and W. Howell. 2013. Fine-scale temporal and spatial distributions of Atlantic cod (*Gadus morhua*) on a western Gulf of Maine spawning ground. Fisheries Research. 141. 31–43. 10.1016/j.fishres.2012.04.001.

Smith, H.M. 1898. The fishes found in the vicinity of Woods Hole. Bull. U.S. Fish. Comm. 17: 85-111.

Steihlik, L.L. 2007. Essential Fish Habitat Source Document: Spiny Dogfish, *Squalus acanthias*, Life History and Habitat Characteristics, Second Edition. NOAA Tech Memo NFMS-NE-203; 52 pp.

Steimle, F.W., W.W. Morse, and D.L. Johnson. 1999a. Essential fish habitat source document: goosefish*, Lophius americanus*, life history and habitat characteristics. NOAA Tech Memo NMFS-NE-127; 31 pp.

Steimle, F.W., W.W. Morse, P.L. Berrien, D.L. Johnson, and C.A. Zetlin. 1999b. Essential fish habitat source document: Ocean pout, *Macrozoarces americanus*, life history and habitat characteristics. NOAA Tech Memo NMFS-NE-129; 26 pp.

Steimle, F.W., W.W. Morse, P.L. Berrien, and D.L. Johnson. 1999c. Essential Fish Habitat Source Document: Red Hake, *Urophycis chuss*, Life History and Habitat Characteristics. NOAA Tech Memo NFMS-NE-133; 42 pp.

Steimle, F.W., C.A. Zetlin, P.L. Berrien, D.L. Johnson, and S. Chang. 1999d. Essential fish habitat source document: Scup, *Stenotomus chrysops*, life history and habitat characteristics. NOAA Tech Memo NMFS NE 149; 39 pp.

Stewart, P.L. and S.H. Arnold. 1994. Environmental requirements of the sea scallop (*Placopecten magellanicu*s) in eastern Canada and its response to human impacts. Can. Tech. Rep. Fish. Aquat. Sci. 2005: 1-36.

Stokesbury, K.D.E. and J.H. Himmelman. 1995. Biological and physical variables associated with aggregations of the giant scallop *Placopecten magellanicus*. Canadian Journal of Fisheries and Aquatic Sciences. 52. 743-753. 10.1139/f95-074.

Summers, W.C. 1971. Age and growth of *Loligo pealei*, a population study of the common Atlantic coast squid. Biol. Bull. (Woods Hole) 141: 189-201.

Summers, W.C. 1983. *Loligo pealei*. In: Boyle, P.R., editor. Cephalopod life cycles, Vol. I: Species accounts. London, England: Academic Press. P. 115-142.

Thouzeau, G., G. Robert, and S.J. Smith. 1991. Spatial variability in distribution and growth of juvenile and adult sea scallops *Placopecten magellanicus* (Gmelin) on eastern Georges Bank (northwest Atlantic). Mar. Ecol. Prog. Ser. 74: 205-218.

Tyler, A.V. 1971. Periodic and resident components in communities of Atlantic fishes. J. Fish. Res. Board Can. 28: 935-946.

Vryhof. 2018. Vryhof Manual – The Guide to Anchoring. ISBN / EAN: 978-90-9028801-7. 170 p.

Zemeckis, D.R., M.J. Dean, and S.X. Cadrin. 2014. Spawning dynamics and associated management implications for Atlantic cod. North American Journal of Fisheries Management 34: 424–442.

Benthic Habitat Mapping to Support Essential Fish Habitat Consultation
Revolution Wind Offshore Wind Farm

FIGURES

Prepared for:

Revolution Wind, LLC

Submitted by:

INSPIRE Environmental
Newport, Rhode Island 02840

February 2023

LIST OF FIGURES

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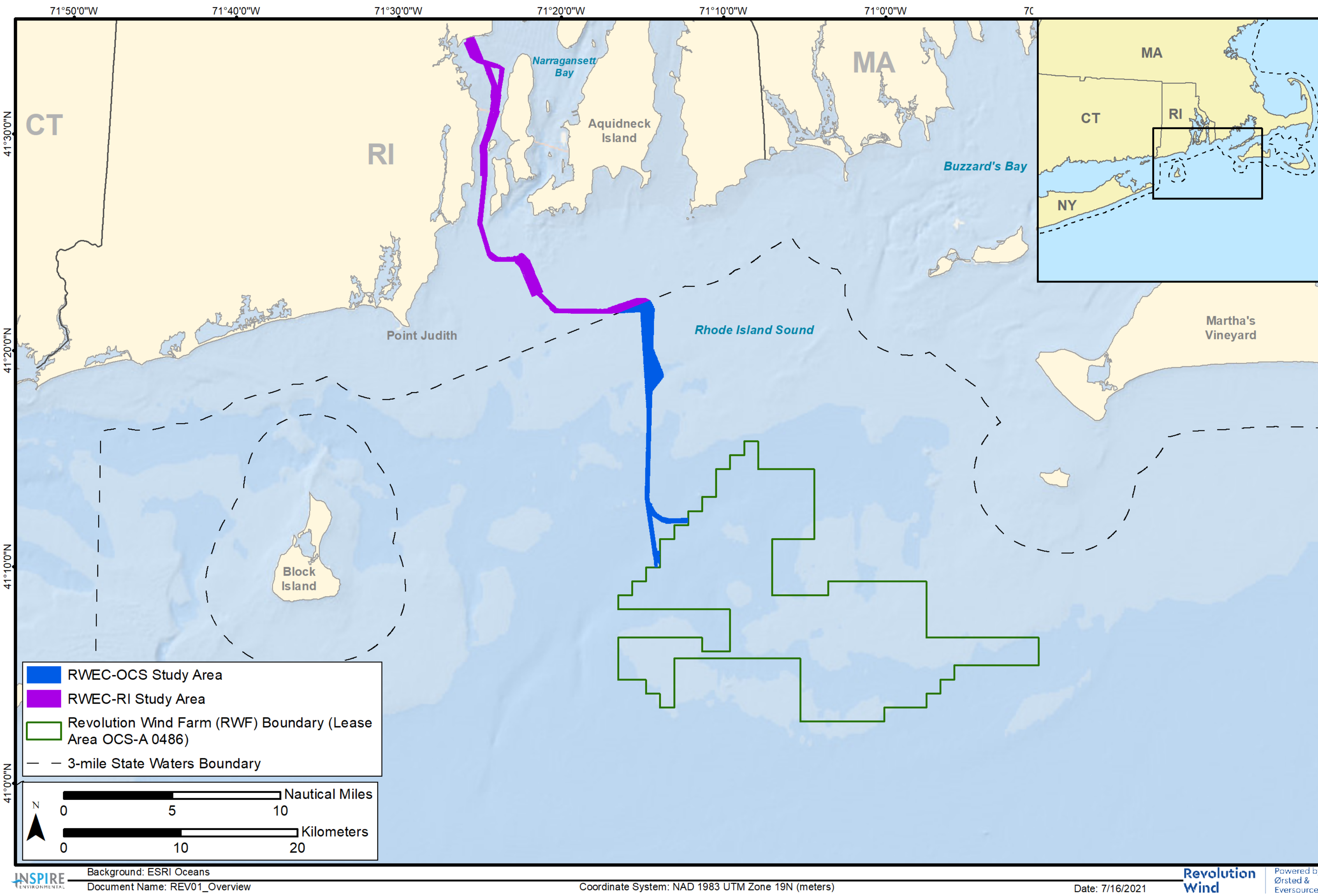


Figure 1-1. Location of the planned Revolution Wind Farm (RWF) and Export Cable Corridor (RWEC) on the outer continental shelf in federal waters (RWEC-OCS) and within Rhode Island state waters (RWEC-RI)

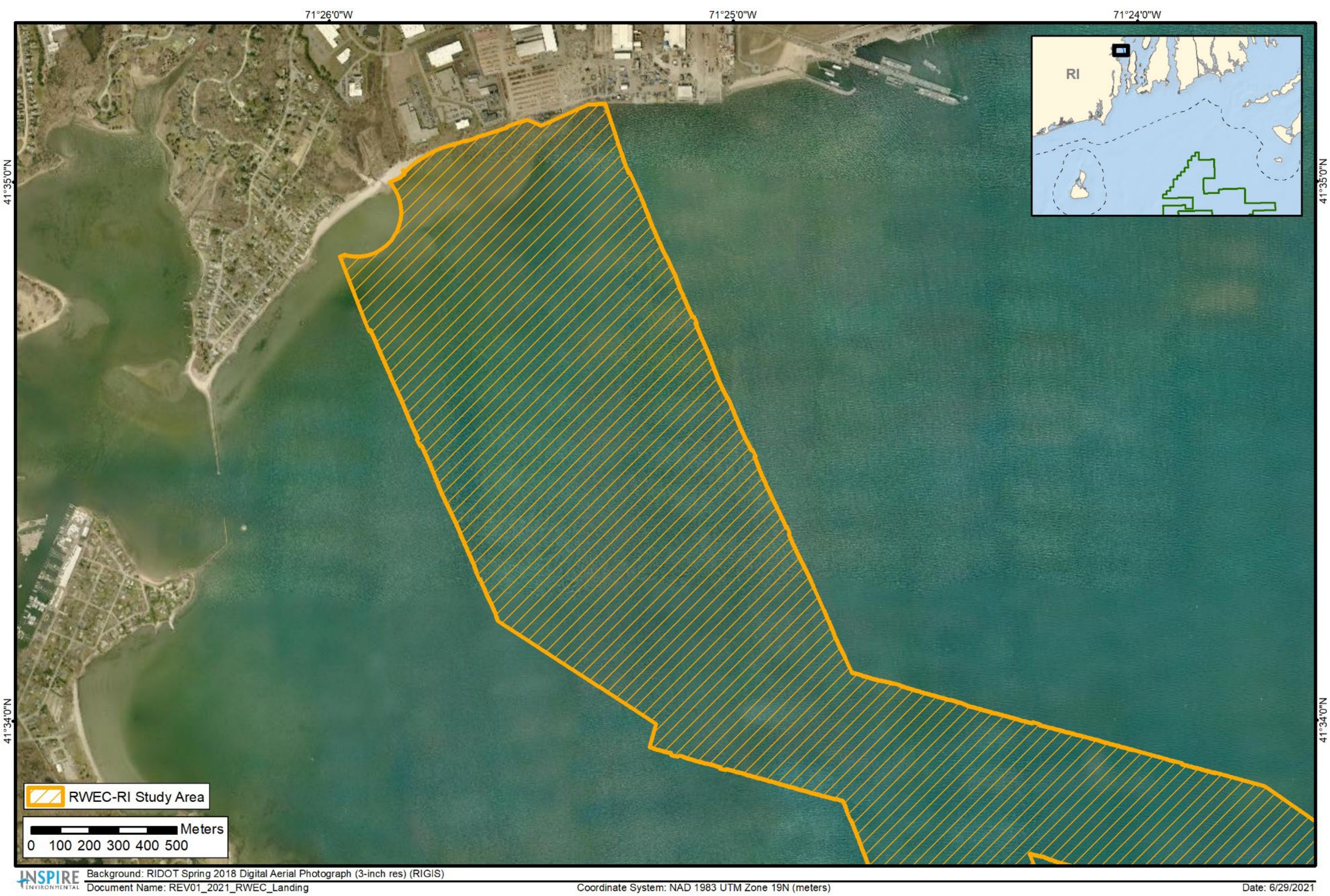


Figure 1-2. Potential landfall of the RWEC at Quonset Point in North Kingstown, RI, including the RWEC-RI Study Area

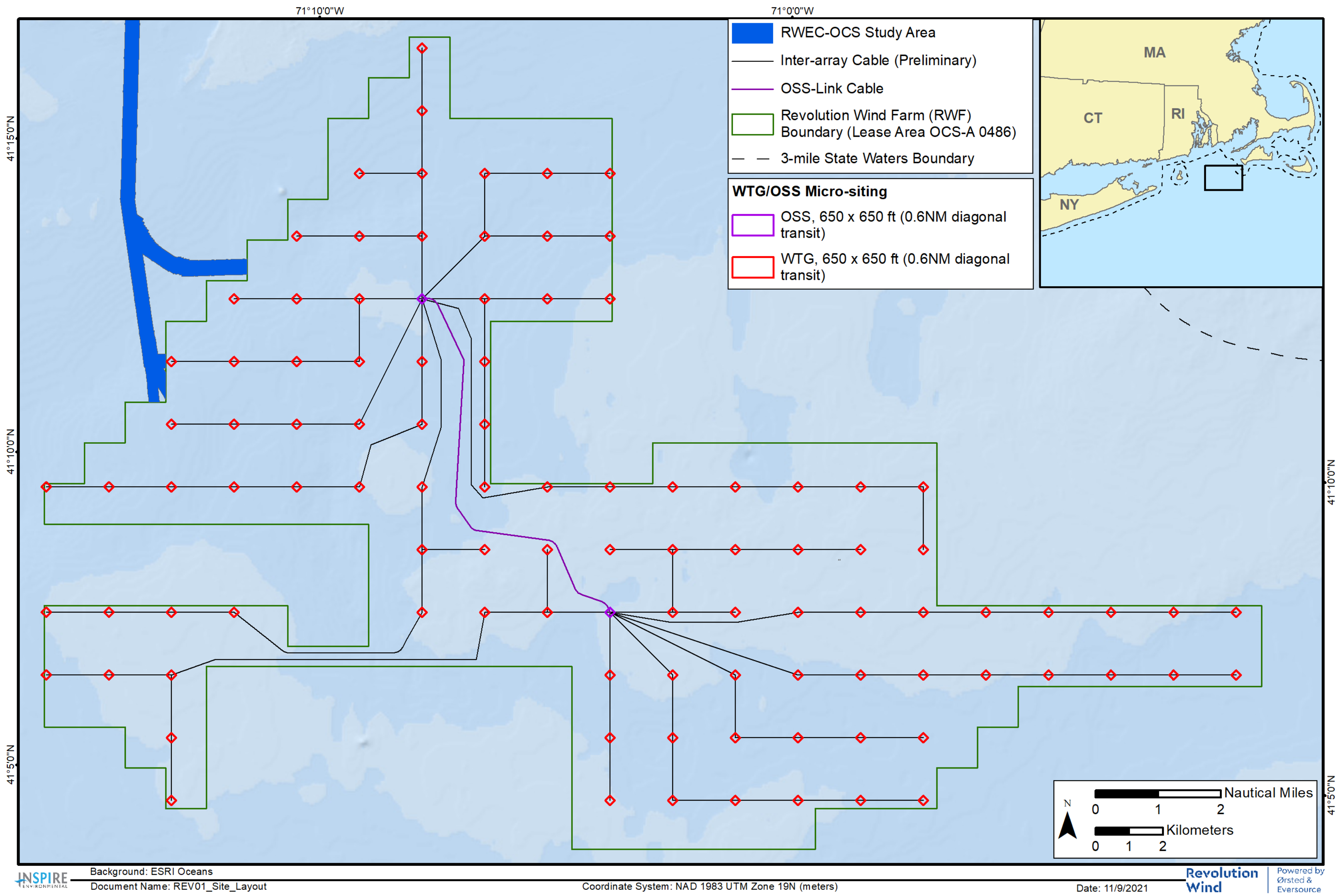


Figure 1-3. Revolution Wind Farm proposed layout of up to 100 wind turbine generators (WTGs), 2 offshore substations (OSSs), inter-array cables (IACs), and the OSS-Link Cable. Micro-siting allowance limits related to navigation transit constraints are depicted as diamonds. At this time, IAC routes between foundations are preliminary and are shown as straight lines; specific indicative IAC routes will be shared once available.

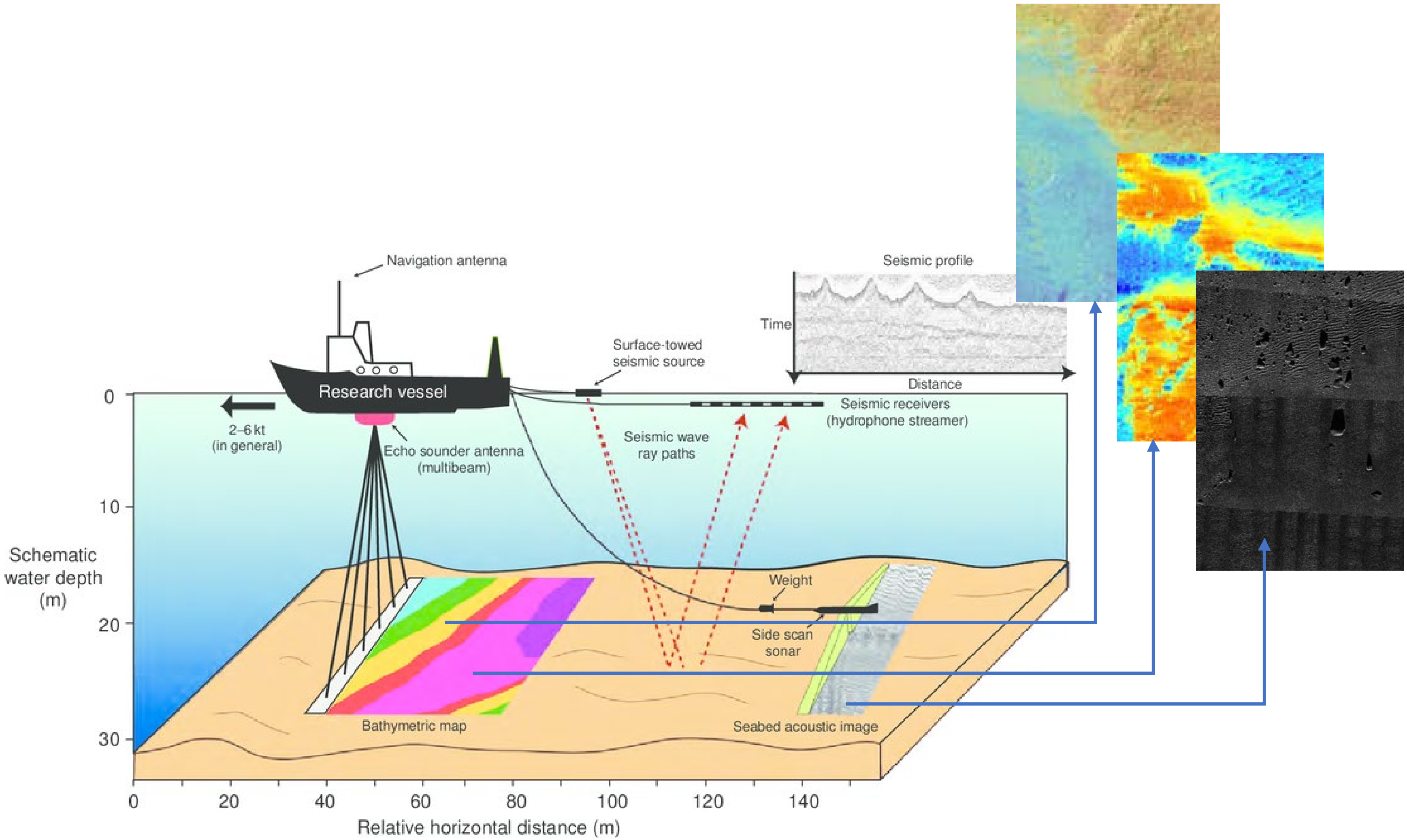


Figure 2-1. Schematic depicting a standard acoustic survey vessel set-up and data collection (after Garel et al. 2009)

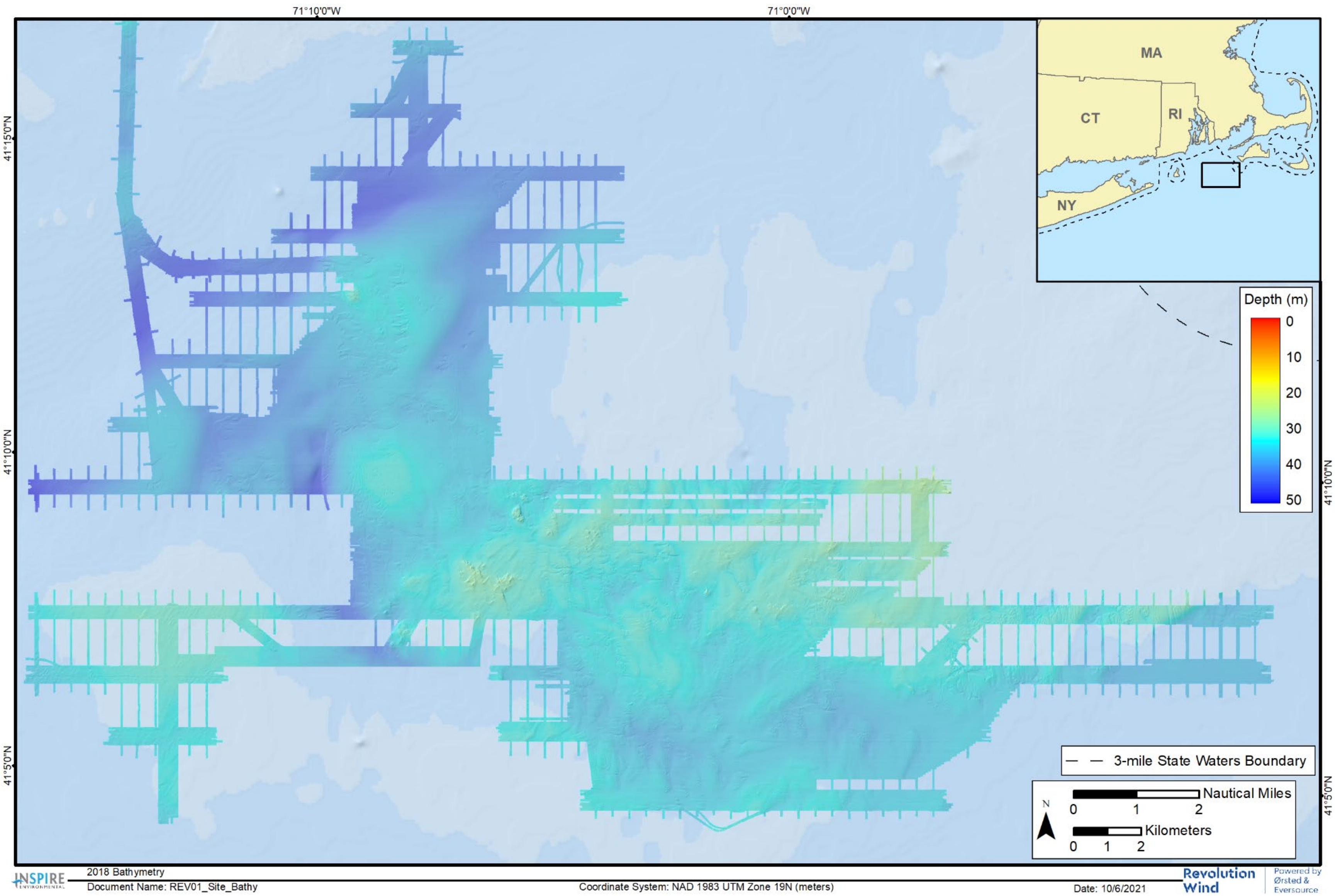


Figure 2-2. Bathymetric data at the RWF

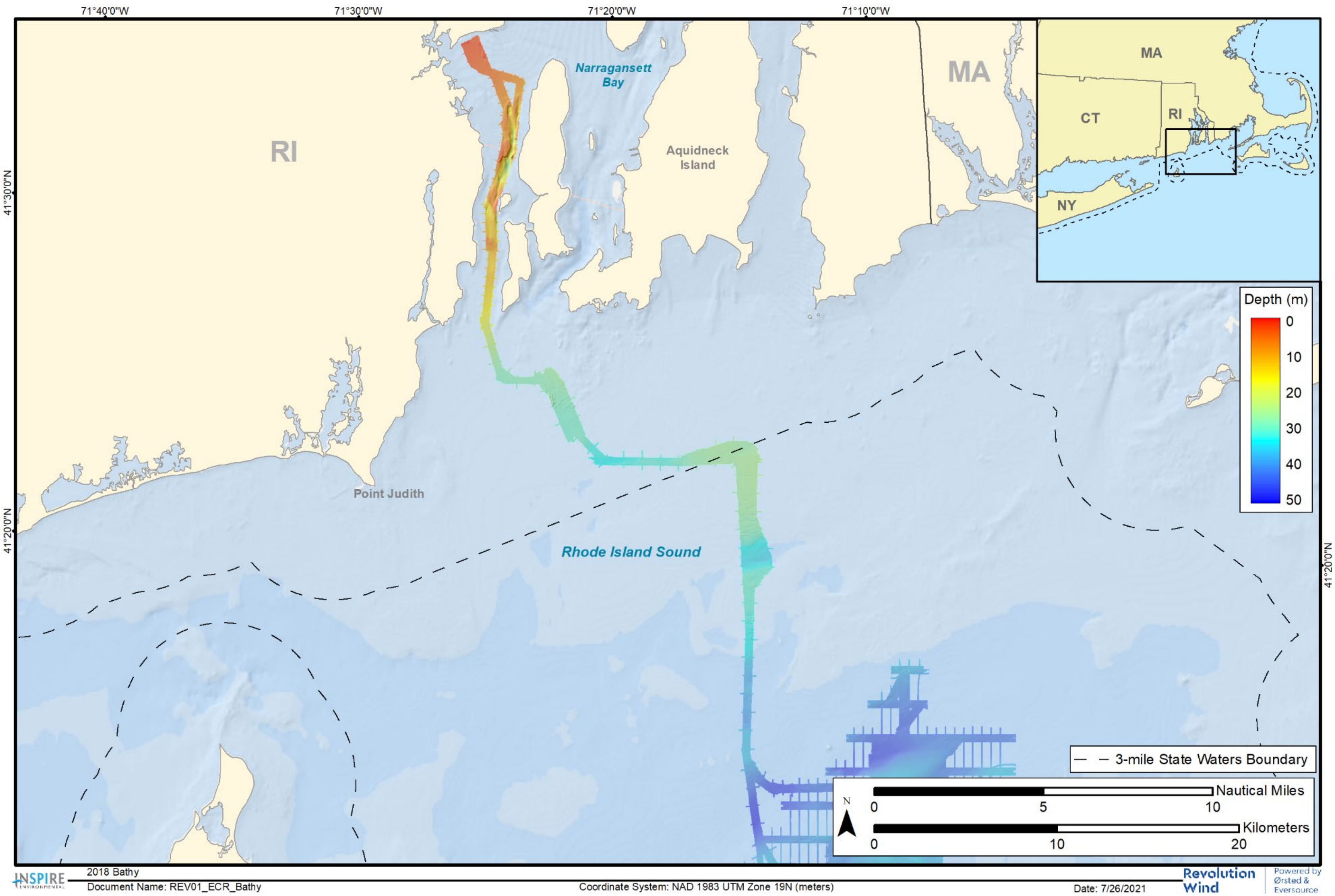


Figure 2-3. Bathymetric data along the RWEC

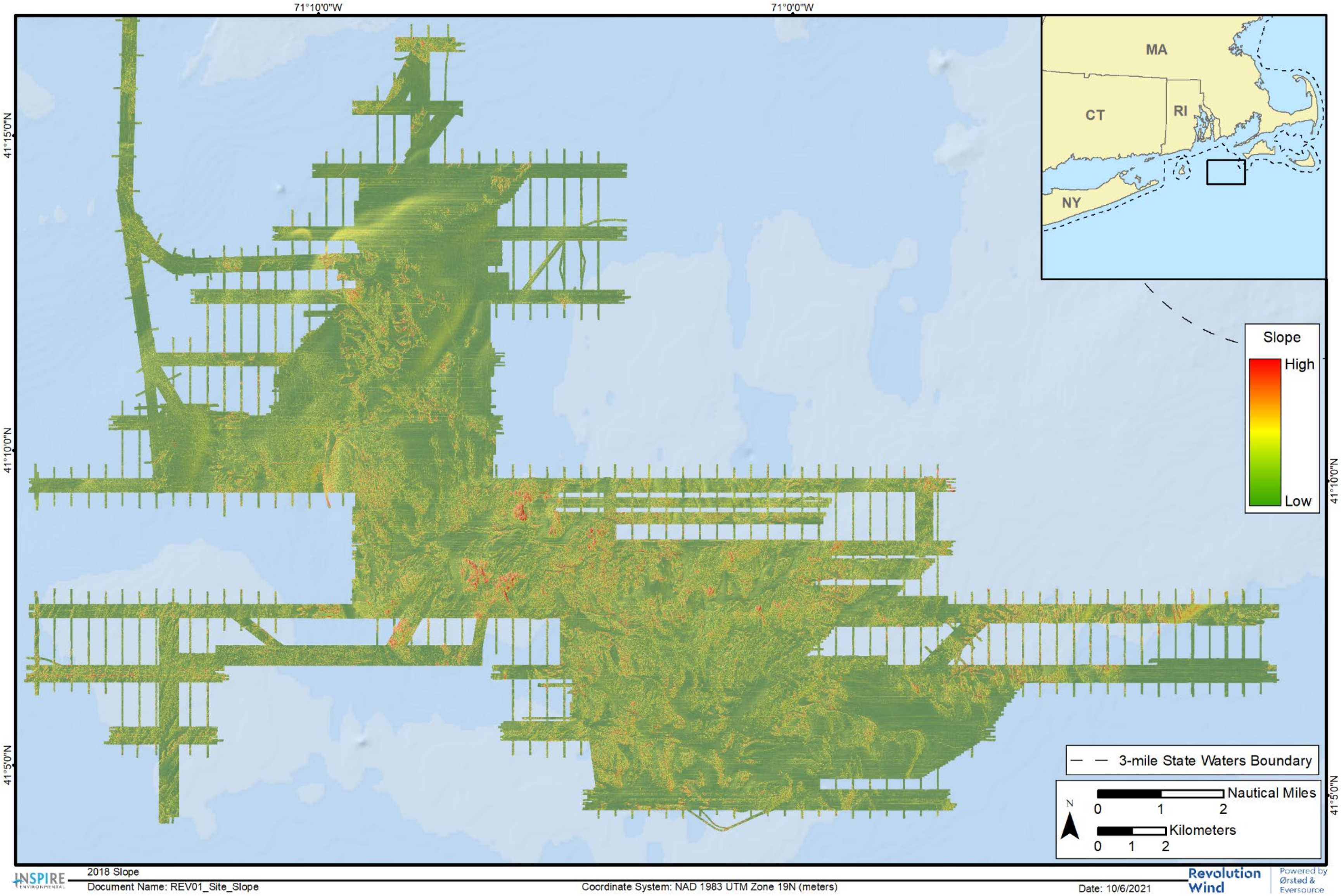


Figure 2-4. Model of seafloor slope at the RWF

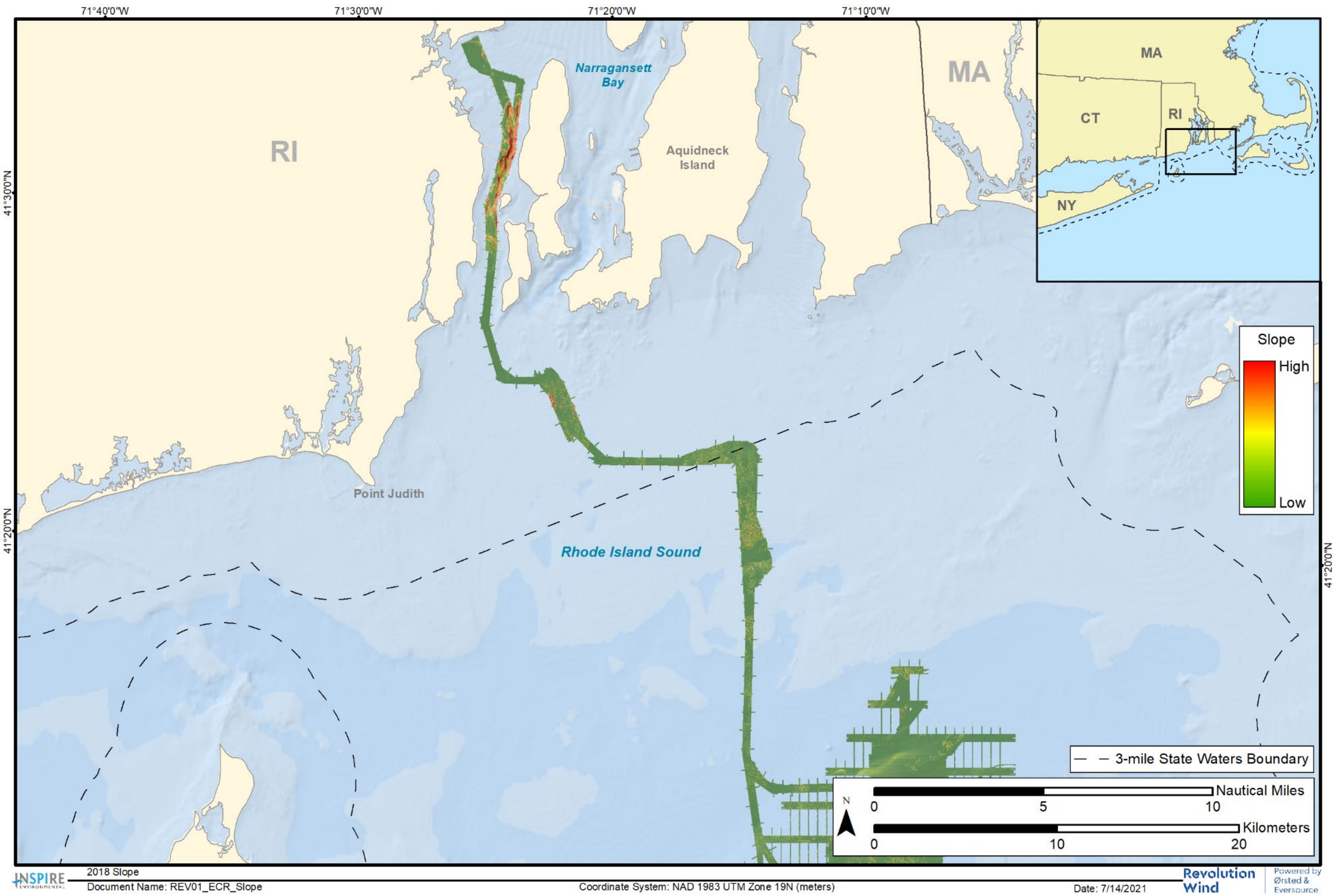


Figure 2-5. **Model of seafloor slope along the RWEC**

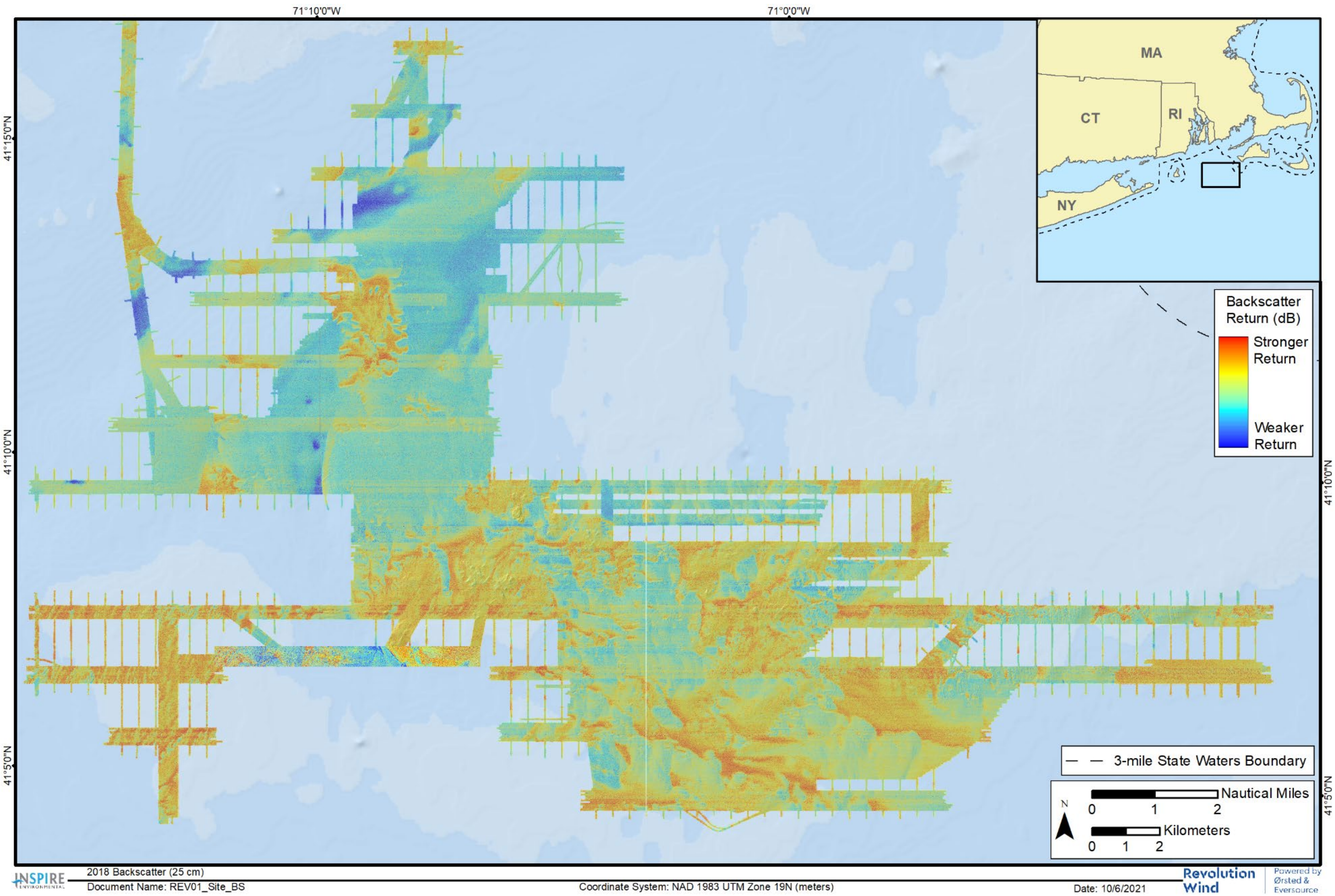


Figure 2-6. Backscatter data over hillshaded bathymetry at the RWF

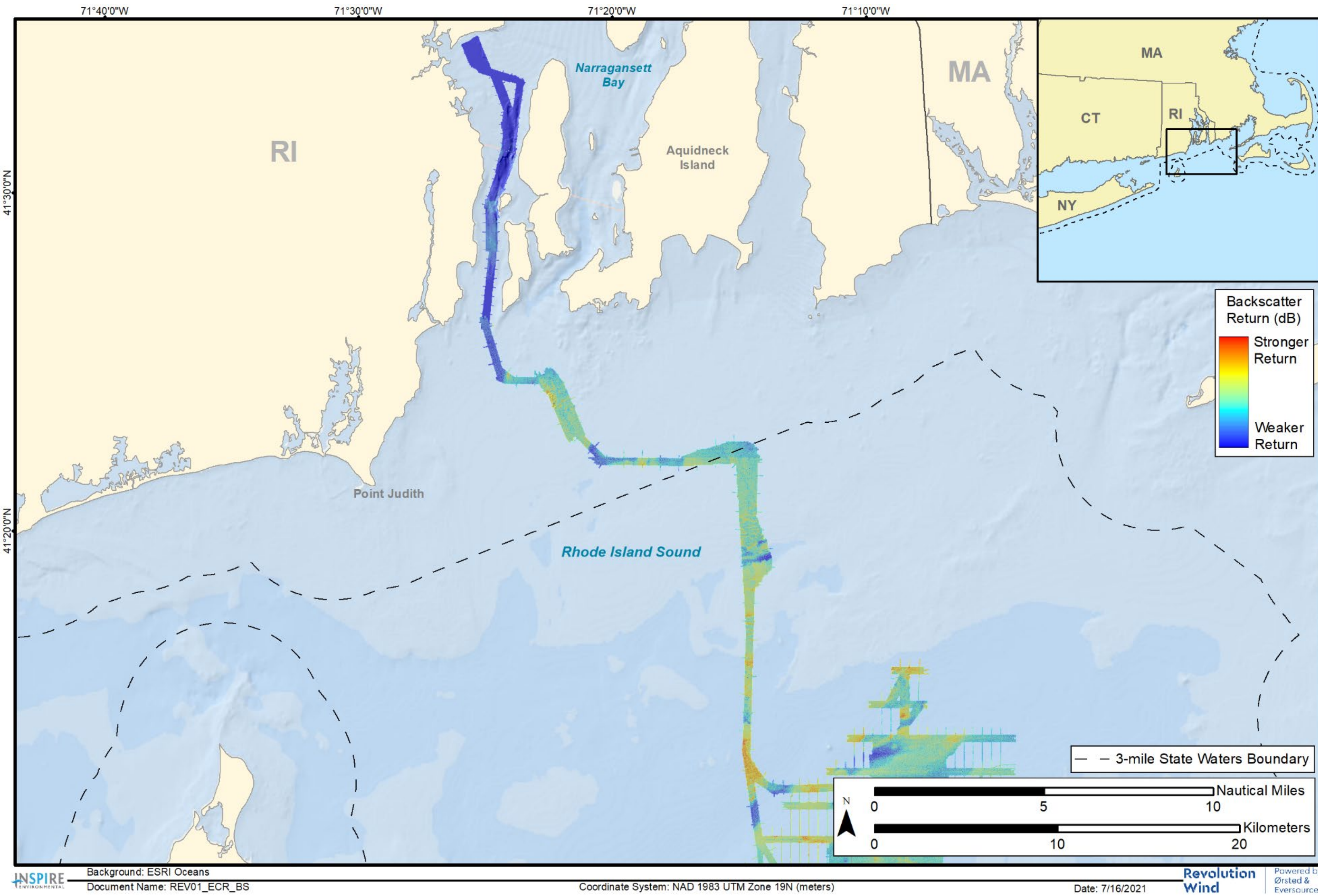


Figure 2-7. Backscatter data over hillshaded bathymetry along the RWEC

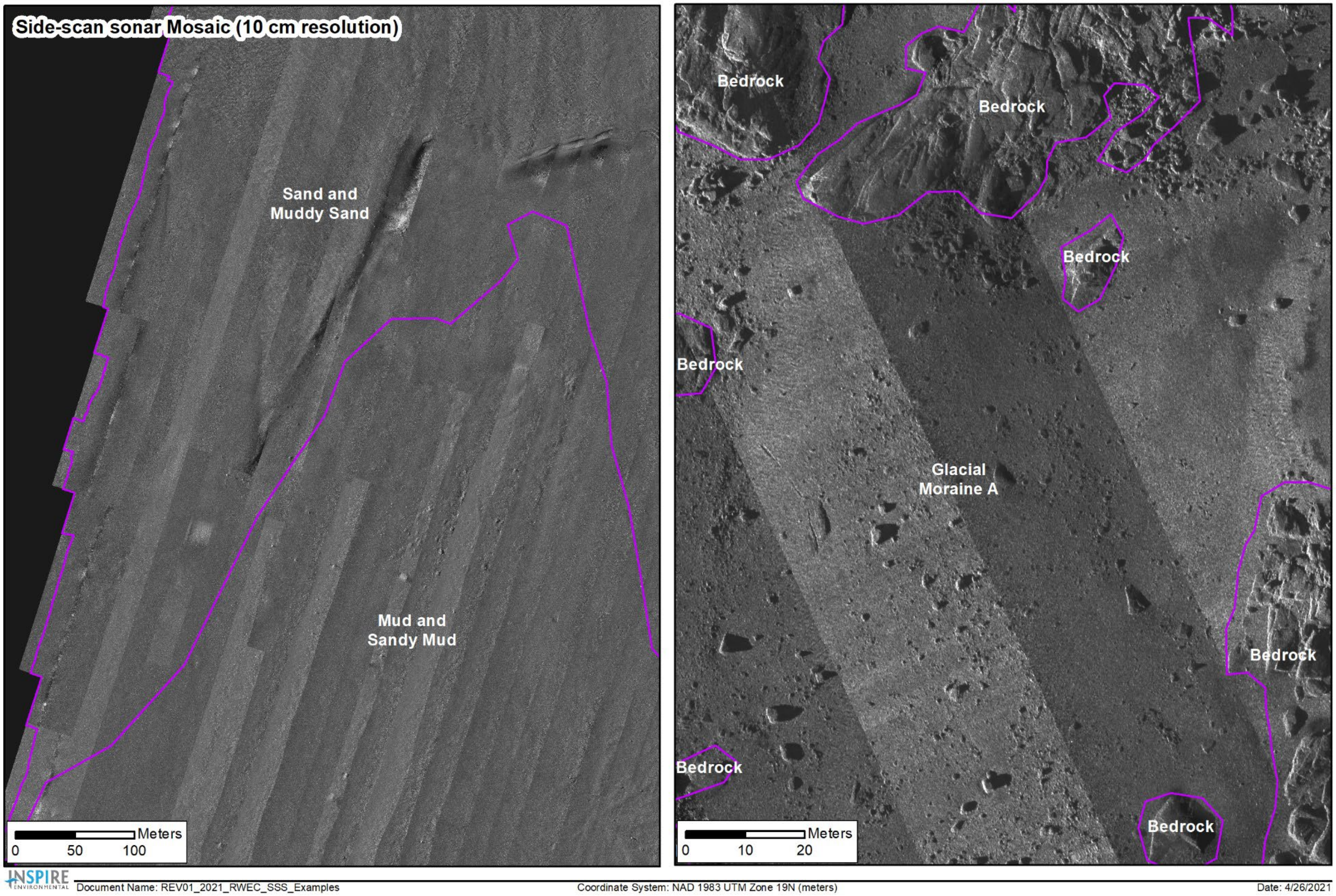


Figure 2-8. Examples of side-scan sonar data showing soft benthic habitats of sand and mud (left) and heterogeneous and complex hard bottom habitats of glacial origin, namely bedrock and moraine (right)

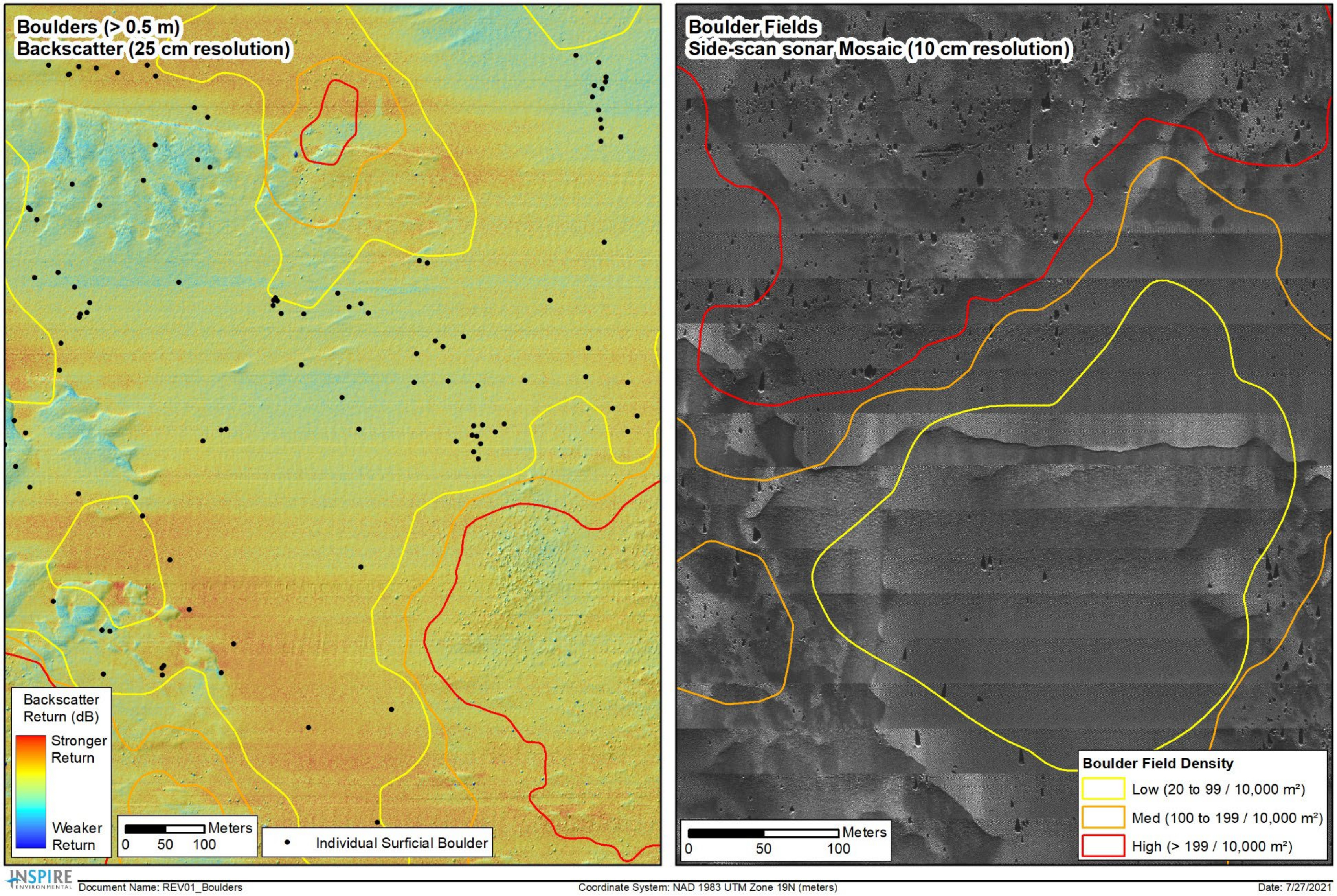


Figure 2-9. Boulder fields and surficial boulders (>0.5 m) individually identified ("picked") from the geophysical data on hillshaded bathymetric data (left) and on side-scan sonar data (right); two different locations are used as examples here. Note that boulders were aggregated into the boulder fields where present in densities >20 boulders per 10,000 m^2 and were not individually identified.

