VINEYARD NORTHEAST

CONSTRUCTION AND OPERATIONS PLAN
VOLUME II APPENDIX

MARCH 2024

PREPARED BY:

Epsilon ASSOCIATES INC.

SUBMITTED BY:

VINEYARD NORTHEAST LLC

VINEYARD OFFSHORE

PUBLIC VERSION

Vineyard Northeast COP
Appendix II-D Essential Fish Habitat Assessment

Prepared by:
RPS and Epsilon Associates

Prepared for:
Vineyard Northeast LLC

March 2024

Revision	Date	Description
0	July 2022	Initial submission.
1	October 2022	Updated to include additional data collected in 2022.
2	April 2023	Updated to address Bureau of Ocean Energy Management (BOEM) Round 1 Comments (dated January 13, 2023) and Round 2 Comments (dated March 1, 2023), updated to include all benthic habitat data collected for the Lease Area and Offshore Export Cable Corridors (OECCs), and made other minor corrections.
3	November 2023	Updated to reflect the revised maximum monopile diameter of 14 m (46 ft). Made other minor revisions.
4	March 2024	Made minor revisions.

Table of Contents

1 INTRODUCTION 1-1
- 1.1 Vineyard Northeast Overview 1-1
- 1.2 Magnuson-Stevens Fishery Conservation and Management Act 1-1

2 AFFECTED ENVIRONMENT 2-1
- 2.1 Offshore Development Area 2-1
  - 2.1.1 Lease Area 2-2
  - 2.1.2 Massachusetts OECC 2-7
  - 2.1.3 Connecticut OECC 2-10

3 EFH DESIGNATIONS IN THE OFFSHORE DEVELOPMENT AREA 3-1
- 3.1 Individual Species EFH and HAPC 3-11

4 POTENTIAL IMPACTS AND PROPOSED AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES 4-1
- 4.1 Seafloor Disturbance and Habitat Modification 4-1
- 4.2 Suspended Sediments and Deposition 4-5
- 4.3 Entrainment and Impingement 4-8
- 4.4 Electromagnetic Fields 4-10
- 4.5 Noise 4-13
- 4.6 Summary of Avoidance, Minimization, and Mitigation Measures 4-28

5 CONCLUSIONS 5-1

6 REFERENCES 6-1

List of Annexes

Annex A Large-Scale Maps of Bottom Habitats and Benthic Features Located Within the Offshore Development Area of Vineyard Northeast

List of Figures

Figure 1.1-1 Overview of Vineyard Northeast 1-3

Figure 2.1-1 NMFS Habitat Mapping Lease Area 2-3
Figure 2.1-2 NMFS Habitat Mapping Massachusetts OECC 2-9
Figure 2.1-3a NMFS Habitat Mapping Connecticut OECC Nearshore 2-12
Figure 2.1-3b NMFS Habitat Mapping Connecticut OECC Offshore 2-13

Figure 3.0-1 EFH Grid Units that Intersect with the Offshore Development Area 3-2
Figure 3.1-1 Juvenile Atlantic Cod Habitat Area of Particular Concern 3-13

List of Tables

Table 2.1-1	Examples of CMECS Defined Substrates Captured During 2019 Underwater Video and Benthic Grab Sampling Throughout the Lease Area	2-4
Table 2.1-2	Benthic Habitat Classification in the Lease Area	2-7
Table 2.1-3	Benthic Habitat Classification in the Massachusetts OECC	2-10
Table 2.1-4	Benthic Habitat Classification in the Connecticut OECC	2-14
Table 3.0-1	EFH Designated Species and HAPC in the Offshore Development Area	3-5
Table 3.0-2	Monthly Presence of Each Life Stage of EFH Species in the Offshore Development Area	3-9
Table 4.0-1	Impact Producing Factors for Essential Fish Habitat Assessment	4-1
Table 4.1-1	Summary of Maximum Potential Seafloor Disturbance by Habitat Type	4-2
Table 4.4-1	Summary of Modeled Magnetic Fields for HVDC Offshore Export Cables, as Deviations from Earth's Steady DC Magnetic Field	4-12
Table 4.4-2	Summary of Modeled Magnetic Fields for HVAC Offshore Export Cables	4-13
Table 4.5-1	Acoustic Thresholds Used to Evaluate Impacts to Fish Exposed to Impact Pile Driving Sound	4-15
Table 4.5-2	General Interim Acoustic Thresholds for Fish Currently Used or Recommended by NMFS and BOEM for Impact Pile Driving	4-15
Table 4.5-3	Summary Acoustic Model Radial Distances (in m) for Post-Piled Jacket Pin Piles to Thresholds Used to Evaluate Potential Impacts to Fish from Impact Pile Driving Sound	4-19
Table 4.5-4	Summary Acoustic Model Radial Distances (in m) for WTG Monopiles to Thresholds Used to Evaluate Potential Impacts to Fish from Impact Pile Driving Sound	4-19
Table 4.5-5	Summary Acoustic Model Radial Distances (in m) to Thresholds Used to Evaluate Potential Impacts to Fish from Unexploded Ordnance (UXO)	4-25
Table 4.5-6	Summary Acoustic Model Radial Distances (in m) for 16 m WTG Monopiles to Thresholds Used to Evaluate Potential Impacts to Fish from Vibratory Pile Setting Followed by Impact Pile Driving Sound	4-21
Table 4.5-7	Summary Acoustic Model Radial Distances (in m) for 4.25 m Jacket Pin Piles to Thresholds Used to Evaluate Potential Impacts to Fish from Vibratory Pile Setting Followed by Impact Pile Driving Sound	4-22
Table 4.5-8	Summary Acoustic Model Radial Distances (in m) to Thresholds Used to Evaluate Potential Impacts to Fish from Drilling	4-24