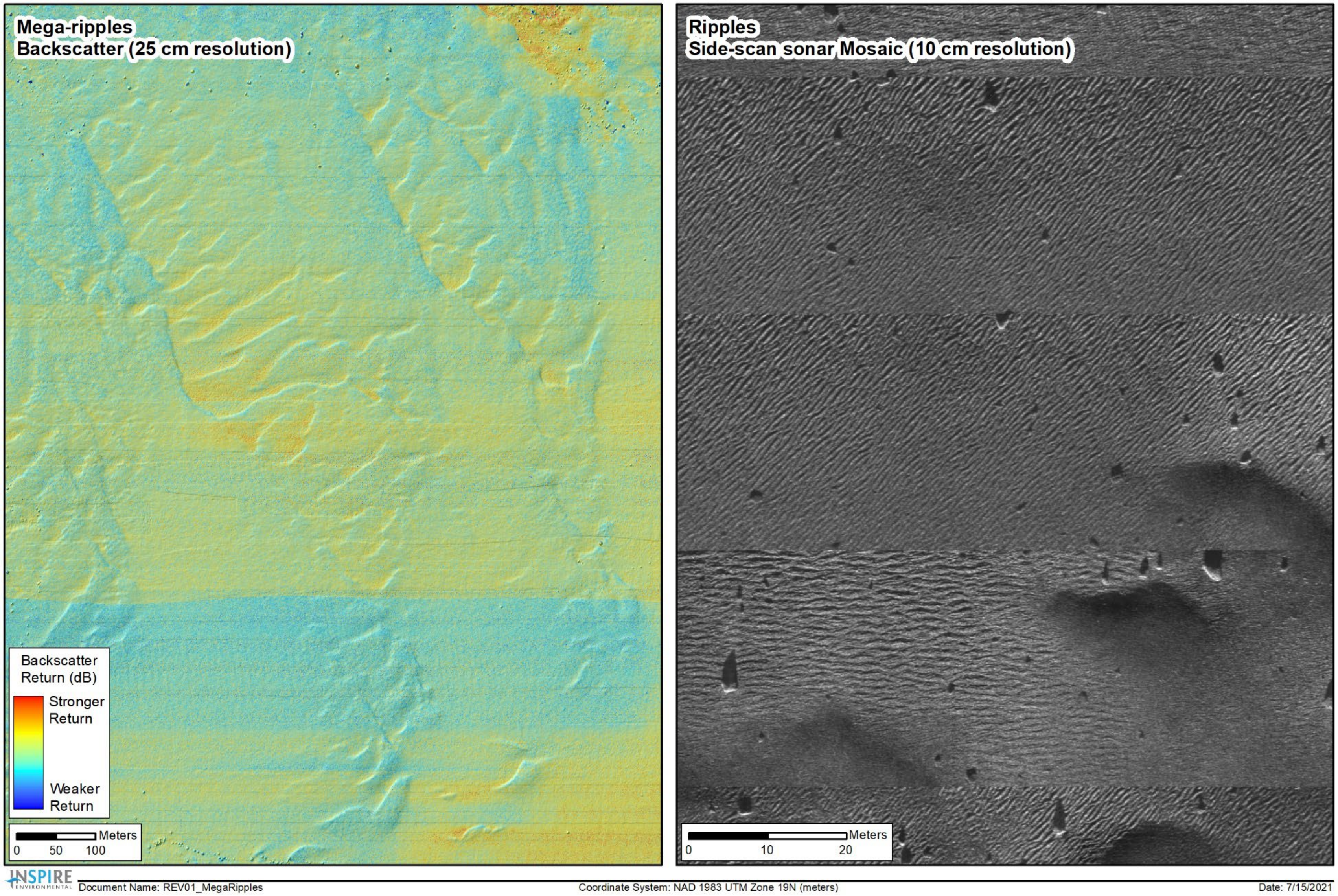
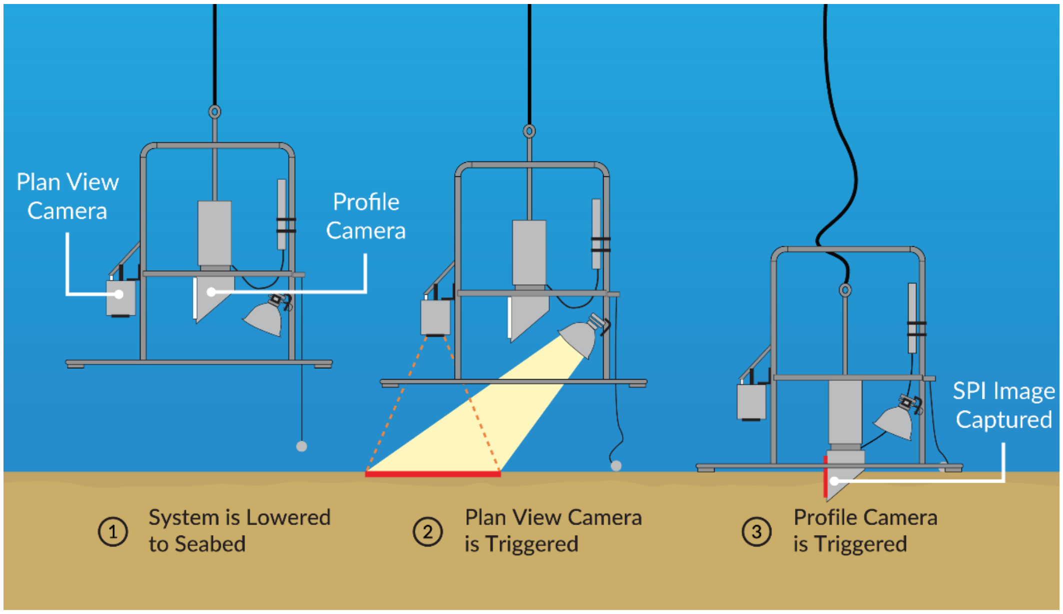


Figure 2-10. Mega-ripples visible in backscatter data over hillshaded bathymetry (left) and small-scale ripples visible in SSS data (right); two different locations are used as examples here



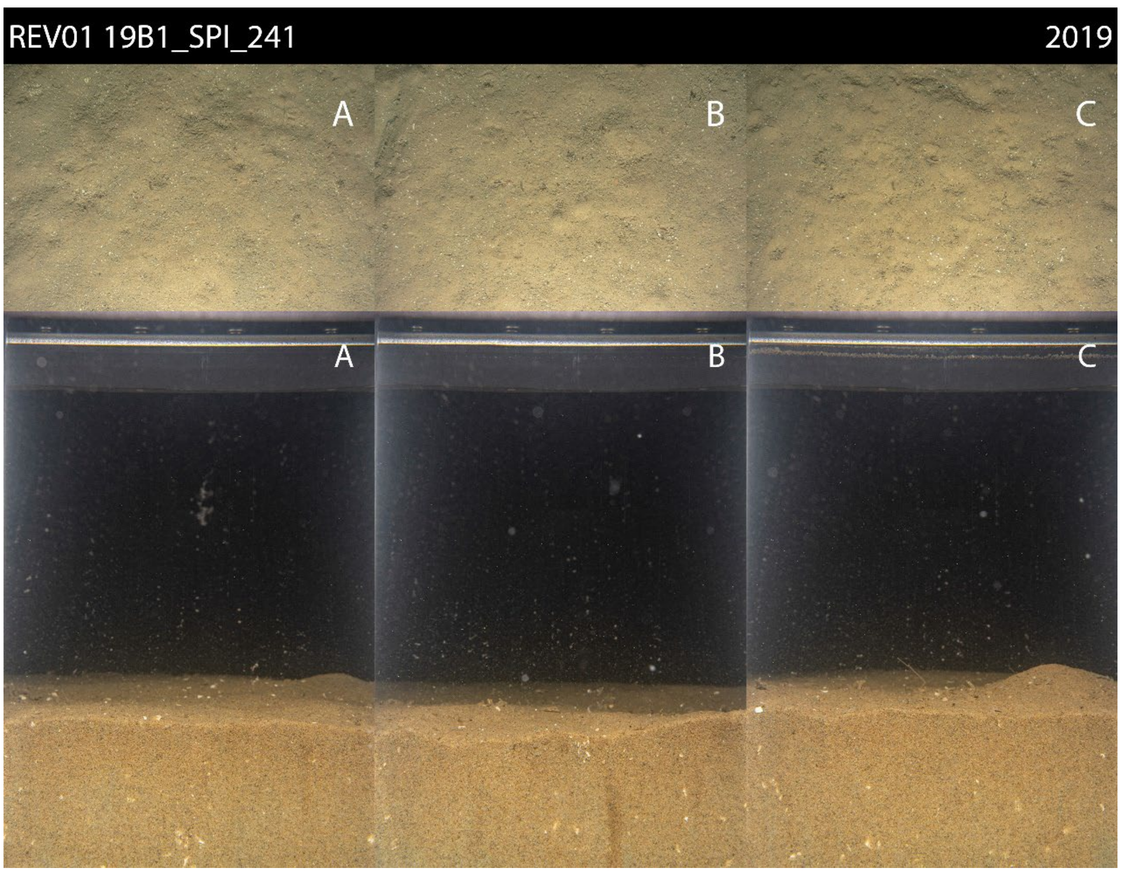


Figure 2-11. Schematic diagram of the operation of the sediment profile and plan view (SPI/PV) camera imaging system; the PV camera images an area of ~1 m^2 and the SPI camera images a profile of the sediment column that is 14.5 cm across and up to ~21 cm high. Three replicate images are analyzed at each station and a composite of these three paired replicate PV images (top) and SPI images (bottom) is prepared for use in reporting products.

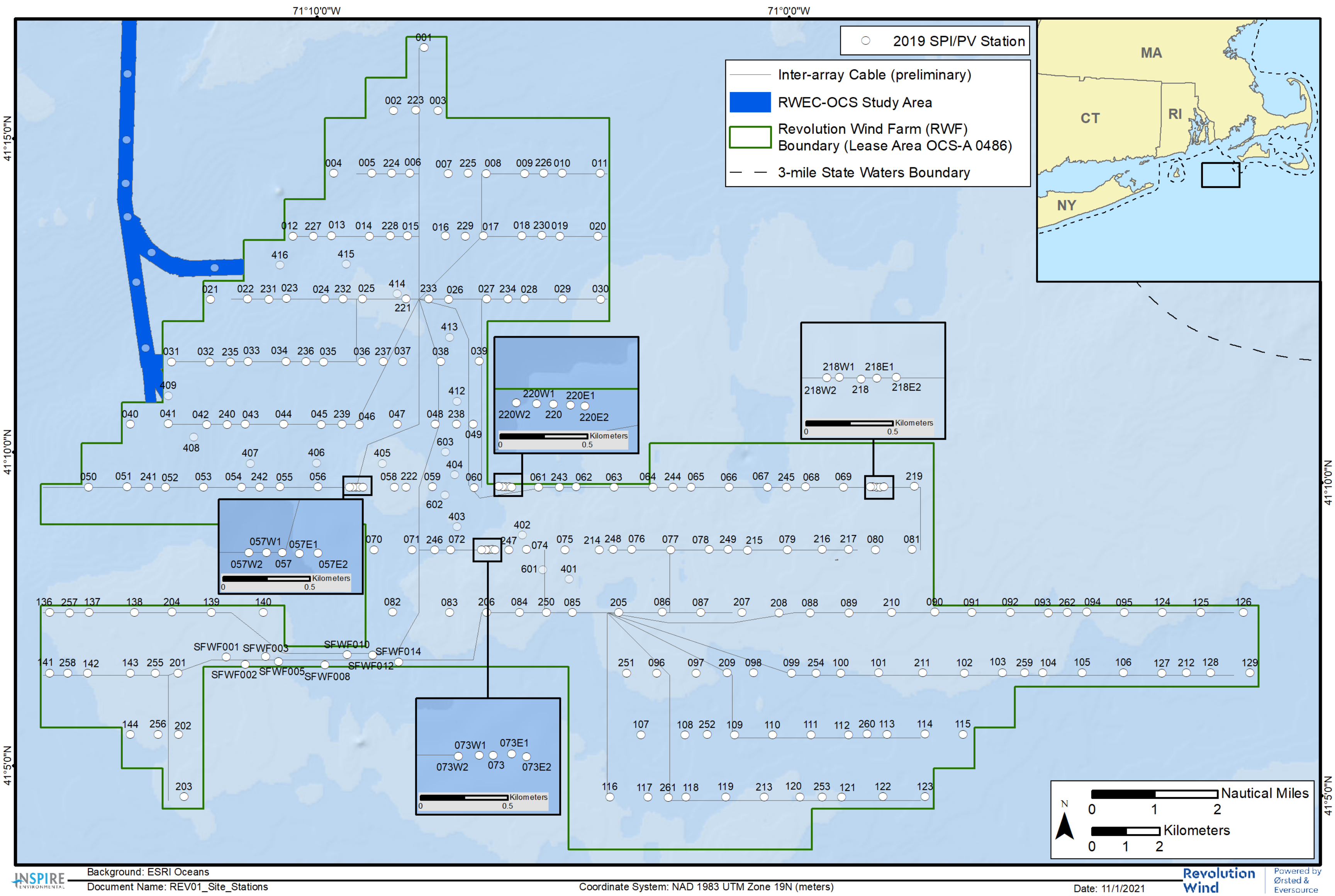


Figure 2-12. Locations sampled with sediment profile and plan view imaging (SPI/PV) used in ground-truthing geophysical data and habitat type interpretations at the RWF

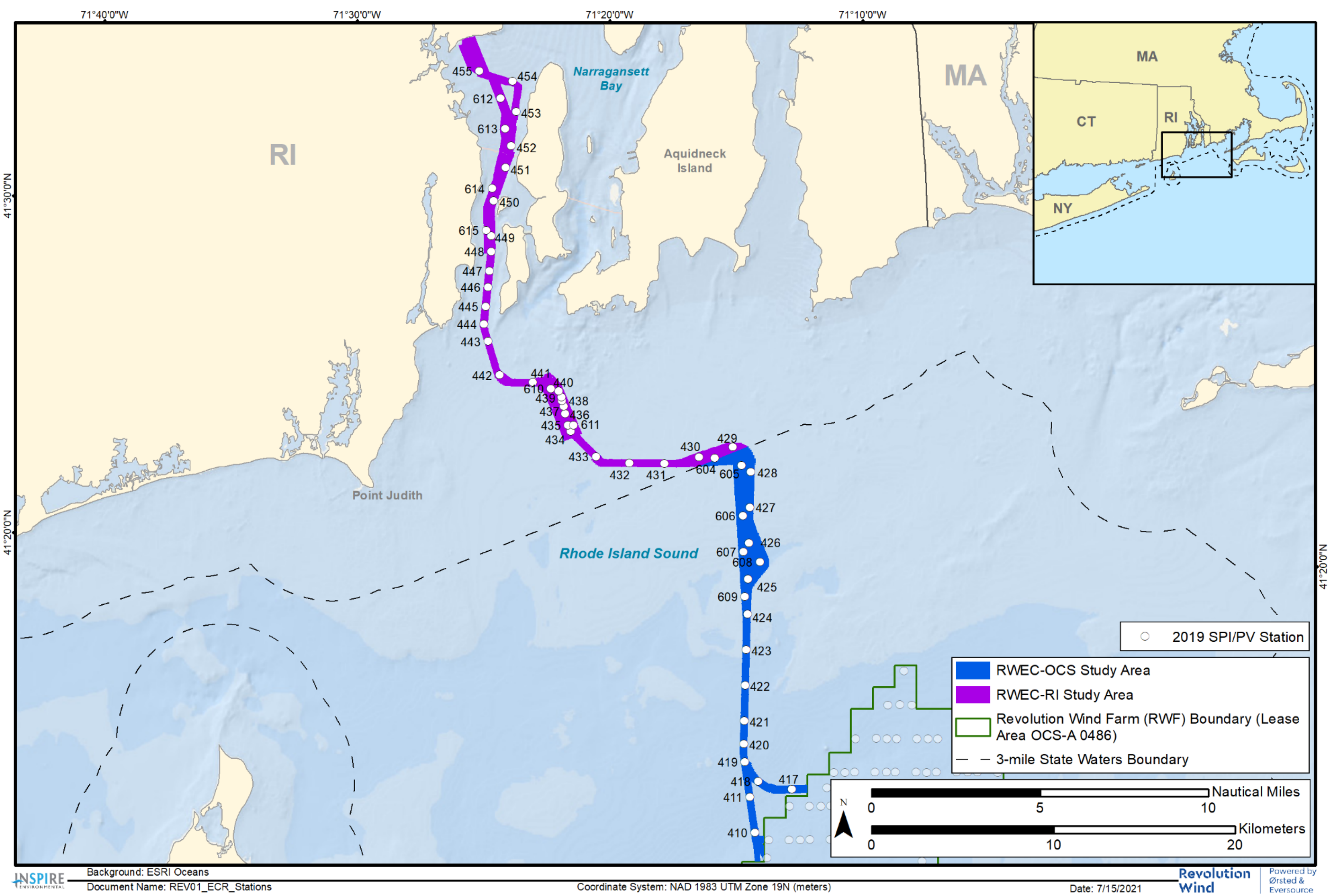


Figure 2-13. Locations sampled with SPI/PV used in ground-truthing geophysical data and habitat type interpretations along the RWEC

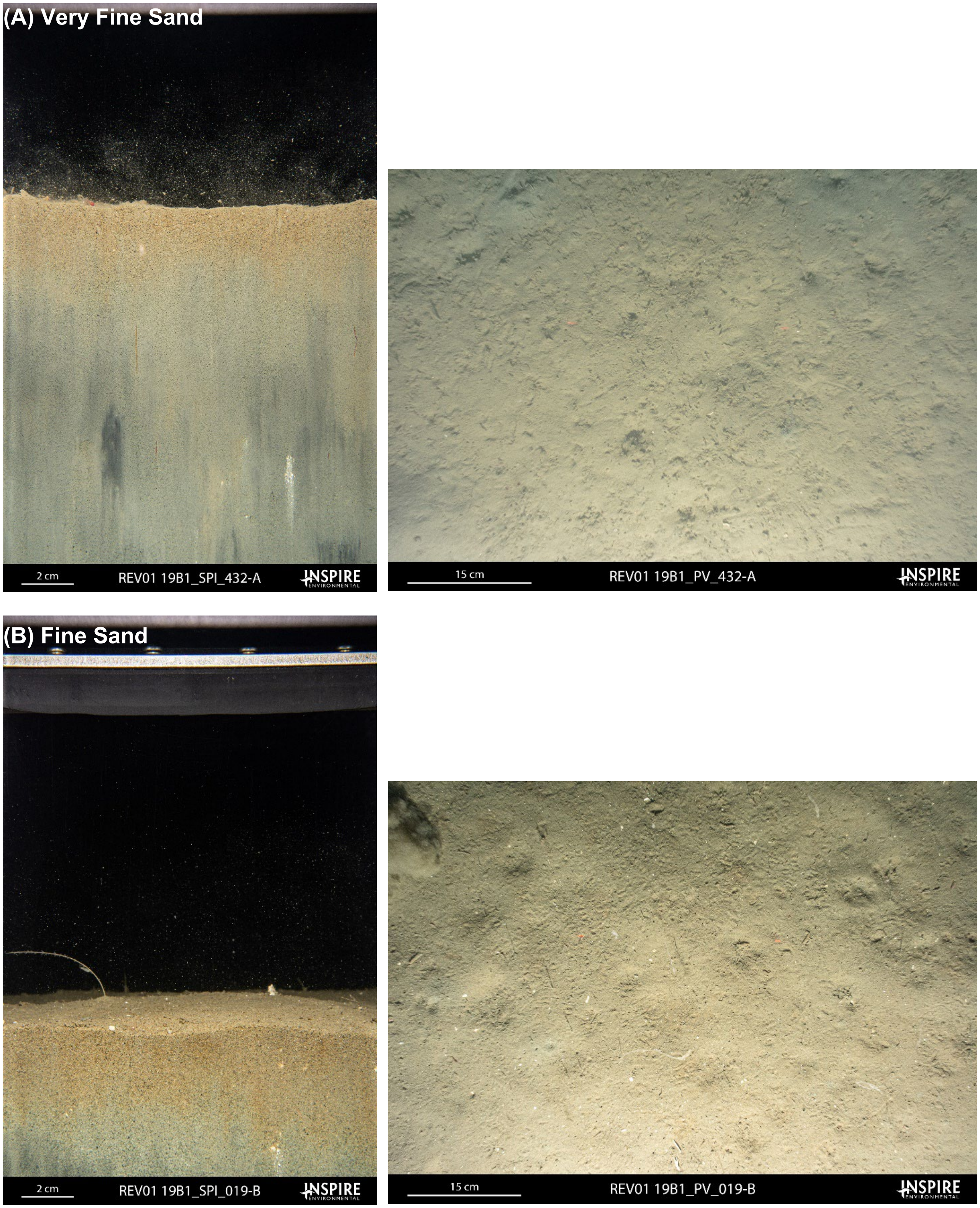
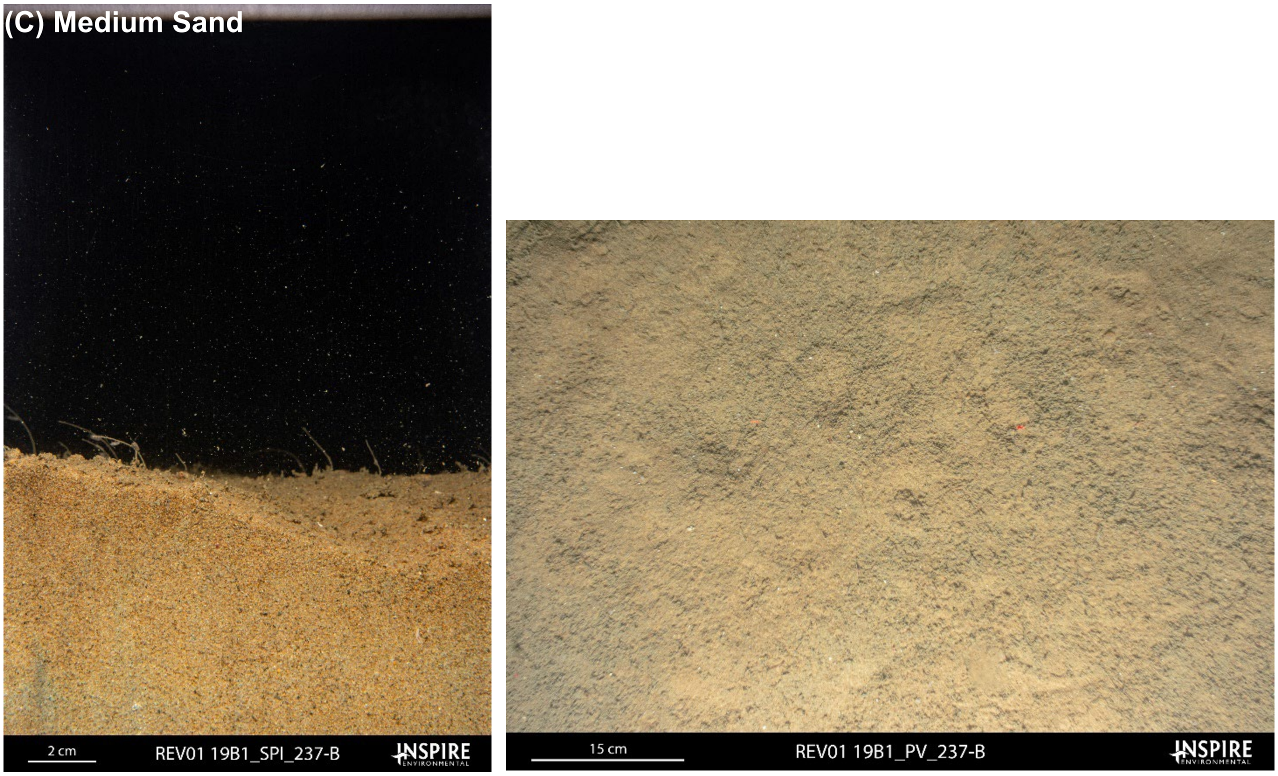


Figure 2-14. Representative SPI and PV images depicting the range of CMECS Substrate Subgroups across the Project Area: (A) Very Fine Sand; (B) Fine Sand; (C) Medium Sand; (D) Very Coarse Sand; (E) Gravelly Sand; (F) Sandy Gravel; (G) Pebble; (H) Cobble; and (I) Shell Substrate



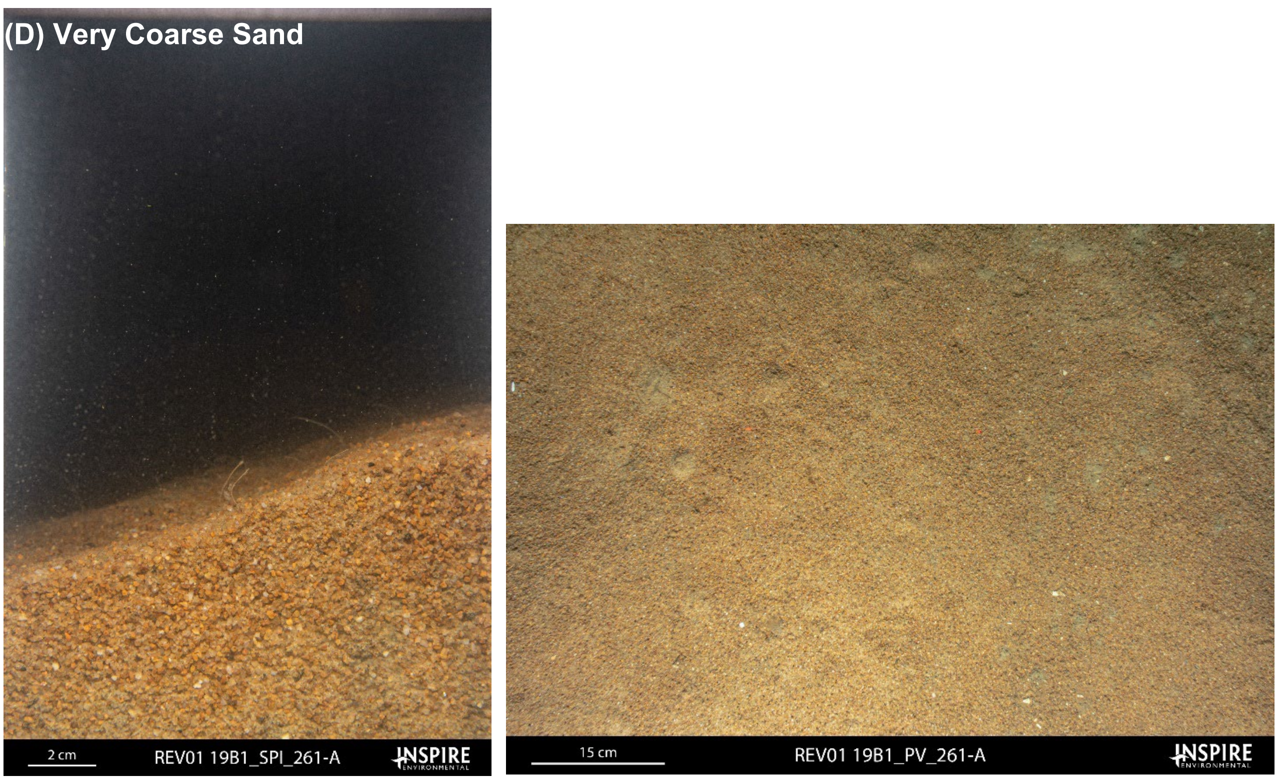
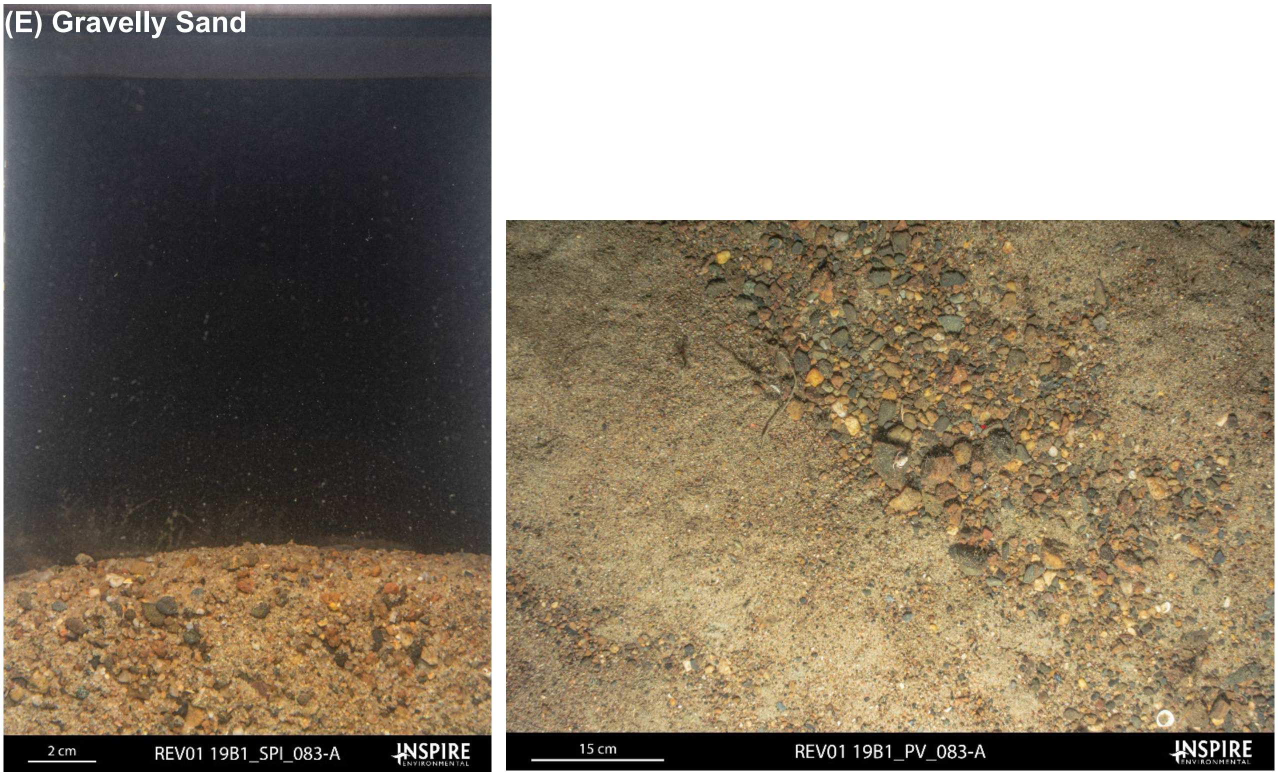


Figure 2-14. continued Representative SPI and PV images depicting the range of CMECS Substrate Subgroups across the Project Area: (A) Very Fine Sand; (B) Fine Sand; (C) Medium Sand; (D) Very Coarse Sand; (E) Gravelly Sand; (F) Sandy Gravel; (G) Pebble; (H) Cobble; and (I) Shell Substrate



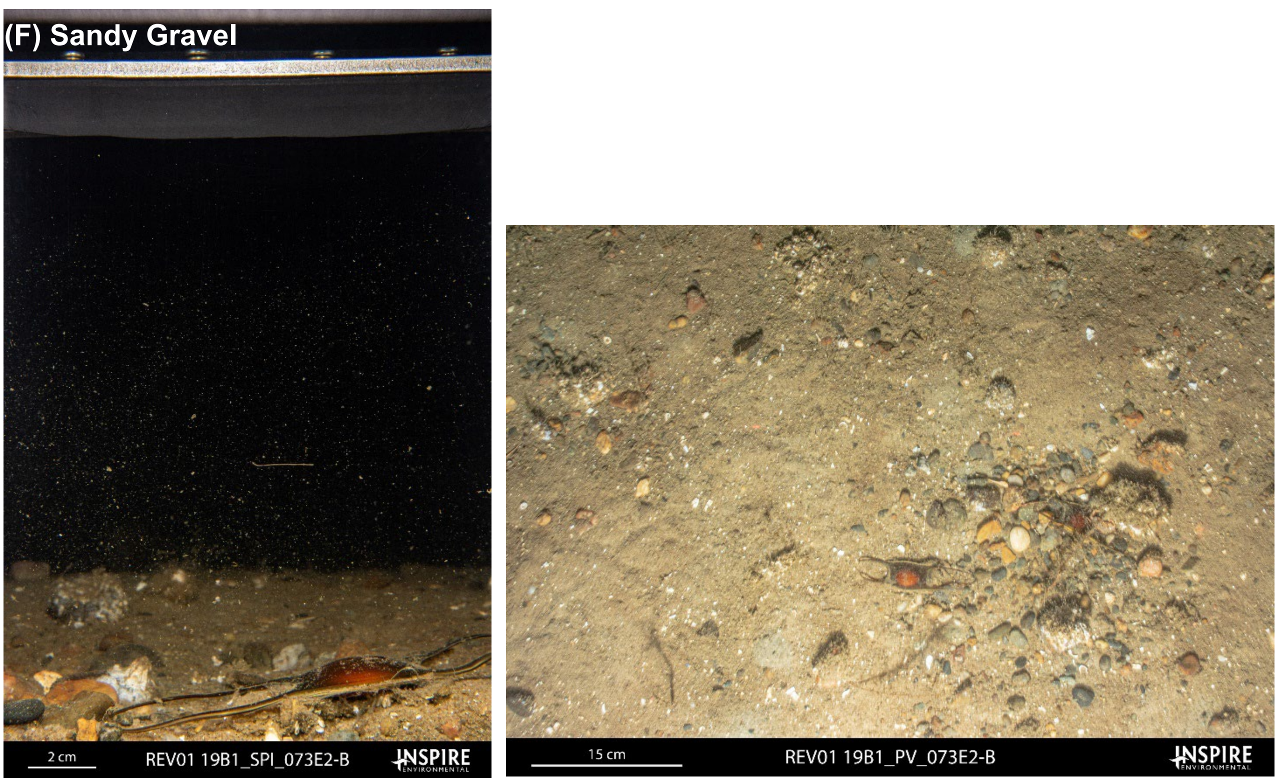


Figure 2-14. continued Representative SPI and PV images depicting the range of CMECS Substrate Subgroups across the Project Area: (A) Very Fine Sand; (B) Fine Sand; (C) Medium Sand; (D) Very Coarse Sand; (E) Gravelly Sand; (F) Sandy Gravel; (G) Pebble; (H) Cobble; and (I) Shell Substrate

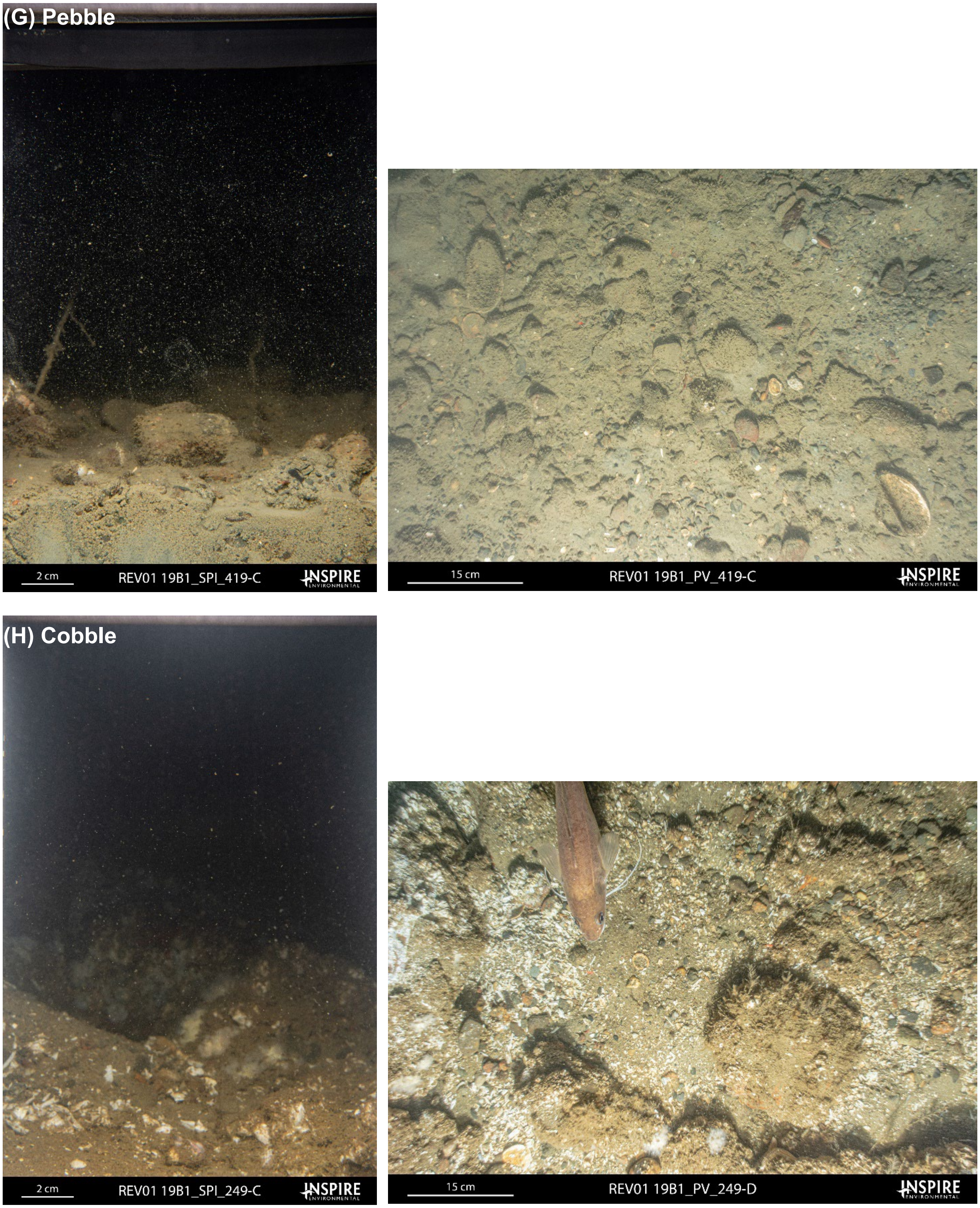


Figure 2-14. continued Representative SPI and PV images depicting the range of CMECS Substrate Subgroups across the Project Area: (A) Very Fine Sand; (B) Fine Sand; (C) Medium Sand; (D) Very Coarse Sand; (E) Gravelly Sand; (F) Sandy Gravel; (G) Pebble; (H) Cobble; and (I) Shell Substrate

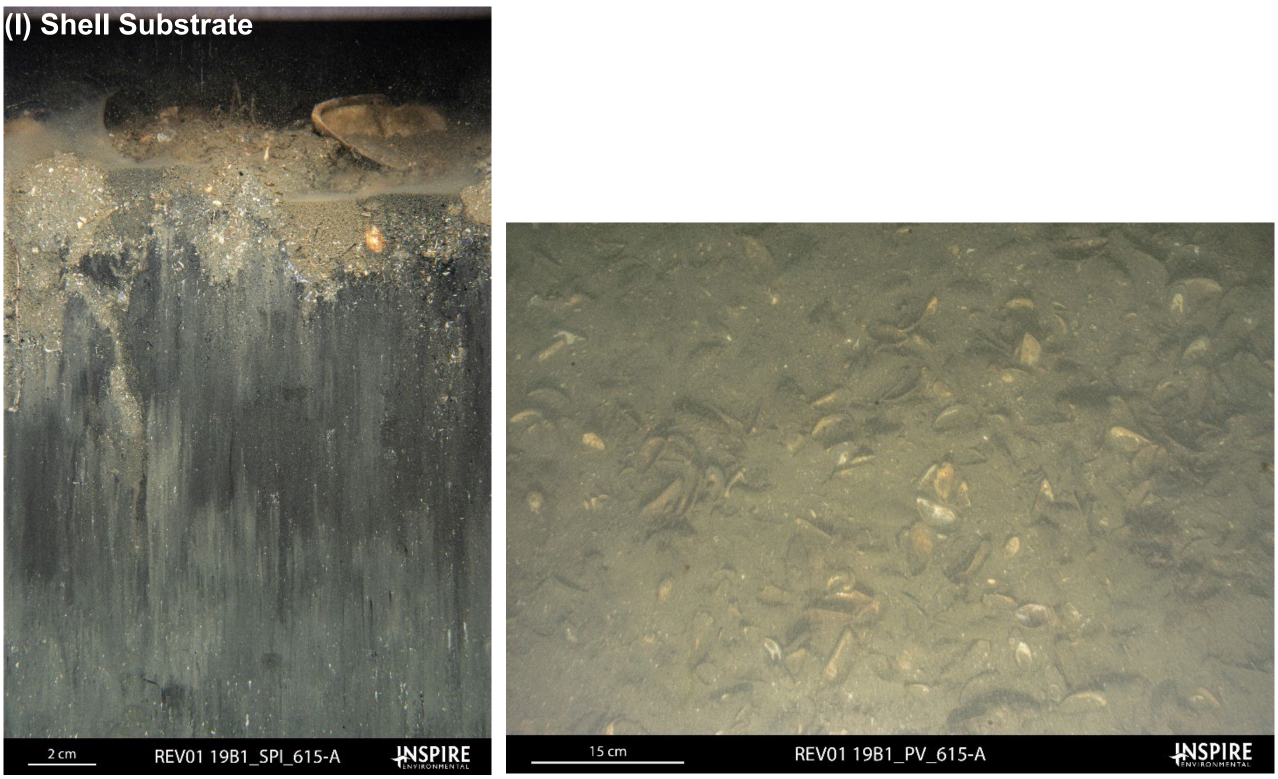
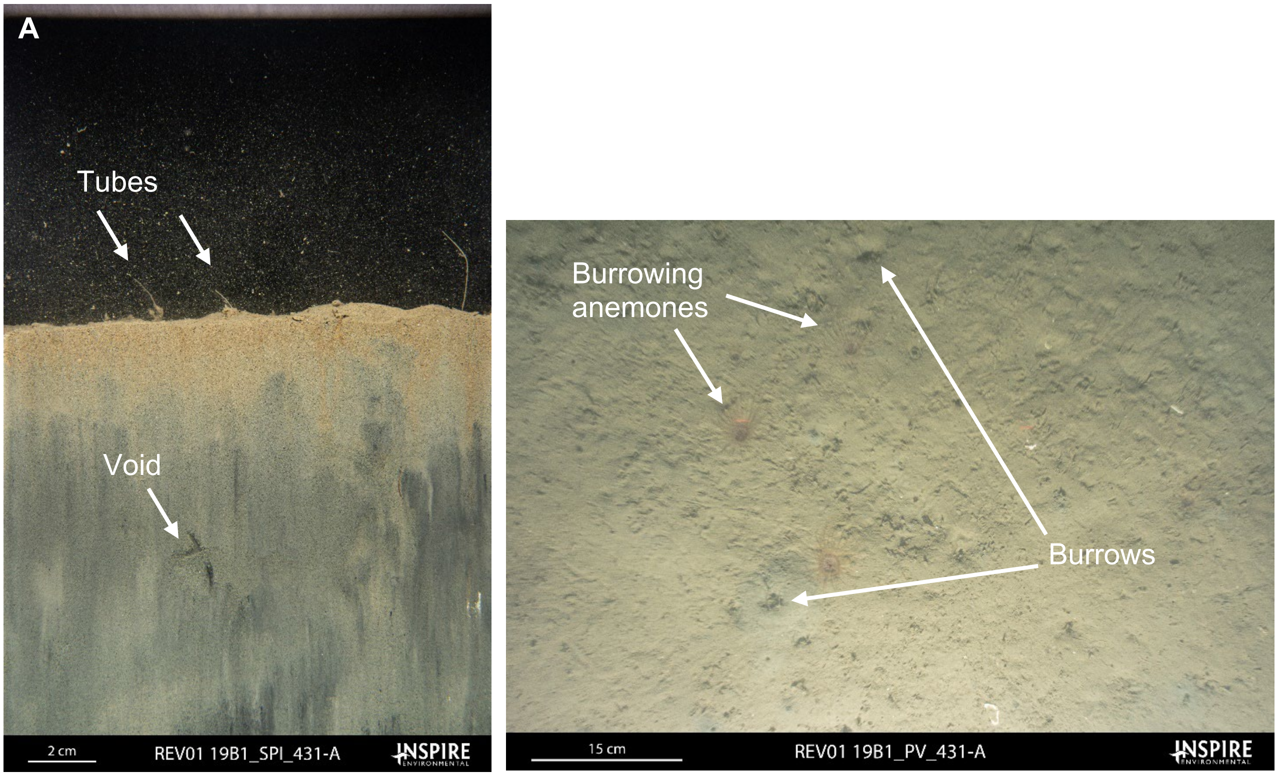
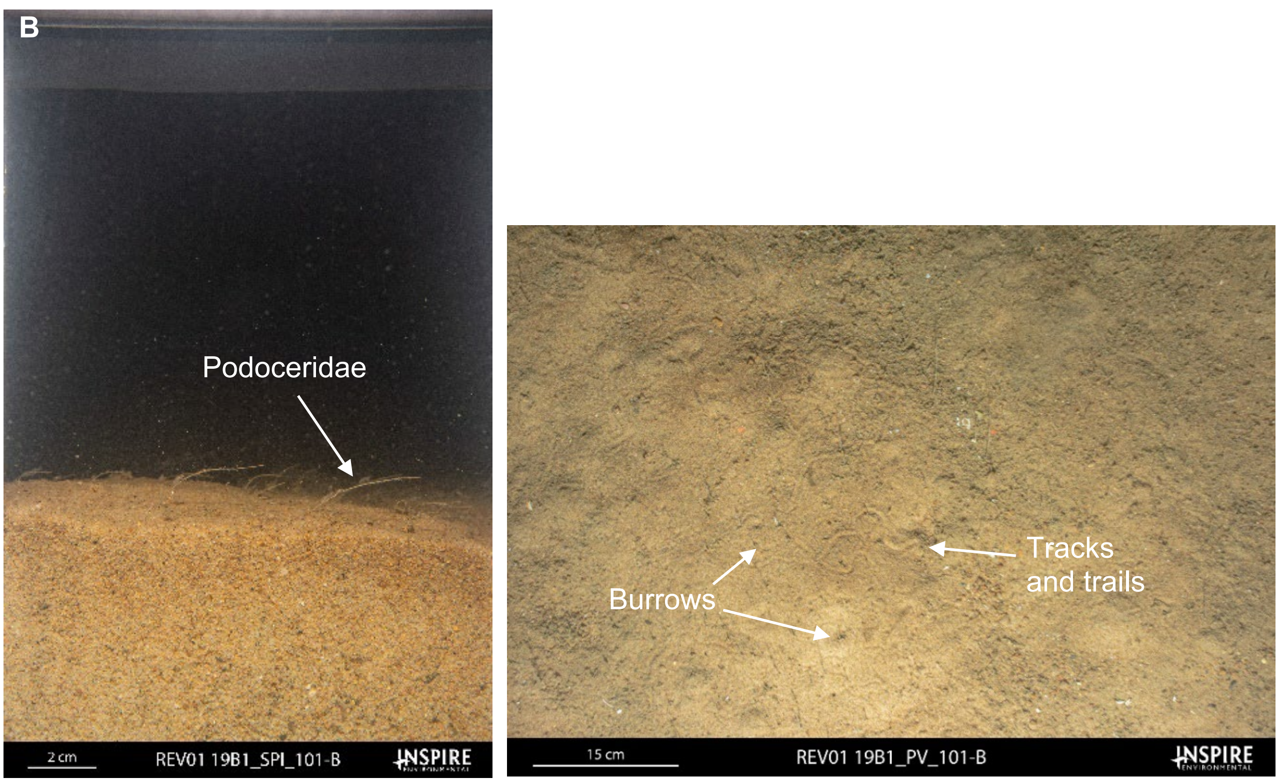


Figure 2-14. continued Representative SPI and PV images depicting the range of CMECS Substrate Subgroups across the Project Area: (A) Very Fine Sand; (B) Fine Sand; (C) Medium Sand; (D) Very Coarse Sand; (E) Gravelly Sand; (F) Sandy Gravel; (G) Pebble; (H) Cobble; and (I) Shell Substrate

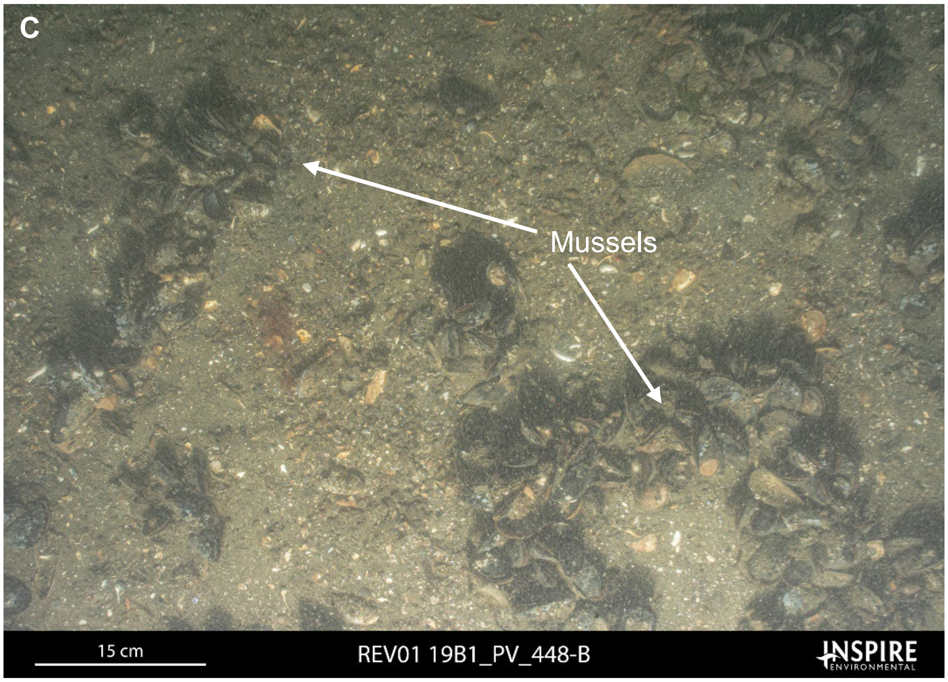


(A) infaunal tubes, burrows, and voids, as well as burrowing anemones (*Cerianthids*) on very fine sand

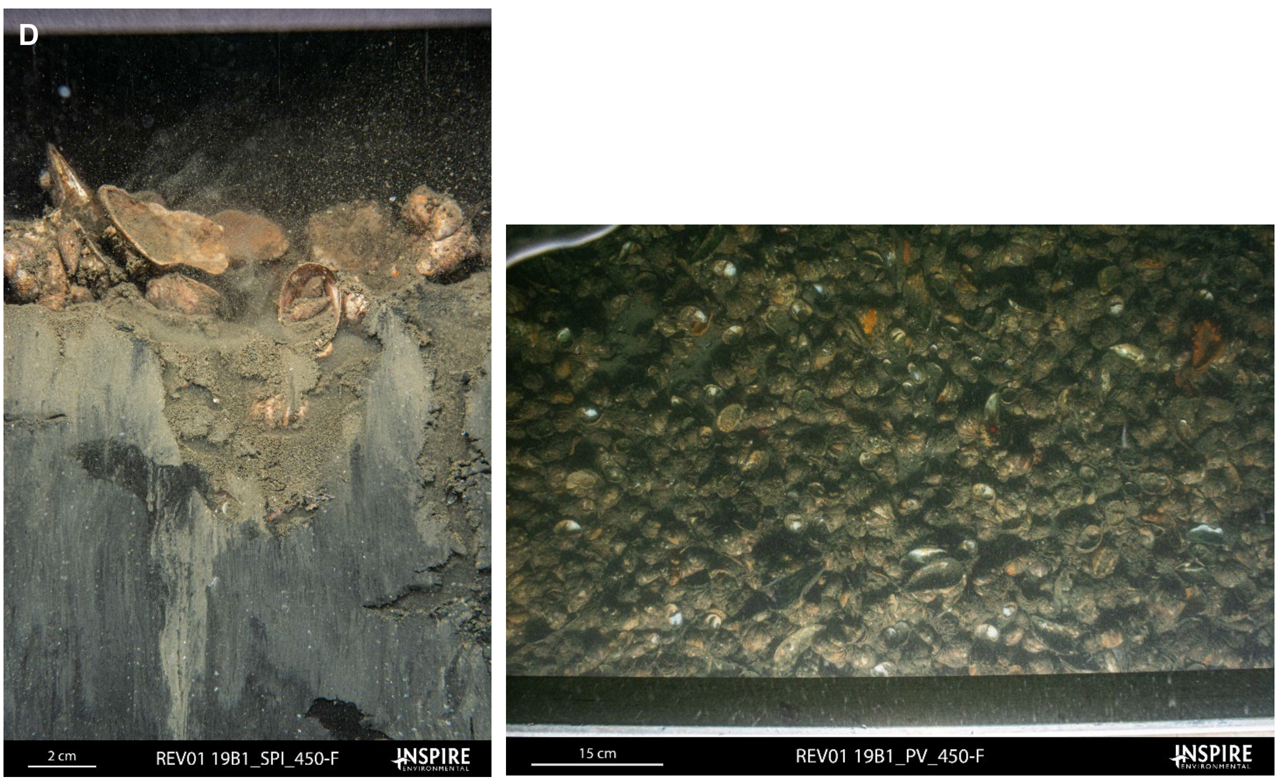


(B) tracks, trails, burrows, and Podoceridae amphipods on medium sand

Figure 2-15. Representative SPI and PV images depicting infaunal and epifaunal communities

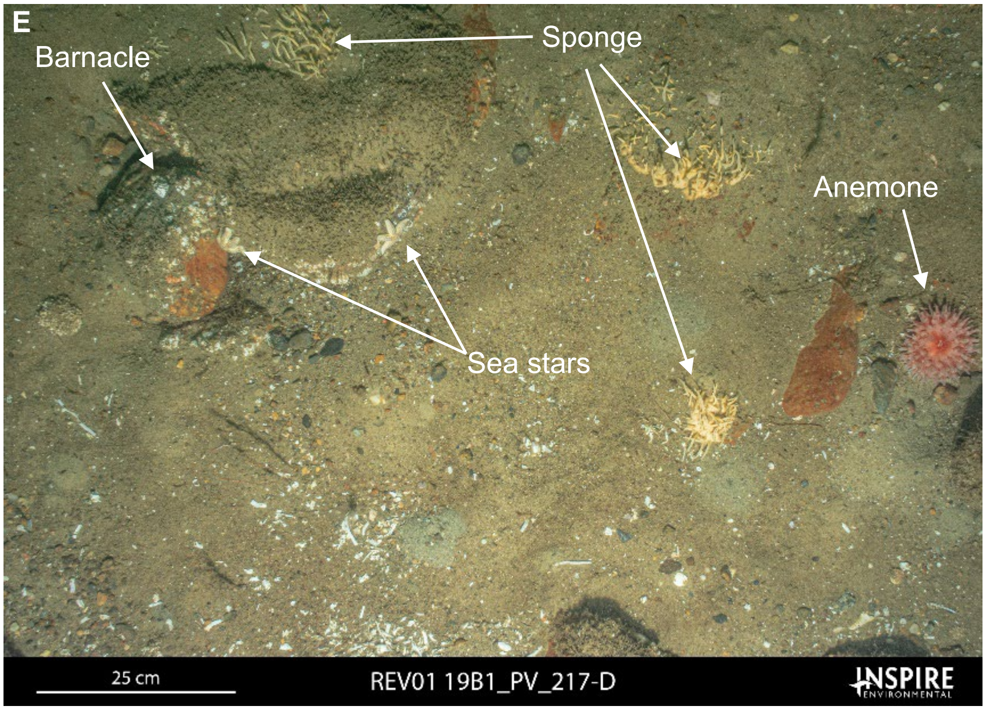


(C) blue mussels on shell hash and silt/clay

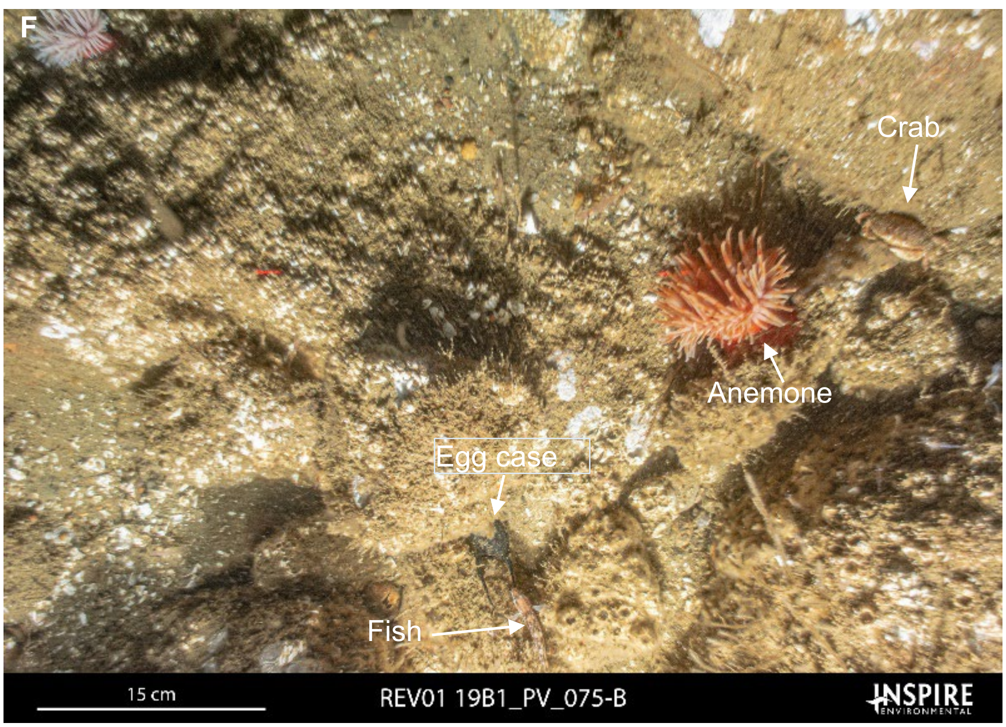


(D) *Crepidula* gastropods forming a reef substrate

Figure 2-15. continued Representative SPI and PV images depicting infaunal and epifaunal communities



(E) sea stars, barnacles, sponges, and an anemone on patchy cobbles and boulders on sand



(F) anemones, sponges, bryozoa, sea pens, and barnacles were observed, in addition to a small fish, a skate egg case, and crabs on boulders

Figure 2-15. continued Representative SPI and PV images depicting infaunal and epifaunal communities

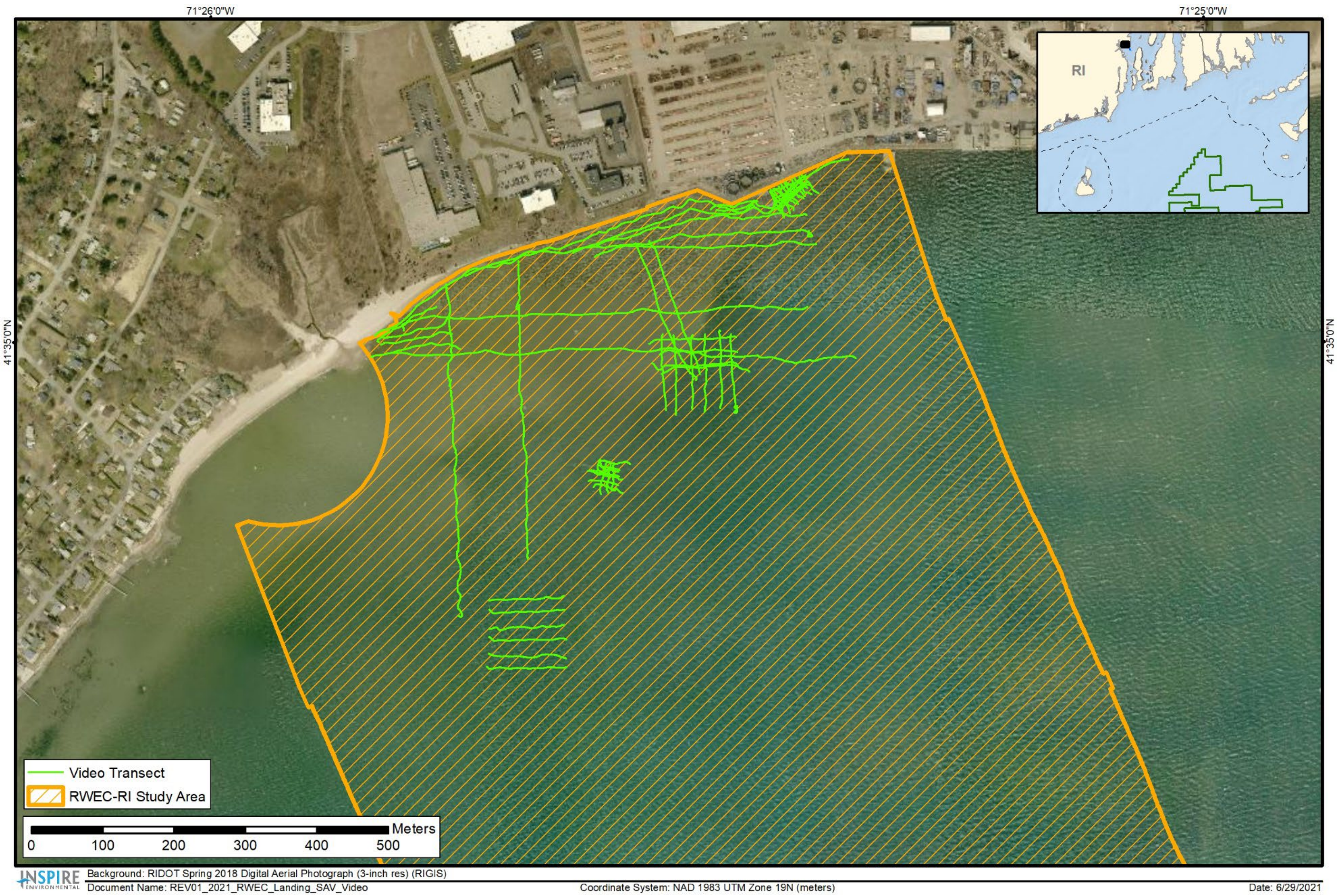


Figure 2-16. Locations of video transects surveyed for presence of submerged aquatic vegetation (SAV) in the vicinity of the potential landfall at Quonset Point

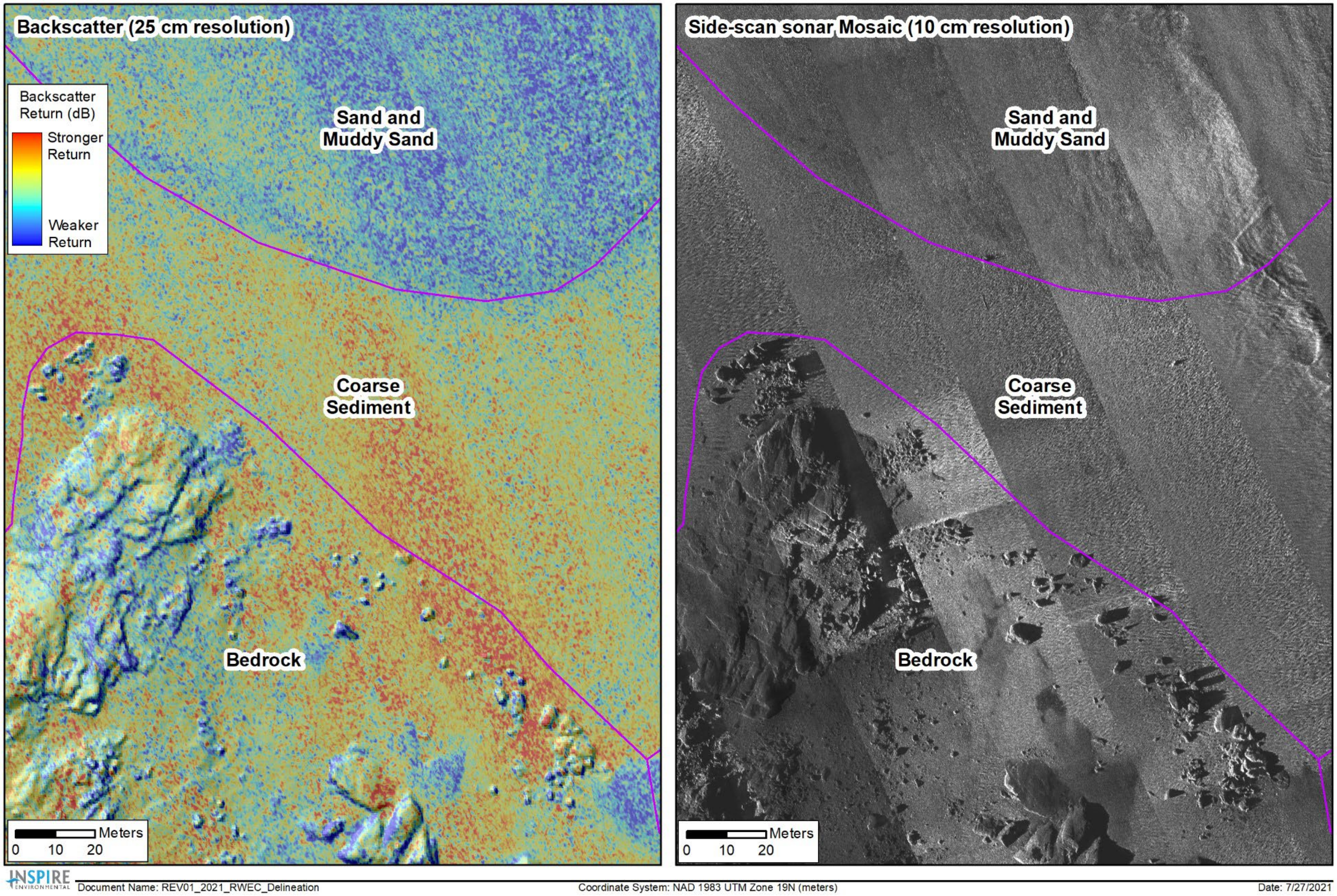


Figure 2-17. Example of delineation process, using MBES to delineate large scale facies (left) and SSS to refine seabed delineations (right)

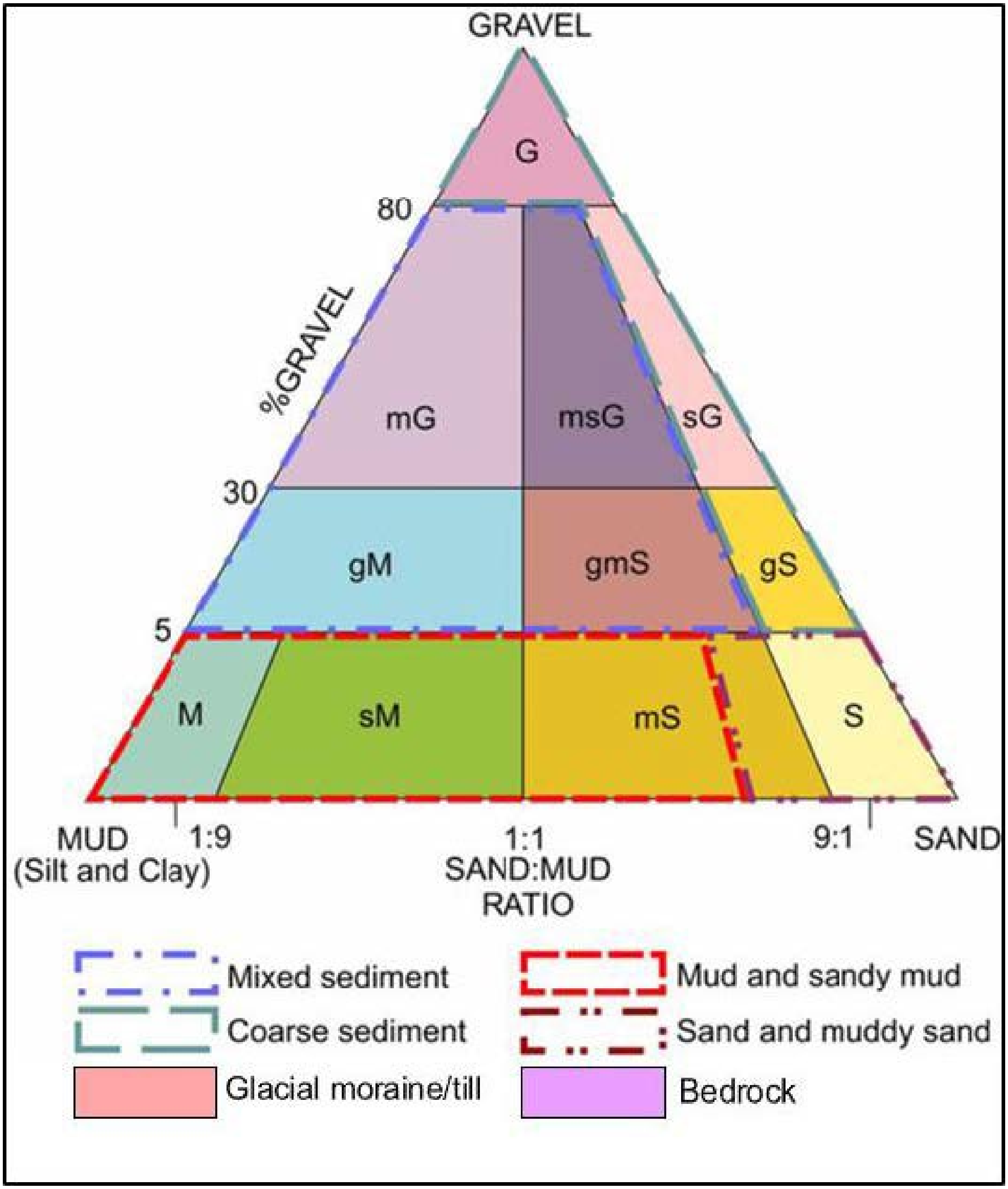


Figure 2-18. CMECS ternary diagram with Revolution Wind's geological seabed interpretation categories

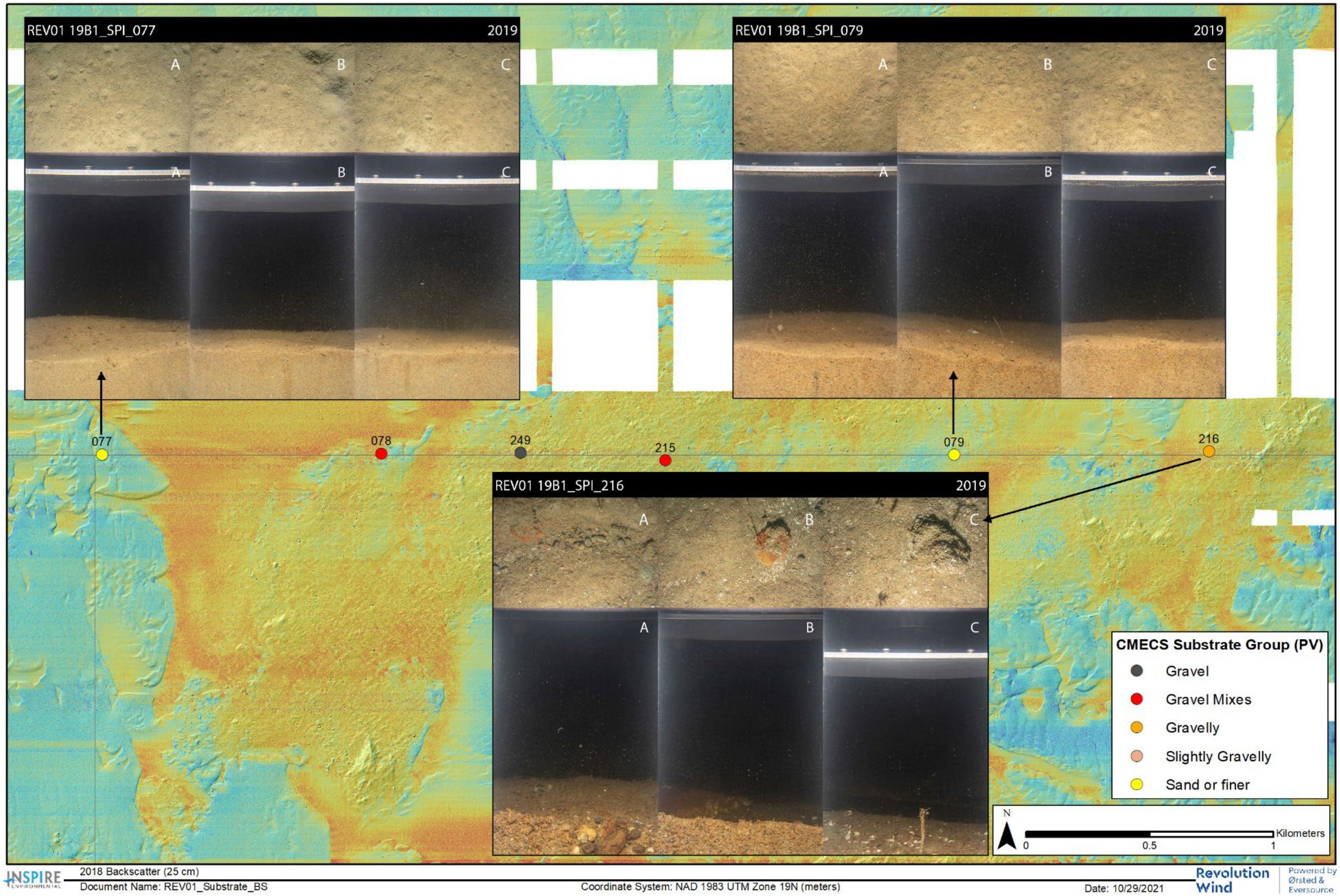


Figure 2-19. Ground-truth PV data for CMECS Substrate Group on backscatter data over hillshaded bathymetry; inset images for Stations 077, 079, and 216 show three paired replicate PV images (top) and SPI images (bottom)

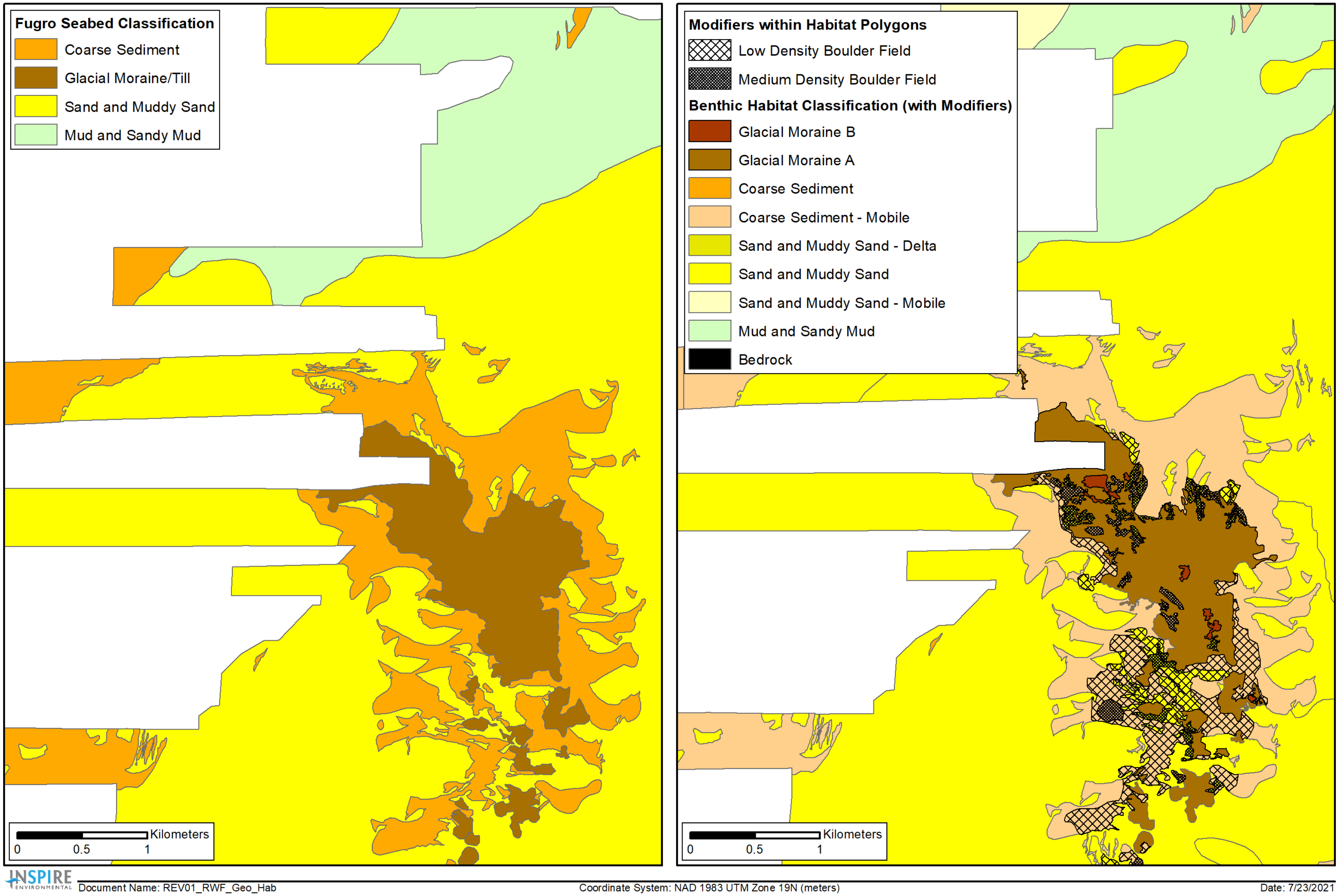


Figure 2-20. Geological seabed interpretations refined to benthic habitat types with modifiers for purposes of assessing potential impacts to essential fish habitat; example from the RWF

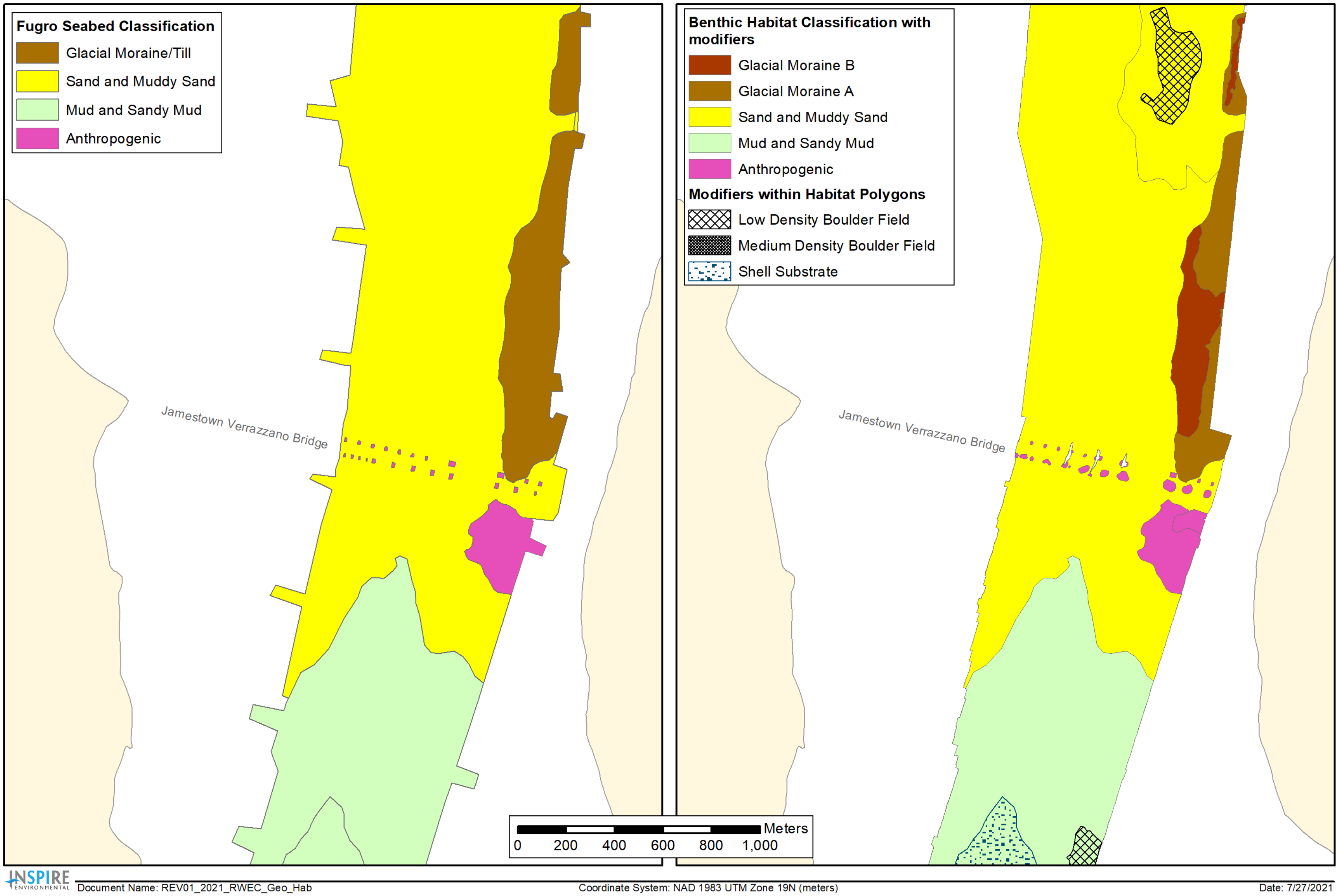


Figure 2-21. Geological seabed interpretations refined to benthic habitat types with modifiers for purposes of assessing potential impacts to essential fish habitat; example from the RWEC-RI

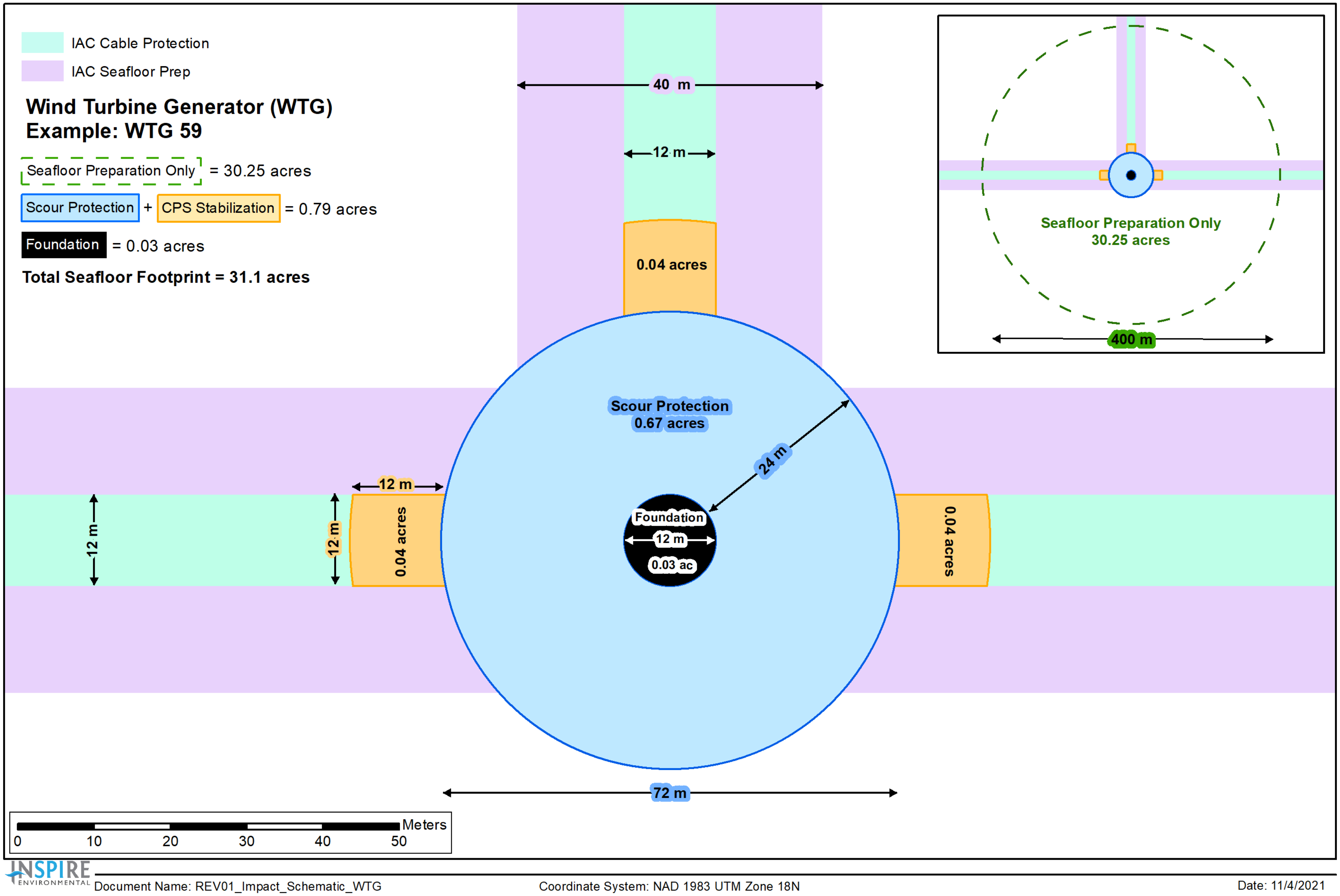


Figure 2-22. Schematic of WTG monopile foundation footprint

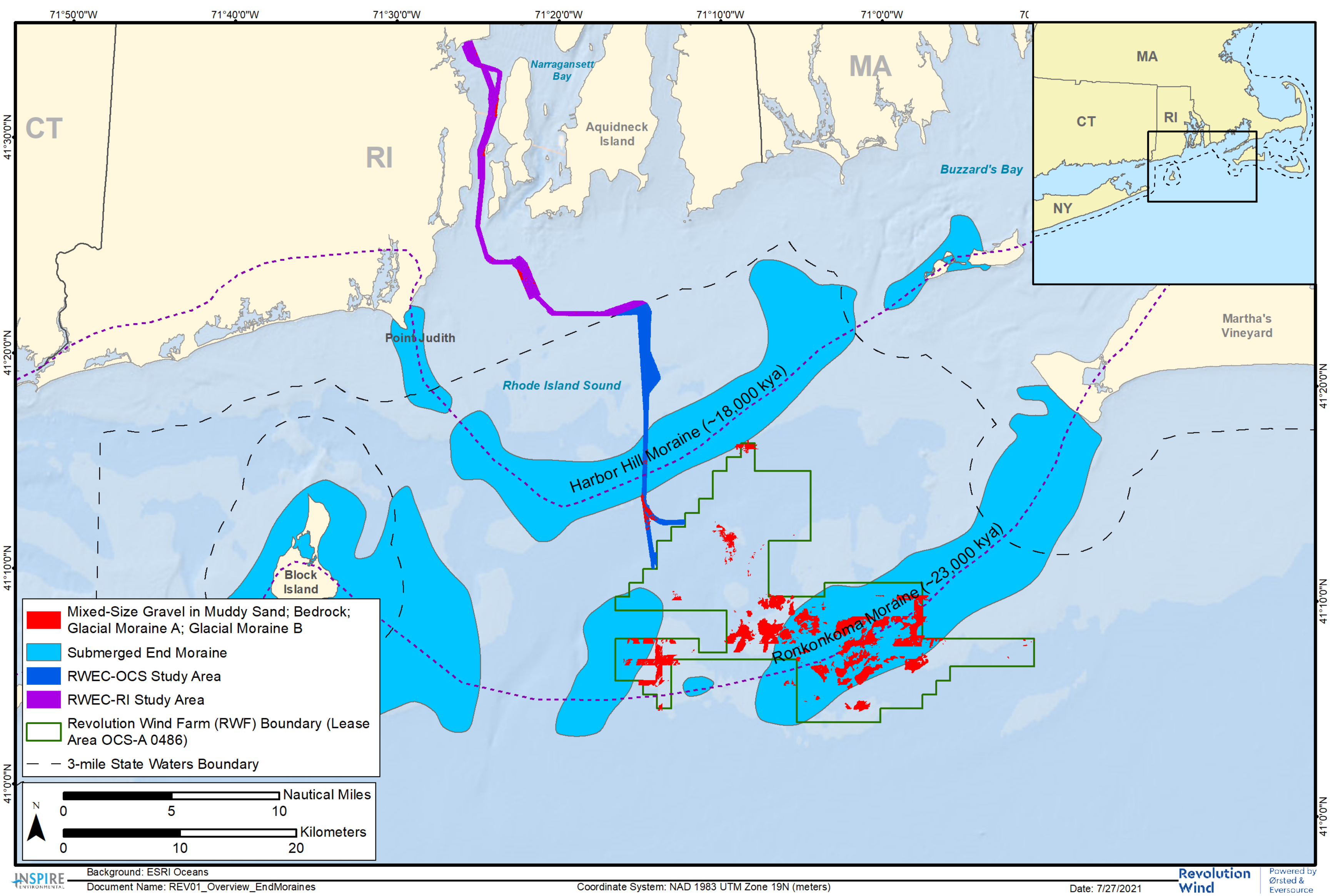


Figure 3-1. Modeled locations of the Ronkonkoma and Harbor Hill end moraine complexes (Revolution Wind, LLC 2021b) and the mapped locations of glacial habitats (Bedrock, Glacial Moraine A and B, and Mixed-Size Gravel in Muddy Sand)

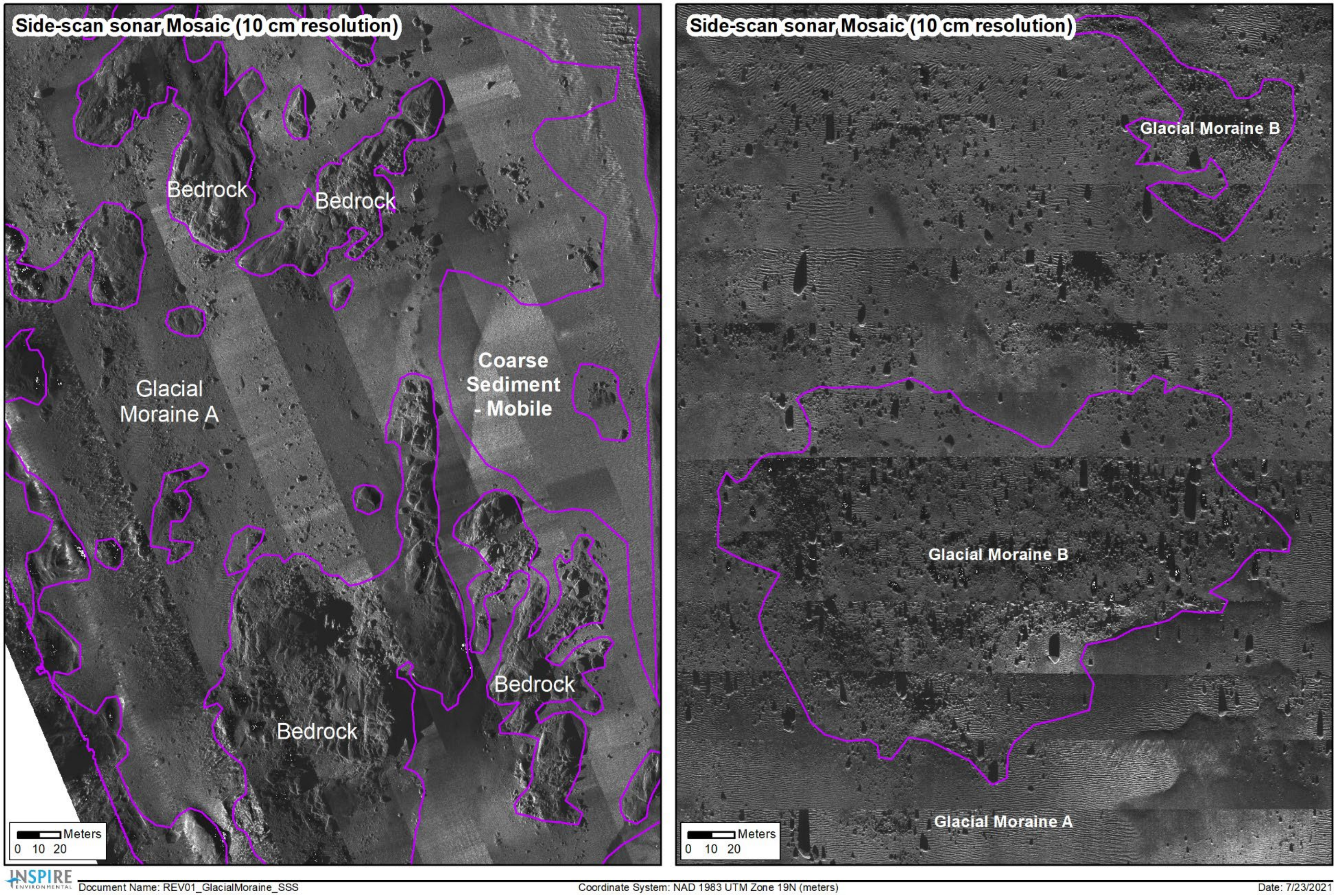


Figure 3-2. Glacial Moraine B, Glacial Moraine A and Bedrock as detected in geophysical data

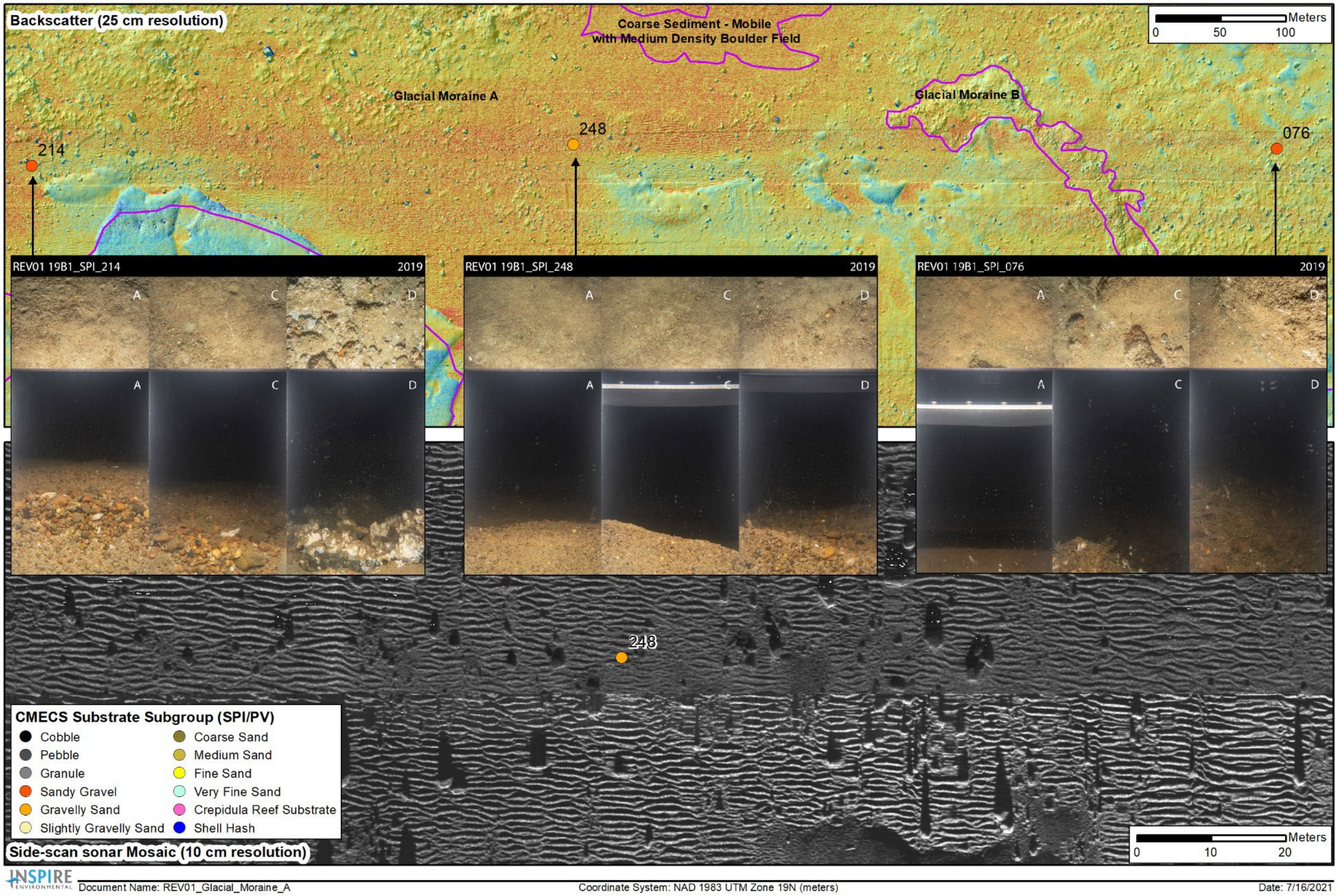


Figure 3-3. Glacial Moraine A habitat as detected in backscatter data over hillshaded bathymetry (top), side-scan sonar (bottom), and ground-truth data; inset images for Stations 214, 248, and 076 show three paired replicate PV images (top) and SPI images (bottom)

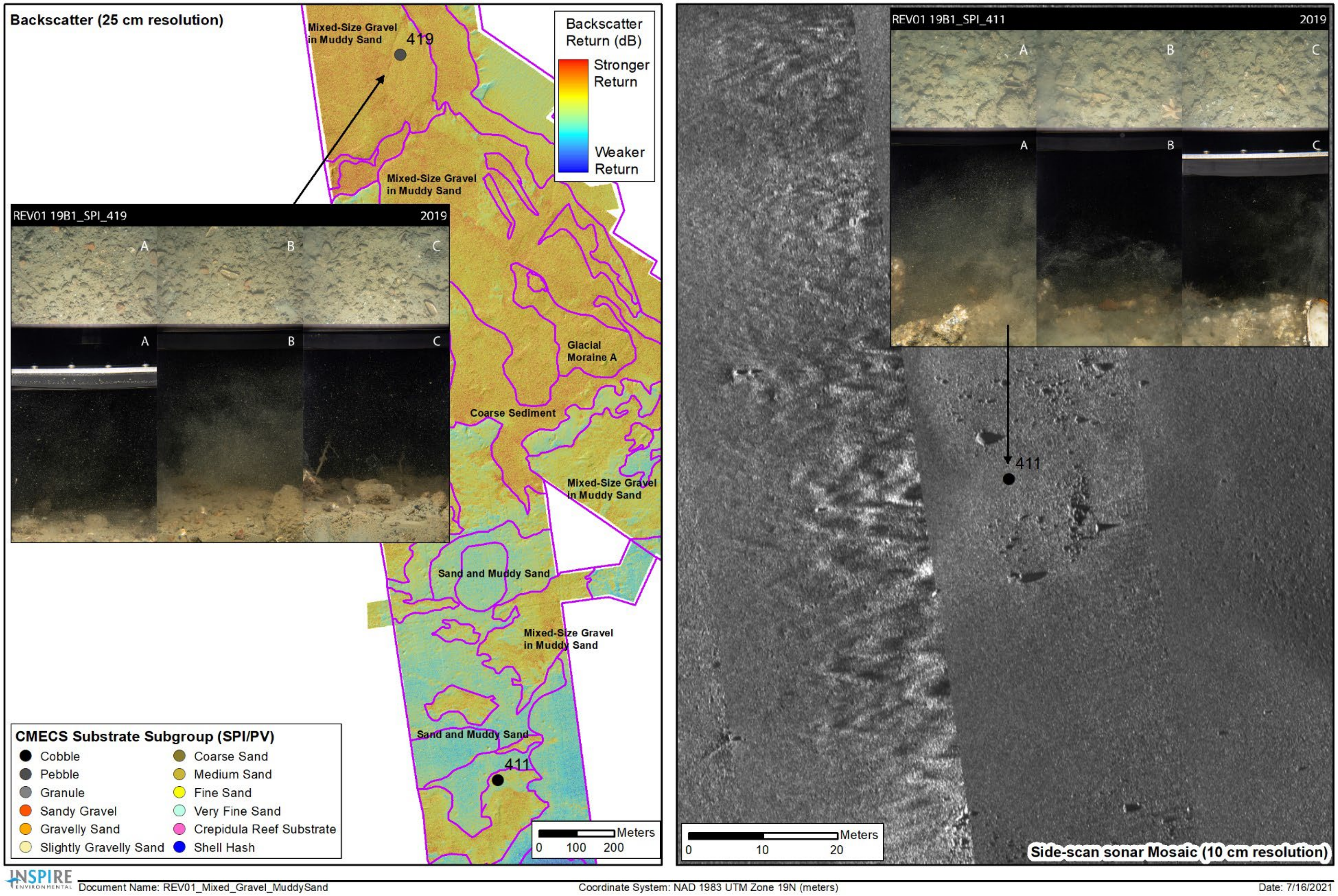


Figure 3-4. Mixed-Size Gravel in Muddy Sand habitat as detected in backscatter data over hillshaded bathymetry (left), side-scan sonar (right), and ground-truth data; inset images for Stations 419 and 411 show three paired replicate PV images (top) and SPI images (bottom)

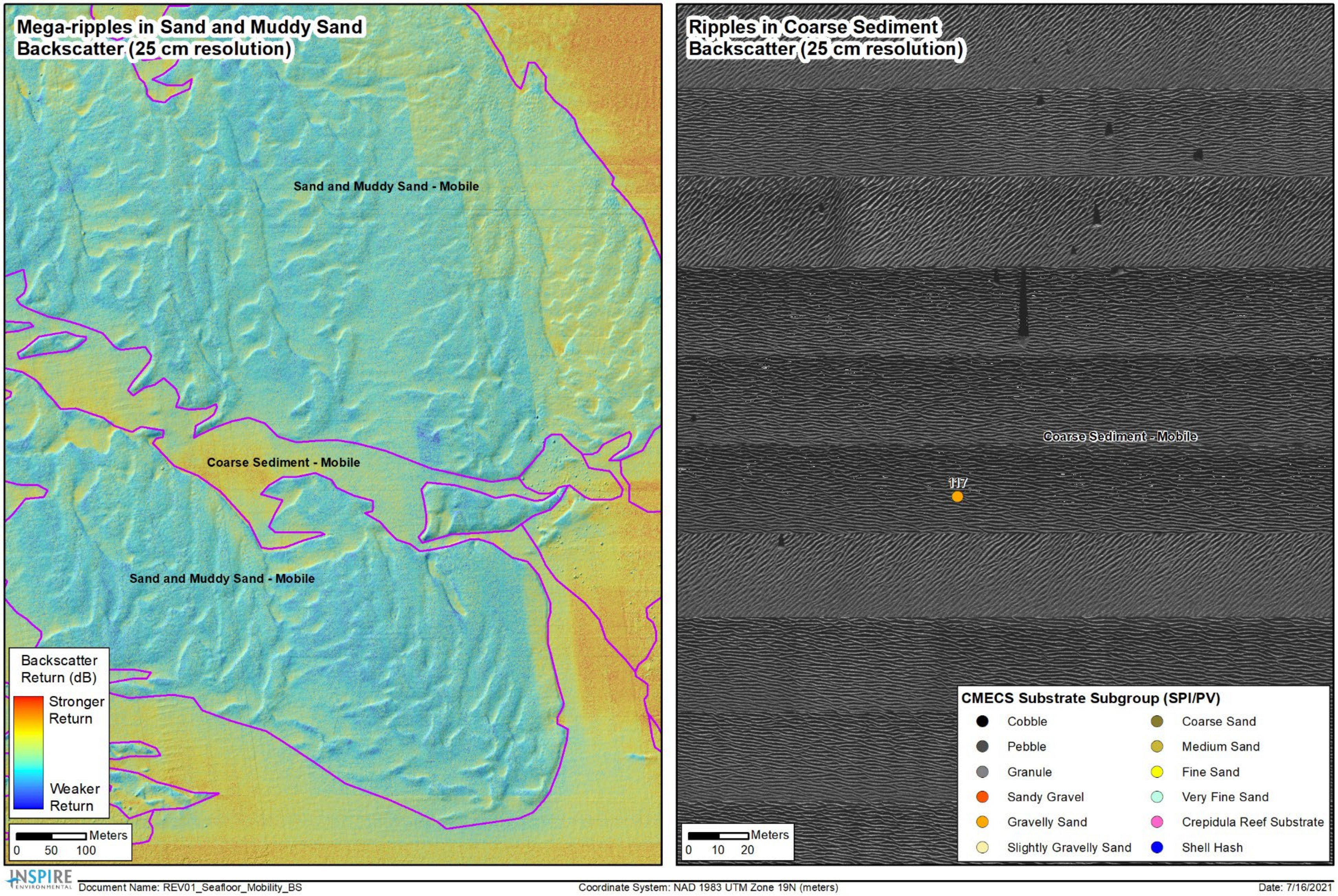


Figure 3-5. Mobility of the seafloor evident in geophysical data: mega-ripples detected in backscatter and bathymetric relief in Sand and Muddy Sand (left); and ripples detected in Coarse Sediment - Gravelly Sand in geophysical data (right); two different locations are used as examples here. The modifier of "- Mobile" is applied to these habitats where seafloor features, including mega-ripples and/or ripples, are observed.