List of Acronyms

AC	alternating current
ANSI	American National Standards Institute
BOEM	Bureau of Ocean Energy Management
CFR	Code of Federal Regulations
CMECS	Coastal and Marine Ecological Classification Standard
COP	Construction and Operations Plan
CSIRO	Commonwealth Scientific and Industrial Research Organization
CT	Connecticut
CWIS	Cooling Water Intake Structure
DMM	discarded military munitions
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EMF	Electromagnetic Field
EPA	Environmental Protection Agency
ESP	Electrical Service Platform
FMP	Fishery Management Plan
ft	feet
GARFO	Greater Atlantic Regional Fisheries Office
HAPC	Habitat Areas of Particular Concern
HDD	Horizontal Directional Drilling
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
Hz	hertz
IPF	impact producing factor
kHz	kilohertz
KP	Kilometer Post
LLC	Limited Liability Company
MA	Massachusetts
MA WEA	Massachusetts Wind Energy Area
m	meters
MADMF	Massachusetts Division of Marine Fisheries
MAFMC	Mid-Atlantic Fisheries Management Council
MF	Magnetic Field
MW	megawatt
NARW	North Atlantic right whale
NEFMC	New England Fisheries Management council
NEFSC	Northeast Fisheries Science Center
NM	Nautical Mile
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OCS	Outer Continental Shelf

List of Acronyms (Continued)

OECC	Offshore Export Cable Corridor
O&M	operations and maintenance
RI/MA WEA	Rhode Island/Massachusetts Wind Energy Area
SAFMC	South Atlantic Fishery Management Council
SAV	Submerged Aquatic Vegetation
SEL	Sound Exposure Level
SPL	Sound Pressure Level
TSS	total suspended solids
TTS	temporary threshold shift
US	United States
USGS	United States Geological Survey
UXO	unexploded ordinance
WTG	Wind Turbine Generator

1 Introduction

1.1 Vineyard Northeast Overview

Vineyard Northeast LLC (the "Proponent") proposes to develop, construct, and operate offshore renewable wind energy facilities in Bureau of Ocean Energy Management (BOEM) Lease Area OCS-A 0522 (the "Lease Area") along with associated offshore and onshore transmission systems. This proposed development is referred to as "Vineyard Northeast." Vineyard Northeast includes 160 total wind turbine generator (WTG) and electrical service platform (ESP) positions within the Lease Area. Up to three of those positions will be occupied by ESPs and the remaining positions will be occupied by WTGs. Two offshore export cable corridors (OECCs)—the Massachusetts OECC and the Connecticut OECC—will connect the renewable wind energy facilities to onshore transmission systems in Massachusetts and Connecticut. If high voltage alternating current (HVAC) offshore export cables are used in the Massachusetts OECC, the cables would connect to a booster station in the northwestern aliquot[1] of Lease Area OCS-A 0534. Figure 1.1-1 provides an overview of Vineyard Northeast.

1.2 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act mandates that federal agencies conduct an Essential Fish Habitat (EFH) consultation for any activity that may adversely affect EFH for federally managed fish species. EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Included in 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act, the primary goal of EFH designation is to identify and protect important fish habitat from certain fishing practices and coastal and marine development.

EFH is designated by National Oceanic and Atmospheric Administration's (NOAA) Fisheries (or National Marine Fisheries Service [NMFS]) and Regional Fishery Management Councils. EFH is typically assigned by egg, larvae, juvenile, and adult life stages and designated as waters or as substrates. In 50 CFR § 600.10, NOAA Fisheries defines waters and substrate as:

- Waters—Aquatic areas and their associated physical, chemical, and biological properties that are used by fish and, where appropriate, may include aquatic areas historically used by fish.
- Substrate—Sediments, hard bottoms, structures underlying the waters, and associated biological communities.

[1] An aliquot is 1/64th of a BOEM Outer Continental Shelf (OCS) Lease Block.

Additionally, the Regional Fishery Management Councils identify Habitat Areas of Particular Concern (HAPCs) within their Fishery Management Plans (FMPs). HAPCs are discrete subsets of EFH that serve important ecological functions or are especially vulnerable to degradation.