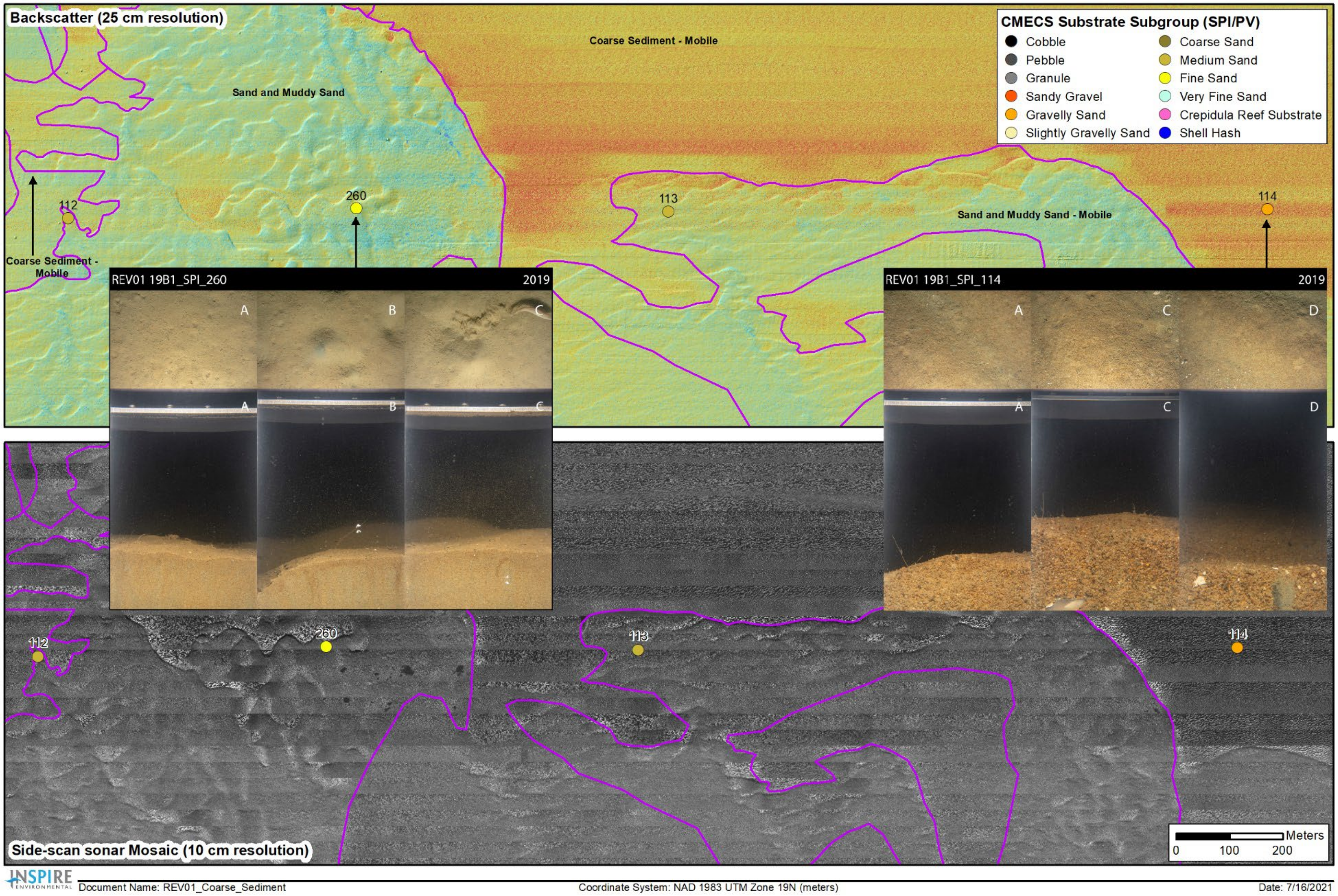


Figure 3-6. Coarse Sediment habitat and Sand and Muddy Sand habitat as detected in backscatter data over hillshaded bathymetry (top), side-scan sonar (bottom), and ground-truth data; inset images for Stations 260 and 114 show three paired replicate PV images (top) and SPI images (bottom)

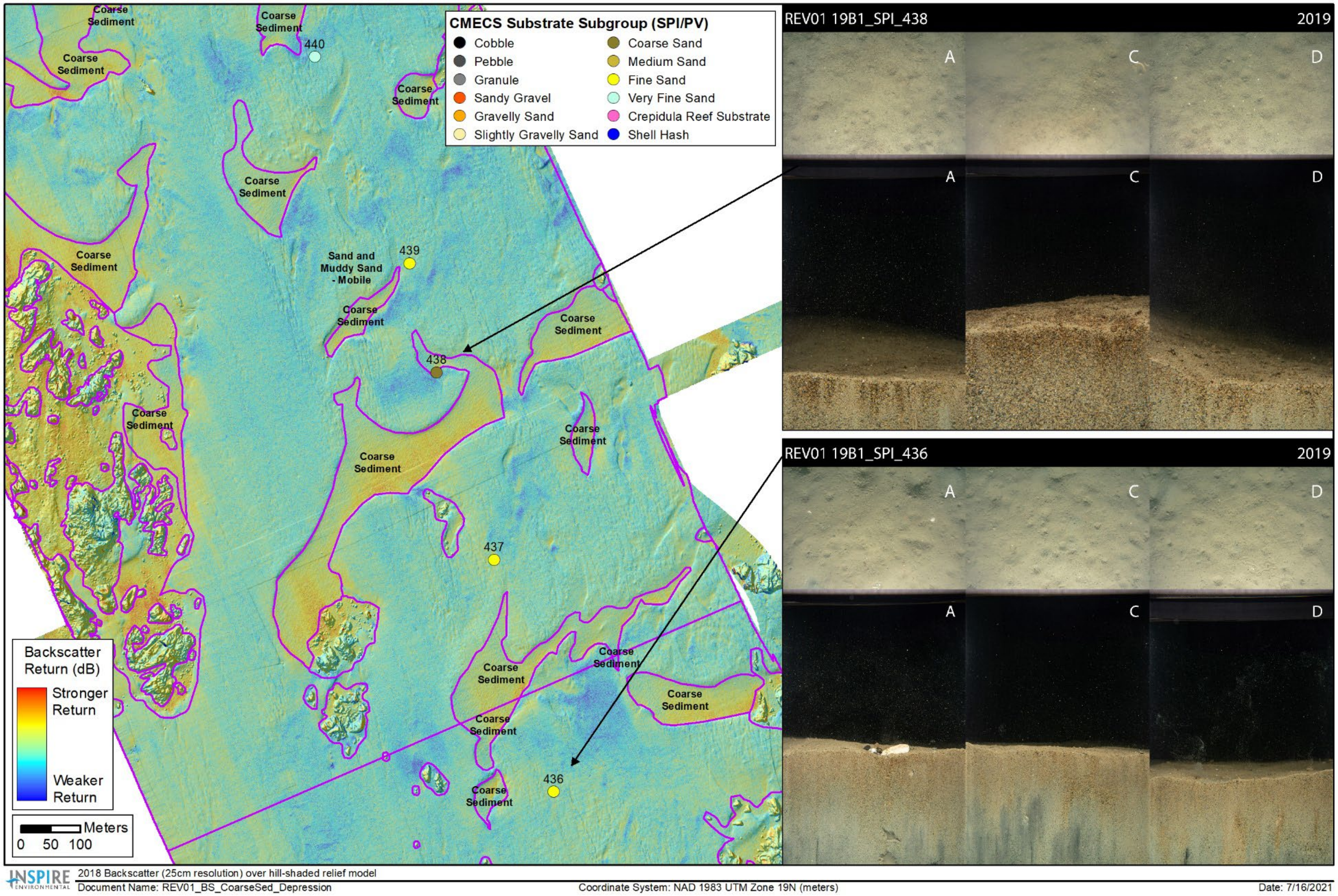


Figure 3-7. Coarse Sediment in depressions in the seafloor detected in geophysical data, surrounded by Sand and Muddy Sand detected in geophysical and ground-truth data

Figure 3-8. Low density (20 to 99 boulders / 10,000 m^2) (left) and medium density (100 to 199 boulders / 10,000 m^2) (right) boulder fields identified from geophysical data and included as a habitat type modifier for mud, sand, and coarse sediment habitat types where present

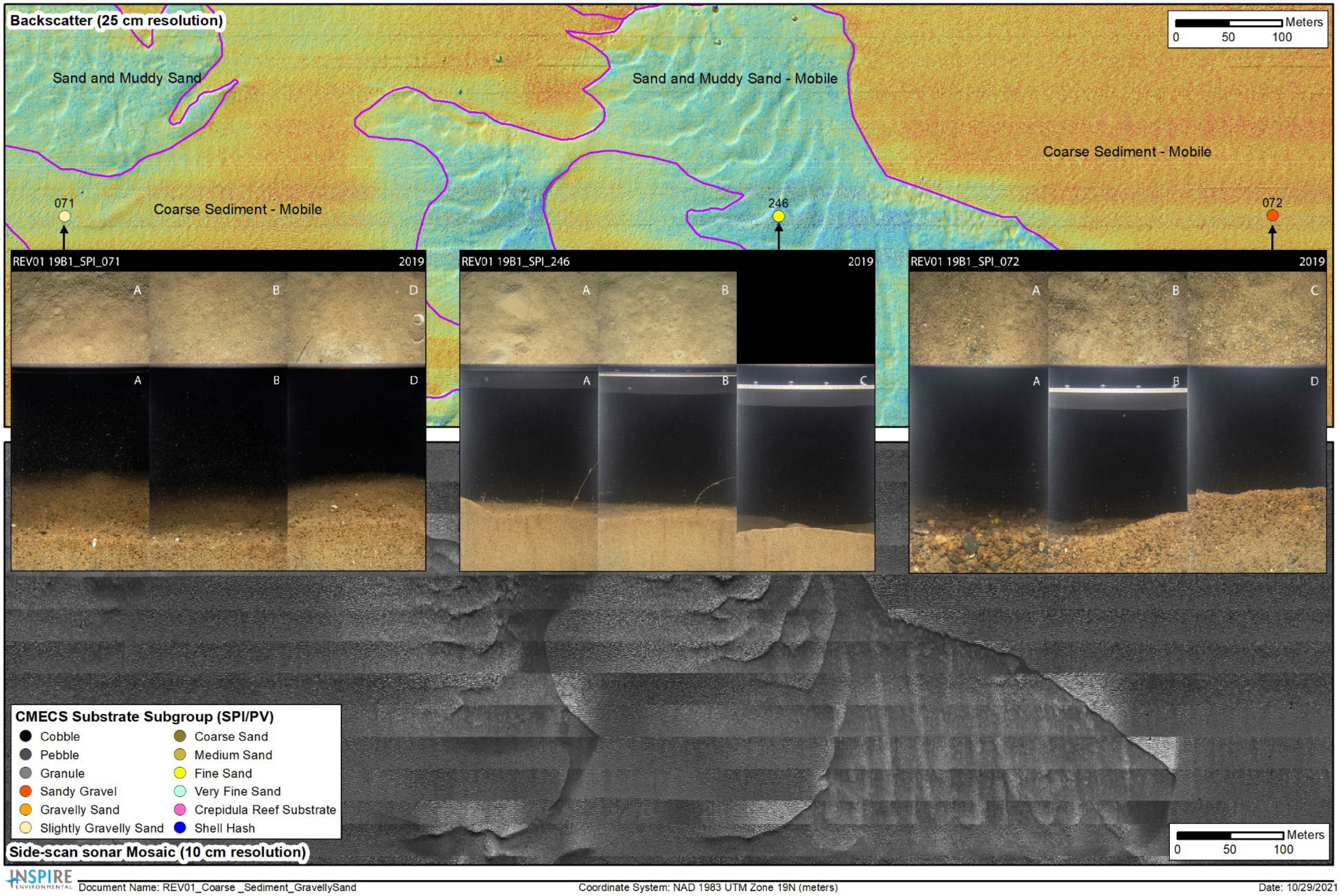


Figure 3-9. Coarse Sediment - Mobile as detected in backscatter data over hillshaded bathymetry (top) and in side-scan sonar data (bottom) and refined as mobile Gravelly Sand based on ground-truth data; inset images for Stations 071, 072, and 246 show three paired replicate PV images (top) and SPI images (bottom)

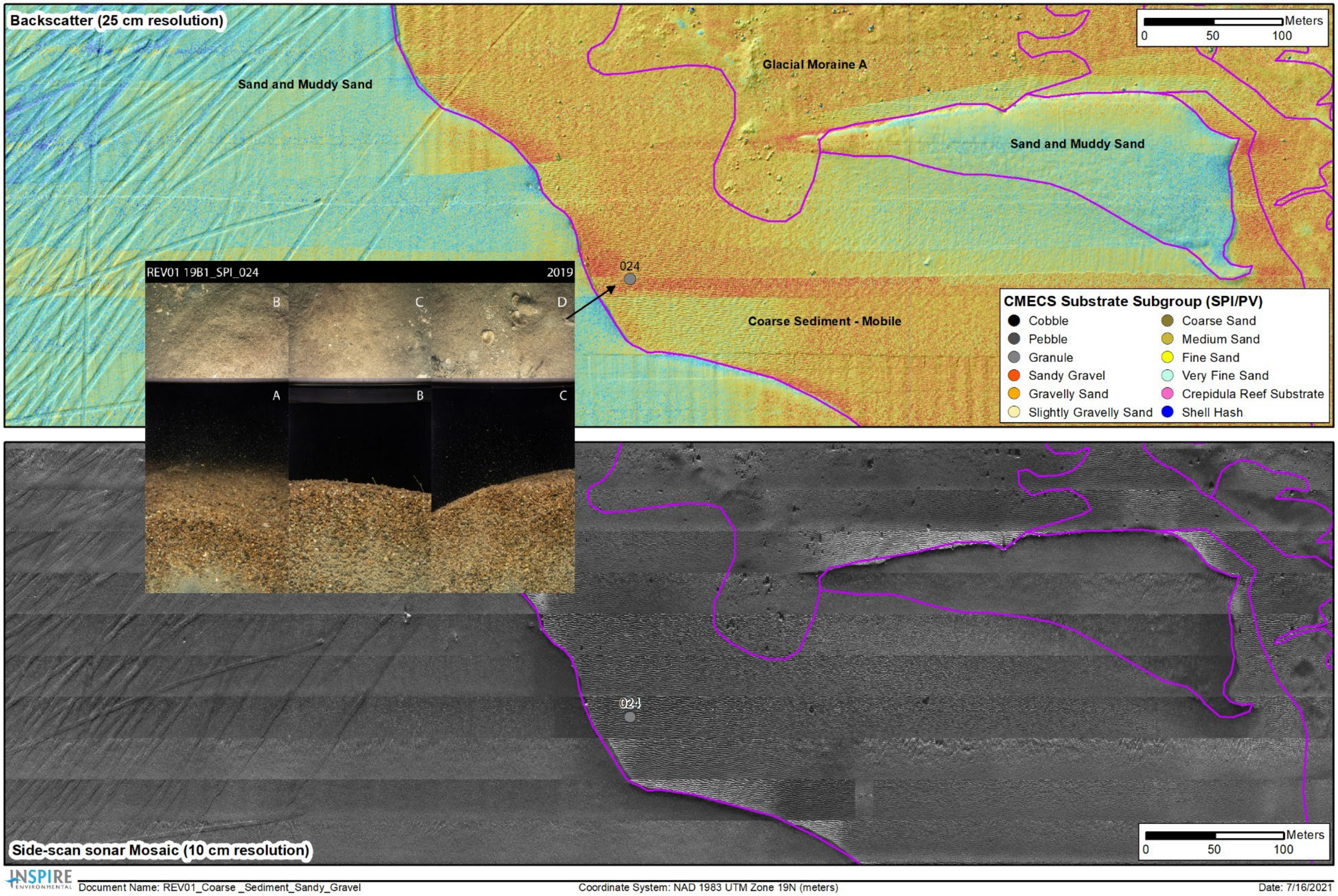


Figure 3-10. Coarse Sediment - Mobile as detected in backscatter data over hillshaded bathymetry (top) and in side-scan sonar data (bottom) and refined as mobile Sandy Gravel based on ground-truth data; inset images for Station 024 show three paired replicate PV images (top) and SPI images (bottom). Note - linear marks visible on the seafloor in the Sand and Muddy Sandy habitat to the left are from trawling activity.

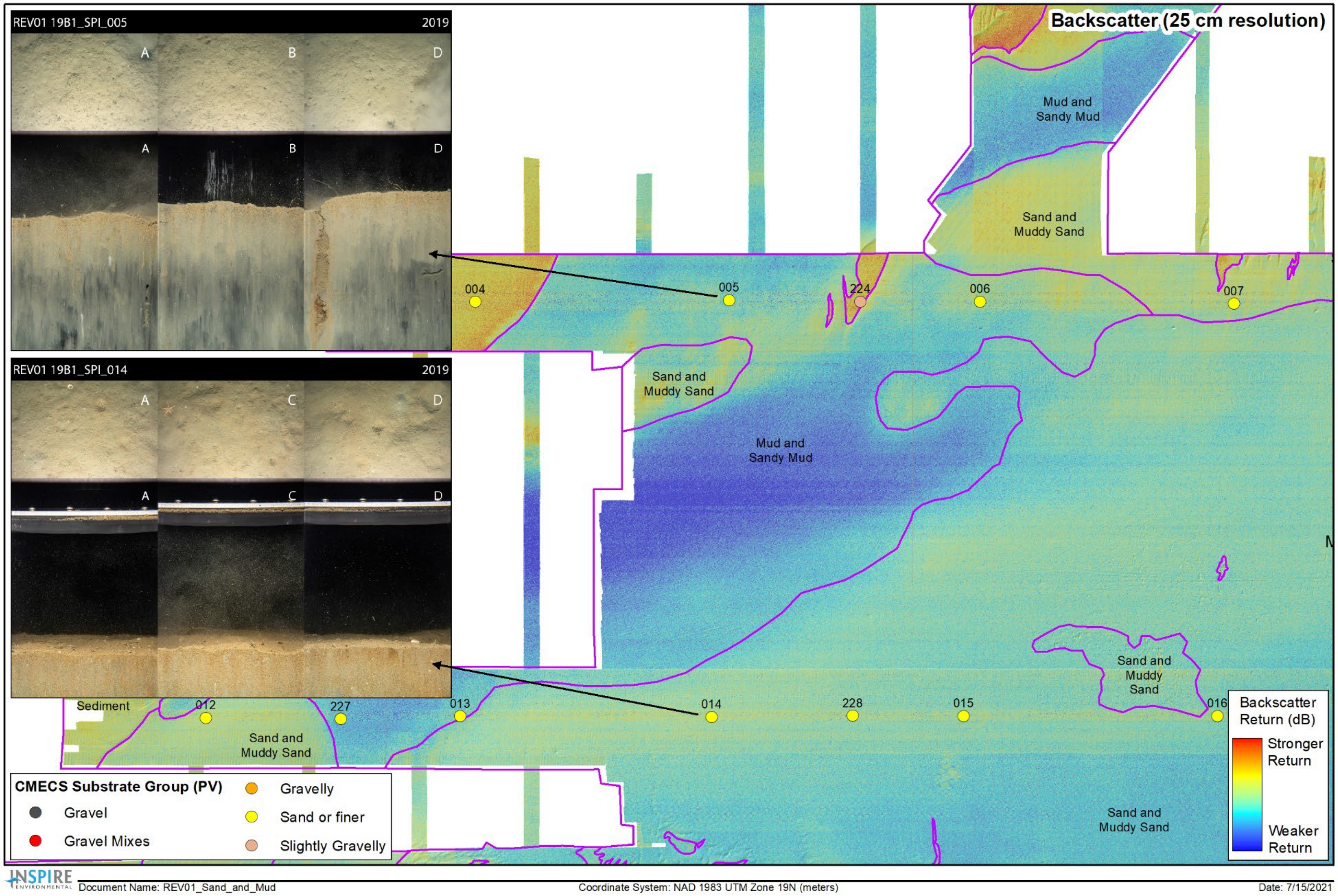


Figure 3-11. Sand and Muddy Sand and Mud and Sandy Mud habitat as detected in backscatter data over hillshaded bathymetry and ground-truth data; inset images for Stations 005 and 014 show three paired replicate PV images (top) and SPI images (bottom)

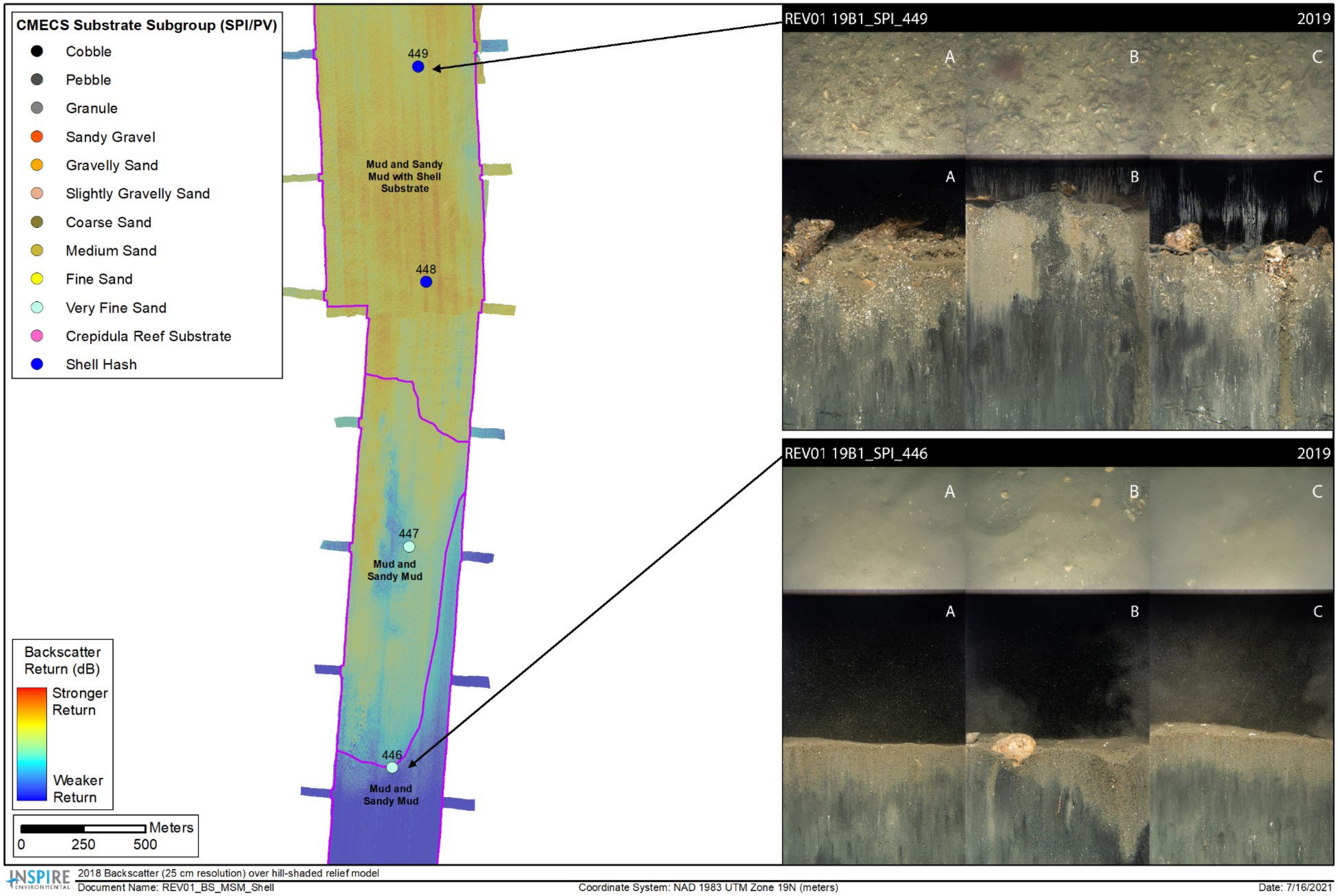


Figure 3-12. Mud and Sandy Mud and Mud and Sandy Mud with Shell Substrate as detected in geophysical and ground-truth data; inset images for Stations 446 and 449 show three paired replicate PV images (top) and SPI images (bottom)

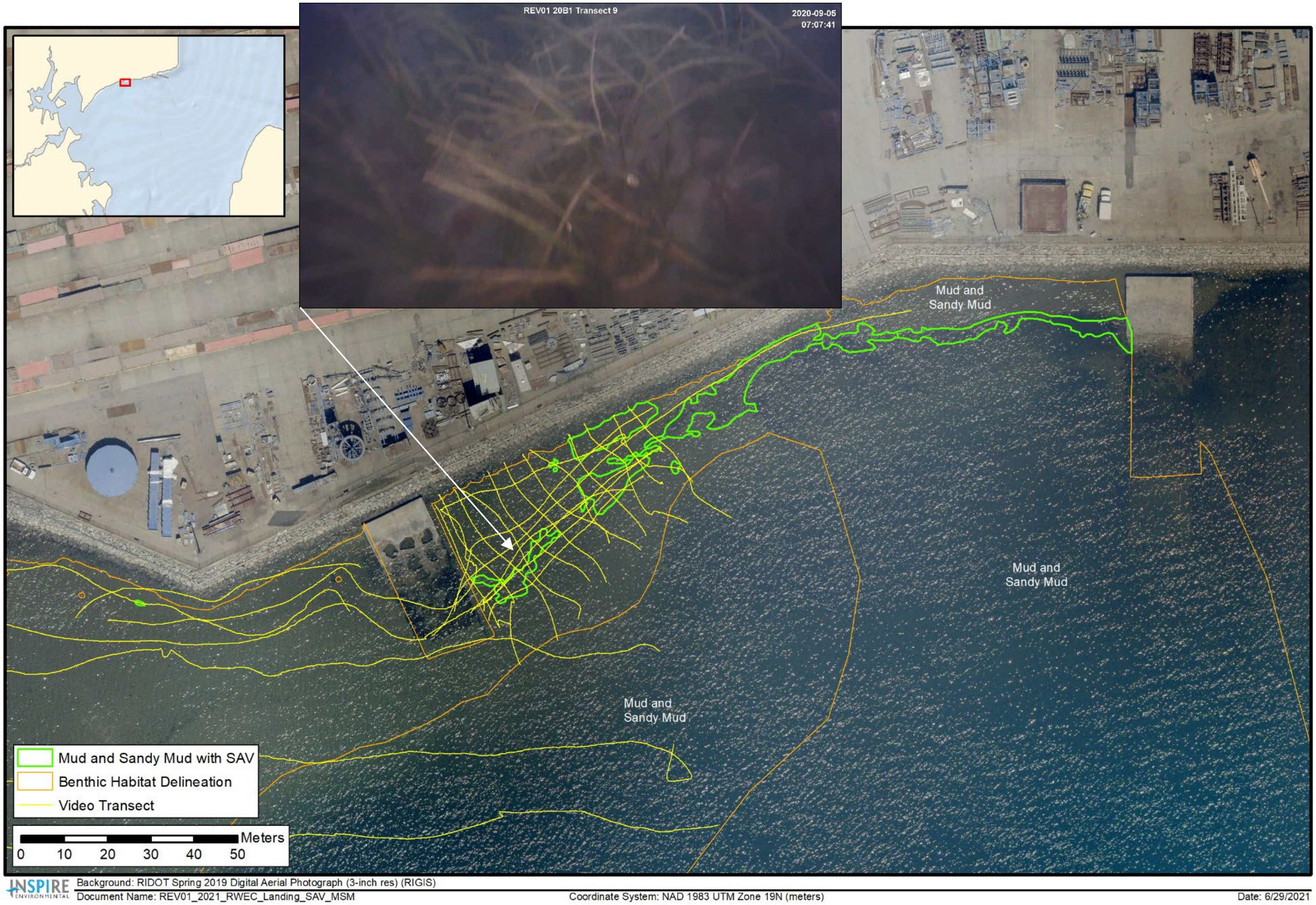


Figure 3-13. Mud and Sandy Mud with submerged aquatic vegetation (SAV) habitat detected in aerial imagery and underwater video footage

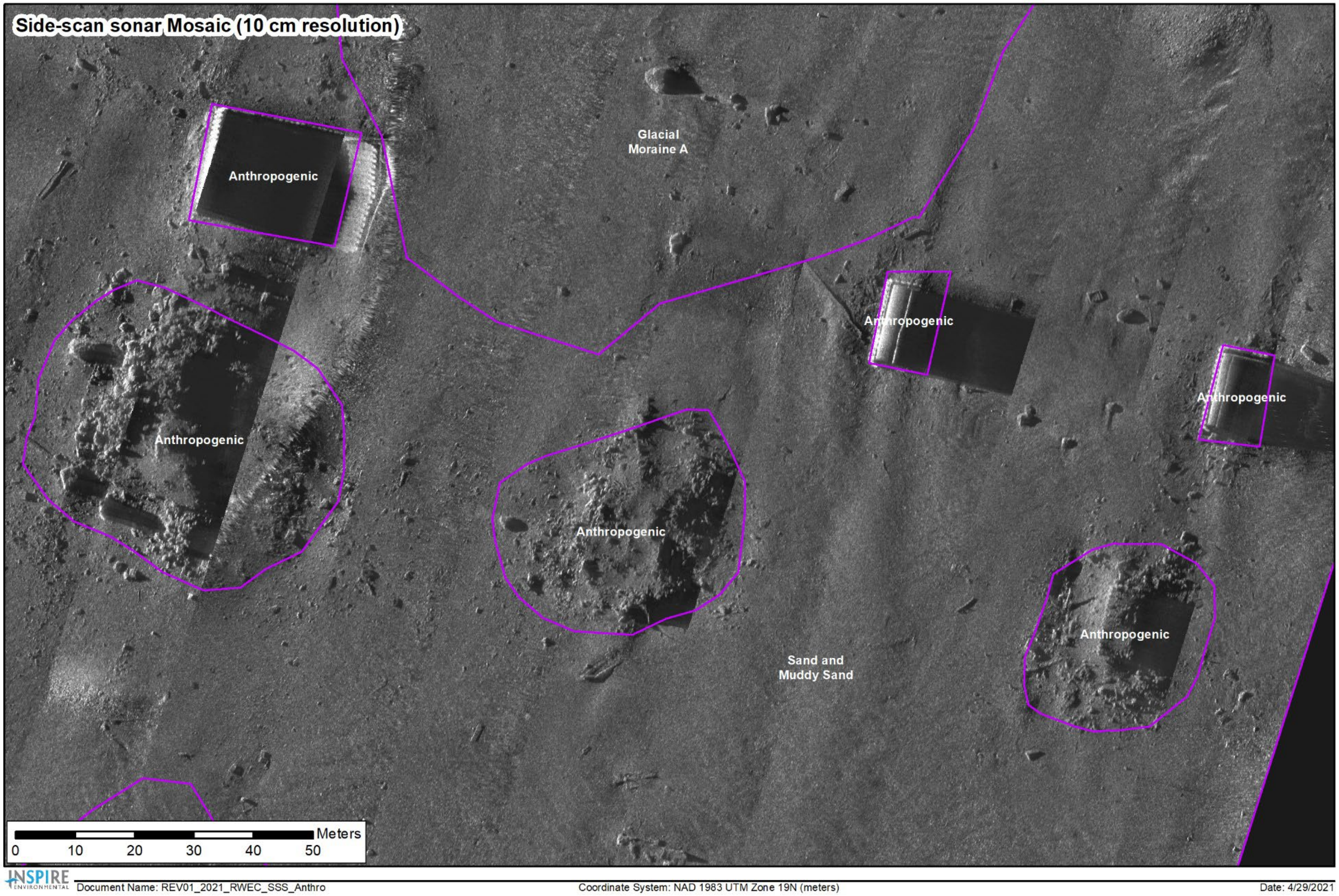


Figure 3-14. Anthropogenic features, such as debris related to the demolition of the old Jamestown Bridge, as detected in SSS data

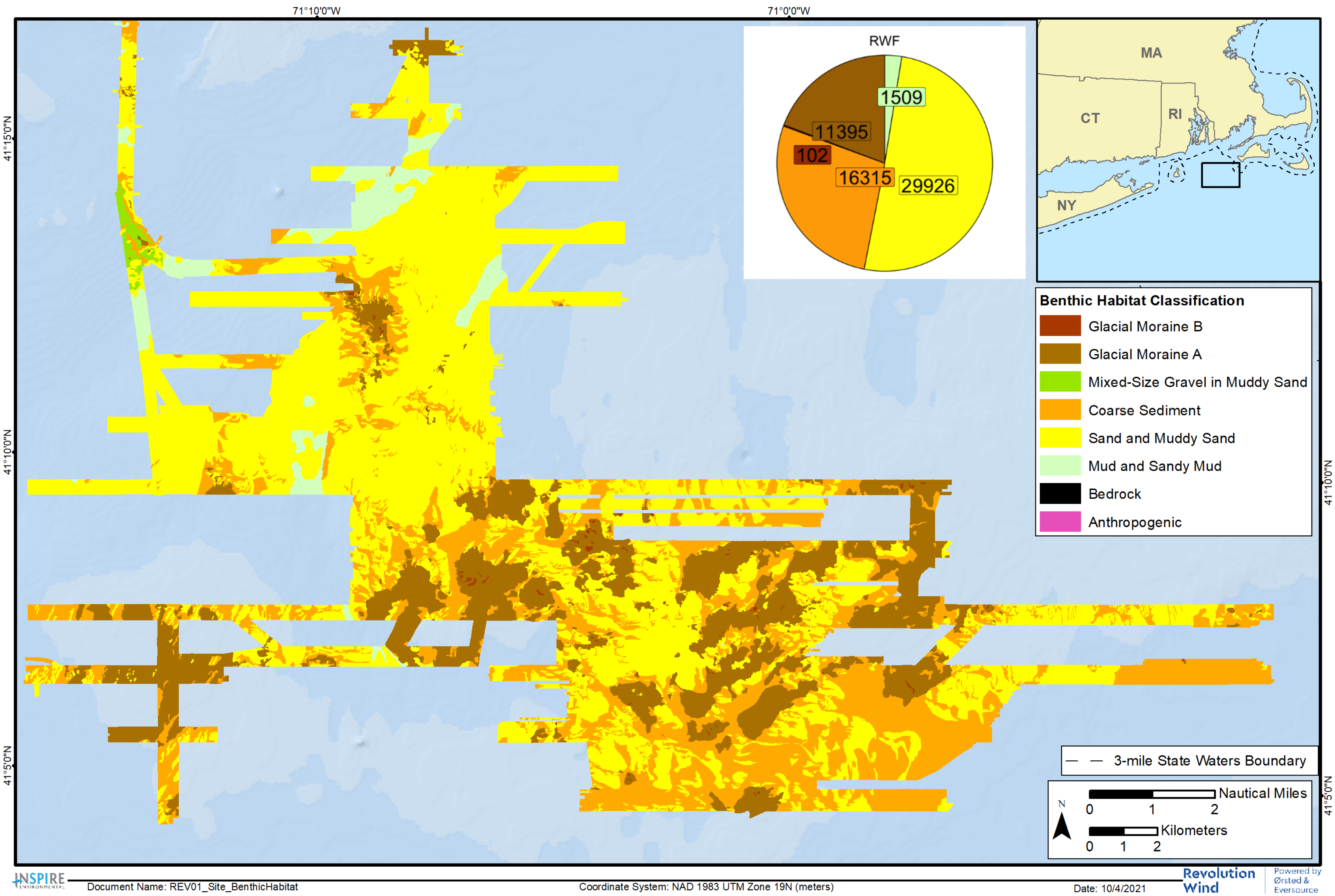


Figure 3-15. Benthic habitat types mapped at the RWF and pie chart of habitat composition with total acres presented as values

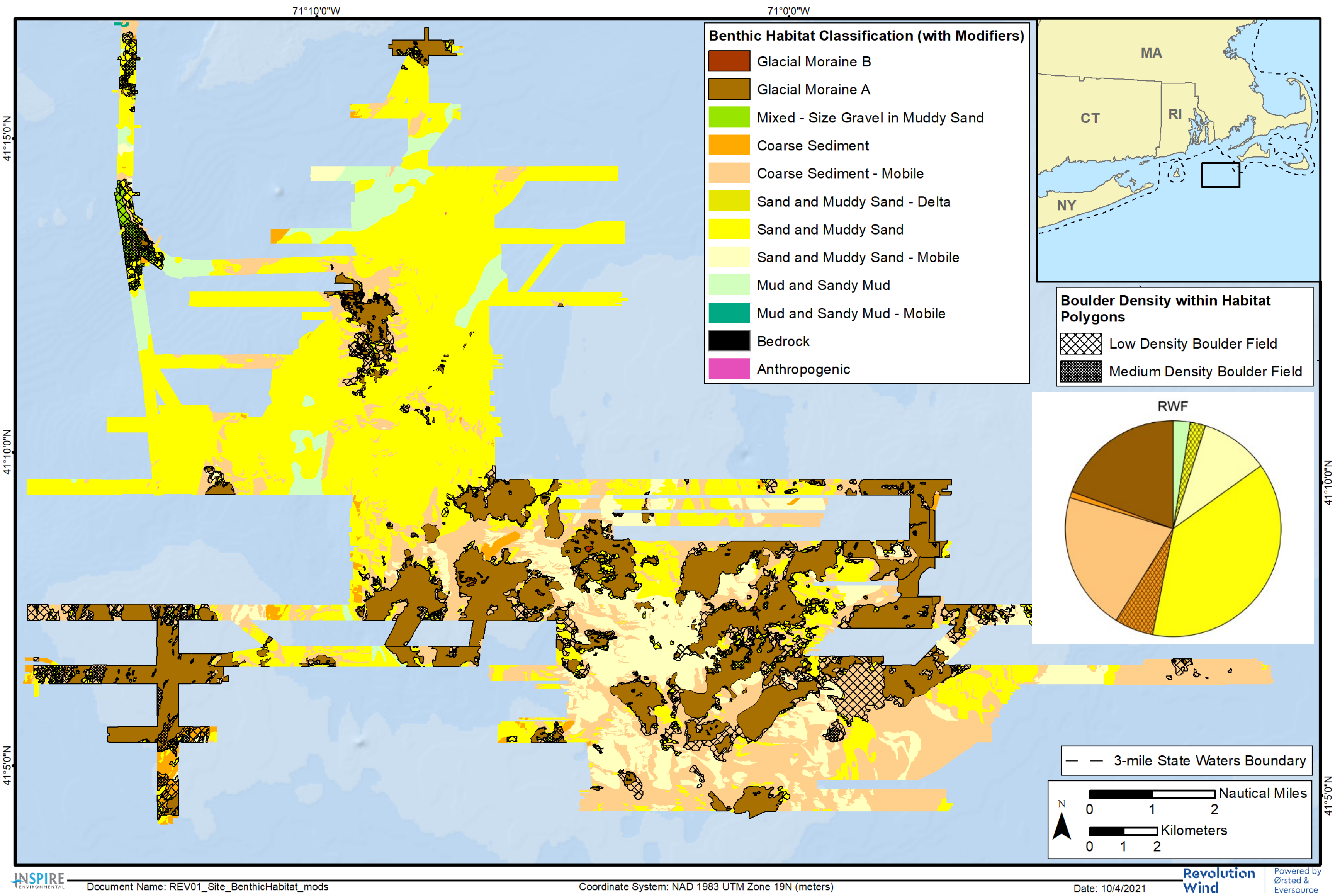


Figure 3-16. Benthic habitat types with modifiers mapped at the RWF and pie chart of habitat composition

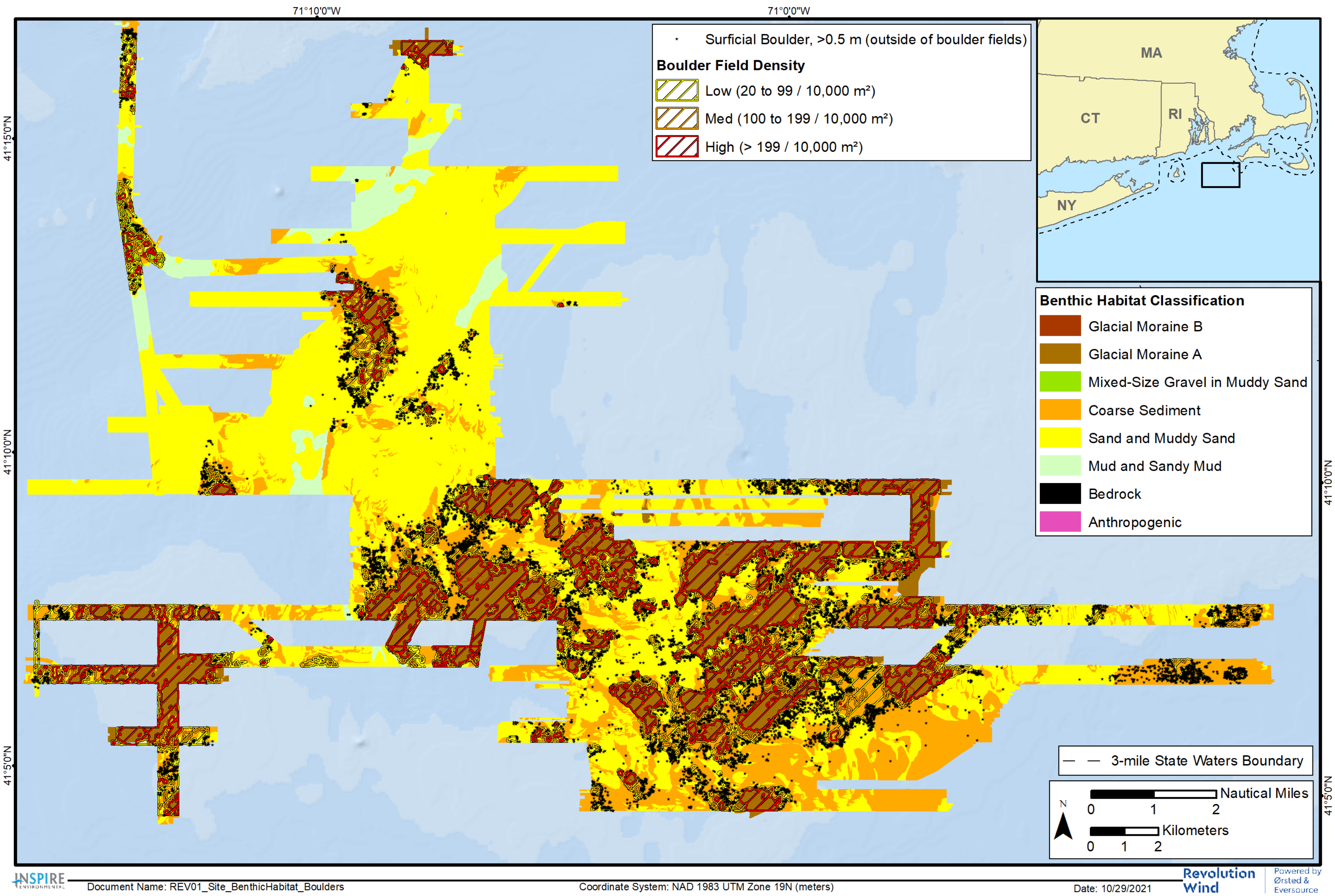


Figure 3-17. Benthic habitat types, boulder fields, and individual large boulders (>0.5 m) mapped at the RWF

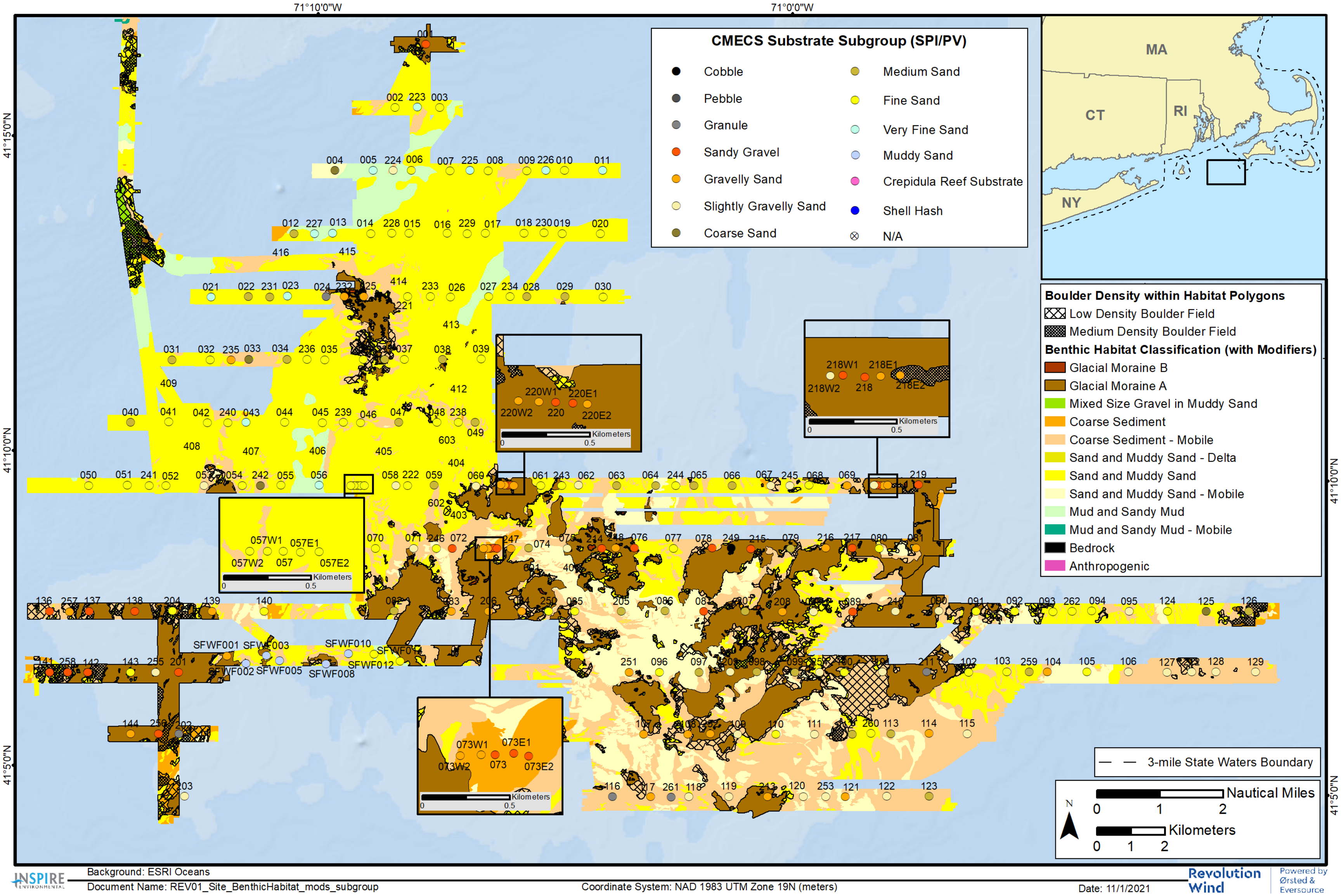


Figure 3-18. Benthic habitat types with modifiers and ground-truth CMECS Substrate Subgroup at the RWF

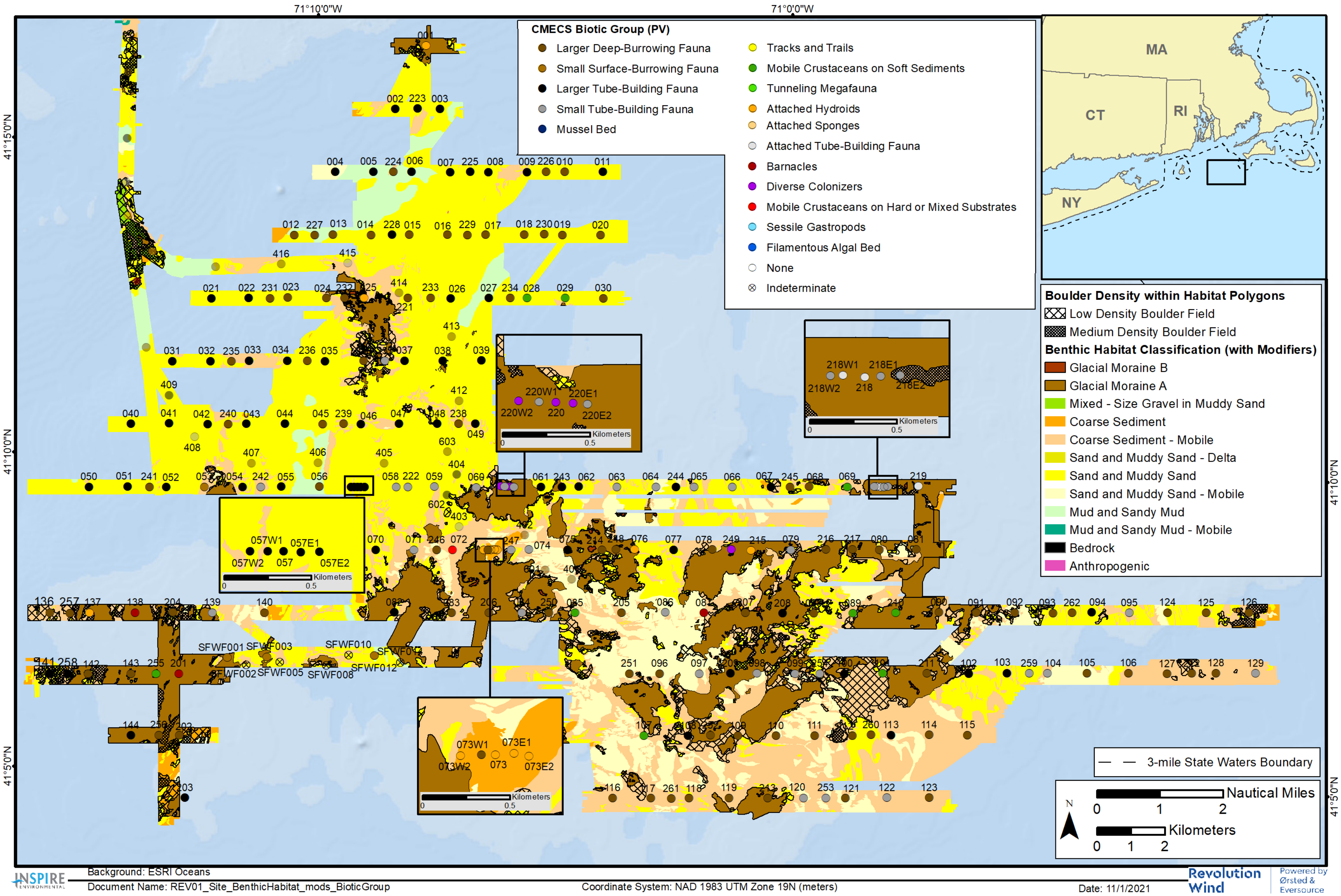


Figure 3-19. Benthic habitat types with modifiers and ground-truth CMECS Biotic Group at the RWF

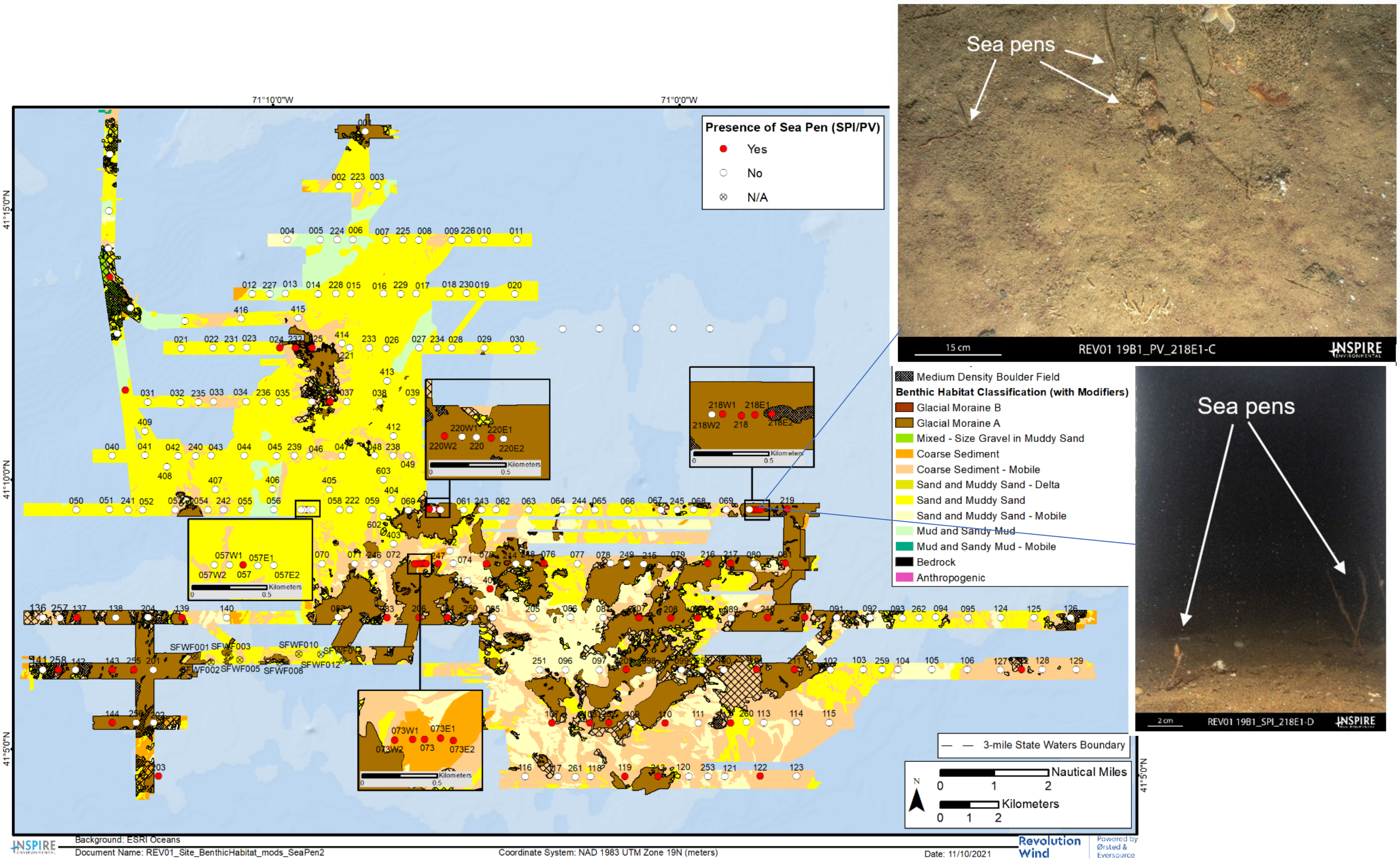


Figure 3-20. Benthic habitat types with modifiers and the distribution of the sea pen *Halipteris finmarchia*

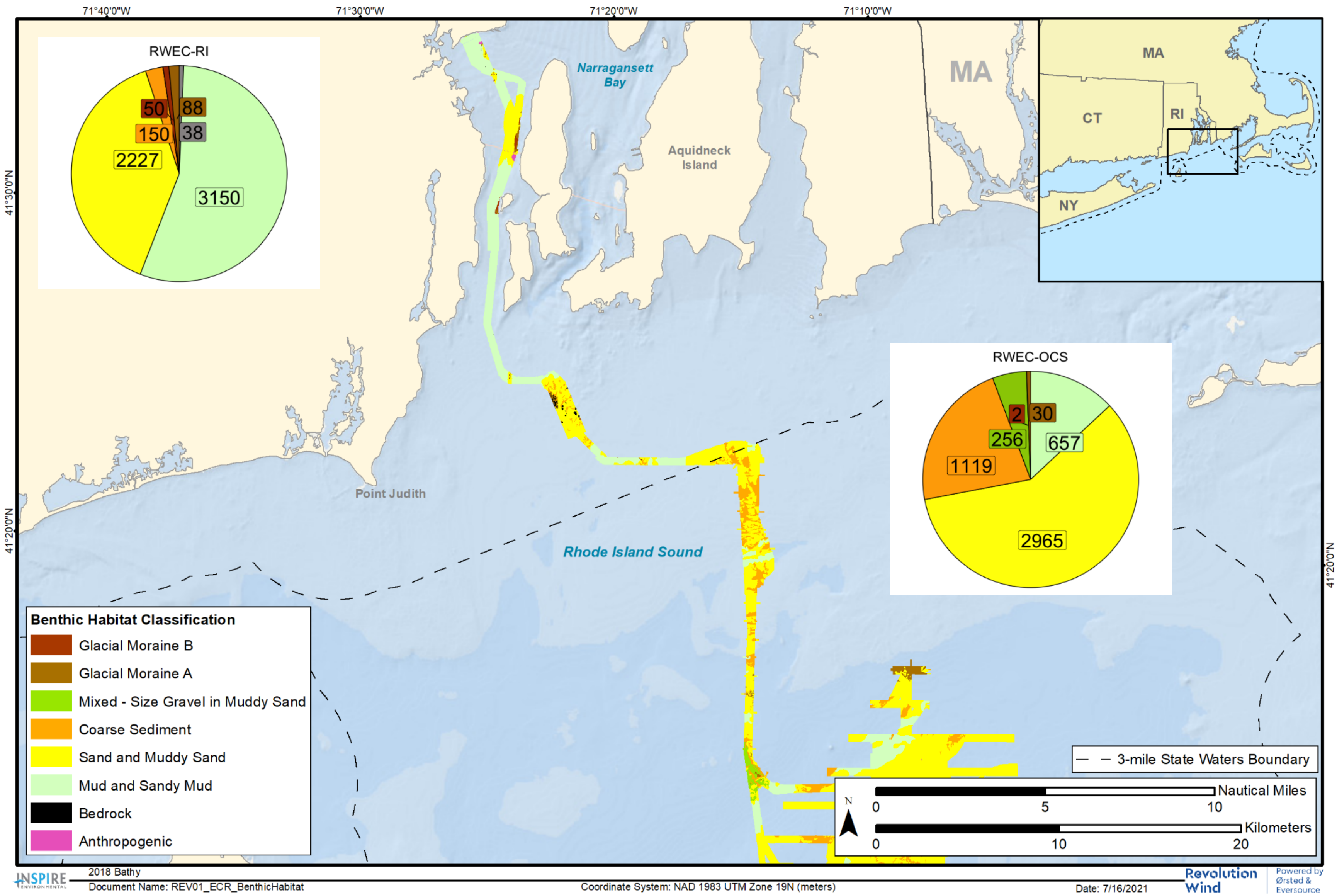


Figure 3-21. Benthic habitat types mapped along the RWEC and pie charts of habitat composition with total acres presented as values

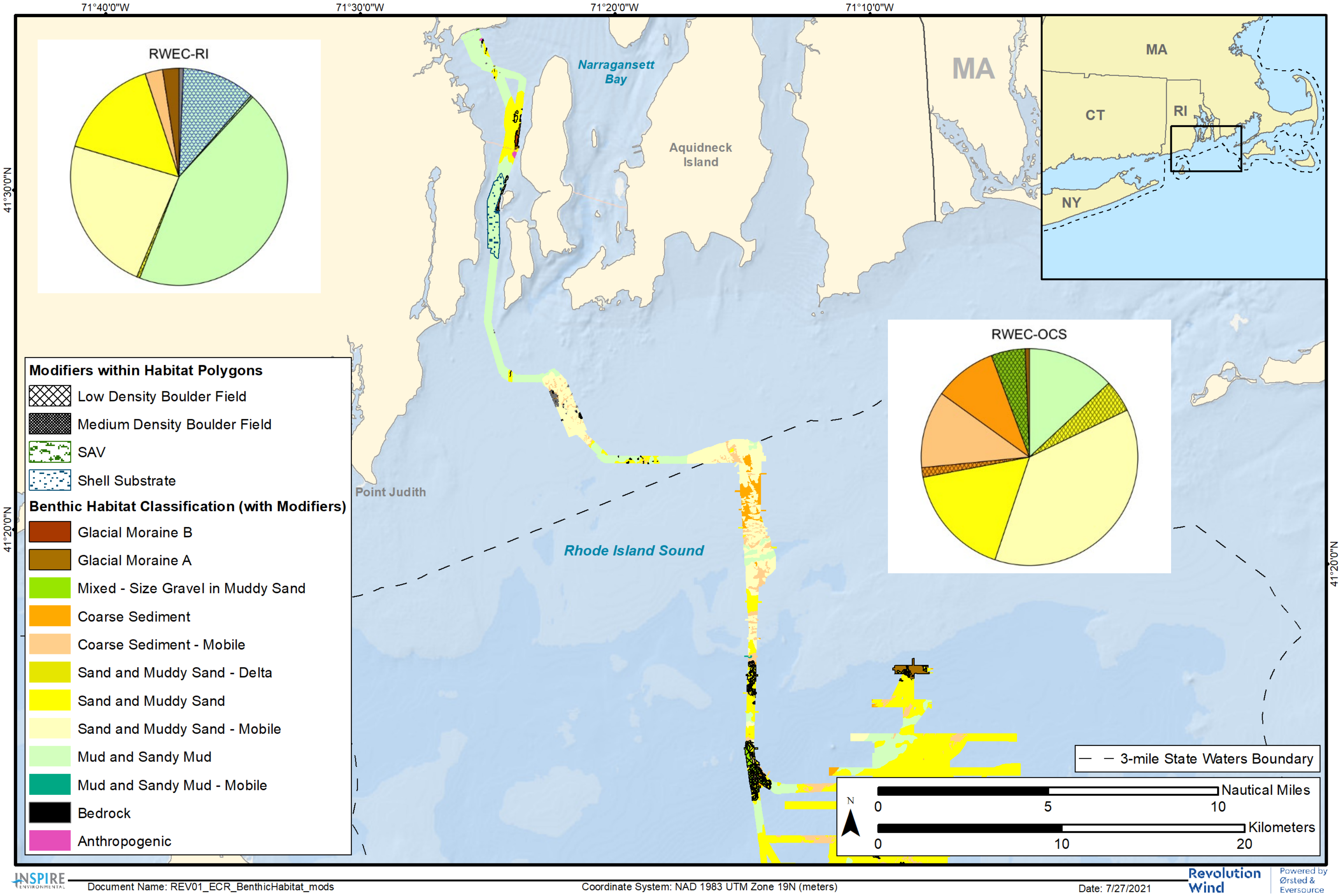


Figure 3-22. Benthic habitat types with modifiers mapped along the RWEC and pie charts of habitat composition

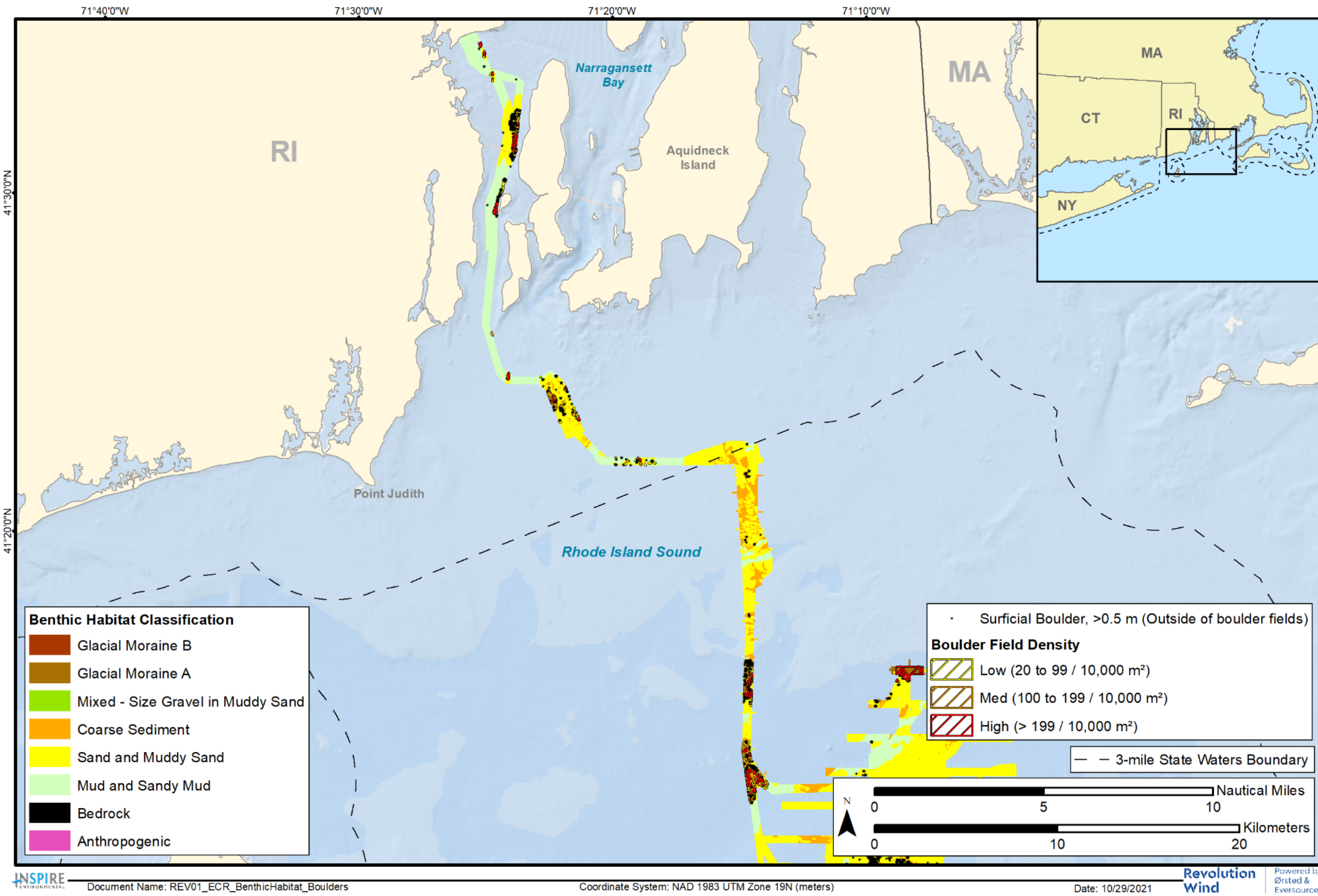


Figure 3-23. Benthic habitat types, boulder fields, and individual large boulders (>0.5 m) mapped along the RWEC

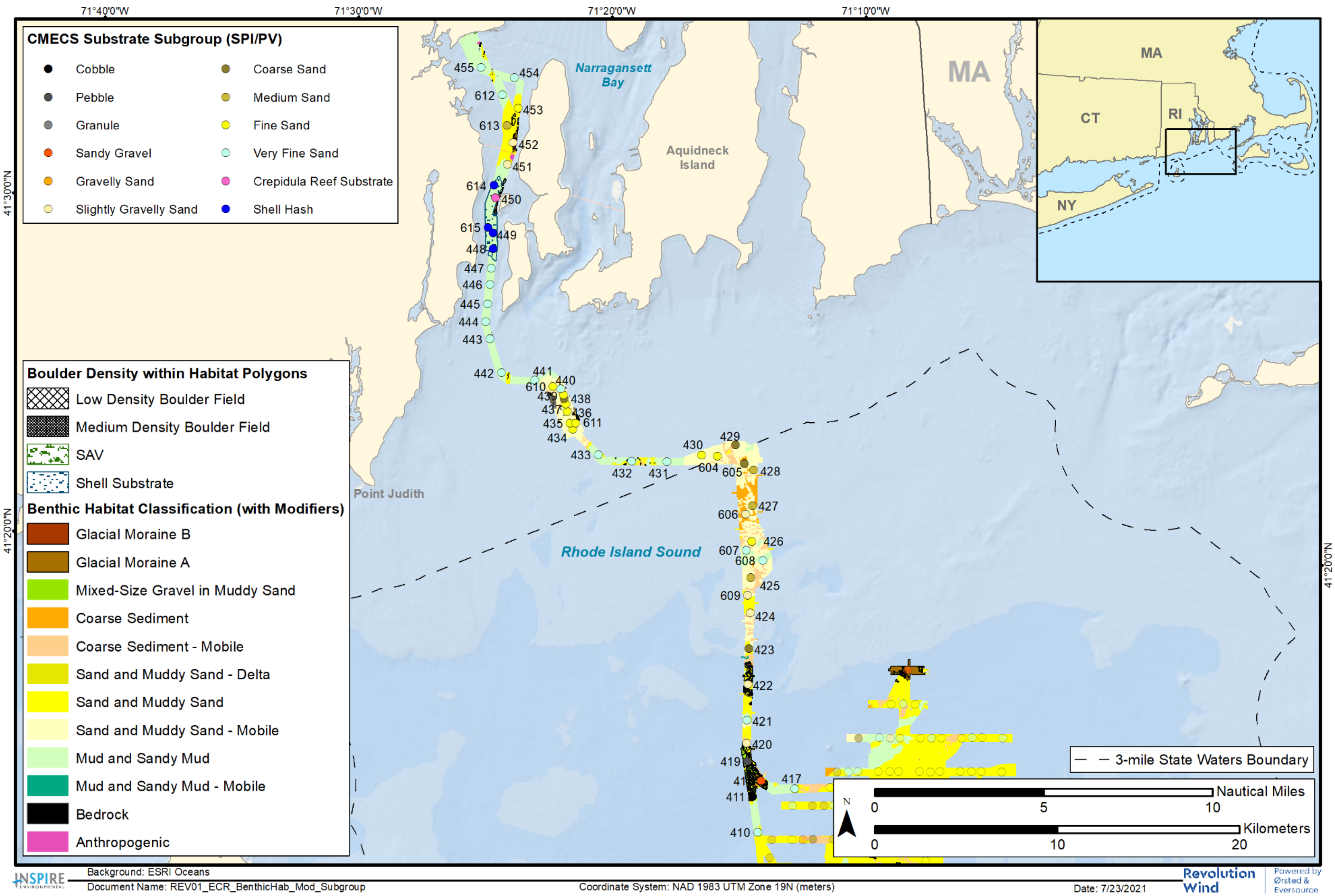


Figure 3-24. Benthic habitat types with modifiers and ground-truth CMECS Substrate Subgroup along the RWEC

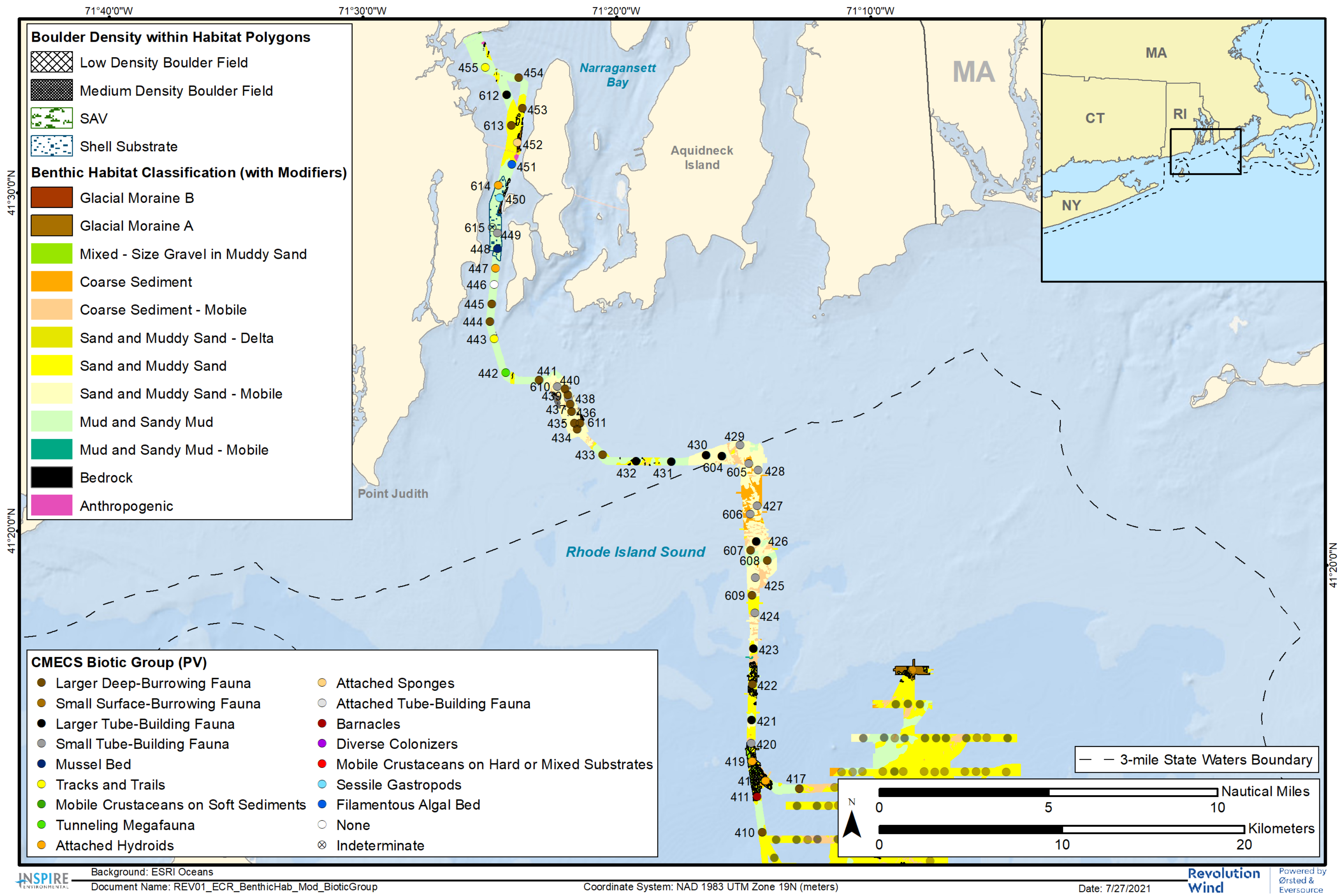


Figure 3-25. Benthic habitat types with modifiers and ground-truth CMECS Biotic Group along the RWEC

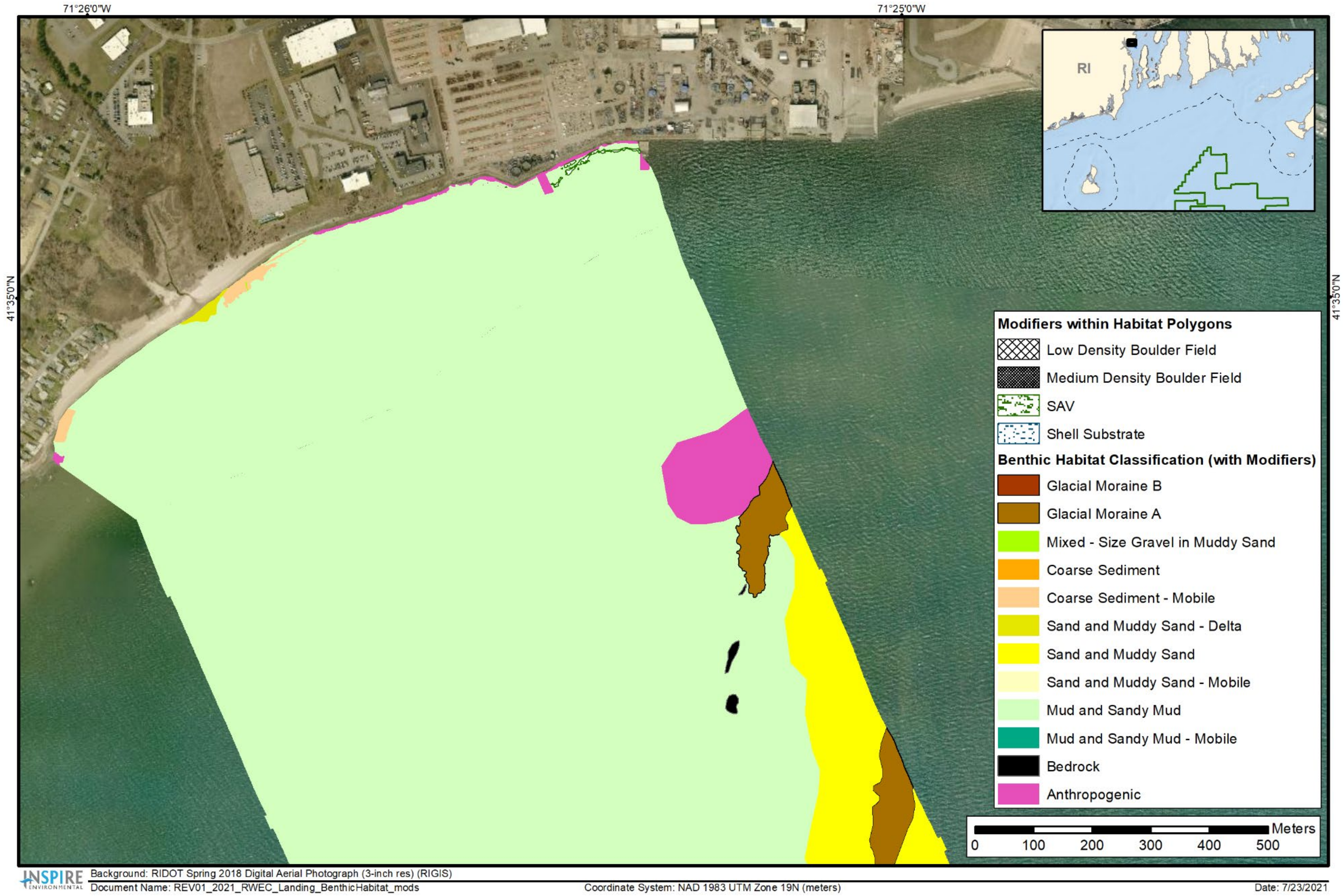


Figure 3-26. Benthic habitat types with modifiers along the RWEC-RI at the Quonset Point landfall

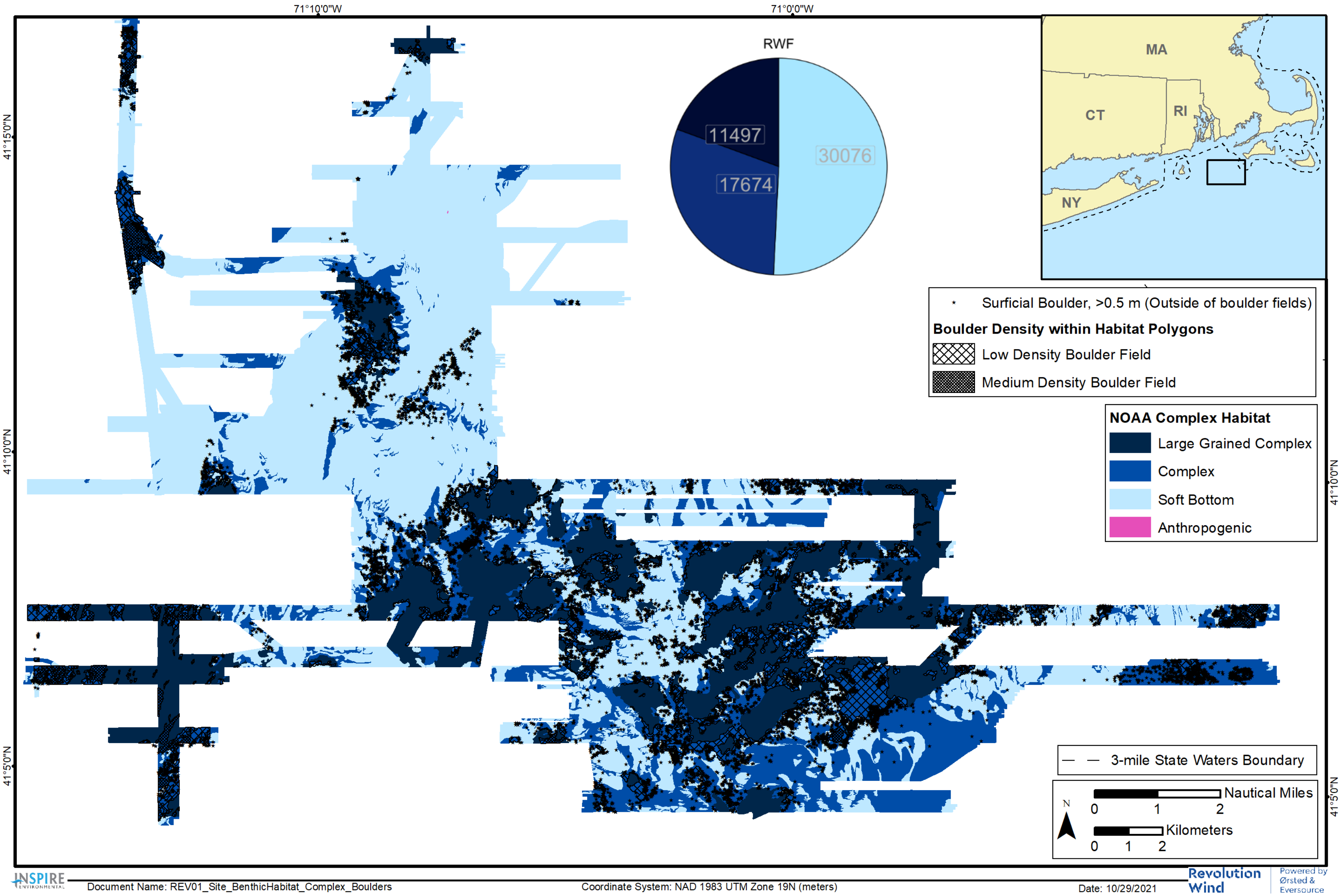


Figure 3-27. Benthic habitats categorized by NOAA Complexity Category, along with boulder fields and individual boulder picks, at the RWF, along with a pie chart of NOAA Complexity Category composition with total acres presented as values

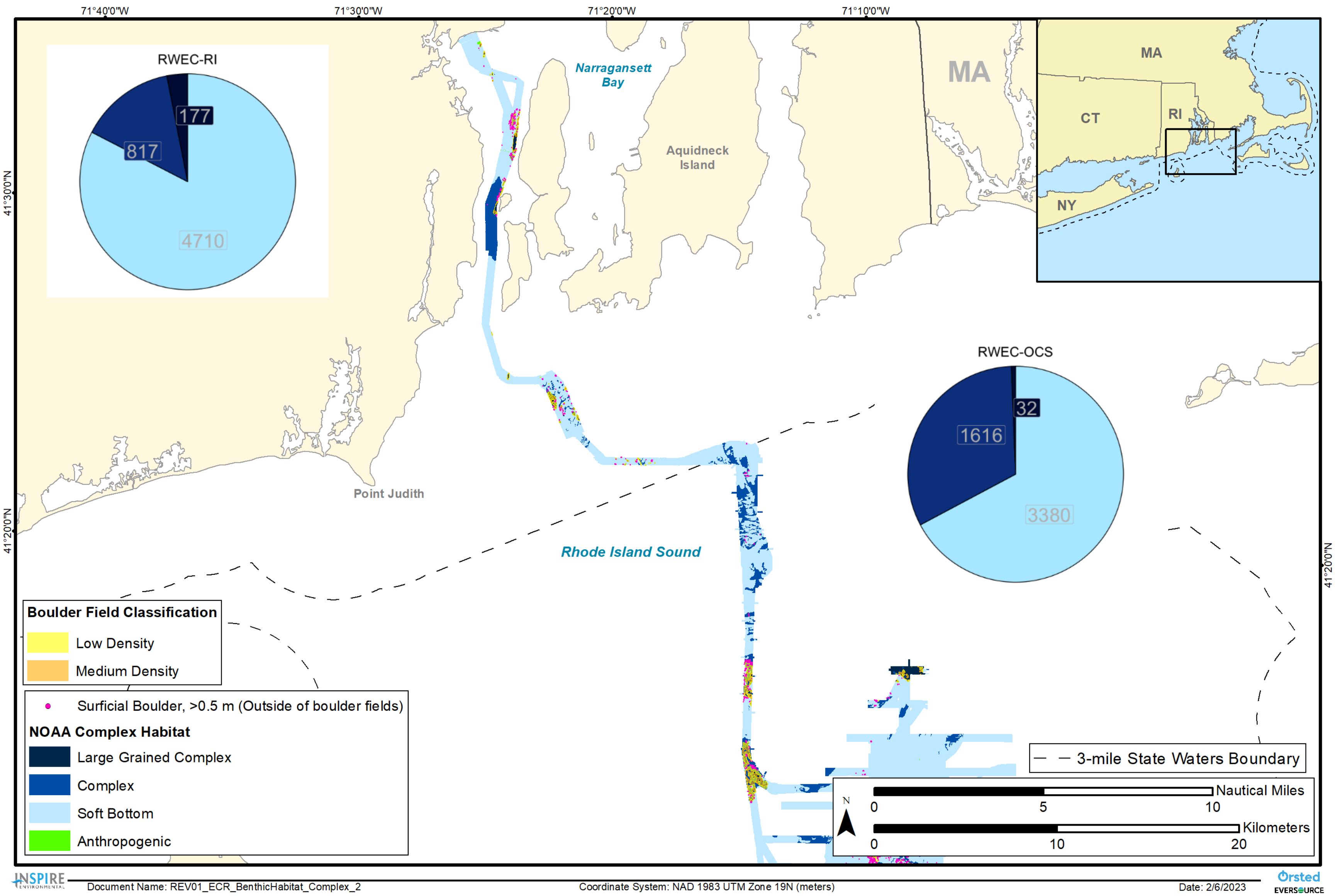


Figure 3-28. Benthic habitats categorized by NOAA Complexity Category along the RWEC, along with pie charts of NOAA Complexity Category composition with total acres presented as values for the RWEC-OCS and RWEC-RI, respectively

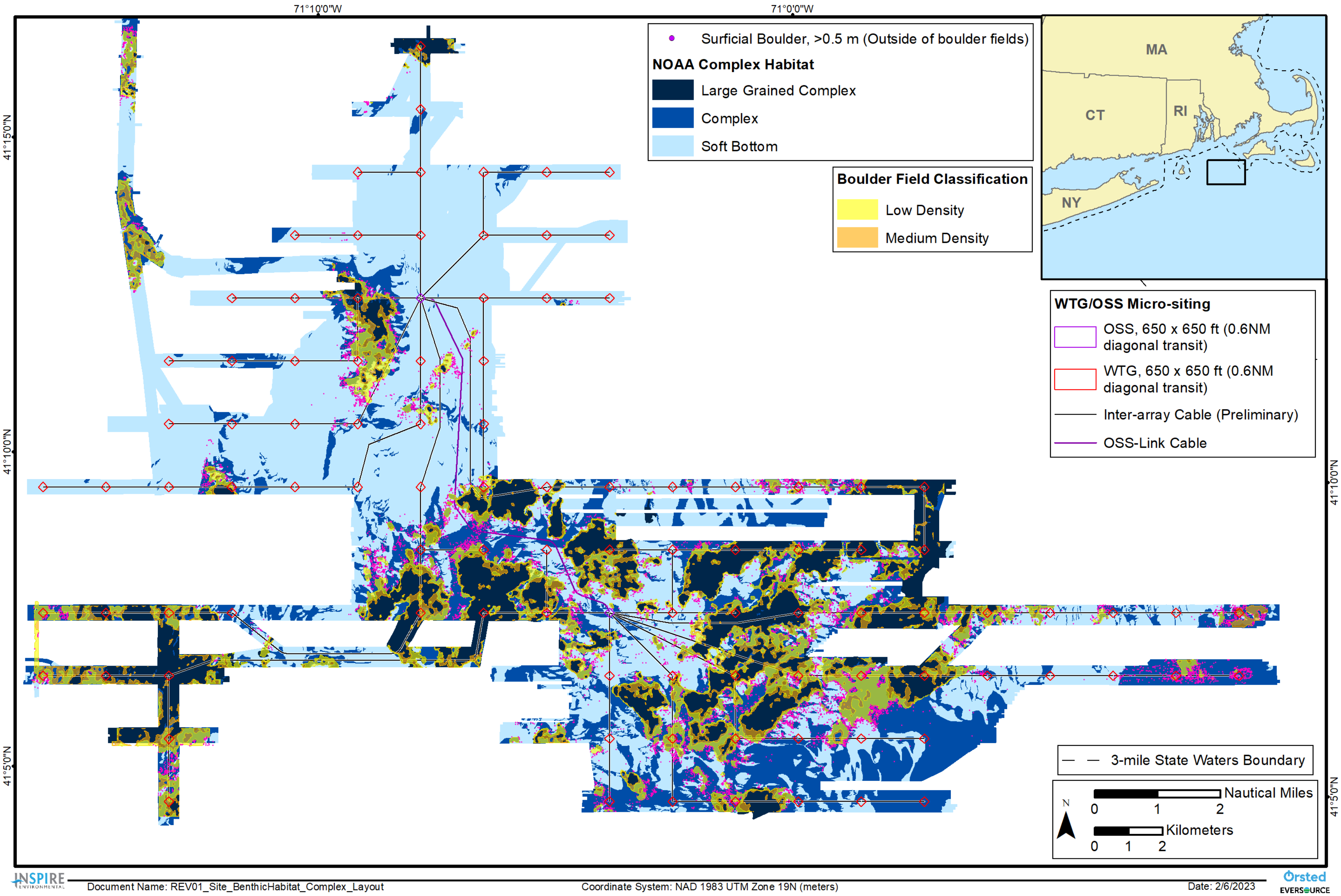


Figure 4-1. Benthic habitats categorized by NOAA Complexity Category at the RWF, current indicative layout showing the micro-siting allowance for each foundation, preliminary IAC routes, and the OSS-Link Cable

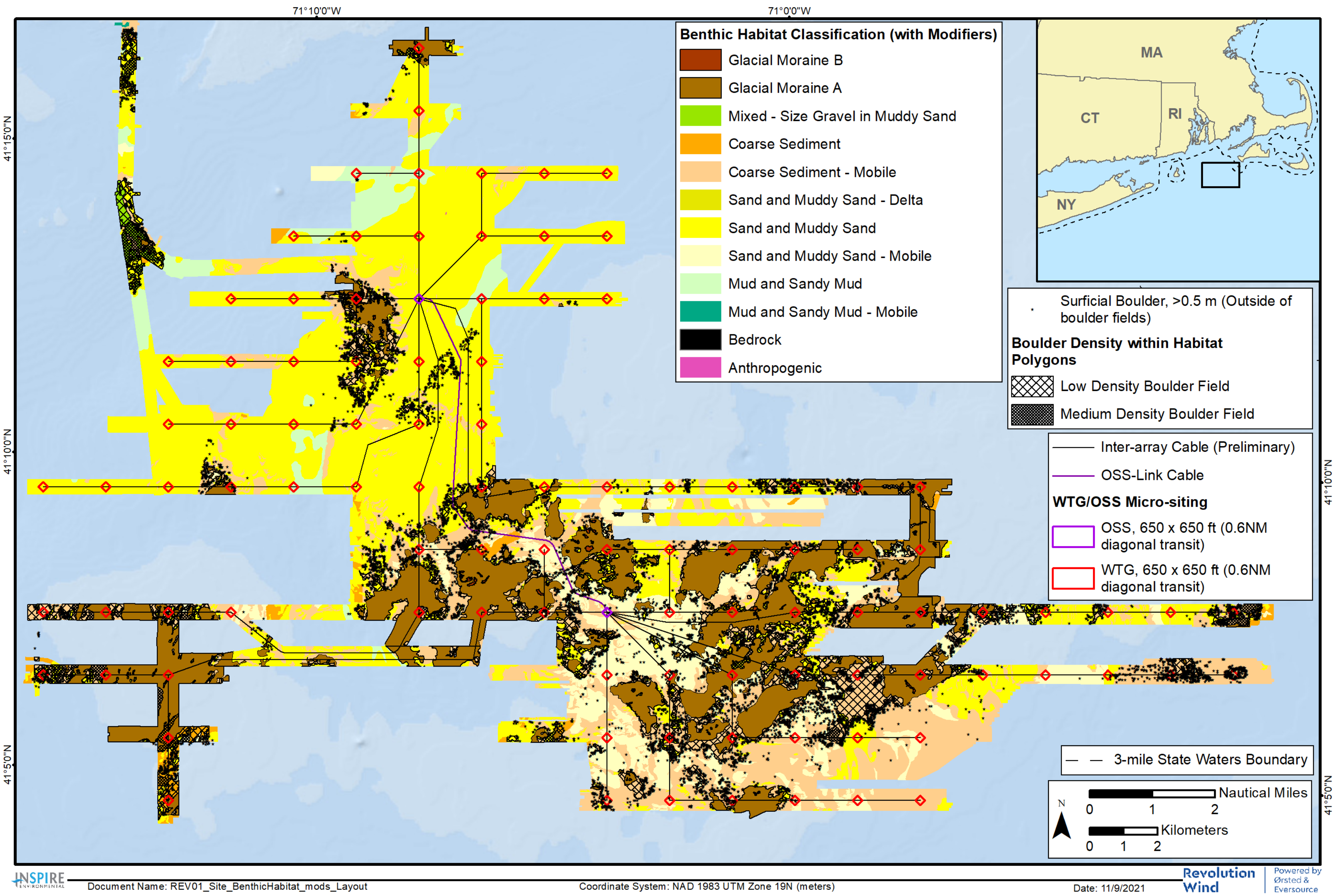


Figure 4-2. Benthic habitat types with modifiers, along with individual boulder picks, at the RWF, current indicative layout showing the micro-siting allowance for each foundation, preliminary IAC routes, and the OSS-Link Cable

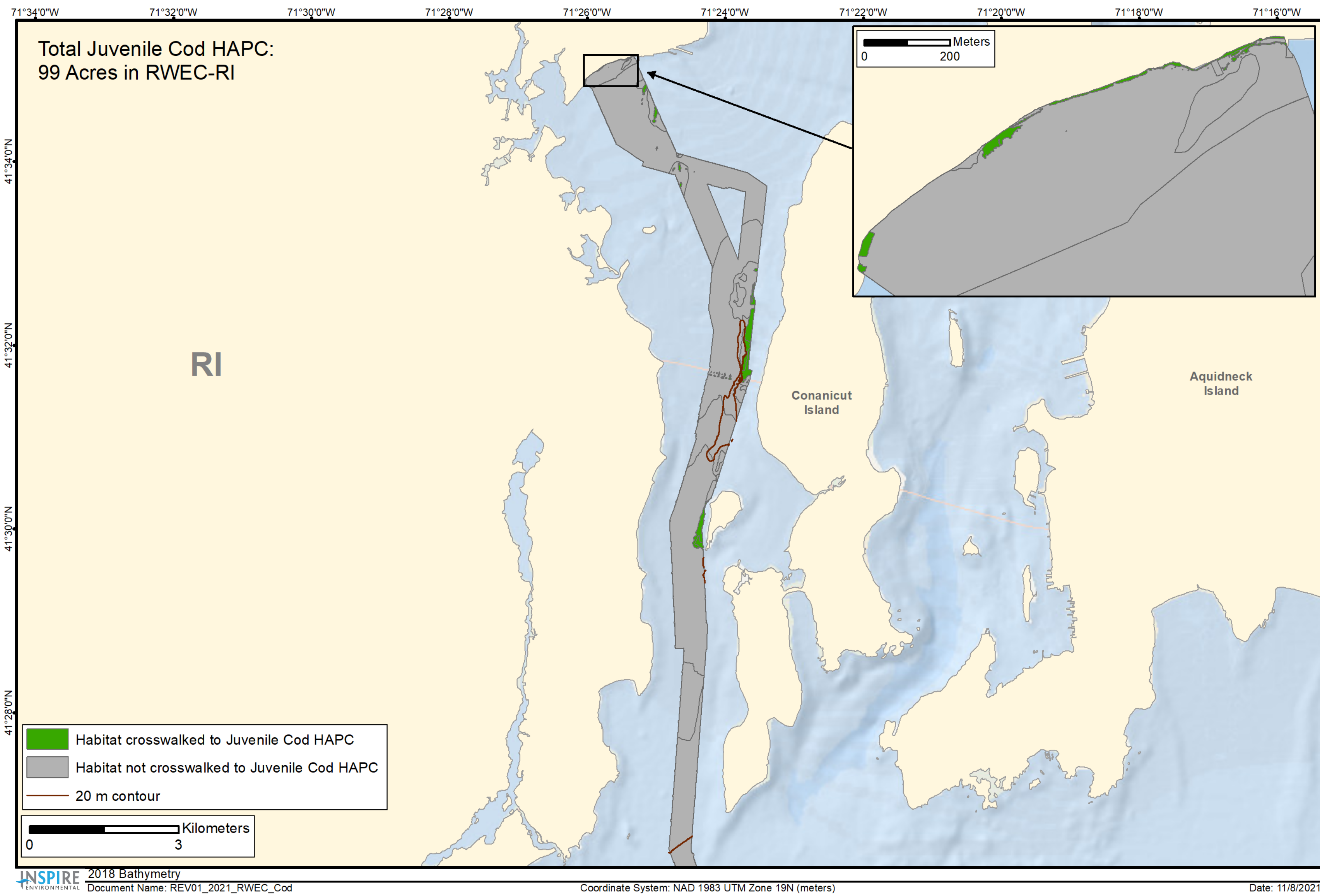


Figure 4-3. Benthic habitats crosswalked to designated juvenile Atlantic cod Habitat Area of Particular Concern (HAPC)

Benthic Habitat Mapping to Support Essential Fish Habitat Consultation
Revolution Wind Offshore Wind Farm

ATTACHMENTS

Prepared for:

Revolution Wind, LLC

Submitted by:

INSPIRE Environmental
Newport, Rhode Island 02840

February 2023

Attachment A – Benthic SPI/PV Ground-Truth Data Analysis Results

Notes:

Ground-Truth results include data from stations surveyed in the Revolution Wind Farm and Export Cables, as well as eight stations surveyed to support the benthic assessment for the South Fork Wind Farm.

IND=Indeterminate

N/A=Not Applicable

1 Successional Stage: “on” indicates one Stage is found on top of another Stage (i.e., 1 on 3); “->” indicates one Stage is progressing to another Stage (i.e., 2 -> 3).

2 Variable determined from combined SPI and PV analysis

Area	Station ID	Water Depth (m)	PV Replicate (n)	Mapped Habitat Type	PV Macrohabitat (# of reps)	PV CMECS Substrate Group	SPI/PV CMECS Substrate Subgroup	PV Max Gravel Measurement (mm)	PV Boulder Presence	PV Bedforms (# of reps)	PV Mean Bedform Wavelength (cm)	PV Biological Debris	PV CMECS Biotic Subclass	PV CMECS Co-occurring Biotic Subclasses	PV CMECS Biotic Group	PV CMECS Co-occurring Biotic Group	PV Maximum Attached Fauna Percent Cover	PV Burrow Presence	PV Tracks Presence	PV Fish Presence/Type
RWF	001	37.7	3	Glacial Moraine A	Continuous Large Pebbles and Cobbles on Sand (3)	Gravel Mixes	Sandy Gravel	35.77	No	None	N/A	Large Shell Fragment(s), Small Shell Fragment(s)	Attached Fauna	Soft Sediment Fauna	Attached Hydroids	Barnacles	Sparse (1 to <30%)	No	Yes	None
RWF	002	41.5	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	003	42.8	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	004	42.3	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Coarse Sand	IND	No	None	N/A	Large Shell Fragment(s), Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	005	44.5	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	006	44.4	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Varies	None	Yes	Yes	None
RWF	007	42.2	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Large Shell Fragment(s), Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	008	42.3	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Large Shell Fragment(s), Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	009	41.9	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	010	42.8	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Large Shell Fragment(s), Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Varies	None	Yes	Yes	None
RWF	011	42.5	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	Silver Hake
RWF	012	42.5	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Varies	None	Yes	Yes	None
RWF	013	43.8	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Tracks and Trails	None	Yes	Yes	None

Area	Station ID	Water Depth (m)	PV Replicate (n)	Mapped Habitat Type	PV Macrohabitat (# of reps)	PV CMECS Substrate Group	SPI/PV CMECS Substrate Subgroup	PV Max Gravel Measurement (mm)	PV Boulder Presence	PV Bedforms (# of reps)	PV Mean Bedform Wavelength (cm)	PV Biological Debris	PV CMECS Biotic Subclass	PV CMECS Co-occurring Biotic Subclasses	PV CMECS Biotic Group	PV CMECS Co-occurring Biotic Group	PV Maximum Attached Fauna Percent Cover	PV Burrow Presence	PV Tracks Presence	PV Fish Presence/Type
RWF	014	40.1	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWF	015	37.9	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Shell Hash	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWF	016	38.7	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWF	017	41.3	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWF	018	41.5	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWF	019	38.9	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	020	37.3	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	021	44.9	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Starfish Bed	None	Yes	Yes	None
RWF	022	42.4	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	023	43.2	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Varies	None	Yes	Yes	None
RWF	024	37.3	3	Coarse Sediment - Mobile	Patchy Cobbles & Boulders on Sand (1), Sand with Mobile Gravel (2)	Gravel	Granule	2.23	Yes	Ripples (2)	IND	Large Shell Fragment(s), Small Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Attached Hydroids	Trace (<1%)	Yes	No	None
RWF	025	34.2	3	Sand and Muddy Sand with Medium Density Boulder Field	Patchy Cobbles & Boulders on Sand (3)	Gravelly	Gravelly Sand	33.09	Yes	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Attached Hydroids	Varies	Sparse (1 to <30%)	No	Yes	None
RWF	026	37.0	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	027	40.4	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None

Area	Station ID	Water Depth (m)	PV Replicate (n)	Mapped Habitat Type	PV Macrohabitat (# of reps)	PV CMECS Substrate Group	SPI/PV CMECS Substrate Subgroup	PV Max Gravel Measurement (mm)	PV Boulder Presence	PV Bedforms (# of reps)	PV Mean Bedform Wavelength (cm)	PV Biological Debris	PV CMECS Biotic Subclass	PV CMECS Co-occurring Biotic Subclasses	PV CMECS Biotic Group	PV CMECS Co-occurring Biotic Group	PV Maximum Attached Fauna Percent Cover	PV Burrow Presence	PV Tracks Presence	PV Fish Presence/Type
RWF	028	37.5	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Mobile Crustaceans on Soft Sediments	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	029	35.3	3	Sand and Muddy Sand	Patchy Cobbles on Sand (1), Sand Sheet (2)	Sand or finer	Medium Sand	44.17	No	None	N/A	Large Shell Fragment(s), Small Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Mobile Crustaceans on Soft Sediments	Varies	Trace (<1%)	No	Yes	None
RWF	030	34.3	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Varies	None	Yes	Yes	None
RWF	031	42.1	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Varies	None	Yes	Yes	None
RWF	032	40.4	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	033	39.5	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Coarse Sand	IND	No	None	N/A	None	Soft Sediment Fauna	None	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	No	None
RWF	034	39.9	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	035	38.1	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Varies	None	Yes	Yes	None
RWF	036	36.8	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	Hake
RWF	037	35.8	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	038	38.5	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	039	39.1	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Varies	None	Yes	Yes	None
RWF	040	37.6	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	None	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	No	None
RWF	041	36.3	2	Sand and Muddy Sand	Sand Sheet (2)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	042	39.8	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None

Area	Station ID	Water Depth (m)	PV Replicate (n)	Mapped Habitat Type	PV Macrohabitat (# of reps)	PV CMECS Substrate Group	SPI/PV CMECS Substrate Subgroup	PV Max Gravel Measurement (mm)	PV Boulder Presence	PV Bedforms (# of reps)	PV Mean Bedform Wavelength (cm)	PV Biological Debris	PV CMECS Biotic Subclass	PV CMECS Co-occurring Biotic Subclasses	PV CMECS Biotic Group	PV CMECS Co-occurring Biotic Group	PV Maximum Attached Fauna Percent Cover	PV Burrow Presence	PV Tracks Presence	PV Fish Presence/Type
RWF	043	41.0	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Varies	None	Yes	Yes	None
RWF	044	39.9	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	045	39.1	2	Sand and Muddy Sand	Sand Sheet (2)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	No	None
RWF	046	37.9	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Large Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	Trace (<1%)	Yes	Yes	Red Hake
RWF	047	36.2	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Tunicate Bed	None	Yes	Yes	None
RWF	048	37.1	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	None	Larger Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	No	None
RWF	049	36.6	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	None	Larger Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	No	None
RWF	050	43.3	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Tracks and Trails	None	Yes	Yes	Silver Hake
RWF	051	40.2	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Shell Hash	Soft Sediment Fauna	None	Larger Tube-Building Fauna	None	None	No	No	None
RWF	052	37.1	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Shell Hash	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	053	39.6	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	8.07	No	None	N/A	None	Soft Sediment Fauna	None	Small Surface-Burrowing Fauna	Small Tube-Building Fauna	None	Yes	No	None
RWF	054	38.5	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Varies	None	Yes	Yes	None
RWF	055	38.8	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	None	Larger Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	No	No	None
RWF	056	45.1	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Small Tube-Building Fauna	None	Yes	Yes	Hake

Area	Station ID	Water Depth (m)	PV Replicate (n)	Mapped Habitat Type	PV Macrohabitat (# of reps)	PV CMECS Substrate Group	SPI/PV CMECS Substrate Subgroup	PV Max Gravel Measurement (mm)	PV Boulder Presence	PV Bedforms (# of reps)	PV Mean Bedform Wavelength (cm)	PV Biological Debris	PV CMECS Biotic Subclass	PV CMECS Co-occurring Biotic Subclasses	PV CMECS Biotic Group	PV CMECS Co-occurring Biotic Group	PV Maximum Attached Fauna Percent Cover	PV Burrow Presence	PV Tracks Presence	PV Fish Presence/Type
RWF	057	35.8	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Large Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Larger Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	Trace (<1%)	Yes	No	None
RWF	057E1	35.2	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	None	Larger Tube-Building Fauna	Tunicate Bed	None	No	No	None
RWF	057E2	34.7	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	None	Larger Tube-Building Fauna	Tunicate Bed	None	No	No	None
RWF	057W1	36.6	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Large Shell Fragments, Shell Hash, Unidentified Object	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Tunicate Bed	None	No	Yes	None
RWF	057W2	38.5	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	None	Larger Tube-Building Fauna	Tunicate Bed	None	No	No	None
RWF	058	33.2	3	Sand and Muddy Sand	Sand Sheet (3)	Slightly Gravelly	Slightly Gravelly Sand	2.63	No	None	N/A	Large Shell Fragment(s), Shell Hash, Sand Dollar Test	Soft Sediment Fauna	None	Small Tube-Building Fauna	None	None	No	No	None
RWF	059	35.0	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	None	Soft Sediment Fauna	None	Small Tube-Building Fauna	Larger Tube-Building Fauna	None	No	No	None
RWF	060	36.2	3	Coarse Sediment - Mobile with Low Density Boulder Field	Patchy Pebbles on Sand with Mobile Gravel (2), Sand with Mobile Gravel (1)	Slightly Gravelly	Slightly Gravelly Sand	17.41	No	Ripples (3)	90.10	None	Soft Sediment Fauna	Attached Fauna	Small Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	Trace (<1%)	Yes	Yes	None
RWF	061	34.7	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Tunicate Bed	None	Yes	Yes	None
RWF	062	35.2	3	Sand and Muddy Sand	Sand Sheet (1), Sand with Mobile Gravel (2)	Slightly Gravelly	Slightly Gravelly Sand	4.75	No	None	N/A	Shell Hash	Soft Sediment Fauna	None	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	No	None
RWF	063	33.3	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	None	Soft Sediment Fauna	None	Small Tube-Building Fauna	None	None	No	No	None
RWF	064	34.1	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	None	Small Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	No	No	None

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RWF	065	33.3	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Shell Hash	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	066	34.1	3	Coarse Sediment - Mobile	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	None	Small Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	No	None
RWF	067	35.8	3	Sand and Muddy Sand with Low Density Boulder Field	Sand Sheet (1), Sand with Mobile Gravel (2)	Slightly Gravelly	Slightly Gravelly Sand	8.10	No	None	N/A	Shell Hash, Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Varies	None	Yes	Yes	None
RWF	068	34.2	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWF	069	32.5	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Gravelly	Gravelly Sand	10.70	No	Ripples (2)	52.58	Small Shell Fragment(s)	Soft Sediment Fauna	None	Mobile Crustaceans on Soft Sediments	None	Trace (<1%)	Yes	No	None
RWF	070	38.3	3	Sand and Muddy Sand	Sand Sheet (2), Sand with Mobile Gravel (1)	Sand or finer	Fine Sand	6.61	No	None	N/A	Shell Hash	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	071	36.4	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	3.46	No	None	N/A	Large Shell Fragments, Seagrass Detritus, Shell Hash	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	None	None	Yes	Yes	None
RWF	072	35.2	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Gravel Mixes	Sandy Gravel	4.39	No	Ripples (1)	48.75	None	Attached Fauna	None	Mobile Crustaceans on Hard or Mixed Substrates	None	Trace (<1%)	Yes	No	None
RWF	073	33.1	3	Coarse Sediment	Coarse Pebbles on Sand (1), Continuous Large Pebbles and Cobbles on Sand (2)	Gravel Mixes	Sandy Gravel	39.86	No	None	N/A	None	Attached Fauna	Soft Sediment Fauna	Attached Hydroids	Barnacles	Dense (70 to < 90%)	Yes	No	None
RWF	073E1	32.9	3	Coarse Sediment	Continuous Large Pebbles and Cobbles on Sand (3)	Gravel Mixes	Sandy Gravel	19.64	No	None	N/A	None	Attached Fauna	Soft Sediment Fauna	Attached Hydroids	Barnacles	Moderate (30 to < 70%)	Yes	No	None
RWF	073E2	32.4	3	Coarse Sediment	Continuous Large Pebbles and Cobbles on Sand (3)	Gravel Mixes	Sandy Gravel	21.75	No	None	N/A	None	Attached Fauna	Soft Sediment Fauna	Attached Hydroids	Barnacles	Moderate (30 to < 70%)	Yes	Yes	None

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RWF	073W1	33.2	3	Sand and Muddy Sand - Mobile	Patchy Cobbles on Sand (2), Sand with Mobile Gravel (1)	Gravelly	Gravelly Sand	138.09	Yes	None	N/A	None	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Varies	Sparse (1 to <30%)	Yes	Yes	None
RWF	073W2	33.7	3	Sand and Muddy Sand - Mobile	Patchy Cobbles & Boulders on Sand (2), Patchy Cobbles on Sand (1)	Gravelly	Gravelly Sand	48.73	Yes	None	N/A	Large Shell Fragment(s), Small Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Attached Hydroids	Barnacles	Sparse (1 to <30%)	Yes	Yes	Pout
RWF	074	32.7	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Medium Sand	2.12	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	075	32.9	3	Glacial Moraine A	Continuous Large Cobbles and Boulders on Sand (1), Patchy Cobbles on Sand (1), Sand Sheet (1)	Slightly Gravelly	Slightly Gravelly Sand	302.55	Yes	None	N/A	None	Soft Sediment Fauna	Attached Fauna	Larger Tube-Building Fauna	Varies	Complete (90-100%)	Yes	Yes	None
RWF	076	33.3	3	Glacial Moraine A	IND (1), Patchy Cobbles & Boulders on Sand (2)	Gravel Mixes	Sandy Gravel	580.21	Yes	None	N/A	None	Attached Fauna	Soft Sediment Fauna	Attached Hydroids	Varies	Moderate (30 to < 70%)	Yes	No	None
RWF	077	33.8	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	078	31.7	3	Sand and Muddy Sand	Patchy Pebbles on Sand with Mobile Gravel (2), Sand Sheet (1)	Gravel Mixes	Sandy Gravel	4.67	No	Ripples (2)	51.09	Small Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	Trace (<1%)	Yes	Yes	None
RWF	079	32.5	3	Coarse Sediment - Mobile with Low Density Boulder Field	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	080	31.3	3	Glacial Moraine A	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	081	30.7	3	Coarse Sediment - Mobile	Patchy Cobbles on Sand (2), Sand with Mobile Gravel (1)	Gravelly	Gravelly Sand	5.12	No	None	N/A	None	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	None	Trace (<1%)	Yes	Yes	None
RWF	082	37.0	3	Sand and Muddy Sand	Sand Sheet (2), Sand with Mobile Gravel (1)	Sand or finer	Medium Sand	9.67	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	083	33.8	3	Coarse Sediment - Mobile	Patchy Pebbles on Sand with Mobile Gravel (3)	Gravelly	Gravelly Sand	9.99	No	Ripples (2)	61.28	Small Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Varies	Sparse (1 to <30%)	Yes	No	None

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RWF	084	32.9	3	Coarse Sediment - Mobile with Low Density Boulder Field	Patchy Cobbles & Boulders on Sand (1), Patchy Cobbles on Sand (2)	Gravelly	Gravelly Sand	35.26	Yes	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Small Tube-Building Fauna	Barnacles	Moderate (30 to < 70%)	Yes	Yes	None
RWF	085	35.0	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Mobile Crustaceans on Soft Sediments	Larger Tube-Building Fauna	None	Yes	Yes	None
RWF	086	33.9	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Sand Dollar Test(s)	Soft Sediment Fauna	None	Small Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	No	None
RWF	087	33.8	3	Coarse Sediment - Mobile with Low Density Boulder Field	Patchy Pebbles on Sand with Mobile Gravel (3)	Gravel Mixes	Sandy Gravel	8.20	No	Ripples (1)	57.77	Small Shell Fragment(s)	Attached Fauna	None	Barnacles	None	Trace (<1%)	Yes	No	Pout, Red Hake
RWF	088	32.8	3	Coarse Sediment - Mobile with Low Density Boulder Field	Patchy Boulders on Sand (1), Patchy Pebbles on Sand (1), Sand Sheet (1)	Slightly Gravelly	Slightly Gravelly Sand	315.35	Yes	None	N/A	Large Shell Fragment(s), Small Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Varies	Sparse (1 to <30%)	Yes	Yes	None
RWF	089	32.1	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Gravel Mixes	Sandy Gravel	2.93	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	None	Mobile Crustaceans on Soft Sediments	Larger Deep-Burrowing Fauna	None	Yes	No	Fourspot Flounder
RWF	090	32.3	3	Coarse Sediment - Mobile with Low Density Boulder Field	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	2.76	No	Ripples (2)	IND	Large Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Varies	None	Yes	Yes	None
RWF	091	32.7	3	Sand and Muddy Sand - Mobile with Low Density Boulder Field	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWF	092	33.4	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	093	33.9	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWF	094	33.4	3	Sand and Muddy Sand	Sand Sheet (2), Sand with Mobile Gravel (1)	Sand or finer	Fine Sand	7.86	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None

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RWF	095	32.8	3	Coarse Sediment - Mobile	Sand Sheet (1), Sand with Mobile Gravel (2)	Slightly Gravelly	Slightly Gravelly Sand	2.62	No	Ripples (3)	63.23	Large Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Small Tube-Building Fauna	Varies	Trace (<1%)	Yes	Yes	None
RWF	096	33.7	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	097	34.5	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Shell Hash, Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	Varies	None	Yes	Yes	None
RWF	098	35.9	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	099	35.2	3	Sand and Muddy Sand - Mobile with Low Density Boulder Field	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	100	35.5	3	Sand and Muddy Sand	Sand Sheet (2), Sand with Mobile Gravel (1)	Sand or finer	Fine Sand	2.24	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	101	34.6	3	Coarse Sediment - Mobile with Low Density Boulder Field	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	3.29	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Mobile Crustaceans on Soft Sediments	None	None	Yes	Yes	None
RWF	102	34.1	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Sand Dollar Test(s)	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	Hake, Silver Hake
RWF	103	34.9	3	Sand and Muddy Sand	Sand Sheet (2), Sand with Mobile Gravel (1)	Sand or finer	Fine Sand	2.68	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Varies	None	Yes	Yes	None
RWF	104	34.8	3	Sand and Muddy Sand - Mobile	Sand with Mobile Gravel (3)	Gravelly	Gravelly Sand	3.24	No	None	N/A	Large Shell Fragment(s), Small Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Small Tube-Building Fauna	Varies	Trace (<1%)	Yes	No	None
RWF	105	37.1	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	106	37.7	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	3.27	No	Ripples (3)	59.03	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None

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RWF	107	38.3	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Gravelly	Gravelly Sand	2.74	No	Ripples (3)	68.66	None	Soft Sediment Fauna	None	Mobile Crustaceans on Soft Sediments	None	None	Yes	No	None
RWF	108	37.5	3	Coarse Sediment - Mobile	Patchy Cobbles on Sand (1), Sand with Mobile Gravel (2)	Gravelly	Gravelly Sand	3.15	No	None	N/A	None	Soft Sediment Fauna	Attached Fauna	Larger Tube-Building Fauna	None	Trace (<1%)	Yes	No	None
RWF	109	36.4	3	Coarse Sediment - Mobile with Low Density Boulder Field	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	3.36	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Small Tube-Building Fauna	None	Yes	Yes	None
RWF	110	36.0	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	No	None
RWF	111	37.3	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	5.04	No	Ripples (2)	71.39	Large Shell Fragment(s), Shell Hash	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	None	None	Yes	Yes	None
RWF	112	37.5	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Varies	None	Yes	Yes	Hake
RWF	113	37.3	3	Sand and Muddy Sand - Mobile	Sand Sheet (2), Sand with Mobile Gravel (1)	Sand or finer	Medium Sand	2.20	No	None	N/A	Sand Dollar Test(s)	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	114	36.9	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Gravelly	Gravelly Sand	3.01	No	Ripples (3)	71.63	Small Shell Fragment(s)	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	No	None
RWF	115	36.2	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	3.96	No	Ripples (1)	64.12	None	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Small Tube-Building Fauna	None	Yes	No	None
RWF	116	34.9	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Gravel	Granule	2.41	No	Ripples (1)	IND	Large Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Hard or Mixed Substrates	Trace (<1%)	Yes	No	None
RWF	117	35.0	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Gravelly	Gravelly Sand	2.47	No	None	N/A	Skate Egg Case	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	No	None
RWF	118	36.1	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	4.92	No	Ripples (1)	63.87	None	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Varies	None	Yes	No	None
RWF	119	35.6	3	Coarse Sediment - Mobile	Patchy Pebbles on Sand with Mobile Gravel (1), Sand with Mobile Gravel (2)	Slightly Gravelly	Slightly Gravelly Sand	5.12	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	Trace (<1%)	Yes	Yes	None

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RWF	120	34.9	3	Coarse Sediment - Mobile	Sand Sheet (2), Sand with Mobile Gravel (1)	Slightly Gravelly	Slightly Gravelly Sand	3.66	No	None	N/A	Large Shell Fragment(s), Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	121	35.0	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Gravelly	Gravelly Sand	4.74	No	Ripples (3)	65.35	Large Shell Fragment(s), Small Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	Trace (<1%)	Yes	No	None
RWF	122	36.3	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	2.97	No	None	N/A	Moon Snail Egg Case, Sand Dollar Test, Shell Hash	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	123	35.6	3	Coarse Sediment - Mobile	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	Ripples (3)	33.05	Shell Hash	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	No	None
RWF	124	32.9	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	125	34.5	3	Coarse Sediment - Mobile	Sand Sheet (3)	Sand or finer	Coarse Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Varies	None	Yes	Yes	None
RWF	126	37.1	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	Ripples (1)	7.62	None	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Varies	None	Yes	No	None
RWF	127	37.7	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	3.12	No	Ripples (3)	70.15	Small Shell Fragment(s)	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	None	None	Yes	No	None
RWF	128	37.6	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	2.49	No	Ripples (2)	IND	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	129	37.8	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	7.48	No	Ripples (1)	78.06	Large Shell Fragment(s)	Soft Sediment Fauna	None	Small Tube-Building Fauna	Varies	None	Yes	No	Hake
RWF	136	34.2	3	Coarse Sediment - Mobile with Low Density Boulder Field	Patchy Pebbles on Sand with Mobile Gravel (3)	Gravel Mixes	Sandy Gravel	7.49	No	Ripples (3)	34.62	None	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Attached Hydroids	Trace (<1%)	Yes	No	None
RWF	137	32.7	3	Coarse Sediment - Mobile with Low Density Boulder Field	Patchy Pebbles on Sand with Mobile Gravel (3)	Gravel Mixes	Sandy Gravel	9.92	No	Ripples (1)	67.43	None	Attached Fauna	Soft Sediment Fauna	Attached Hydroids	Barnacles	Trace (<1%)	No	No	None

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RWF	138	31.8	3	Glacial Moraine A	Continuous Large Cobbles and Boulders on Sand (1), IND (1), Patchy Cobbles & Boulders on Sand (1)	Gravel	Sandy Gravel	66.29	Yes	None	N/A	Large Shell Fragment(s), Shell Hash	Attached Fauna	Soft Sediment Fauna	Barnacles	Attached Hydroids	Complete (90-100%)	No	No	None
RWF	139	31.6	3	Glacial Moraine A	Patchy Cobbles on Sand (2), Patchy Pebbles on Sand with Mobile Gravel (1)	Gravelly	Gravelly Sand	37.78	No	Ripples (1)	67.96	Large Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Small Tube-Building Fauna	Barnacles	Trace (<1%)	Yes	No	None
RWF	140	33.2	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	No	None
RWF	141	36.4	3	Coarse Sediment - Mobile with Low Density Boulder Field	Patchy Pebbles on Sand with Mobile Gravel (1), Sand with Mobile Gravel (2)	Gravel Mixes	Sandy Gravel	9.94	No	Ripples (3)	40.55	None	Soft Sediment Fauna	Attached Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	Trace (<1%)	Yes	No	None
RWF	142	34.7	3	Coarse Sediment - Mobile with Low Density Boulder Field	Patchy Boulders on Sand (1), Patchy Pebbles on Sand with Mobile Gravel (2)	Gravel Mixes	Sandy Gravel	2.88	Yes	Ripples (3)	49.32	None	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	Sparse (1 to <30%)	Yes	No	None
RWF	143	33.2	3	Sand and Muddy Sand with Medium Density Boulder Field	Patchy Pebbles on Sand with Mobile Gravel (1), Sand Sheet (2)	Sand or finer	Fine Sand	2.08	No	Ripples (1)	53.79	Skate Egg Case	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	Trace (<1%)	Yes	Yes	None
RWF	144	34.6	3	Glacial Moraine A	Patchy Pebbles on Sand with Mobile Gravel (3)	Gravelly	Gravelly Sand	5.90	No	Ripples (3)	IND	Small Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Larger Tube-Building Fauna	Barnacles	Trace (<1%)	Yes	No	None
RWF	201	32.5	3	Glacial Moraine A	Continuous Large Cobbles and Boulders on Sand (1), Patchy Cobbles & Boulders on Sand (2)	Gravel Mixes	Sandy Gravel	355.11	Yes	None	N/A	Small Shell Fragment(s)	Attached Fauna	Soft Sediment Fauna	Barnacles	Attached Hydroids	Complete (90-100%)	Yes	Yes	None
RWF	202	35.0	3	Coarse Sediment with Low Density Boulder Field	Patchy Pebbles on Sand with Mobile Gravel (1), Sand with Mobile Gravel (2)	Gravel	Granule	2.90	No	Ripples (3)	75.21	None	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	None	Trace (<1%)	Yes	No	None
RWF	204	31.6	3	Sand and Muddy Sand with Low Density Boulder Field	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None

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RWF	205	34.1	3	Coarse Sediment - Mobile	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Large Shell Fragment(s), Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	206	32.8	3	Glacial Moraine A	Patchy Boulders on Sand (1), Sand with Mobile Gravel (2)	Gravelly	Gravelly Sand	3.96	Yes	Ripples (1)	IND	None	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Attached Hydroids	Sparse (1 to <30%)	Yes	Yes	None
RWF	207	33.1	3	Glacial Moraine A	Sand Sheet (3)	Sand or finer	Medium Sand	2.36	No	None	N/A	Large Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	Trace (<1%)	Yes	Yes	None
RWF	208	32.7	3	Glacial Moraine A	Patchy Boulders on Sand (2), Patchy Cobbles on Sand (1)	Gravelly	Gravelly Sand	679.66	Yes	None	N/A	None	Soft Sediment Fauna	Attached Fauna	Larger Tube-Building Fauna	Varies	Moderate (30 to < 70%)	Yes	No	None
RWF	209	35.4	3	Glacial Moraine A	Patchy Cobbles on Sand (2), Patchy Pebbles on Sand (1)	Slightly Gravelly	Slightly Gravelly Sand	117.94	No	None	N/A	None	Soft Sediment Fauna	Attached Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	Sparse (1 to <30%)	Yes	No	None
RWF	210	30.9	3	Glacial Moraine A	Patchy Cobbles on Sand (1), Sand Sheet (1), Sand with Mobile Gravel (1)	Slightly Gravelly	Slightly Gravelly Sand	2.89	No	Ripples (1)	IND	None	Soft Sediment Fauna	Attached Fauna	Mobile Crustaceans on Soft Sediments	Varies	Trace (<1%)	Yes	No	Silver Hake
RWF	211	33.9	3	Coarse Sediment - Mobile with Low Density Boulder Field	Patchy Pebbles on Sand with Mobile Gravel (2), Sand with Mobile Gravel (1)	Gravel	Granule	3.36	No	None	N/A	Moon Snail Egg Case, Small Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Varies	Trace (<1%)	Yes	No	None
RWF	212	37.7	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	11.14	No	Ripples (3)	IND	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	Hake
RWF	213	34.4	3	Glacial Moraine A	Patchy Cobbles on Sand (2), Sand with Mobile Gravel (1)	Gravelly	Gravelly Sand	92.73	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Varies	Sparse (1 to <30%)	Yes	Yes	None
RWF	214	33.2	3	Glacial Moraine A	Continuous Large Cobbles and Boulders on Sand (1), Patchy Pebbles on Sand with Mobile Gravel (1), Sand with Mobile Gravel (1)	Gravel Mixes	Sandy Gravel	337.24	Yes	Ripples (2)	73.82	None	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Attached Hydroids	Dense (70 to < 90%)	Yes	No	None
RWF	215	31.4	3	Glacial Moraine A	Patchy Cobbles & Boulders on Sand (2), Patchy Pebbles on Sand with Mobile Gravel (1)	Gravel Mixes	Sandy Gravel	92.59	Yes	None	N/A	Barnacle Hash	Attached Fauna	Soft Sediment Fauna	Attached Hydroids	Barnacles	Moderate (30 to < 70%)	Yes	Yes	None

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RWF	216	30.8	3	Glacial Moraine A	Patchy Boulders on Sand (2), Patchy Pebbles on Sand (1)	Gravelly	Gravelly Sand	28.50	Yes	None	N/A	Barnacle Hash, Shell Hash	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Varies	Sparse (1 to <30%)	Yes	No	None
RWF	217	31.5	3	Glacial Moraine A	Patchy Cobbles & Boulders on Sand (1), Patchy Pebbles on Sand (1), Patchy Pebbles on Sand with Mobile Gravel (1)	Gravel Mixes	Sandy Gravel	165.70	Yes	Ripples (1)	41.67	Barnacle Hash	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Varies	Moderate (30 to < 70%)	Yes	No	None
RWF	218	29.2	3	Glacial Moraine A	Patchy Cobbles & Boulders on Sand (3)	Gravel Mixes	Sandy Gravel	89.34	Yes	None	N/A	None	Attached Fauna	Soft Sediment Fauna	Attached Tube-Building Fauna	Barnacles	Moderate (30 to < 70%)	Yes	Yes	None
RWF	218E1	29.0	3	Glacial Moraine A	Patchy Cobbles & Boulders on Sand (3)	Gravelly	Gravelly Sand	60.23	Yes	None	N/A	None	Soft Sediment Fauna	Attached Fauna	Small Tube-Building Fauna	Attached Tube-Building Fauna	Complete (90-100%)	Yes	No	None
RWF	218E2	28.8	3	Coarse Sediment - Mobile with Medium Density Boulder Field	Patchy Pebbles on Sand with Mobile Gravel (3)	Gravelly	Gravelly Sand	7.00	No	Ripples (3)	41.22	None	Soft Sediment Fauna	Attached Fauna	Small Tube-Building Fauna	Larger Deep-Burrowing Fauna	Trace (<1%)	Yes	No	None
RWF	218W1	29.7	3	Glacial Moraine A	Patchy Boulders on Sand (1), Patchy Cobbles & Boulders on Sand (1), Patchy Cobbles on Sand (1)	Gravel Mixes	Sandy Gravel	398.10	Yes	None	N/A	Spent Squid Eggs	Attached Fauna	Soft Sediment Fauna	Attached Tube-Building Fauna	Varies	Moderate (30 to < 70%)	Yes	Yes	None
RWF	218W2	29.9	3	Glacial Moraine A	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	7.92	No	Ripples (2)	56.06	None	Soft Sediment Fauna	None	Small Tube-Building Fauna	None	None	Yes	No	None
RWF	219	28.3	3	Glacial Moraine A	IND (1), Patchy Cobbles & Boulders on Sand (2)	Gravel Mixes	Sandy Gravel	308.89	Yes	None	N/A	Barnacle Hash	Attached Fauna	Soft Sediment Fauna	Attached Tube-Building Fauna	Varies	Dense (70 to < 90%)	Yes	Yes	None
RWF	220	34.8	3	Glacial Moraine A	Patchy Boulders on Sand (1), Patchy Cobbles & Boulders on Sand (1), Patchy Cobbles on Sand (1)	Gravel Mixes	Sandy Gravel	54.41	Yes	None	N/A	Barnacle Hash, Small Shell Fragment(s)	Attached Fauna	Soft Sediment Fauna	Diverse Colonizers	Larger Deep-Burrowing Fauna	Dense (70 to < 90%)	Yes	Yes	None

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RWF	220E1	34.7	3	Glacial Moraine A	Patchy Cobbles & Boulders on Sand (3)	Gravel Mixes	Sandy Gravel	231.39	Yes	None	N/A	Barnacle Hash, Large Shell Fragment(s), Skate Egg Sack	Attached Fauna	Soft Sediment Fauna	Diverse Colonizers	Larger Deep-Burrowing Fauna	Dense (70 to < 90%)	Yes	No	None
RWF	220E2	34.7	3	Glacial Moraine A	Patchy Cobbles & Boulders on Sand (2), Sand with Mobile Gravel (1)	Gravelly	Gravelly Sand	156.45	Yes	Ripples (1)	52.66	Barnacle Hash	Soft Sediment Fauna	Attached Fauna	Small Tube-Building Fauna	Varies	Moderate (30 to < 70%)	Yes	No	None
RWF	220W1	35.0	3	Glacial Moraine A	Patchy Boulders on Sand (1), Patchy Cobbles on Sand (1), Patchy Pebbles on Sand with Mobile Gravel (1)	Gravelly	Gravelly Sand	735.37	Yes	None	N/A	Large Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Small Tube-Building Fauna	Varies	Sparse (1 to <30%)	Yes	Yes	None
RWF	220W2	34.8	3	Glacial Moraine A	Patchy Cobbles & Boulders on Sand (3)	Gravelly	Gravelly Sand	130.53	Yes	None	N/A	Small Shell Fragment(s)	Attached Fauna	Soft Sediment Fauna	Diverse Colonizers	Larger Deep-Burrowing Fauna	Moderate (30 to < 70%)	Yes	Yes	None
RWF	221	34.5	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Small Tube-Building Fauna	None	Yes	No	None
RWF	222	33.5	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Shell Hash	Soft Sediment Fauna	None	Small Tube-Building Fauna	None	None	Yes	No	None
RWF	223	42.1	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	224	44.7	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	2.62	No	None	N/A	Large Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWF	225	42.6	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	226	42.7	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWF	227	46.0	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Tracks and Trails	None	Yes	Yes	Silver Hake
RWF	228	38.2	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	229	39.7	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWF	230	40.3	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None

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RWF	231	42.3	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	Red Hake
RWF	232	35.3	3	Coarse Sediment - Mobile with Medium Density Boulder Field	Continuous Large Pebbles and Cobbles on Sand (1), Patchy Pebbles on Sand with Mobile Gravel (2)	Gravelly	Gravelly Sand	223.13	Yes	None	N/A	Barnacle Hash, Large Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Varies	Moderate (30 to < 70%)	Yes	No	None
RWF	233	36.2	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Varies	None	Yes	No	None
RWF	234	38.8	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWF	235	40.0	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Gravelly	Gravelly Sand	2.10	No	None	N/A	None	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	None	None	Yes	No	None
RWF	236	39.4	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Tracks and Trails	None	Yes	Yes	None
RWF	237	36.6	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	None	Soft Sediment Fauna	None	Small Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	No	None
RWF	238	36.9	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWF	239	38.7	3	Coarse Sediment - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Large Shell Fragment(s), Shell Hash	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Varies	Sparse (1 to <30%)	Yes	Yes	None
RWF	240	41.4	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	No	None
RWF	241	38.0	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Shell Hash	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	No	None
RWF	242	38.4	3	Coarse Sediment - Mobile	Sand Sheet (3)	Sand or finer	Coarse Sand	IND	No	None	N/A	Moon Snail Egg Case	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	243	36.4	3	Glacial Moraine A	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Shell Hash, Small Shell Fragment(s)	Soft Sediment Fauna	None	Larger Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	No	None
RWF	244	33.7	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	None	Larger Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	No	None

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RWF	245	34.6	3	Sand and Muddy Sand	Patchy Cobbles on Sand (1), Sand Sheet (1), Sand with Mobile Gravel (1)	Slightly Gravelly	Slightly Gravelly Sand	106.30	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	Trace (<1%)	Yes	Yes	None
RWF	246	35.4	2	Sand and Muddy Sand - Mobile	Sand Sheet (2)	Sand or finer	Fine Sand	IND	No	None	N/A	Moon Snail Egg Case	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	No	None
RWF	247	33.0	3	Coarse Sediment - Mobile	Patchy Pebbles on Sand with Mobile Gravel (2), Sand with Mobile Gravel (1)	Gravelly	Gravelly Sand	22.16	No	Ripples (3)	38.45	None	Soft Sediment Fauna	Attached Fauna	Small Tube-Building Fauna	None	Trace (<1%)	Yes	Yes	None
RWF	248	33.5	3	Glacial Moraine A	Patchy Pebbles on Sand with Mobile Gravel (1), Sand with Mobile Gravel (2)	Gravelly	Gravelly Sand	13.58	No	Ripples (1)	IND	Moon Snail Egg Case	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	None	Trace (<1%)	Yes	No	None
RWF	249	31.7	3	Glacial Moraine A	Continuous Large Cobbles and Boulders on Sand (3)	Gravel	Cobble	174.91	Yes	None	N/A	Shell Hash	Attached Fauna	None	Diverse Colonizers	Attached Hydroids	Dense (70 to < 90%)	No	No	Red Hake
RWF	250	34.5	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	251	34.8	3	Coarse Sediment - Mobile	Sand Sheet (1), Sand with Mobile Gravel (2)	Gravelly	Gravelly Sand	5.43	No	Ripples (1)	62.86	Shell Hash	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	252	36.0	3	Glacial Moraine A	Patchy Cobbles on Sand (2), Patchy Pebbles on Sand (1)	Gravelly	Gravelly Sand	163.69	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Varies	Sparse (1 to <30%)	Yes	Yes	None
RWF	253	34.2	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	2.78	No	None	N/A	Large Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	254	35.6	3	Sand and Muddy Sand	Sand Sheet (1), Sand with Mobile Gravel (2)	Slightly Gravelly	Slightly Gravelly Sand	2.41	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Small Tube-Building Fauna	Larger Deep-Burrowing Fauna	Trace (<1%)	Yes	No	None
RWF	255	32.6	3	Glacial Moraine A	Sand Sheet (1), Sand with Mobile Gravel (2)	Slightly Gravelly	Slightly Gravelly Sand	6.47	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Mobile Crustaceans on Soft Sediments	Tracks and Trails	None	Yes	Yes	None
RWF	256	34.5	3	Glacial Moraine A	Patchy Pebbles on Sand with Mobile Gravel (2), Sand with Mobile Gravel (1)	Gravel Mixes	Sandy Gravel	16.49	No	Ripples (3)	66.36	None	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	None	Trace (<1%)	Yes	Yes	None

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RWF	257	33.6	3	Coarse Sediment - Mobile with Low Density Boulder Field	Sand with Mobile Gravel (3)	Gravelly	Gravelly Sand	4.76	No	Ripples (1)	72.31	None	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	No	None
RWF	258	35.4	3	Coarse Sediment - Mobile with Low Density Boulder Field	Patchy Pebbles on Sand with Mobile Gravel (2), Sand with Mobile Gravel (1)	Gravel Mixes	Sandy Gravel	17.81	No	Ripples (2)	32.81	Moon Snail Egg Case	Soft Sediment Fauna	Attached Fauna	Larger Tube-Building Fauna	Small Tube-Building Fauna	Trace (<1%)	Yes	Yes	None
RWF	259	34.7	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Shell Hash	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	260	37.6	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	No	Hake
RWF	261	36.0	3	Coarse Sediment - Mobile	Sand with Mobile Gravel (3)	Gravel	Granule	2.18	No	Ripples (1)	IND	None	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	None	None	Yes	No	None
RWF	262	33.9	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None
RWF	401	33.9	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	No	Hake
RWF	402	33.6	3	Coarse Sediment - Mobile	Patchy Pebbles on Sand (2), Sand with Mobile Gravel (1)	Slightly Gravelly	Slightly Gravelly Sand	31.99	No	None	N/A	Shell Hash	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	Trace (<1%)	Yes	Yes	None
RWF	403	35.3	3	Sand and Muddy Sand	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	2.73	No	None	N/A	Shell Hash, Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	404	36.0	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Large Shell Fragment(s), Shell Hash	Soft Sediment Fauna	Attached Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	Trace (<1%)	Yes	Yes	None
RWF	405	33.4	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Small Tube-Building Fauna	None	Yes	No	None
RWF	406	41.6	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	Large Shell Fragment(s), Small Shell Fragment(s)	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	No	None
RWF	407	38.5	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Large Shell Fragment(s), Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None

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RWF	408	38.1	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Large Shell Fragment(s), Shell Hash	Soft Sediment Fauna	Attached Fauna	Small Tube-Building Fauna	Larger Deep-Burrowing Fauna	Trace (<1%)	Yes	Yes	None
RWF	409	38.0	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Shell Hash	Soft Sediment Fauna	None	Larger Tube-Building Fauna	Small Tube-Building Fauna	None	Yes	No	None
RWEC-OCS	410	45.6	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWEC-OCS	411	44.9	3	Mixed-Size Gravel in Muddy Sand with Medium Density Boulder Field	Continuous Large Pebbles and Cobbles on Sand (3)	Gravel	Cobble	82.12	No	None	N/A	Large Shell Fragment(s)	Attached Fauna	Soft Sediment Fauna	Barnacles	Attached Hydroids	Dense (70 to < 90%)	Yes	No	None
RWF	412	37.7	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	No	None
RWF	413	39.9	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Small Tube-Building Fauna	None	Yes	Yes	None
RWF	414	34.5	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Small Tube-Building Fauna	None	Yes	Yes	None
RWF	415	35.8	3	Coarse Sediment - Mobile	Patchy Pebbles on Sand (2), Sand Sheet (1)	Slightly Gravelly	Slightly Gravelly Sand	31.86	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWF	416	42.8	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWEC-OCS	417	46.1	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWEC-OCS	418	43.3	3	Mixed-Size Gravel in Muddy Sand with Medium Density Boulder Field	Continuous Large Cobbles and Boulders on Sand (1), Continuous Large Pebbles and Cobbles on Sand (2)	Gravel Mixes	Sandy Gravel	100.87	Yes	None	N/A	Large Shell Fragment(s)	Attached Fauna	Soft Sediment Fauna	Attached Hydroids	Varies	Moderate (30 to < 70%)	Yes	No	Red Hake
RWEC-OCS	419	37.2	3	Mixed-Size Gravel in Muddy Sand with Low Density Boulder Field	Continuous Large Pebbles and Cobbles on Sand (3)	Gravel	Pebble	81.56	No	None	N/A	Large Shell Fragment(s)	Attached Fauna	Soft Sediment Fauna	Attached Hydroids	None	Sparse (1 to <30%)	Yes	No	None

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RWEC-OCS	420	37.2	3	Sand and Muddy Sand with Low Density Boulder Field	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	19.29	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	None	Small Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	No	None
RWEC-OCS	421	40.4	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWEC-OCS	422	38.8	3	Sand and Muddy Sand with Medium Density Boulder Field	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	12.94	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Varies	None	Yes	Yes	None
RWEC-OCS	423	34.4	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Coarse Sand	IND	No	Ripples (3)	69.01	Shell Hash	Soft Sediment Fauna	None	Larger Tube-Building Fauna	Small Tube-Building Fauna	None	No	No	None
RWEC-OCS	424	32.6	3	Sand and Muddy Sand	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	7.84	No	Ripples (3)	59.96	Shell Hash, Small Shell Fragment(s)	Soft Sediment Fauna	None	Small Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	No	None
RWEC-OCS	425	31.6	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Large Shell Fragment(s), Shell Hash	Soft Sediment Fauna	Attached Fauna	Small Tube-Building Fauna	Larger Tube-Building Fauna	Trace (<1%)	Yes	No	None
RWEC-OCS	426	31.5	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	None	None	Yes	Yes	None
RWEC-OCS	427	27.6	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	Ripples (1)	IND	Moon Snail Egg Case	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWEC-OCS	428	26.7	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Shell Hash	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	None	None	No	Yes	None
RWEC-RI	429	27.5	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Coarse Sand	IND	No	None	N/A	Moon Snail Egg Case, Shell Hash, Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	None	None	No	Yes	None
RWEC-RI	430	28.2	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Shell Hash, Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Varies	None	Yes	Yes	None
RWEC-RI	431	32.4	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWEC-RI	432	34.1	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWEC-RI	433	33.7	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Small Tube-Building Fauna	None	Yes	Yes	None

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RWEC-RI	434	31.0	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWEC-RI	435	31.1	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWEC-RI	436	31.1	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWEC-RI	437	30.5	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWEC-RI	438	30.1	3	Coarse Sediment - Mobile	Sand Sheet (3)	Sand or finer	Coarse Sand	IND	No	None	N/A	Large Shell Fragment(s), Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	None	None	Yes	Yes	None
RWEC-RI	439	29.9	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Varies	None	Yes	Yes	None
RWEC-RI	440	29.4	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	Moon Snail Egg Case	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Tracks and Trails	None	Yes	Yes	None
RWEC-RI	441	29.8	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Tunneling Megafauna	None	Yes	Yes	None
RWEC-RI	442	29.4	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Tunneling Megafauna	Tracks and Trails	None	Yes	Yes	None
RWEC-RI	443	23.5	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	Ripples (3)	11.93	None	Soft Sediment Fauna	Inferred Fauna	Tracks and Trails	Varies	None	Yes	Yes	None
RWEC-RI	444	19.9	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	Ripples (3)	IND	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	None	None	Yes	Yes	None
RWEC-RI	445	17.6	2	Mud and Sandy Mud	Sand Sheet (2)	Sand or finer	Very Fine Sand	IND	No	Ripples (1)	IND	Large Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Larger Deep-Burrowing Fauna	None	Trace (<1%)	Yes	Yes	None
RWEC-RI	446	14.7	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	Large Shell Fragment(s), Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	None	None	None	No	Yes	Northern Sea Robin
RWEC-RI	447	15.0	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	Large Shell Fragment(s)	Soft Sediment Fauna	Attached Fauna	Attached Hydroids	None	Sparse (1 to <30%)	Yes	Yes	None
RWEC-RI	448	10.9	3	Mud and Sandy Mud with Shell Substrate	Mollusk Bed (or Shells) on Mud (3)	Shell Substrate	Shell Hash	IND	No	None	N/A	Large Mussel Shell Fragments	Soft Sediment Fauna	Attached Fauna	Mussel Bed	Varies	Moderate (30 to < 70%)	Yes	No	None

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RWEC-RI	449	13.8	3	Mud and Sandy Mud with Shell Substrate	Mollusk Bed (or Shells) on Mud (3)	Shell Substrate	Shell Hash	IND	No	None	N/A	Large Mussel Shell Fragments	Soft Sediment Fauna	Attached Fauna	Small Tube-Building Fauna	Filamentous Algal Bed	Sparse (1 to <30%)	No	No	None
RWEC-RI	450	11.0	3	Mud and Sandy Mud with Shell Substrate	Mollusk Bed (or Shells) on Mud (3)	Shell Substrate	Crepidula Reef Substrate	IND	No	None	N/A	Large Shell Fragment(s)	Attached Fauna	None	Sessile Gastropods	Attached Hydroids	Complete (90-100%)	No	No	None
RWEC-RI	451	25.5	3	Sand and Muddy Sand	IND (1), Patchy Cobbles on Sand (2)	Slightly Gravelly	Slightly Gravelly Sand	IND	No	None	N/A	Large Shell Fragment(s)	Benthic Macroalgae	Soft Sediment Fauna	Filamentous Algal Bed	Attached Sponges	Moderate (30 to < 70%)	IND	Yes	None
RWEC-RI	452	21.5	3	Glacial Moraine B	Patchy Cobbles on Sand (2), Patchy Pebbles on Sand (1)	Slightly Gravelly	Slightly Gravelly Sand	114.61	No	None	N/A	Large Shell Fragment(s), Small Shell Fragment(s)	Attached Fauna	Soft Sediment Fauna	Attached Sponges	None	Sparse (1 to <30%)	No	Yes	None
RWEC-RI	453	13.6	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Benthic Macroalgae	Larger Deep-Burrowing Fauna	Filamentous Algal Bed	Sparse (1 to <30%)	Yes	No	None
RWEC-RI	454	8.6	2	Mud and Sandy Mud	Sand Sheet (2)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	None	None	Yes	Yes	None
RWEC-RI	455	5.2	1	Mud and Sandy Mud	Sand Sheet (1)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Tracks and Trails	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	601	33.0	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Varies	None	Yes	Yes	None
RWF	602	36.0	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Larger Deep-Burrowing Fauna	None	Yes	Yes	None
RWF	603	36.3	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWEC-RI	604	27.8	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	Small Shell Fragment(s)	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	None	None	No	Yes	None
RWEC-OCS	605	27.3	3	Coarse Sediment	Sand Sheet (3)	Sand or finer	Coarse Sand	IND	No	Ripples (1)	IND	Large Shell Fragment(s), Shell Hash	Soft Sediment Fauna	None	Small Tube-Building Fauna	None	None	Yes	No	None
RWEC-OCS	606	28.6	3	Coarse Sediment	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	7.49	No	Ripples (3)	68.36	Shell Hash	Soft Sediment Fauna	None	Small Tube-Building Fauna	None	None	Yes	No	None
RWEC-OCS	607	34.7	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Varies	None	Yes	Yes	None
RWEC-OCS	608	36.1	3	Mud and Sandy Mud	Sand Sheet (3)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Mobile Crustaceans on Soft Sediments	None	Yes	Yes	None

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RWEC-OCS	609	31.6	3	Sand and Muddy Sand - Mobile	Sand with Mobile Gravel (3)	Slightly Gravelly	Slightly Gravelly Sand	2.36	No	Ripples (3)	38.80	Shell Hash, Small Shell Fragment(s)	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	Varies	None	Yes	No	None
RWEC-RI	610	29.5	3	Coarse Sediment - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Small Tube-Building Fauna	Tracks and Trails	None	Yes	Yes	None
RWEC-RI	611	30.8	3	Sand and Muddy Sand - Mobile	Sand Sheet (3)	Sand or finer	Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Deep-Burrowing Fauna	Larger Tube-Building Fauna	None	Yes	Yes	None
RWEC-RI	612	8.9	2	Mud and Sandy Mud	Sand Sheet (2)	Sand or finer	Very Fine Sand	IND	No	None	N/A	None	Soft Sediment Fauna	Inferred Fauna	Larger Tube-Building Fauna	Tracks and Trails	None	Yes	Yes	None
RWEC-RI	613	9.2	3	Sand and Muddy Sand	Sand Sheet (3)	Sand or finer	Medium Sand	IND	No	None	N/A	Shell Hash	Soft Sediment Fauna	None	Larger Deep-Burrowing Fauna	IND	None	Yes	IND	None
RWEC-RI	614	11.2	3	Mud and Sandy Mud with Shell Substrate	Mollusk Bed (or Shells) on Mud (3)	Shell Substrate	Shell Hash	IND	No	None	N/A	Large Shell Fragment(s), Shell Hash	Attached Fauna	None	Attached Hydroids	None	Sparse (1 to <30%)	No	No	None
RWEC-RI	615	14.2	3	Mud and Sandy Mud with Shell Substrate	Mollusk Bed (or Shells) on Mud (3)	Shell Substrate	Shell Hash	IND	No	None	N/A	Large Mussel Shell Fragments	Attached Fauna	None	IND	None	Sparse (1 to <30%)	No	No	None

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RWF	001	3	Pebble over finer sediment (1), Very fine sand (2)	3.6	1.2	IND	Low	2	IND	IND	None	None	No	None	No	Barnacles, Bryozoan, Hydroids, Sea Star	No
RWF	002	3	Fine sand (2), Fine sand over very fine sand (1)	12.3	0.8	4.77	Low	2 on 3	2 on 3	2 on 3	None	None	Yes	Podoceridae	No	Hydroid, Shrimp, Unidentified Organism	No
RWF	003	3	Fine sand (3)	12.8	0.7	3.93	Low	2 on 3	2 on 3	2 on 3	None	None	Yes	Caprellidae, Podoceridae	No	None	No
RWF	004	3	Coarse sand (3)	5.3	2.1	IND	Low	2	2	IND	None	None	Yes	Podoceridae	No	Shrimp	No
RWF	005	3	Very fine sand (3)	14.4	1.4	4.30	Low	2 on 3	2 on 3	2 on 3	None	None	Yes	Podoceridae	No	Shrimp	No
RWF	006	3	Fine sand over very fine sand (3)	12.7	0.8	4.80	Low	2 on 3	2 on 3	2 on 3	None	None	Yes	Podoceridae	No	Shrimp	No
RWF	007	3	Fine sand (3)	10.1	1.4	4.82	Low	2 on 3	2 on 3	2 on 3	None	None	Yes	Podoceridae	No	Shrimp	No
RWF	008	3	Fine sand (3)	9.8	1.5	6.35	Low	2	2 -> 3	3	None	None	Yes	Podoceridae	No	Hydroids, Nudibranch, Paguroid(s), Shrimp	No
RWF	009	3	Fine sand (3)	6.0	0.9	4.46	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	None	No
RWF	010	3	Fine sand over very fine sand (3)	13.8	0.8	5.73	Low	2 on 3	2 on 3	2 on 3	None	None	Yes	Podoceridae	No	None	No
RWF	011	3	Very fine sand (3)	16.8	0.7	4.15	Low	2 on 3	2 on 3	2 on 3	None	None	Yes	Ampeliscid, Caprellidae, Podoceridae	No	None	No
RWF	012	3	Medium sand (2), Medium sand over finer sediment (1)	6.8	1.1	4.15	Low	2	2	2 -> 3	None	None	Yes	Podoceridae	No	Paguroid, Shrimp	No
RWF	013	3	Very fine sand (3)	18.9	1.3	3.62	Medium	3	2 on 3	2 on 3	None	None	Yes	Podoceridae	No	None	No

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RWF	014	3	Fine sand (3)	4.7	0.5	IND	Low	2 on 3	IND	IND	None	None	Yes	Podoceridae	No	Sea Star(s)	No
RWF	015	3	Fine sand (3)	4.5	0.7	4.18	Low	2	2	2	None	None	Yes	None	No	Sea Star, Shrimp	No
RWF	016	3	Fine sand (3)	4.2	1.0	IND	Low	2	2	2 -> 3	None	None	Yes	Caprellidae, Podoceridae	No	None	No
RWF	017	3	Fine sand over very fine sand (3)	16.7	0.6	5.38	Low	2 on 3	2 on 3	2 on 3	None	None	Yes	Caprellidae, Podoceridae	No	Shrimp	No
RWF	018	3	Fine sand over very fine sand (3)	17.1	1.0	5.52	Low	2 on 3	2 on 3	2 on 3	None	None	Yes	Podoceridae	No	None	No
RWF	019	3	Fine sand (3)	5.0	0.9	3.21	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Shrimp	No
RWF	020	3	Fine sand (3)	4.9	0.9	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Caprellidae, Podoceridae	No	None	No
RWF	021	3	Very fine sand (3)	14.0	1.1	3.27	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	None	No	Sea Star(s)	No
RWF	022	3	Medium sand (3)	5.2	1.2	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	None	No	Crab, Sea Star(s), Shrimp	No
RWF	023	3	Very fine sand (3)	16.1	0.5	1.92	Low	2 -> 3	2 -> 3	1 on 3	None	None	Yes	None	No	Sea Star(s)	No
RWF	024	3	Granule (2), Granule over sand (1)	9.3	2.3	IND	None	2	IND	IND	None	None	No	Podoceridae	Yes	Barnacles, Hydroids	No
RWF	025	3	Coarse sand (2), Medium sand (1)	3.0	0.7	IND	None	2	IND	IND	None	None	No	Caprellidae, Podoceridae	Yes	Barnacles, Colonial Tunicate(s), Crab, Hydroids, Shrimp	Yes
RWF	026	3	Fine sand (3)	4.4	0.8	3.11	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	None	No
RWF	027	3	Fine sand over very fine sand (3)	9.0	1.2	3.90	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Caprellidae, Podoceridae	No	Crab, Nudibranch	No

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RWF	028	3	Medium sand over finer sediment (3)	5.7	0.7	4.03	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Shrimp	No
RWF	029	3	Coarse sand over finer sediment (1), Medium sand (2)	4.7	1.5	IND	Low	2	2	IND	None	None	No	Caprellidae, Podoceridae	No	Crab(s), Hydroids, Shrimp	No
RWF	030	3	Fine sand (3)	4.5	0.5	4.06	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Ampeliscid, Podoceridae	No	Crab, Shrimp	No
RWF	031	3	Medium sand (3)	5.0	0.9	IND	Low	2	2 -> 3	IND	None	None	Yes	None	No	Sea Star(s)	No
RWF	032	3	Fine sand (3)	4.3	0.9	3.23	Low	2	2 -> 3	2 -> 3	None	None	Yes	Ampeliscid, Podoceridae	No	Sea Star(s), Shrimp	No
RWF	033	3	Coarse sand over finer sediment (3)	7.1	2.7	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Crab, Shrimp, Tunicate(s)	No
RWF	034	3	Fine sand (1), Medium sand (2)	5.7	1.9	1.75	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Shrimp	No
RWF	035	3	Fine sand (3)	5.8	1.9	2.94	Low	2 -> 3	2 -> 3	IND	None	None	Yes	Ampeliscid, Podoceridae	No	Isopod, Shrimp	No
RWF	036	3	Fine sand (3)	5.4	1.0	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Corymorpha, Shrimp, Tunicates	No
RWF	037	3	Fine sand (3)	4.0	1.4	IND	Low	2	2	2 -> 3	None	None	Yes	Podoceridae	No	Paguroid, Shrimp	No
RWF	038	3	Medium sand (3)	4.9	1.3	2.68	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Shrimp, Tunicates	No
RWF	039	3	Fine sand (2), Fine sand over very fine sand (1)	4.6	0.8	2.49	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Shrimp	No
RWF	040	3	Medium sand (3)	6.1	0.8	IND	Low	2	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Paguroid, Shrimp	No
RWF	041	3	Fine sand (3)	5.7	1.1	IND	Low	2	2 -> 3	2 -> 3	None	None	Yes	Caprellidae, Podoceridae	No	Sea Star, Tunicates	No
RWF	042	3	Fine sand (2), Fine sand over very fine sand (1)	5.5	0.8	2.29	Low	2	2 -> 3	2 on 3	None	None	Yes	Ampeliscid, Podoceridae	No	None	No

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RWF	043	3	Very fine sand (2), Very fine sand over silt/clay (1)	11.3	0.7	1.13	Medium	2	2 -> 3	2 -> 3	None	None	Yes	Caprellidae, Podoceridae	No	Shrimp	No
RWF	044	3	Fine sand (3)	6.0	1.5	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Caprellidae, Podoceridae	No	Isopod, Shrimp	No
RWF	045	3	Fine sand (3)	6.4	0.7	2.10	Low	2	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	None	No
RWF	046	3	Fine sand (2), Fine sand over very fine sand (1)	9.1	1.8	3.17	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Ampeliscid, Podoceridae	No	Hydroids, Tunicates	No
RWF	047	3	Medium sand (3)	6.1	1.2	IND	Low	2	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Tunicates	No
RWF	048	3	Fine sand (3)	4.8	0.5	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Ampeliscid, Podoceridae	No	None	No
RWF	049	3	Medium sand (3)	4.6	1.0	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Tunicates	No
RWF	050	3	Fine sand (2), Fine sand over silt/clay (1)	7.7	1.2	2.28	Low	2 -> 3	2 -> 3	2 on 3	None	None	Yes	Ampeliscid	No	Nudibranch, Sea Star(s)	No
RWF	051	3	Fine sand (3)	5.8	0.8	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Tunicates	No
RWF	052	3	Fine sand (3)	6.4	1.3	IND	Low	2 -> 3	2 on 3	IND	None	None	Yes	Podoceridae	No	None	No
RWF	053	3	Sand over very coarse sand (2), Very coarse sand over sand (1)	8.5	3.3	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	None	No
RWF	054	3	Fine sand (3)	6.2	1.0	IND	Low	2	2 -> 3	2 on 3	None	None	Yes	Ampeliscid, Podoceridae	No	Corymorpha, Crab, Paguroid, Shrimp, Tunicates	No
RWF	055	3	Fine sand (3)	6.2	2.1	7.47	Low	2	2	2	None	None	Yes	Ampeliscid, Podoceridae	No	Shrimp, Tunicates	No
RWF	056	3	Very fine sand over silt/clay (3)	14.0	0.5	2.19	Medium	2	2	3	None	None	Yes	Podoceridae	No	Sea Star(s)	No

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RWF	057	3	Fine sand (3)	5.0	1.1	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	Yes	Corymorpha, Gastropod, Hydroids, Shrimp, Tunicates	No
RWF	057E1	3	Fine sand (3)	5.0	0.9	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Crab, Paguroid, Tunicates	No
RWF	057E2	3	Fine sand (3)	6.2	0.6	IND	Low	2	2	2 -> 3	None	None	Yes	Ampeliscid, Podoceridae	No	Paguroid, Shrimp, Tunicates	No
RWF	057W1	3	Fine sand (3)	5.1	0.7	IND	Low	1	1	1	None	None	Yes	Podoceridae	No	Paguroid, Shrimp, Tunicates	No
RWF	057W2	3	Fine sand (3)	4.2	0.8	IND	Low	2	2	2 -> 3	None	None	Yes	Podoceridae	No	Crab, Paguroid, Tunicates	No
RWF	058	3	Coarse sand over finer sediment (3)	6.0	1.7	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Cerianthid, Gastropod, Paguroid, Tunicates	No
RWF	059	3	Medium sand (3)	5.8	1.5	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Paguroid, Sand Dollar	No
RWF	060	3	Medium sand (1), Very coarse sand (1), Very coarse sand over sand (1)	7.1	1.7	IND	Low	2	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Hydroids, Shrimp	No
RWF	061	3	Fine sand (3)	4.9	0.7	IND	Low	2	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Crab, Shrimp, Tunicates	No
RWF	062	3	Fine sand over silt/clay (1), Fine sand over very fine sand (1), Very fine sand (1)	8.4	0.7	2.46	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Shrimp, Tunicates	No
RWF	063	3	Medium sand (3)	6.5	1.7	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Corymorpha, Gastropod, Sand Dollar, Shrimp, Tunicates	No
RWF	064	3	Medium sand (3)	6.7	1.4	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Gastropod, Paguroid, Shrimp, Tunicate(s)	No

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RWF	065	3	Medium sand (3)	5.4	1.4	IND	Low	2	2	2 -> 3	None	None	Yes	Podoceridae	No	Gastropod, Shrimp, Tunicates	No
RWF	066	3	Medium sand (3)	5.2	1.3	IND	Low	2	2	2 -> 3	None	None	Yes	Podoceridae	No	Gastropod, Isopod, Shrimp, Tunicates	No
RWF	067	3	Fine sand over silt/clay (2), Medium sand over finer sediment (1)	13.7	0.7	2.77	Medium	2	2	2 -> 3	None	None	Yes	Podoceridae	No	Tunicates	No
RWF	068	3	Fine sand (3)	5.3	0.8	IND	Low	2	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Hydroid, Paguroid, Shrimp, Tunicates	No
RWF	069	3	Finer sediment over pebble (1), Granule over sand (1), Very coarse sand over sand over pebble (1)	4.5	1.8	IND	Low	1	2	2 -> 3	None	None	Yes	Podoceridae	No	Barnacle, Hydroid(s), Shrimp, Tunicate(s)	No
RWF	070	3	Fine sand (3)	4.6	2.1	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Corymorpha, Crab, Tunicate(s)	No
RWF	071	3	Coarse sand over finer sediment (2), Medium sand (1)	3.6	0.8	IND	Low	2	2 -> 3	IND	None	None	Yes	Podoceridae	No	Gastropod, Shrimp, Unidentified Crustacean	No
RWF	072	3	Pebble over finer sediment (2), Very coarse sand over sand (1)	5.6	1.6	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Paguroid(s)	No
RWF	073	3	Fine sand (1), Indeterminate (2)	1.0	0.8	IND	Low	IND	IND	IND	None	None	No	None	Yes	Barnacle(s), Bryozoan, Colonial Tunicate, Crab(s), Hydroids	Yes
RWF	073E1	3	Fine sand (1), Indeterminate (2)	0.1	1.1	IND	Low	IND	IND	IND	None	None	No	None	Yes	Anemone, Barnacle(s), Bryozoan, Hydroids, Shrimp	No
RWF	073E2	3	Indeterminate (3)	0.1	1.8	IND	IND	IND	IND	IND	None	None	No	Podoceridae	Yes	Barnacle(s), Ceriantid, Colonial Tunicate, Crab, Hydroids, Nudibranchs, Shrimp	Yes

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RWF	073W1	3	Fine sand (3)	1.0	0.9	IND	Low	2 -> 3	2 -> 3	IND	None	None	Yes	Podoceridae	Yes	Barnacles, Bryozoan, Hydroids	No
RWF	073W2	3	Fine sand (1), Indeterminate (1), Medium sand (1)	1.7	0.9	IND	Low	2 -> 3	2 -> 3	IND	None	None	Yes	Podoceridae	Yes	Barnacles, Hydroids, Shrimp	No
RWF	074	3	Medium sand over finer sediment (3)	6.7	1.6	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Shrimp	No
RWF	075	3	Fine sand (2), Indeterminate (1)	3.6	1.1	IND	Low	2	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	Yes	Anemone, Barnacles, Crabs, Hydroids, Shrimp, Sponges, Tunicates	No
RWF	076	3	Indeterminate (3)	0.0	IND	IND	IND	IND	IND	IND	None	None	Yes	Podoceridae	Yes	Barnacles, Bryozoan, Colonial Tunicate(s), Hydroids, Shrimp, Tunicates	Yes
RWF	077	3	Fine sand (3)	4.0	1.0	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Gastropod, Tunicates	No
RWF	078	3	Fine sand (1), Sand over granule (2)	5.0	1.4	IND	Low	2 -> 3	2 -> 3	IND	None	None	Yes	Podoceridae	No	Barnacles, Hydroids, Tunicates	No
RWF	079	3	Medium sand over finer sediment (3)	4.0	1.2	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Gastropod, Tunicates	No
RWF	080	3	Fine sand (3)	5.4	0.9	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	None	No
RWF	081	3	Coarse sand (3)	2.0	2.6	IND	Low	IND	IND	IND	None	None	Yes	Caprellidae, Podoceridae	Yes	Barnacles, Bryozoan, Hydroids, Shrimp	No
RWF	082	3	Medium sand (3)	5.2	1.1	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	None	No
RWF	083	3	Coarse sand (1), Pebble over finer sediment (1), Very coarse sand over sand (1)	3.6	1.5	IND	Low	2 -> 3	IND	IND	None	None	No	Podoceridae	Yes	Barnacles, Bryozoan, Hydroids, Paguroid, Shrimp	No

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RWF	084	3	Fine sand (2), Indeterminate (1)	1.8	1.7	IND	Low	2 -> 3	2 -> 3	IND	None	None	Yes	Podoceridae	Yes	Barnacle(s), Bryozoan, Colonial Tunicate(s), Hydroids, Shrimp, Sponge	Yes
RWF	085	3	Fine sand (3)	5.5	1.0	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	None	No
RWF	086	3	Medium sand (1), Medium sand over finer sediment (2)	5.4	1.0	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Corymorpha	No
RWF	087	3	Granule over sand (2), Sand over granule (1)	5.9	1.7	3.06	Low	2	2 -> 3	IND	None	None	Yes	Podoceridae	No	Barnacles, Hydroids, Paguroid(s), Shrimp	No
RWF	088	3	Medium sand (2), Medium sand over finer sediment (1)	6.9	1.8	7.00	Low	2 -> 3	2 -> 3	2 on 3	None	None	Yes	Podoceridae	Yes	Barnacles, Colonial Tunicate, Gastropod(s), Hydroids, Paguroid, Shrimp	Yes
RWF	089	3	Granule over sand (1), Very coarse sand over sand (2)	7.9	4.1	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	No	Podoceridae	No	Paguroid	No
RWF	090	3	Coarse sand over finer sediment (2), Medium sand (1)	5.9	1.6	IND	Low	2 -> 3	2 -> 3	IND	None	None	Yes	Podoceridae	Yes	Gastropod, Tunicates	No
RWF	091	3	Fine sand (3)	5.0	1.0	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Paguroid, Tunicates	No
RWF	092	3	Fine sand (3)	4.8	0.5	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Corymorpha, Gastropod, Tunicate(s)	No
RWF	093	3	Fine sand (3)	5.3	0.7	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Corymorpha, Tunicate(s)	No
RWF	094	3	Fine sand (3)	5.2	1.9	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Ampeliscid, Podoceridae	No	Tunicates	No

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RWF	095	3	Finer sediment over coarse sand (1), Medium sand (1), Medium sand over finer sediment (1)	7.0	1.2	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Caprellidae, Podoceridae	No	Barnacles, Paguroid, Shrimp, Tunicates	No
RWF	096	3	Fine sand (3)	5.2	1.0	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Corymorpha, Tunicate(s)	No
RWF	097	3	Medium sand (3)	6.2	1.4	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Tunicates	No
RWF	098	3	Medium sand (3)	7.7	1.1	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Corymorpha, Tunicate(s)	No
RWF	099	3	Medium sand (3)	5.8	1.2	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Sand Dollar, Shrimp, Tunicates	No
RWF	100	3	Coarse sand over finer sediment (1), Fine sand (2)	5.6	1.5	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Tunicates	No
RWF	101	3	Finer sediment over coarse sand (2), Medium sand (1)	5.7	2.6	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	Yes	Shrimp, Tunicate(s)	No
RWF	102	3	Fine sand (3)	4.3	1.2	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Ampeliscid, Podoceridae	No	Shrimp	No
RWF	103	3	Fine sand (3)	5.1	1.6	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Shrimp, Tunicates	No
RWF	104	3	Coarse sand over finer sediment (1), Very coarse sand over sand (2)	5.2	1.5	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Barnacles, Hydroids, Tunicates	No
RWF	105	3	Fine sand (3)	6.3	0.9	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Cerianthid, Tunicates	No
RWF	106	3	Coarse sand (1), Coarse sand over finer sediment (1), Very coarse sand over sand (1)	5.9	2.3	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Caprellidae, Podoceridae	No	None	No

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RWF	107	3	Coarse sand (1), Sand over very coarse sand (1), Very coarse sand (1)	8.0	2.2	IND	Low	2	2 -> 3	IND	None	None	No	Podoceridae	Yes	Cerianthid, Shrimp	No
RWF	108	3	Coarse sand (2), Coarse sand over finer sediment (1)	5.8	3.0	IND	Low	2	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	Yes	Barnacles, Colonial Tunicate, Gastropod	Yes
RWF	109	3	Coarse sand over finer sediment (3)	5.9	3.4	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Tunicates	No
RWF	110	3	Fine sand (3)	5.6	0.7	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	Yes	Tunicates	No
RWF	111	3	Coarse sand over finer sediment (3)	7.3	1.8	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Barnacles, Shrimp, Tunicate(s)	No
RWF	112	3	Medium sand (3)	5.8	1.3	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Caprellidae, Podoceridae	Yes	Bryozoan, Shrimp, Tunicate(s)	No
RWF	113	3	Medium sand (3)	5.3	1.2	IND	Low	2	2	2	None	None	Yes	Caprellidae, Podoceridae	No	Shrimp, Tunicates	No
RWF	114	3	Very coarse sand (3)	5.1	1.8	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Gastropod, Shrimp	No
RWF	115	3	Coarse sand (2), Very coarse sand over sand (1)	6.9	2.0	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Tunicates	No
RWF	116	3	Very coarse sand (1), Very coarse sand over sand (2)	7.3	1.4	IND	Low	2	2	2 -> 3	None	None	Yes	Podoceridae	No	Barnacles, Corymorpha	No
RWF	117	3	Very coarse sand (3)	6.7	3.2	IND	None	2	2	2	None	None	Yes	Podoceridae	No	None	No
RWF	118	3	Coarse sand over finer sediment (3)	6.3	2.1	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Tunicates	No
RWF	119	3	Coarse sand (1), Very coarse sand over sand (2)	6.3	2.0	IND	Low	2	2	2	None	None	Yes	Podoceridae	Yes	Barnacles, Shrimp, Tunicates	No

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RWF	120	3	Coarse sand over finer sediment (2), Medium sand (1)	6.3	2.1	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	None	No
RWF	121	3	Coarse sand over finer sediment (1), Medium sand (1), Very coarse sand over sand (1)	6.2	1.0	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Barnacles, Paguroid, Tunicates	No
RWF	122	3	Coarse sand over finer sediment (2), Medium sand (1)	4.6	0.8	IND	Low	2	2	2	None	None	Yes	Podoceridae	Yes	Paguroids, Tunicates	No
RWF	123	3	Medium sand (3)	5.3	2.8	IND	Low	2	2	2	None	None	No	Podoceridae	No	Tunicates	No
RWF	124	3	Fine sand (3)	5.6	0.7	IND	Low	2	2	2 -> 3	None	None	Yes	Podoceridae	No	Corymorpha, Gastropods, Paguroid, Tunicate(s)	No
RWF	125	3	Coarse sand over finer sediment (2), Medium sand (1)	6.1	1.2	IND	Low	2	2	2 -> 3	None	None	Yes	Podoceridae	No	Tunicates	No
RWF	126	3	Coarse sand over finer sediment (1), Medium sand (2)	5.9	1.7	IND	Low	2	2	2 -> 3	None	None	Yes	Podoceridae	No	Shrimp, Tunicates	No
RWF	127	3	Coarse sand (2), Very coarse sand (1)	2.7	1.2	IND	None	2	2	2	None	None	No	Podoceridae	No	None	No
RWF	128	3	Very coarse sand over sand (3)	8.1	2.4	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	None	No
RWF	129	3	Very coarse sand (1), Very coarse sand over sand (2)	5.9	3.3	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	None	No
RWF	136	3	Granule over sand (1), Pebble over finer sediment (1), Very coarse sand over sand (1)	4.9	3.0	IND	Low	2	2	2	None	None	Yes	None	No	Barnacles, Hydroids, Shrimp	No
RWF	137	3	Pebble over finer sediment (2), Very coarse sand over sand (1)	6.9	3.6	IND	Low	2	2	2	None	None	Yes	Podoceridae	Yes	Barnacle(s), Hydroids, Shrimp	No

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RWF	138	3	Indeterminate (2), Very coarse sand over sand (1)	1.5	2.1	IND	None	2	IND	IND	None	None	Yes	None	No	Anemone, Barnacle(s), Hydroids, Sea Star, Shrimp, Sponges	No
RWF	139	3	Coarse sand (1), Very coarse sand over sand (2)	2.8	1.5	IND	Low	2	2	2	None	None	Yes	None	Yes	Barnacles, Gastropod, Hydroids	No
RWF	140	3	Fine sand (3)	4.9	1.1	IND	Low	2	2	2	None	None	Yes	Ampeliscid, Podoceridae	No	Nudibranch, Tunicates	No
RWF	141	3	Pebble over finer sediment (2), Very coarse sand over sand (1)	4.0	2.5	IND	Low	2	2	2 -> 3	None	Sea Scallop	Yes	Podoceridae	No	Barnacles, Hydroids, Sea Scallop, Shrimp	No
RWF	142	3	Pebble over finer sediment (1), Very coarse sand (2)	6.0	1.2	IND	None	2	2	1 -> 2	None	None	Yes	Podoceridae	No	Barnacles, Hydroids, Shrimp, Sponges, Tunicates, Unidentified Organism	No
RWF	143	3	Coarse sand (1), Fine sand (2)	3.7	1.5	IND	Low	2	2	IND	None	None	Yes	Podoceridae	Yes	Barnacles, Hydroids, Shrimp	No
RWF	144	3	Coarse sand (1), Pebble over finer sediment (1), Very coarse sand (1)	2.6	3.0	IND	None	2	2	2	None	None	Yes	Podoceridae	Yes	Barnacles, Hydroids	No
RWF	201	3	Indeterminate (3)	0.0	IND	IND	IND	IND	IND	IND	None	None	Yes	None	No	Barnacle(s), Colonial Tunicate, Hydroids, Sea Star, Shrimp	Yes
RWF	202	3	Granule (2), Granule over sand (1)	6.5	1.0	IND	None	2	2	2	None	None	Yes	Podoceridae	No	Barnacles	No
RWF	204	3	Fine sand (3)	5.7	1.3	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	None	No

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RWF	205	3	Medium sand over finer sediment (3)	5.7	1.3	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Shrimp, Tunicates	No
RWF	206	3	Very coarse sand over sand (3)	4.8	2.0	IND	Low	2	2	2 -> 3	None	None	Yes	Podoceridae	Yes	Barnacles, Colonial Tunicate(s), Hydroids	Yes
RWF	207	3	Medium sand (3)	1.8	1.5	IND	Low	2	2	2	None	None	Yes	Podoceridae	Yes	Barnacles, Tunicates	No
RWF	208	3	Fine sand (1), Medium sand (2)	2.1	1.3	IND	Low	2	2	IND	Non-Reef Building Hard Coral	None	Yes	Podoceridae	Yes	Barnacles, Hydroids, Northern Star Coral, Polymastia Sponge, Sea Star(s), Tunicates	No
RWF	209	3	Indeterminate (1), Medium sand (2)	1.6	1.1	IND	Low	2	2	2	None	None	Yes	Podoceridae	Yes	Barnacles, Shrimp	No
RWF	210	3	Coarse sand over finer sediment (1), Very coarse sand over sand (2)	4.2	1.1	IND	Low	2	2	2	None	None	Yes	Podoceridae	Yes	Barnacles, Gastropods, Paguroid	No
RWF	211	3	Very coarse sand (2), Very coarse sand over sand (1)	2.5	2.3	IND	Low	2	2	2	None	None	Yes	Podoceridae	Yes	Barnacles, Hydroids, Paguroid	No
RWF	212	3	Coarse sand (1), Coarse sand over finer sediment (2)	6.9	1.6	IND	Low	2	2	2	None	None	Yes	Podoceridae	Yes	Paguroid	No
RWF	213	3	Coarse sand over finer sediment (3)	2.5	2.9	IND	Low	2	2	IND	None	None	Yes	Podoceridae	Yes	Barnacles	No
RWF	214	3	Indeterminate (1), Pebble over finer sediment (2)	3.4	1.3	IND	None	IND	IND	IND	None	None	Yes	Podoceridae	No	Barnacles, Colonial Tunicate, Crabs, Hydroids, Shrimp	Yes
RWF	215	3	Fine sand (2), Indeterminate (1)	1.0	0.8	IND	Low	2	IND	IND	Non-Reef Building Hard Coral	None	Yes	Podoceridae	No	Anemone, Barnacles, Colonial Tunicate, Hydroids, Moon Snail, Northern Star Coral, Paguroid, Polymastia Sponge, Sea Star	Yes

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RWF	216	3	Indeterminate (1), Very coarse sand (2)	1.7	2.3	IND	Low	1	2	IND	None	None	Yes	None	Yes	Barnacles, Colonial Tunicate(s), Gastropods, Hydroids, Sea Star, Sponges	Yes
RWF	217	3	Coarse sand (1), Indeterminate (2)	0.3	0.5	IND	Low	2	IND	IND	None	None	Yes	Podoceridae	Yes	Anemone, Barnacles, Colonial Tunicate, Crab(s), Hydroids, Polymastia Sponge, Sea Star, Sponges	Yes
RWF	218	3	Fine sand (1), Indeterminate (2)	0.1	0.9	IND	Low	IND	IND	IND	None	None	Yes	None	Yes	Barnacles, Hydroids, Polymastia Sponge, Shrimp, Sponges	No
RWF	218E1	3	Fine sand (1), Indeterminate (2)	0.1	1.0	IND	Low	2	IND	IND	None	None	Yes	None	Yes	Barnacles, Colonial Tunicate, Gastropod, Hydroids, Polymastia Sponge, Sea Star, Sponges, Unidentified Organism	Yes
RWF	218E2	3	Medium sand (1), Very coarse sand over sand (2)	2.8	1.3	IND	Low	2	2	2	None	None	Yes	Caprellidae, Podoceridae	Yes	Barnacles, Hydroids	No
RWF	218W1	3	Indeterminate (2), Medium sand (1)	0.1	0.9	IND	Low	2	IND	IND	None	None	Yes	None	Yes	Barnacles, Colonial Tunicate, Polymastia Sponge, Sea Star(s), Shrimp, Sponges	Yes
RWF	218W2	3	Coarse sand (1), Coarse sand over finer sediment (1), Very coarse sand over sand (1)	4.3	1.5	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Nudibranchs, Tunicates	No
RWF	219	3	Indeterminate (2), Very coarse sand (1)	1.7	0.7	IND	Low	2	IND	IND	Non-Reef Building Hard Coral	None	Yes	None	Yes	Barnacles(s), Hydroids, Northern Star Coral, Shrimp, Sponges	No
RWF	220	3	Indeterminate (2), Pebble over finer sediment (1)	0.6	2.2	IND	Low	IND	IND	IND	None	None	Yes	Podoceridae	No	Barnacle(s), Colonial Tunicate, Hydroids, Sea Star, Shrimp, Sponges	Yes

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RWF	220E1	3	Fine sand (1), Indeterminate (2)	0.1	0.5	IND	Low	IND	IND	IND	None	None	Yes	None	Yes	Barnacle(s), Crab, Hydroids, Shrimp, Sponges	No
RWF	220E2	3	Indeterminate (2), Very coarse sand over sand (1)	1.5	1.7	IND	Low	2	IND	IND	None	None	Yes	Podoceridae	No	Barnacles, Colonial Tunicate, Hydroids, Shrimp, Sponges, Tunicate	Yes
RWF	220W1	3	Coarse sand (1), Indeterminate (1), Medium sand (1)	2.5	2.4	IND	Low	2	2	IND	None	None	Yes	Podoceridae	No	Barnacles, Hydroids, Paguroid(s)	No
RWF	220W2	2	Indeterminate (2)	0.0	IND	IND	IND	2	IND	-	None	None	Yes	Podoceridae	Yes	Barnacles, Colonial Tunicate, Hydroids, Sponges, Tunicates	Yes
RWF	221	3	Fine sand (3)	4.8	1.0	IND	Low	2	2	2 -> 3	None	None	Yes	Podoceridae	No	None	No
RWF	222	3	Fine sand (3)	5.5	0.8	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Shrimp, Tunicates	No
RWF	223	3	Very fine sand (3)	11.8	1.1	3.47	Low	2 -> 3	2 on 3	2 on 3	None	None	Yes	Ampeliscid	No	None	No
RWF	224	3	Very coarse sand (3)	7.1	2.1	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	None	No
RWF	225	3	Very fine sand (3)	8.8	0.9	3.24	Low	2 -> 3	2 -> 3	2 on 3	None	None	Yes	Ampeliscid, Podoceridae	No	Shrimp	No
RWF	226	3	Very fine sand (3)	11.7	1.7	4.32	Low	2 on 3	2 on 3	2 on 3	None	None	Yes	Ampeliscid, Podoceridae	No	Shrimp	No
RWF	227	3	Very fine sand (3)	18.3	1.1	1.73	Medium	1 on 3	1 on 3	2 on 3	None	None	Yes	Podoceridae	No	Sea Star(s)	No
RWF	228	3	Fine sand (3)	4.6	0.9	2.77	Low	2	2	2	None	None	Yes	Ampeliscid, Podoceridae	No	Paguroids, Sea Star, Shrimp	No
RWF	229	3	Fine sand (3)	5.0	1.0	2.54	Low	2	2	2 -> 3	None	None	Yes	Ampeliscid, Podoceridae	No	Shrimp	No
RWF	230	3	Fine sand over very fine sand (3)	9.1	0.7	3.16	Medium	2 -> 3	2 -> 3	2 -> 3	None	Sea Scallop	Yes	Ampeliscid, Podoceridae	No	Sea Scallop, Shrimp	No

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RWF	231	3	Medium sand over finer sediment (3)	5.2	1.2	3.21	Low	2	2	2	None	None	Yes	Ampeliscid, Podoceridae	No	Crab, Sea Star, Shrimp	No
RWF	232	3	Indeterminate (1), Medium sand (2)	1.6	1.8	IND	Low	2	2	IND	None	Sea Scallop	Yes	Podoceridae	Yes	Barnacles, Hydroids, Scallop, Sea Star	No
RWF	233	3	Fine sand (3)	4.2	0.6	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Jonah Crab, Shrimp	No
RWF	234	3	Fine sand (1), Fine sand over very fine sand (1)	7.6	1.4	4.03	Medium	2	2 -> 3	2 -> 3	None	None	Yes	Ampeliscid, Podoceridae	No	Shrimp	No
RWF	235	3	Very coarse sand (3)	6.8	1.1	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Sea Star(s)	No
RWF	236	3	Fine sand (3)	7.0	1.0	1.59	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Paguroid, Shrimp	No
RWF	237	3	Medium sand (3)	5.8	2.4	IND	Low	2	2	2	None	None	Yes	Podoceridae	Yes	Shrimp, Tunicate(s)	No
RWF	238	3	Fine sand (2), Fine sand over silt/clay (1)	5.3	1.1	3.00	Low	2	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Shrimp	No
RWF	239	3	Fine sand (2), Medium sand (1)	3.9	1.6	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Hydroids, Shrimp, Tunicates	No
RWF	240	3	Fine sand (3)	5.9	1.1	2.33	Low	2	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Shrimp, Tunicates	No
RWF	241	3	Fine sand (3)	5.7	0.7	IND	Low	2	2	2 -> 3	None	None	Yes	Podoceridae	No	Jonah Crab, Tunicates	No
RWF	242	3	Coarse sand (1), Coarse sand over finer sediment (2)	6.0	0.8	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Paguroid, Shrimp, Tunicates, Unidentified Organism	No
RWF	243	3	Fine sand (1), Fine sand over silt/clay (2)	7.6	1.2	2.06	High	2	2	2 -> 3	None	None	Yes	Podoceridae	No	Tunicates	No
RWF	244	3	Fine sand (3)	5.3	1.2	2.29	Low	2	2	2	None	None	Yes	Ampeliscid, Podoceridae	No	Tunicates	No

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RWF	245	3	Fine sand (3)	4.3	0.5	1.87	Low	2	2	2	None	None	Yes	Ampeliscid, Podoceridae	No	Barnacle(s), Shrimp, Tunicates	No
RWF	246	3	Fine sand (3)	5.3	1.2	IND	Low	2	2	2	None	None	Yes	Ampeliscid, Caprellidae, Podoceridae	No	Tunicates	No
RWF	247	3	Very coarse sand (1), Very coarse sand over sand (2)	4.5	1.9	IND	Low	2	2	2	None	None	Yes	Podoceridae	Yes	Barnacles, Hydroids, Shrimp	No
RWF	248	3	Very coarse sand (1), Very coarse sand over sand (2)	3.6	2.6	IND	Low	2	2	IND	None	None	Yes	Podoceridae	No	Barnacles, Hydroids, Paguroid(s)	No
RWF	249	3	Indeterminate (3)	0.0	IND	IND	IND	IND	IND	IND	Non-Reef Building Hard Coral	None	Yes	None	No	Barnacle(s), Colonial Tunicate, Hydroids, Northern Star Coral, Sea Star(s)	Yes
RWF	250	3	Fine sand (3)	8.2	0.9	8.08	Low	2	2	2	None	None	Yes	Podoceridae	No	Paguroid, Shrimp, Tunicate(s)	No
RWF	251	3	Fine sand (1), Very coarse sand over sand (2)	7.4	3.1	IND	Low	2	2	2 -> 3	None	None	Yes	Podoceridae	No	Shrimp, Tunicate(s)	No
RWF	252	3	Coarse sand (2), Medium sand (1)	4.4	1.3	IND	Low	2	2	2	None	None	Yes	Podoceridae	Yes	Barnacles, Colonial Tunicate, Hydroids, Shrimp	Yes
RWF	253	3	Coarse sand (3)	8.2	1.9	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Moon Snail, Tunicates	No
RWF	254	3	Coarse sand (3)	5.0	3.9	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Barnacles, Shrimp, Tunicate(s)	No
RWF	255	3	Coarse sand (1), Medium sand (2)	5.1	1.1	IND	Low	2	2	2 -> 3	None	None	Yes	Podoceridae	Yes	Tunicates	No
RWF	256	3	Very coarse sand (2), Very coarse sand over sand (1)	8.4	1.3	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Barnacles, Hydroids	No

Area	Station ID	SPI Replicate (n)	SPI Sediment Type (# of reps)	SPI Mean Prism Penetration Depth (cm)	SPI Mean Boundary Roughness (cm)	SPI Mean aRPD Depth (cm)	SPI Sediment Oxygen Demand Level	SPI Successional Stage (by replicate)[1]			SPI/PV Sensitive Taxa Type[2]	SPI/PV Species of Concern[2]	SPI/PV Presence of Tubes[2]	SPI/PV Amphipod Presence/Type[2]	SPI/PV Sea Pen Presence[2]	SPI/PV Other Epifauna Present[2]	SPI/PV Possible Non-Native *Botrylloides sp.*[2]
RWF	257	3	Very coarse sand (2), Very coarse sand over sand (1)	5.7	3.6	IND	Low	1	1	2	None	None	Yes	Podoceridae	No	Shrimp	No
RWF	258	3	Coarse sand (1), Pebble over finer sediment (1), Very coarse sand (1)	5.0	1.3	IND	Low	2	2	2	None	Sea Scallop	Yes	Caprellidae, Podoceridae	Yes	Barnacles, Sea Scallop, Shrimp	No
RWF	259	3	Medium sand (3)	7.4	0.7	IND	Low	2	2	2 -> 3	None	None	Yes	Ampeliscid, Podoceridae	No	Paguroid, Tunicates	No
RWF	260	3	Fine sand (3)	5.1	1.9	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Tunicates	No
RWF	261	3	Very coarse sand (3)	8.4	3.8	IND	Low	2	2	2 -> 3	None	None	No	Podoceridae	No	Tunicates	No
RWF	262	3	Fine sand (3)	5.4	0.8	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Shrimp, Tunicates	No
RWF	401	3	Fine sand (3)	4.0	1.3	IND	Low	2	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	Yes	Tunicates	No
RWF	402	3	Indeterminate (1), Medium sand (2)	1.1	2.0	IND	Low	2	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Barnacles, Gastropod, Hydroids, Shrimp, Tunicates	No
RWF	403	3	Coarse sand (3)	6.6	1.1	IND	Low	2	2	2 -> 3	None	None	Yes	Podoceridae	No	Hydroids, Shrimp, Tunicate(s)	No
RWF	404	3	Fine sand over silt/clay (1), Medium sand over finer sediment (2)	15.4	2.0	2.87	High	2	2 -> 3	2 on 3	None	None	Yes	Podoceridae	No	Barnacles, Gastropod, Shrimp, Tunicates	No
RWF	405	3	Medium sand (3)	4.9	1.2	IND	Low	2	2	2 -> 3	None	None	Yes	Podoceridae	No	Tunicates	No
RWF	406	3	Very fine sand (3)	5.3	1.2	2.94	Medium	2 -> 3	2 on 3	2 on 3	None	None	Yes	Podoceridae	No	Paguroid, Tunicates, Unidentified Organism	No
RWF	407	3	Fine sand (3)	4.3	0.7	IND	Low	2	2	2 -> 3	None	None	Yes	Ampeliscid, Podoceridae	No	Isopods, Tunicate(s)	No

Area	Station ID	SPI Replicate (n)	SPI Sediment Type (# of reps)	SPI Mean Prism Penetration Depth (cm)	SPI Mean Boundary Roughness (cm)	SPI Mean aRPD Depth (cm)	SPI Sediment Oxygen Demand Level	SPI Successional Stage (by replicate)[1]			SPI/PV Sensitive Taxa Type[2]	SPI/PV Species of Concern[2]	SPI/PV Presence of Tubes[2]	SPI/PV Amphipod Presence/Type[2]	SPI/PV Sea Pen Presence[2]	SPI/PV Other Epifauna Present[2]	SPI/PV Possible Non-Native *Botrylloides sp.*[2]
RWF	408	3	Medium sand (3)	4.1	0.6	IND	Low	2	2	2	None	None	Yes	Ampeliscid, Podoceridae	No	Hydroids, Tunicates	No
RWF	409	3	Medium sand (3)	4.7	0.7	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Sea Star(s)	No
RWEC-OCS	410	3	Very fine sand (3)	12.7	0.8	3.72	Medium	2 on 3	2 on 3	2 on 3	None	None	Yes	None	Yes	Sea Star(s)	No
RWEC-OCS	411	3	Indeterminate (3)	0.0	IND	IND	IND	IND	IND	IND	None	None	No	None	No	Barnacle(s), Crab, Hydroids, Sea Star, Shrimp, Sponges	No
RWF	412	3	Fine sand (2), Fine sand over very fine sand (1)	5.1	1.4	2.32	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Tunicates	No
RWF	413	3	Fine sand (1), Fine sand over very fine sand (1)	4.5	2.8	3.47	Low	2	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Paguroid, Tunicates	No
RWF	414	3	Medium sand (3)	5.0	1.1	IND	Low	2	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Tunicates	No
RWF	415	3	Indeterminate (1), Medium sand (2)	0.2	0.9	IND	Low	2	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Paguroid, Shrimp, Tunicates	No
RWF	416	3	Fine sand (3)	4.7	2.0	3.07	Low	2 -> 3	2 -> 3	2 on 3	None	None	Yes	Podoceridae	No	Shrimp, Unidentified Organism	No
RWEC-OCS	417	3	Very fine sand (3)	13.6	0.7	2.59	Medium	2 on 3	2 on 3	2 on 3	None	None	Yes	Podoceridae	No	Sea Star(s)	No
RWEC-OCS	418	3	Indeterminate (1), Silt/clay (2)	1.6	2.3	IND	Low	IND	IND	IND	None	None	Yes	None	No	Anemone, Barnacles, Crab, Hydroids, Sea Star	No
RWEC-OCS	419	3	Indeterminate (1), Silt/clay (1), Very fine sand (1)	0.9	1.1	IND	Low	IND	IND	IND	None	None	No	None	Yes	Barnacles, Crab, Hydroids, Paguroid, Shrimp	No

Area	Station ID	SPI Replicate (n)	SPI Sediment Type (# of reps)	SPI Mean Prism Penetration Depth (cm)	SPI Mean Boundary Roughness (cm)	SPI Mean aRPD Depth (cm)	SPI Sediment Oxygen Demand Level	SPI Successional Stage (by replicate)[1]			SPI/PV Sensitive Taxa Type[2]	SPI/PV Species of Concern[2]	SPI/PV Presence of Tubes[2]	SPI/PV Amphipod Presence/Type[2]	SPI/PV Sea Pen Presence[2]	SPI/PV Other Epifauna Present[2]	SPI/PV Possible Non-Native *Botrylloides sp.*[2]
RWEC-OCS	420	3	Fine sand (2), Medium sand over finer sediment (1)	4.1	1.5	IND	Low	2	2	2	None	None	Yes	Ampeliscid, Podoceridae	No	Shrimp	No
RWEC-OCS	421	3	Very fine sand over silt/clay (3)	14.8	1.4	2.35	Medium	2 -> 3	2 on 3	2 on 3	None	None	Yes	Ampeliscid, Podoceridae	No	Sea Star, Shrimp	No
RWEC-OCS	422	3	Fine sand (3)	5.0	0.7	2.76	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Ampeliscid	No	Shrimp	No
RWEC-OCS	423	3	Coarse sand (3)	5.2	2.2	IND	Low	2	2	2	None	None	Yes	Ampeliscid, Podoceridae	No	Crab	No
RWEC-OCS	424	3	Coarse sand (3)	7.8	3.1	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Tunicates	No
RWEC-OCS	425	3	Coarse sand (1), Medium sand (2)	5.3	1.6	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Hydroids, Sand Dollar, Shrimp, Tunicates	No
RWEC-OCS	426	3	Fine sand (2), Medium sand over finer sediment (1)	4.7	1.5	IND	Low	2	2	2	None	None	Yes	Ampeliscid, Podoceridae	No	Sand Dollar, Tunicates	No
RWEC-OCS	427	3	Medium sand (3)	4.4	0.6	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Paguroid, Tunicates	No
RWEC-OCS	428	3	Coarse sand over finer sediment (1), Medium sand (2)	4.9	1.2	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Paguroid(s), Shrimp	No
RWEC-RI	429	3	Coarse sand over finer sediment (3)	5.4	0.8	IND	Low	2	2	2 -> 3	None	None	Yes	Unidentified	No	Shrimp	No
RWEC-RI	430	3	Fine sand (3)	4.6	0.4	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	None	No	None	No
RWEC-RI	431	3	Very fine sand (3)	13.4	0.6	1.80	Low	2 on 3	2 on 3	2 on 3	None	None	Yes	Ampeliscid, Podoceridae	No	None	No
RWEC-RI	432	3	Very fine sand (3)	13.8	1.5	2.08	Low	2 on 3	2 on 3	2 on 3	None	None	Yes	Ampeliscid, Podoceridae	No	None	No
RWEC-RI	433	3	Very fine sand over silt/clay (3)	14.7	1.1	1.63	Low	2 on 3	2 on 3	2 on 3	None	None	Yes	Podoceridae	No	Crab	No

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RWEC-RI	434	3	Fine sand (3)	5.8	0.9	1.97	Low	2	2 -> 3	2 -> 3	None	None	Yes	Ampeliscid	No	Paguroid	No
RWEC-RI	435	3	Fine sand (3)	6.0	1.3	2.51	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Ampeliscid, Podoceridae	No	Moon Snail, Paguroid	No
RWEC-RI	436	3	Fine sand over very fine sand (3)	8.2	1.0	2.95	Low	2 -> 3	2 -> 3	3	None	None	Yes	None	No	Gastropods, Paguroid, Unidentified Organism	No
RWEC-RI	437	3	Fine sand over very fine sand (3)	9.1	1.9	3.16	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Gastropod(s)	No
RWEC-RI	438	3	Coarse sand (1), Coarse sand over finer sediment (2)	5.3	1.3	IND	Low	2	2	2	None	None	Yes	Podoceridae	No	Gastropod(s), Paguroid(s)	No
RWEC-RI	439	3	Fine sand over very fine sand (1), Finer sediment over coarse sand (2)	7.3	1.6	2.92	Low	2	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Gastropod(s), Moon Snail, Paguroid(s)	No
RWEC-RI	440	3	Fine sand over very fine sand (1), Very fine sand over silt/clay (2)	18.0	1.2	2.00	Medium	1 on 3	1 on 3	1 on 3	None	None	Yes	None	No	Gastropod, Paguroid, Unidentified Organism	No
RWEC-RI	441	3	Very fine sand (3)	16.7	1.1	2.30	Low	2 -> 3	2 on 3	2 on 3	None	None	Yes	Podoceridae	No	None	No
RWEC-RI	442	3	Very fine sand over silt/clay (3)	14.7	2.5	1.77	Low	2 -> 3	2 on 3	2 on 3	None	None	Yes	Podoceridae	No	Crab(s)	No
RWEC-RI	443	3	Very fine sand (3)	10.0	1.5	1.99	Low	1 on 3	1 on 3	1 on 3	None	None	Yes	None	No	Gastropod(s), Paguroid(s)	No
RWEC-RI	444	3	Very fine sand (3)	10.8	0.7	2.26	Medium	2 -> 3	1 on 3	2 on 3	None	None	Yes	unidentified	No	Paguroid(s), Shrimp	No
RWEC-RI	445	3	Very fine sand (3)	8.4	1.1	1.84	Medium	2	2	2	None	None	Yes	Podoceridae	No	Barnacles, Gastropod(s), Paguroid(s)	No
RWEC-RI	446	3	Medium sand over finer sediment (1), Very fine sand over silt/clay (2)	9.5	0.9	1.52	Medium	2 -> 3	1 on 3	2 on 3	None	None	Yes	None	No	Crab, Gastropod, Paguroid(s)	No
RWEC-RI	447	3	Very fine sand over silt/clay (3)	9.3	0.8	1.22	Medium	2	2	1 on 3	None	None	Yes	None	No	Barnacles, Hydroids, Paguroid(s)	No
RWEC-RI	448	3	Silt/clay (3)	8.2	1.2	0.98	Medium	2 -> 3	IND	IND	None	None	Yes	None	No	Barnacles, Gastropod, Hydroids, Mussels	No

Area	Station ID	SPI Replicate (n)	SPI Sediment Type (# of reps)	SPI Mean Prism Penetration Depth (cm)	SPI Mean Boundary Roughness (cm)	SPI Mean aRPD Depth (cm)	SPI Sediment Oxygen Demand Level	SPI Successional Stage (by replicate)[1]			SPI/PV Sensitive Taxa Type[2]	SPI/PV Species of Concern[2]	SPI/PV Presence of Tubes[2]	SPI/PV Amphipod Presence/Type[2]	SPI/PV Sea Pen Presence[2]	SPI/PV Other Epifauna Present[2]	SPI/PV Possible Non-Native *Botrylloides sp.*[2]
RWEC-RI	449	3	Silt/clay (3)	15.1	1.5	0.98	Medium	3	3	3	None	None	Yes	None	No	Crab, Hydroids	No
RWEC-RI	450	3	Silt/clay (3)	11.8	3.3	IND	Medium	IND	IND	IND	None	None	No	None	No	Barnacles, Crepidula, Hydroids, Sponges	No
RWEC-RI	451	3	Very fine sand over silt/clay (3)	11.6	1.3	1.06	Medium	1	2 -> 3	3	None	None	Yes	None	No	Gastropod, Sponge(s), Whelk	No
RWEC-RI	452	3	Fine sand (2), Fine sand over silt/clay (1)	3.1	0.9	0.02	Medium	1	1	1	None	None	No	None	No	Barnacles, Barnacles, Gastropod(s), Sponge(s)	No
RWEC-RI	453	3	Fine sand (3)	1.9	0.9	1.10	Low	1	IND	IND	None	None	No	None	No	None	No
RWEC-RI	454	3	Very fine sand over silt/clay (3)	13.3	1.0	1.96	Low	2 -> 3	2 on 3	2 on 3	None	None	No	None	No	None	No
RWEC-RI	455	3	Silt/clay (1), Very fine sand (2)	8.9	1.3	2.20	Medium	2	2 -> 3	2 on 3	None	None	Yes	None	No	None	No
RWF	601	3	Medium sand (3)	5.7	0.6	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Corymorpha, Gastropod(s), Tunicates	No
RWF	602	3	Medium sand (3)	6.1	1.5	6.66	Low	2 -> 3	2 -> 3	2 on 3	None	None	Yes	Podoceridae	No	Tunicates	No
RWF	603	3	Fine sand (3)	4.2	0.7	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Tunicates	No
RWEC-RI	604	3	Fine sand (3)	4.6	1.0	IND	Low	2	2	2	None	None	Yes	Ampeliscid	No	Gastropod(s)	No
RWEC-OCS	605	3	Coarse sand (3)	5.5	1.4	IND	None	2 -> 3	IND	IND	None	None	Yes	Podoceridae	No	Gastropod, Paguroid	No
RWEC-OCS	606	3	Very coarse sand (2), Very coarse sand over sand (1)	3.4	2.1	IND	None	2	2	IND	None	None	Yes	Podoceridae	No	Gastropod, Sand Dollar	No
RWEC-OCS	607	3	Very fine sand (3)	13.0	1.0	3.08	Low	2 -> 3	2 -> 3	3	None	None	Yes	Caprellidae, Podoceridae	No	Corymorpha, Shrimp	No
RWEC-OCS	608	3	Very fine sand (3)	13.4	0.5	2.88	Low	2 on 3	2 on 3	2 on 3	None	None	Yes	Podoceridae	No	Shrimp	No

Area	Station ID	SPI Replicate (n)	SPI Sediment Type (# of reps)	SPI Mean Prism Penetration Depth (cm)	SPI Mean Boundary Roughness (cm)	SPI Mean aRPD Depth (cm)	SPI Sediment Oxygen Demand Level	SPI Successional Stage (by replicate)[1]			SPI/PV Sensitive Taxa Type[2]	SPI/PV Species of Concern[2]	SPI/PV Presence of Tubes[2]	SPI/PV Amphipod Presence/Type[2]	SPI/PV Sea Pen Presence[2]	SPI/PV Other Epifauna Present[2]	SPI/PV Possible Non-Native *Botrylloides sp.*[2]
RWEC-OCS	609	3	Medium sand (3)	5.8	1.2	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Tunicates	No
RWEC-RI	610	3	Fine sand (3)	5.1	1.7	IND	Low	2 -> 3	2 -> 3	2 -> 3	None	None	Yes	Podoceridae	No	Paguroid(s)	No
RWEC-RI	611	3	Fine sand (3)	5.3	1.6	4.62	Low	2 -> 3	2 -> 3	IND	None	None	Yes	Ampeliscid, Podoceridae	No	Gastropods, Paguroid	No
RWEC-RI	612	3	Very fine sand (3)	11.7	1.1	2.10	Low	2 on 3	2 on 3	2 on 3	None	None	Yes	None	No	None	No
RWEC-RI	613	3	Medium sand (3)	2.2	1.3	IND	None	IND	IND	IND	None	None	No	None	No	None	No
RWEC-RI	614	3	Silt/clay (3)	9.4	0.7	2.18	High	3	3	IND	None	None	No	None	No	Hydroids, Sponges	No
RWEC-RI	615	3	Silt/clay (3)	15.7	1.5	1.55	High	3	2 on 3	2 on 3	None	None	Yes	None	No	Hydroids, Jonah Crab	No

Area	Station ID	Water Depth (m)	PV Replicate Count (n)	Mapped Habitat Type	PV Macrohabitat	PV CMECS Substrate Group/Subgroup (by replicate)			PV Boulder Presence	PV Bedforms (by replicate)			PV Dominant CMECS Biotic Subclass	PV Dominant CMECS Co-occurring Biotic Subclass	PV Dominant CMECS Biotic Group	PV Dominant CMECS Co-occurring Biotic Group	PV Maximum Attached Fauna Percent Cover	PV Burrow Presence	PV Tubes Presence	PV Tracks Presence	PV Flora Present	PV Fish Present	SPI Replicate Count (n)	SPI Mean Prism Penetration Depth (cm)
RWF	SFWF001	33.8	3	Glacial Moraine A	Sand with Mobile Gravel	Gravelly Sand	Gravelly Sand	Slightly Gravelly Sand	No	Ripples	Ripples	Ripples	Soft Sediment Fauna	Attached Fauna (1)	Small Surface-Burrowing Fauna	Attached Hydroids	Sparse (1 to <30%)	Yes	No	Yes	None	None	3	2.5
RWF	SFWF002	34.2	3	Sand and Muddy Sand	Sand Sheet	Muddy Sand	Muddy Sand	Muddy Sand	No	Mounds/ hummocks on low relief topography	Mounds/ hummocks on low relief topography	Irregular short period ripples	Soft Sediment Fauna	None	IND	None	None	No	No	Yes	None	None	3	6.7
RWF	SFWF003	35.7	3	Sand and Muddy Sand	Sand Sheet	Muddy Sand	Muddy Sand	Muddy Sand	No	Irregular short period ripples	Irregular short period ripples	Irregular short period ripples	Soft Sediment Fauna	None	Small Surface-Burrowing Fauna	None	None	Yes	No	Yes	None	None	3	4.1
RWF	SFWF005	36.5	3	Sand and Muddy Sand	Sand Sheet	Muddy Sand	Muddy Sand	Muddy Sand	No	Irregular short period ripples	Irregular short period ripples	Irregular short period ripples	Soft Sediment Fauna	None	IND	None	None	No	No	Yes	None	None	3	3.4
RWF	SFWF008	37.4	3	Sand and Muddy Sand	Sand Sheet	Muddy Sand	Muddy Sand	Muddy Sand	No	Irregular short period ripples	Irregular short period ripples	Irregular short period ripples	Soft Sediment Fauna	None	IND	None	None	No	No	No	None	None	3	4.0
RWF	SFWF010	38.8	3	Sand and Muddy Sand	Sand Sheet	Muddy Sand	Muddy Sand	Muddy Sand	No	Mounds/ hummocks on low relief topography	Mounds/ hummocks on low relief topography	IND	Soft Sediment Fauna	None	IND	None	None	No	No	No	None	None	3	5.6
RWF	SFWF012	40.3	3	Mud and Sandy Mud	Sand Sheet	Muddy Sand	Sand	Sand	No	IND	IND	IND	Soft Sediment Fauna	None	Small Surface-Burrowing Fauna	None	None	Yes	No	No	None	None	3	5.9
RWF	SFWF014	40.3	3	Mud and Sandy Mud	Sand Sheet	Sand	Sand	Sand	No	Mounds/ hummocks on low relief topography	Mounds/ hummocks on low relief topography	Mounds/ hummocks on low relief topography	Soft Sediment Fauna	None	IND	None	None	No	No	No	None	None	3	6.4

Area	Station ID	Water Depth (m)	PV Replicate Count (n)	SPI Mean Boundary Roughness (cm)	SPI Sediment Type (by replicate)			SPI Mean aRPD Depth (cm)	SPI Sediment Oxygen Demand Level	SPI Low Dissolved Oxygen Presence	SPI Methane Presence	SPI Successional Stage (by replicate)[1]			SPI Non-Native Taxa Present	SPI Sensitive Taxa Present	SPI/PV Infauna Present[2]	SPI/PV Epifauna Present[2]
RWF	SFWF001	33.8	3	3.4	Coarse sand	Pebble	Very coarse sand	IND	Low	No	No	IND	IND	IND	No	No	None	Hydroids
RWF	SFWF002	34.2	3	2.3	Medium sand	Medium sand	Medium sand	IND	Low	No	No	2			No	No	Tubes	None
RWF	SFWF003	35.7	3	1.8	Fine sand	Fine sand	Fine sand	0.8	Low	No	No	2			No	No	Tubes	None
RWF	SFWF005	36.5	3	0.9	Fine sand	Fine sand	Fine sand	1.1	Low	No	No	2			No	No	Tubes	None
RWF	SFWF008	37.4	3	2.1	Fine sand	Fine sand	Fine sand	1.3	Low	No	No	2			No	No	None	None
RWF	SFWF010	38.8	3	1.5	Medium sand	Medium sand	Medium sand	IND	Low	No	No	2			No	No	Tubes	None
RWF	SFWF012	40.3	3	0.8	Silt/clay & Silt/clay over sand	Very fine sand over silt/clay	Very fine sand over silt/clay	1.1	Medium	No	Yes	2			No	No	Polychaete(s), Tubes	None
RWF	SFWF014	40.3	3	0.9	Silt/clay & Silt/clay over sand	Very fine sand	Very fine sand	1.2	Medium	No	No	2			No	No	None	None

Attachment B – SAV Ground-Truth Data Analysis Results

Notes:

SAV=Submerged Aquatic Vegetation

Survey ID	Transect ID	Date	Time	Transect	SAV Period	SAV Present?	SAV Description	SAV Percent Cover	X_UTM19N_m	Y_UTM19N_m	Lat_WGS84_N	Lon_WGS84_W
REV01_20B1	T01	9/4/2020	7:37:31	Start	-	No	None	None	298009.25	4606488.28	41.58456262	-71.42319762
REV01_20B1	T01	9/4/2020	8:24:01	End	-	No	None	None	297390.76	4606378.72	41.58342011	-71.43057406
REV01_20B1	T02	9/4/2020	8:26:01	Start	-	No	None	None	297394.37	4606369.67	41.58333956	-71.43052765
REV01_20B1	T02	9/4/2020	9:00:25	End	-	No	None	None	297995.56	4606400.45	41.58376871	-71.42333212
REV01_20B1	T03	9/4/2020	9:21:05	Start	-	No	None	None	297388.7	4606350.27	41.58316352	-71.43058905
REV01_20B1	T03	9/4/2020	9:57:30	End	-	No	None	None	298060.41	4606328.47	41.58313739	-71.4225306
REV01_20B1	T04	9/4/2020	10:16:15	Start	-	No	None	None	297496.8	4605982.27	41.57987922	-71.42916919
REV01_20B1	T04	9/4/2020	10:47:57	End	-	No	None	None	297491.38	4606446.44	41.584055	-71.42939085
REV01_20B1	T05	9/4/2020	11:01:09	Start	-	No	None	None	297992.97	4606576.67	41.58535395	-71.42342251
REV01_20B1	T05	9/4/2020	11:01:24	-	Start	Yes	Shoots	Sparse (1 to 10%)	297992.83	4606578.95	41.58537439	-71.42342498
REV01_20B1	T05	9/4/2020	11:01:25	-	End	Yes	Shoots	Sparse (1 to 10%)	297992.8	4606579.07	41.58537548	-71.42342538
REV01_20B1	T05	9/4/2020	11:01:29	-	Start	Yes	Patches	Sparse (1 to 10%)	297992.36	4606579.34	41.58537777	-71.42343078
REV01_20B1	T05	9/4/2020	11:02:23	-	End	Yes	Patches	Sparse (1 to 10%)	297981.73	4606574.28	41.58532954	-71.42355642
REV01_20B1	T05	9/4/2020	11:02:40	-	Start	Yes	Continuous	High (> 50%)	297976.35	4606572.87	41.58531552	-71.42362044
REV01_20B1	T05	9/4/2020	11:10:22	-	End	Yes	Continuous	High (> 50%)	297879.43	4606543.82	41.58502957	-71.4247724
REV01_20B1	T05	9/4/2020	11:29:00	End	-	No	None	None	297520.48	4606458.86	41.58417414	-71.42904627
REV01_20B1	T06	9/4/2020	12:17:32	Start	-	No	None	None	297595.01	4606060.26	41.5806059	-71.42801844
REV01_20B1	T06	9/4/2020	12:41:02	End	-	No	None	None	297593.96	4606475.2	41.58433981	-71.42817102
REV01_20B1	T07	9/5/2020	6:26:13	Start	-	No	None	None	297992.96	4606566.51	41.58526247	-71.42341922
REV01_20B1	T07	9/5/2020	6:26:25	-	Start	Yes	Patches	Sparse (1 to 10%)	297990.5	4606566.58	41.5852625	-71.42344876
REV01_20B1	T07	9/5/2020	6:26:26	-	End	Yes	Patches	Sparse (1 to 10%)	297990.26	4606566.58	41.58526241	-71.42345165
REV01_20B1	T07	9/5/2020	6:26:38	-	Start	Yes	Patches	Low (11 to 25%)	297988.08	4606566.28	41.58525915	-71.42347769
REV01_20B1	T07	9/5/2020	6:26:41	-	End	Yes	Patches	Low (11 to 25%)	297987.32	4606566.12	41.58525759	-71.42348678
REV01_20B1	T07	9/5/2020	6:27:04	-	Start	Yes	Patches	Moderate (26 to 50%)	297982.17	4606563.9	41.58523628	-71.42354776
REV01_20B1	T07	9/5/2020	6:29:08	-	End	Yes	Patches	Moderate (26 to 50%)	297960.2	4606542.1	41.58503457	-71.42380371
REV01_20B1	T07	9/5/2020	6:35:28	-	Start	Yes	Patches	Sparse (1 to 10%)	297851.68	4606538.83	41.58497768	-71.4251034
REV01_20B1	T07	9/5/2020	6:35:29	-	End	Yes	Patches	Sparse (1 to 10%)	297851.44	4606538.92	41.58497847	-71.42510624
REV01_20B1	T07	9/5/2020	6:46:30	End	-	No	None	None	297670.41	4606486.13	41.58445753	-71.42725835
REV01_20B1	T08	9/5/2020	6:54:20	Start	Start	Yes	Patches	Sparse (1 to 10%)	298000.84	4606575.36	41.58534412	-71.42332781
REV01_20B1	T08	9/5/2020	6:54:47	-	End	Yes	Patches	Sparse (1 to 10%)	298000.41	4606575.98	41.58534957	-71.42333314
REV01_20B1	T08	9/5/2020	6:55:04	-	Start	Yes	Patches	Low (11 to 25%)	297997.05	4606573.76	41.58532882	-71.42337263
REV01_20B1	T08	9/5/2020	6:55:54	-	End	Yes	Patches	Low (11 to 25%)	297987.22	4606567.71	41.58527183	-71.4234885
REV01_20B1	T08	9/5/2020	6:56:13	-	Start	Yes	Patches	Moderate (26 to 50%)	297983.32	4606564.21	41.58523936	-71.42353398
REV01_20B1	T08	9/5/2020	6:58:11	-	End	Yes	Patches	Moderate (26 to 50%)	297959.54	4606542.7	41.58503974	-71.42381183
REV01_20B1	T08	9/5/2020	6:58:26	End	-	No	None	None	297956.58	4606539.94	41.58501419	-71.42384636
REV01_20B1	T09	9/5/2020	7:03:18	Start	-	No	None	None	297948.73	4606535.86	41.58497553	-71.42393907
REV01_20B1	T09	9/5/2020	7:04:20	-	Start	Yes	Patches	Low (11 to 25%)	297958.04	4606548.89	41.5850951	-71.42383191
REV01_20B1	T09	9/5/2020	7:06:38	-	End	Yes	Patches	Low (11 to 25%)	297986.58	4606572.75	41.58531703	-71.42349788
REV01_20B1	T09	9/5/2020	7:06:54	-	Start	Yes	Continuous	Moderate (26 to 50%)	297990.57	4606575.92	41.58534662	-71.42345108
REV01_20B1	T09	9/5/2020	7:10:20	-	End	Yes	Continuous	Moderate (26 to 50%)	298055.51	4606605.24	41.58562689	-71.42268253
REV01_20B1	T09	9/5/2020	7:10:24	End	-	No	None	None	298056.7	4606605.42	41.58562875	-71.42266828
REV01_20B1	T10	9/5/2020	7:15:49	Start	-	No	None	None	297952.97	4606542.81	41.58503914	-71.42389062
REV01_20B1	T10	9/5/2020	7:16:17	-	Start	Yes	Patches	Sparse (1 to 10%)	297955.96	4606551.35	41.58511674	-71.42385765
REV01_20B1	T10	9/5/2020	7:19:39	-	End	Yes	Patches	Sparse (1 to 10%)	297998.64	4606584.86	41.58542908	-71.4233573

Survey ID	Transect ID	Date	Time	Transect	SAV Period	SAV Present?	SAV Description	SAV Percent Cover	X_UTM19N_m	Y_UTM19N_m	Lat_WGS84_N	Lon_WGS84_W
REV01_20B1	T10	9/5/2020	7:19:40	End	-	Yes	Patches	Sparse (1 to 10%)	297998.85	4606585	41.58543038	-71.42335489
REV01_20B1	T11	9/5/2020	7:24:57	Start	-	No	None	None	297959.18	4606540.78	41.58502238	-71.42381553
REV01_20B1	T11	9/5/2020	7:25:21	-	Start	Yes	Continuous	Moderate (26 to 50%)	297960.43	4606542.43	41.58503759	-71.4238011
REV01_20B1	T11	9/5/2020	7:25:59	-	End	Yes	Continuous	Moderate (26 to 50%)	297968	4606548.96	41.58509822	-71.42371252
REV01_20B1	T11	9/5/2020	7:26:20	-	Start	Yes	Patches	Sparse (1 to 10%)	297971.9	4606551.72	41.58512408	-71.42366675
REV01_20B1	T11	9/5/2020	7:27:08	-	End	Yes	Patches	Sparse (1 to 10%)	297980.17	4606558.79	41.58518983	-71.42356992
REV01_20B1	T11	9/5/2020	7:27:33	-	Start	Yes	Patches	Low (11 to 25%)	297984.38	4606562.56	41.58522483	-71.42352072
REV01_20B1	T11	9/5/2020	7:27:56	-	End	Yes	Patches	Low (11 to 25%)	297988.11	4606566.66	41.58526261	-71.42347738
REV01_20B1	T11	9/5/2020	7:28:04	-	Start	Yes	Patches	Sparse (1 to 10%)	297989.8	4606568.22	41.58527709	-71.42345767
REV01_20B1	T11	9/5/2020	7:28:29	-	End	Yes	Patches	Sparse (1 to 10%)	297995.8	4606572.9	41.58532068	-71.42338731
REV01_20B1	T11	9/5/2020	7:28:30	End	-	No	None	None	297996.03	4606573.05	41.58532216	-71.42338467
REV01_20B1	T12	9/5/2020	7:32:48	Start	-	No	None	None	297961.17	4606540.35	41.58501903	-71.4237915
REV01_20B1	T12	9/5/2020	7:34:25	-	Start	Yes	Patches	Sparse (1 to 10%)	297977.95	4606553.7	41.58514344	-71.42359479
REV01_20B1	T12	9/5/2020	7:35:25	-	End	Yes	Patches	Sparse (1 to 10%)	297989.36	4606564.75	41.58524571	-71.42346179
REV01_20B1	T12	9/5/2020	7:35:51	End	-	No	None	None	297995.47	4606568.88	41.5852845	-71.42338994
REV01_20B1	T13	9/5/2020	7:43:42	Start	Start	Yes	Shoots	Sparse (1 to 10%)	297962.39	4606536.17	41.58498173	-71.42377546
REV01_20B1	T13	9/5/2020	7:44:21	-	End	Yes	Shoots	Sparse (1 to 10%)	297959.66	4606541.85	41.58503212	-71.42381005
REV01_20B1	T13	9/5/2020	7:45:40	End	-	No	None	None	297948.68	4606564.13	41.58522992	-71.42394915
REV01_20B1	T14	9/5/2020	7:49:17	Start	-	No	None	None	297975.14	4606535.89	41.58498246	-71.4236225
REV01_20B1	T14	9/5/2020	7:50:07	-	Start	Yes	Continuous	High (> 50%)	297968.42	4606547.42	41.5850845	-71.42370694
REV01_20B1	T14	9/5/2020	7:50:39	-	End	Yes	Continuous	High (> 50%)	297963.14	4606552.43	41.58512821	-71.42377193
REV01_20B1	T14	9/5/2020	7:51:51	End	-	No	None	None	297953.17	4606567.67	41.58526292	-71.4238966
REV01_20B1	T15	9/5/2020	7:53:56	Start	-	No	None	None	297980.84	4606548.91	41.58510103	-71.42355863
REV01_20B1	T15	9/5/2020	7:54:31	-	Start	Yes	Continuous	High (> 50%)	297971.93	4606554.6	41.58515002	-71.42366729
REV01_20B1	T15	9/5/2020	7:54:46	-	End	Yes	Continuous	High (> 50%)	297968.27	4606558.25	41.58518188	-71.42371241
REV01_20B1	T15	9/5/2020	7:55:41	End	-	No	None	None	297961.49	4606570.5	41.58529045	-71.42379778
REV01_20B1	T16	9/5/2020	7:58:10	Start	-	No	None	None	297988.49	4606554.61	41.58515431	-71.42346885
REV01_20B1	T16	9/5/2020	7:59:04	-	Start	Yes	Patches	Low (11 to 25%)	297980.94	4606560.83	41.58520836	-71.42356138
REV01_20B1	T16	9/5/2020	7:59:20	-	End	Yes	Patches	Low (11 to 25%)	297977.03	4606563.67	41.58523294	-71.42360919
REV01_20B1	T16	9/5/2020	8:00:18	End	-	No	None	None	297969.12	4606575.37	41.58533616	-71.42370803
REV01_20B1	T17	9/5/2020	8:02:38	Start	-	No	None	None	297994.28	4606560.03	41.58520449	-71.42340119
REV01_20B1	T17	9/5/2020	8:03:04	-	Start	Yes	Patches	Low (11 to 25%)	297989.27	4606565.43	41.58525183	-71.42346317
REV01_20B1	T17	9/5/2020	8:03:28	-	End	Yes	Patches	Low (11 to 25%)	297985.06	4606569.43	41.58528682	-71.42351496
REV01_20B1	T17	9/5/2020	8:03:55	-	Start	Yes	Patches	Sparse (1 to 10%)	297981.6	4606574.81	41.5853343	-71.42355816
REV01_20B1	T17	9/5/2020	8:04:09	-	End	Yes	Patches	Sparse (1 to 10%)	297980.68	4606577.5	41.58535825	-71.42357009
REV01_20B1	T17	9/5/2020	8:04:23	End	-	No	None	None	297979.8	4606579.67	41.5853776	-71.42358138
REV01_20B1	T18	9/5/2020	8:06:55	Start	-	No	None	None	298005.91	4606570.57	41.58530234	-71.42326542
REV01_20B1	T18	9/5/2020	8:07:47	-	Start	Yes	Patches	High (> 50%)	297993.53	4606576.13	41.5853492	-71.42341567
REV01_20B1	T18	9/5/2020	8:07:51	-	End	Yes	Patches	High (> 50%)	297993.01	4606577.11	41.5853579	-71.42342222
REV01_20B1	T18	9/5/2020	8:08:05	-	Start	Yes	Patches	Sparse (1 to 10%)	297991.72	4606580.5	41.58538805	-71.42343881
REV01_20B1	T18	9/5/2020	8:08:19	-	End	Yes	Patches	Sparse (1 to 10%)	297990.44	4606583.18	41.58541184	-71.42345512
REV01_20B1	T18	9/5/2020	8:08:24	End	-	No	None	None	297990.28	4606583.69	41.58541643	-71.42345715
REV01_20B1	T19	9/5/2020	8:16:06	Start	-	No	None	None	297965.43	4606532.15	41.58494633	-71.42373771
REV01_20B1	T19	9/5/2020	8:16:57	-	Start	Yes	Patches	High (> 50%)	297965.1	4606543.63	41.58504955	-71.42374545

Survey ID	Transect ID	Date	Time	Transect	SAV Period	SAV Present?	SAV Description	SAV Percent Cover	X_UTM19N_m	Y_UTM19N_m	Lat_WGS84_N	Lon_WGS84_W
REV01_20B1	T19	9/5/2020	8:17:19	-	End	Yes	Patches	High (> 50%)	297960.76	4606549.01	41.58509686	-71.42379937
REV01_20B1	T19	9/5/2020	8:18:24	End	-	No	None	None	297949.54	4606566.62	41.5852525	-71.42393968
REV01_20B1	T20	9/5/2020	8:20:17	Start	-	No	None	None	297981.31	4606539.82	41.58501935	-71.42354987
REV01_20B1	T20	9/5/2020	8:21:08	-	Start	Yes	Patches	Moderate (26 to 50%)	297969.15	4606550.53	41.5851127	-71.42369922
REV01_20B1	T20	9/5/2020	8:21:30	-	End	Yes	Patches	Moderate (26 to 50%)	297966.93	4606555.56	41.58515735	-71.42372758
REV01_20B1	T20	9/5/2020	8:22:42	End	-	No	None	None	297954.9	4606567.42	41.58526103	-71.42387572
REV01_20B1	T21	9/5/2020	8:24:35	Start	-	No	None	None	297985.8	4606549.25	41.58510536	-71.42349925
REV01_20B1	T21	9/5/2020	8:25:01	-	Start	Yes	Patches	Sparse (1 to 10%)	297979.35	4606554.83	41.58515395	-71.42357843
REV01_20B1	T21	9/5/2020	8:25:04	-	End	Yes	Patches	Sparse (1 to 10%)	297978.57	4606555.62	41.58516083	-71.4235881
REV01_20B1	T21	9/5/2020	8:25:18	-	Start	Yes	Patches	High (> 50%)	297975.66	4606559.01	41.58519064	-71.42362412
REV01_20B1	T21	9/5/2020	8:25:25	-	End	Yes	Patches	High (> 50%)	297974.21	4606560.55	41.58520416	-71.42364201
REV01_20B1	T21	9/5/2020	8:25:33	-	Start	Yes	Patches	Sparse (1 to 10%)	297972.25	4606562.46	41.58522078	-71.42366613
REV01_20B1	T21	9/5/2020	8:25:34	-	End	Yes	Patches	Sparse (1 to 10%)	297971.99	4606562.71	41.585223	-71.42366929
REV01_20B1	T21	9/5/2020	8:26:16	End	-	No	None	None	297964.74	4606573.63	41.58531944	-71.42375994
REV01_20B1	T22	9/5/2020	8:28:09	Start	-	No	None	None	297992.83	4606554.63	41.58515555	-71.42341683
REV01_20B1	T22	9/5/2020	8:28:40	-	Start	Yes	Patches	Low (11 to 25%)	297984.54	4606560.38	41.58520518	-71.42351816
REV01_20B1	T22	9/5/2020	8:29:37	-	End	Yes	Patches	Low (11 to 25%)	297978.03	4606571.84	41.58530672	-71.42360002
REV01_20B1	T22	9/5/2020	8:29:47	-	Start	Yes	Patches	High (> 50%)	297975.47	4606573.28	41.58531899	-71.42363119
REV01_20B1	T22	9/5/2020	8:29:49	-	End	Yes	Patches	High (> 50%)	297974.73	4606573.72	41.58532274	-71.42364021
REV01_20B1	T22	9/5/2020	8:30:03	End	-	No	None	None	297970.83	4606576.37	41.58534564	-71.42368778
REV01_20B1	T23	9/5/2020	8:32:14	Start	-	No	None	None	298001.97	4606560.56	41.58521119	-71.42330927
REV01_20B1	T23	9/5/2020	8:33:10	-	Start	Yes	Patches	Sparse (1 to 10%)	297992.98	4606572	41.58531187	-71.42342083
REV01_20B1	T23	9/5/2020	8:33:12	-	End	Yes	Patches	Sparse (1 to 10%)	297992.9	4606572.26	41.58531425	-71.42342197
REV01_20B1	T23	9/5/2020	8:33:22	-	Start	Yes	Patches	Low (11 to 25%)	297990.78	4606574.4	41.58533292	-71.42344799
REV01_20B1	T23	9/5/2020	8:33:24	-	End	Yes	Patches	Low (11 to 25%)	297990.25	4606574.77	41.58533611	-71.42345452
REV01_20B1	T23	9/5/2020	8:33:48	-	Start	Yes	Patches	Sparse (1 to 10%)	297984.53	4606579.73	41.58537937	-71.42352478
REV01_20B1	T23	9/5/2020	8:33:50	-	End	Yes	Patches	Sparse (1 to 10%)	297984.25	4606580.38	41.58538514	-71.42352827
REV01_20B1	T23	9/5/2020	8:33:56	End	-	No	None	None	297983.69	4606581.61	41.58539604	-71.42353539
REV01_20B1	T24	9/5/2020	8:36:23	Start	Start	Yes	Shoots	Sparse (1 to 10%)	298008.4	4606565.21	41.5852547	-71.42323379
REV01_20B1	T24	9/5/2020	8:36:25	-	End	Yes	Shoots	Sparse (1 to 10%)	298008.19	4606565.56	41.58525778	-71.4232364
REV01_20B1	T24	9/5/2020	8:37:07	-	Start	Yes	Continuous	Moderate (26 to 50%)	298004.23	4606573.98	41.58533258	-71.42328664
REV01_20B1	T24	9/5/2020	8:37:11	-	End	Yes	Continuous	Moderate (26 to 50%)	298003.2	4606575.37	41.58534483	-71.42329946
REV01_20B1	T24	9/5/2020	8:37:17	-	Start	Yes	Patches	Sparse (1 to 10%)	298001.94	4606576.5	41.58535466	-71.42331492
REV01_20B1	T24	9/5/2020	8:37:42	-	End	Yes	Patches	Sparse (1 to 10%)	297996.73	4606581.75	41.58540063	-71.42337921
REV01_20B1	T24	9/5/2020	8:38:02	End	-	No	None	None	297993.68	4606585.57	41.58543424	-71.42341701
REV01_20B1	T25	9/5/2020	8:47:24	Start	-	No	None	None	297705.29	4606495.97	41.58455496	-71.42684354
REV01_20B1	T25	9/5/2020	8:55:44	-	Start	Yes	Patches	Sparse (1 to 10%)	297867.12	4606530.6	41.58490747	-71.42491549
REV01_20B1	T25	9/5/2020	8:55:46	-	End	Yes	Patches	Sparse (1 to 10%)	297867.74	4606530.84	41.58490987	-71.42490822
REV01_20B1	T25	9/5/2020	8:56:30	-	Start	Yes	Shoots	Sparse (1 to 10%)	297882.58	4606532.78	41.58493103	-71.42473095
REV01_20B1	T25	9/5/2020	8:56:32	-	End	Yes	Shoots	Sparse (1 to 10%)	297883	4606532.84	41.58493174	-71.42472589
REV01_20B1	T25	9/5/2020	9:03:30	End	-	No	None	None	297997.38	4606530.5	41.58493952	-71.4233541
REV01_20B1	T26	9/5/2020	9:09:05	Start	-	No	None	None	297991.4	4606508.54	41.58474042	-71.42341846
REV01_20B1	T26	9/5/2020	9:22:12	End	-	No	None	None	297703.32	4606481.61	41.5844252	-71.42686235
REV01_20B1	T27	9/5/2020	9:32:51	Start	-	No	None	None	297868	4606543.99	41.58502825	-71.42490943

Survey ID	Transect ID	Date	Time	Transect	SAV Period	SAV Present?	SAV Description	SAV Percent Cover	X_UTM19N_m	Y_UTM19N_m	Lat_WGS84_N	Lon_WGS84_W
REV01_20B1	T27	9/5/2020	9:36:30	End	-	No	None	None	297929.91	4606551.03	41.58510725	-71.42416981
REV01_20B1	T28	9/5/2020	9:38:12	Start	-	No	None	None	297926.37	4606543.37	41.58503746	-71.42420966
REV01_20B1	T28	9/5/2020	9:41:14	End	-	No	None	None	297873.56	4606539.91	41.58499296	-71.42484147
REV01_20B1	T29	9/5/2020	10:04:56	Start	-	No	None	None	297732.09	4606191.13	41.58181838	-71.42641954
REV01_20B1	T29	9/5/2020	10:07:28	End	-	No	None	None	297700.48	4606194.49	41.58184059	-71.42679956
REV01_20B1	T30	9/5/2020	10:09:10	Start	-	No	None	None	297726.73	4606180.04	41.58171722	-71.42648011
REV01_20B1	T30	9/5/2020	10:09:35	-	Start	Yes	Shoots	Sparse (1 to 10%)	297721.3	4606182.34	41.58173654	-71.42654596
REV01_20B1	T30	9/5/2020	10:09:37	-	End	Yes	Shoots	Sparse (1 to 10%)	297720.86	4606182.45	41.5817374	-71.42655124
REV01_20B1	T30	9/5/2020	10:11:12	End	-	No	None	None	297700.19	4606187.09	41.58177398	-71.42680053
REV01_20B1	T31	9/5/2020	10:13:00	Start	-	No	None	None	297724.53	4606177.93	41.58169772	-71.42650569
REV01_20B1	T31	9/5/2020	10:14:19	End	-	No	None	None	297697.87	4606180.56	41.58171461	-71.42682613
REV01_20B1	T32	9/5/2020	10:17:54	Start	-	No	None	None	297689.09	4606180.93	41.5817157	-71.42693153
REV01_20B1	T32	9/5/2020	10:19:58	End	-	No	None	None	297724.86	4606168.63	41.58161409	-71.4264986
REV01_20B1	T33	9/5/2020	10:22:43	Start	-	No	None	None	297693.79	4606176.72	41.58167901	-71.42687378
REV01_20B1	T33	9/5/2020	10:24:41	End	-	No	None	None	297724.79	4606171.71	41.58164174	-71.42650054
REV01_20B1	T34	9/5/2020	10:30:17	Start	-	No	None	None	297688.24	4606167.07	41.58159075	-71.42693701
REV01_20B1	T34	9/5/2020	10:32:23	End	-	No	None	None	297723.45	4606159.7	41.58153335	-71.42651261
REV01_20B1	T35	9/5/2020	10:35:19	Start	-	No	None	None	297727.73	4606148.47	41.58143336	-71.42645747
REV01_20B1	T35	9/5/2020	10:37:37	End	-	No	None	None	297694.04	4606161.26	41.58153994	-71.42686563
REV01_20B1	T36	9/5/2020	10:45:54	Start	-	No	None	None	297699.43	4606157.34	41.58150606	-71.42679967
REV01_20B1	T36	9/5/2020	10:51:48	End	-	No	None	None	297708.92	4606193.08	41.58183002	-71.42669794
REV01_20B1	T37	9/5/2020	10:55:20	Start	-	No	None	None	297710.54	4606149.23	41.58143583	-71.42666377
REV01_20B1	T37	9/5/2020	10:58:38	End	-	No	None	None	297713.4	4606192.1	41.58182236	-71.42664394
REV01_20B1	T38	9/5/2020	11:01:09	Start	-	No	None	None	297715.18	4606152.48	41.58146626	-71.42660918
REV01_20B1	T38	9/5/2020	11:03:48	End	-	No	None	None	297718.56	4606187.83	41.58178524	-71.42658059
REV01_20B1	T39	9/14/2020	6:20:18	Start	-	No	None	None	297891.63	4606262.24	41.58249872	-71.42453137
REV01_20B1	T39	9/14/2020	6:28:17	End	-	No	None	None	297888.36	4606365.58	41.58342785	-71.42460533
REV01_20B1	T40	9/14/2020	6:29:24	Start	-	No	None	None	297872.79	4606371.31	41.58347548	-71.42479392
REV01_20B1	T40	9/14/2020	6:34:53	End	-	No	None	None	297870.41	4606262.71	41.58249754	-71.42478585
REV01_20B1	T41	9/14/2020	6:36:31	Start	-	No	None	None	297848.94	4606260.66	41.58247364	-71.42504252
REV01_20B1	T41	9/14/2020	6:44:16	End	-	No	None	None	297851.7	4606367.03	41.58343163	-71.42504527
REV01_20B1	T42	9/14/2020	6:45:48	Start	-	No	None	None	297833.9	4606365.39	41.58341236	-71.42525808
REV01_20B1	T42	9/14/2020	6:50:36	End	-	No	None	None	297831.27	4606262.77	41.58248819	-71.42525504
REV01_20B1	T43	9/14/2020	6:52:19	Start	-	No	None	None	297808.15	4606256.72	41.58242789	-71.42553003
REV01_20B1	T43	9/14/2020	6:58:25	End	-	No	None	None	297807.99	4606366.48	41.58341558	-71.42556899
REV01_20B1	T44	9/14/2020	6:59:49	Start	-	No	None	None	297791.75	4606366.5	41.58341172	-71.42576361
REV01_20B1	T44	9/14/2020	7:05:10	End	-	No	None	None	297794.14	4606262.77	41.58247883	-71.42570002
REV01_20B1	T45	9/14/2020	7:10:53	Start	-	No	None	None	297838.15	4606304.76	41.58286776	-71.42518667
REV01_20B1	T45	9/14/2020	7:20:49	End	-	No	None	None	297758.67	4606496.84	41.58457625	-71.42620401
REV01_20B1	T46	9/14/2020	7:22:14	Start	-	No	None	None	297778.1	4606497.73	41.58458914	-71.42597149
REV01_20B1	T46	9/14/2020	7:31:23	End	-	No	None	None	297843.4	4606311.96	41.58293389	-71.42512622
REV01_20B1	T47	9/14/2020	7:38:58	Start	-	No	None	None	297640.22	4606004.54	41.58011598	-71.42745775
REV01_20B1	T47	9/14/2020	7:44:19	End	-	No	None	None	297539.3	4606003.17	41.5800781	-71.42866685
REV01_20B1	T48	9/14/2020	7:45:02	Start	-	No	None	None	297539.73	4605989.29	41.57995325	-71.42865701

Survey ID	Transect ID	Date	Time	Transect	SAV Period	SAV Present?	SAV Description	SAV Percent Cover	X_UTM19N_m	Y_UTM19N_m	Lat_WGS84_N	Lon_WGS84_W
REV01_20B1	T48	9/14/2020	7:50:46	End	-	No	None	None	297643.97	4605987.22	41.57996102	-71.42740698
REV01_20B1	T49	9/14/2020	7:51:46	Start	-	No	None	None	297638.47	4605964.78	41.57975772	-71.42746535
REV01_20B1	T49	9/14/2020	7:57:03	End	-	No	None	None	297539.29	4605963.38	41.57972002	-71.42865365
REV01_20B1	T50	9/14/2020	7:58:35	Start	-	No	None	None	297539.79	4605950.53	41.57960448	-71.42864325
REV01_20B1	T50	9/14/2020	8:04:24	End	-	No	None	None	297643.59	4605946.28	41.5795925	-71.42739774
REV01_20B1	T51	9/14/2020	8:08:04	Start	-	No	None	None	297644.34	4605918.93	41.5793466	-71.4273795
REV01_20B1	T51	9/14/2020	8:13:53	End	-	No	None	None	297539.26	4605927.04	41.57939296	-71.42864174
REV01_20B1	T52	9/14/2020	8:15:30	Start	-	No	None	None	297534.82	4605909.11	41.57923047	-71.42868889
REV01_20B1	T52	9/14/2020	8:21:27	End	-	No	None	None	297643.78	4605906.53	41.57923485	-71.42738203
REV01_20B1	T53	9/14/2020	8:32:28	Start	-	No	None	None	297430.35	4606388.48	41.58351797	-71.43010283
REV01_20B1	T53	9/14/2020	8:36:07	End	-	No	None	None	297476.8	4606415.69	41.58377457	-71.42955525
REV01_20B1	T54	9/14/2020	8:37:03	Start	-	No	None	None	297493.33	4606401.79	41.58365372	-71.42935242
REV01_20B1	T54	9/14/2020	8:42:20	End	-	No	None	None	297402.74	4606374.95	41.58338918	-71.43042915
REV01_20B1	T55	9/14/2020	8:43:34	Start	-	No	None	None	297400.61	4606366.35	41.58331129	-71.43045176
REV01_20B1	T55	9/14/2020	8:48:52	End	-	No	None	None	297496.96	4606377.31	41.58343435	-71.42930063
REV01_20B1	T56	9/14/2020	9:24:10	Start	-	No	None	None	297507.09	4606356.51	41.58324968	-71.42917223
REV01_20B1	T56	9/14/2020	9:29:22	End	-	No	None	None	297413.13	4606354.03	41.58320353	-71.43029755
REV01_20B1	T57	9/14/2020	9:44:07	Start	-	No	None	None	297783.95	4606361.05	41.58336062	-71.42585532
REV01_20B1	T57	9/14/2020	9:49:18	End	-	No	None	None	297891.75	4606362.37	41.58339984	-71.4245636
REV01_20B1	T58	9/14/2020	9:50:19	Start	-	No	None	None	297890.79	4606341.76	41.58321413	-71.42456817
REV01_20B1	T58	9/14/2020	9:55:27	End	-	No	None	None	297789.38	4606341.95	41.58319012	-71.42578375
REV01_20B1	T59	9/14/2020	9:56:33	Start	-	No	None	None	297782	4606322.64	41.58301447	-71.42586566
REV01_20B1	T59	9/14/2020	10:02:57	End	-	No	None	None	297893.41	4606321.5	41.58303242	-71.42452998
REV01_20B1	T60	9/14/2020	10:16:35	Start	-	No	None	None	297900.08	4606317.93	41.58300197	-71.42444877
REV01_20B1	T60	9/14/2020	10:21:55	End	-	No	None	None	297790.85	4606313.94	41.58293847	-71.42575675

Attachment C – Benthic Species & Life Stages with EFH in the Project Area Crosswalked to Mapped Benthic Habitat Types

Notes:

• Mapped EFH overlaps with the given project component and given habitat falls within the species life stage EFH definition.

- Mapped EFH overlaps with the given project component but the given habitat does not fall within the species life stage EFH definition.

☐ Mapped EFH does not overlap with the given project component.

1 Species life stage unlikely to utilize mobile habitats.

2 Species life stage may be present on any given project habitat type with the presence of boulders, SAV, or shell substrate.

HAPC= Habitat Area of Particular Concern

References: Atlantic Wolffish BRT 2009; Brodziak 2005; Cargnelli et al. 1999a, 1999b, 1999c; Chang et al. 1999a, 1999b; Drohan et al. 2007; Hart and Chute 2004; Jacobson 2005; Lock and Packer 2004; Lough 2004; NEFMC 2017; NOAA Fisheries 2017; Packer at al. 1999, 2003a, 2003b; Pereira et al. 1999; Steihlik 2007; Steimle et al. 1999a, 1999b, 1999c, 1999d

Species Name	Benthic Life Stage	Revolution Wind Habitat Types														Distinct habitat features that serve as EFH regardless of underlying substrate[2]		
		Glacial Moraine (A&B)			Mixed-Size Gravel in Muddy Sand		Coarse Sediment			Sand and Muddy Sand			Mud and Sandy Mud					
		RWF	RWEC-OCS	RWEC-RI	RWEC-OCS	RWEC-RI	RWF	RWEC-OCS	RWEC-RI	RWF	RWEC-OCS	RWEC-RI	RWF	RWEC-OCS	RWEC-RI	Boulders	Shell Substrate (RWEC-RI)	SAV (RWEC-RI)
New England Finfish Species																		
Atlantic cod	Juveniles	●	●	●	●	●	●	●	●	-	-	-	-	-	-	●	-	●
	Adults	●	●	●	●	●	●	●	●	-	-	-	-	-	-	●		
Atlantic wolffish	Eggs	●					●			-			-			●		
	Larvae	●					●[1]			-			-			●		
	Juveniles	●					●			●			●			●		
	Adults	●					●			●			-			●		
Haddock	Juveniles	●					●			-			-			●		
Monkfish	Juveniles	-					●			●			●			●		
	Adults	-					●			●			●			●		
Ocean pout	Eggs	●	●	●	●	●	●	●	●	-	-	-	-	-	-	●	-	-
	Juveniles	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	-
	Adults	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	-	-
Pollock	Juveniles	●	●	●	●	●	-	-	-	-	-	-	-	-	-	●	-	●
Red hake	Juveniles	●	●	●	●	●	●	●	●	●	●	●	●	●	●	-	●	●
	Adults	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	-
Silver hake	Juveniles	-	-	-	-	-	-	-	-	●	●		●	●		-	●	-
White hake	Juveniles	-	-	-	-	-	-	-	-	●	●	●	●	●	●	-	-	●
Windowpane flounder	Juveniles	-	-	-	-	-	-	-	-	●	●	●	●	●	●	-	-	-
	Adults	-	-	-	-	-	-	-	-	●	●	●	●	●	●	-	-	-
Winter flounder	Eggs			-		●			●[1]			●[1]			●[1]	-	-	●
	Juveniles	-	-	-	●	●	●	●	●	●	●	●	●	●	●	-	-	●
	Adults	-	-	-	●	●	●	●	●	●	●	●	●	●	●	-	-	●
Yellowtail flounder	Juveniles	-	-	-	-	-	●	●	●	●	●	●	-	-	-	-		
	Adults	-	-	-	-	-	●	●	●	●	●	●	-	-	-	-		

Species Name	Benthic Life Stage	Revolution Wind Habitat Types														Distinct habitat features that serve as EFH regardless of underlying substrate[2]		
		Glacial Moraine (A&B)			Mixed-Size Gravel in Muddy Sand		Coarse Sediment			Sand and Muddy Sand			Mud and Sandy Mud					
		RWF	RWEC-OCS	RWEC-RI	RWEC-OCS	RWEC-RI	RWF	RWEC-OCS	RWEC-RI	RWF	RWEC-OCS	RWEC-RI	RWF	RWEC-OCS	RWEC-RI	Boulders	Shell Substrate (RWEC-RI)	SAV (RWEC-RI)
Mid-Atlantic Finfish species																		
Black sea bass	Juveniles	●	●	●	●	●	●	●	●	-	-	-	-	-	-	●	●	●
	Adults	●	●	●	●	●	●	●	●	-	-	-	-	-	-	●	●	●
Scup	Juveniles	-	-	-	-	●	●	●	●	●	●	●	●	●	●	●	●	●
	Adults	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Summer flounder	Juveniles	-	-	-	-	-	-	-	-	●	●	●	●	●	●	-	-	HAPC
	Adults	-	-	-	-	-	-	-	-	●	●	●	●	●	●	-	-	HAPC
Sharks																		
Sand tiger shark	Neonate/YOY	-	-	●	●	●	-	●	●	-	-	●	-	-	●	●	-	-
	Juvenile	-	-	●	●	●	-	●	●	-	-	●	-	-	●	●	-	-
Sandbar shark	Juvenile	-	-	●	●	●	-	●	●	-	-	●	-	-	●	●	●	-
	Adult	●	●	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-
Smooth dogfish	Neonate	●	●	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-
	Juvenile	●	●	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-
	Adult	●	●	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-
Spiny dogfish	Sub-Adults (female)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-
	Sub-Adults (male)	●					●			●			●			-		
	Adults (female)	●	●		●		●	●		●	●		●	●		-		
	Adults (male)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-
Skates																		
Little skate	Juveniles	●	●	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-
	Adults	●	●	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-
Winter skate	Juveniles	●	●	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-
	Adults	●	●	●	●	●	●	●	●	●	●	●	●	●	●	-	-	-

Species Name	Benthic Life Stage	Revolution Wind Habitat Types														Distinct habitat features that serve as EFH regardless of underlying substrate[2]		
		Glacial Moraine (A&B)			Mixed-Size Gravel in Muddy Sand		Coarse Sediment			Sand and Muddy Sand			Mud and Sandy Mud					
		RWF	RWEC-OCS	RWEC-RI	RWEC-OCS	RWEC-RI	RWF	RWEC-OCS	RWEC-RI	RWF	RWEC-OCS	RWEC-RI	RWF	RWEC-OCS	RWEC-RI	Boulders	Shell Substrate (RWEC-RI)	SAV (RWEC-RI)
Invertebrates																		
Atlantic sea scallop	Eggs	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-
	Larvae	●	●	●	●	●	●[1]	●[1]	●[1]	●[1]	●[1]	●[1]	-	-	-	-	-	-
	Juveniles	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-
	Adults	●	●	●	●	●	●	●	●	●	●	●	-	-	-	-	-	-
Atlantic surfclam	Juveniles			●		●			●			●			-	-	-	-
	Adults		●	●		●		●	●		●	●		-	-	-	-	-
Longfin squid	Eggs	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	-	●
Ocean quahog	Juveniles	●					●			●			●			-		
	Adults	●					●			●			●			-		

• Mapped EFH overlaps with the given project component and given habitat falls within the species life stage EFH definition.
- Mapped EFH overlaps with the given project component but the given habitat does not fall within the species life stage EFH definition.
[shaded box] Mapped EFH does not overlap with the given project component.

[1] Species life stage unlikely to utilize mobile habitats.
[2] Species life stage may be present on any given project habitat type with the presence of boulders, SAV, or shell substrate.
HAPC= Habitat Area of Particular Concern

References: Atlantic Wolffish BRT 2009; Brodziak 2005; Cargnelli et al. 1999a, 1999b, 1999c; Chang et al. 1999a, 1999b; Drohan et al. 2007; Hart and Chute 2004; Jacobson 2005; Lock and Packer 2004; Lough 2004; NEFMC 2017; NOAA Fisheries 2017; Packer at al. 1999, 2003a, 2003b; Pereira et al. 1999; Steihlik 2007; Steimle et al. 1999a, 1999b, 1999c, 1999d