G:\Projects2\MA\MA5410\2023\MXD\Vol_II_REV_Sept_2023\1.1-1_Project_Overview_20230928.mxd

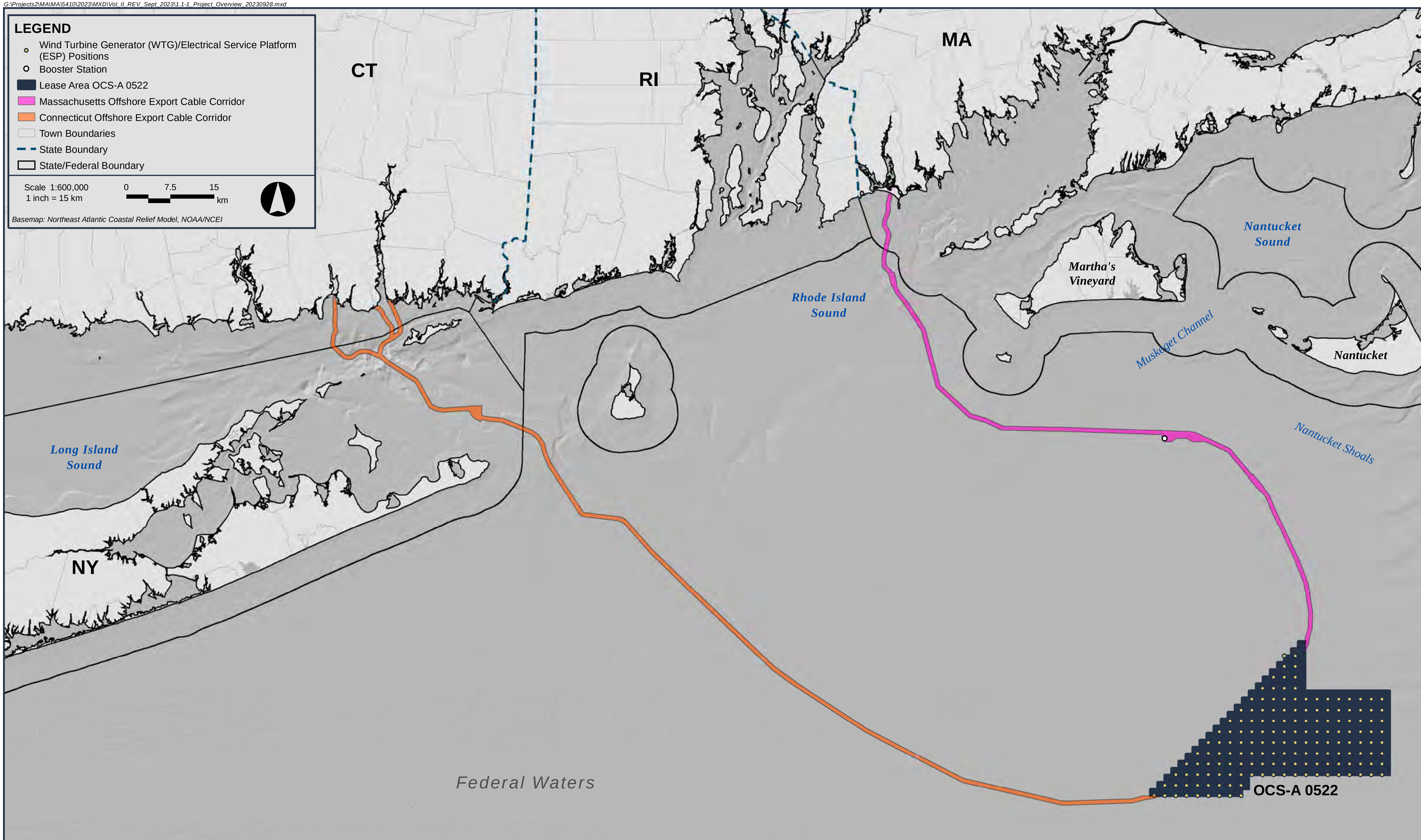


Figure 1.1-1
Overview of Vineyard Northeast

VINEYARD NORTHEAST
VINEYARD OFFSHORE

2 Affected Environment

2.1 Offshore Development Area

The Offshore Development Area includes the Lease Area, two OECCs, and the broader region surrounding the offshore facilities that could be affected by Vineyard Northeast-related activities. The Lease Area is located south of Nantucket in the northern Mid-Atlantic Bight of the Northeast United States (US) Shelf Ecosystem. The OECCs are the surveyed areas identified for routing the offshore export cables.

Habitats within the Lease Area and OECCs were evaluated utilizing geophysical data, vibracores, benthic grab samples, and underwater video transects. As described in Section 5.2 of Appendix II-B of the COP, potential sensitive habitat boundaries were classified and mapped using the NMFS' (2021) Recommendations for Mapping Fish Habitat for the entire Offshore Development Area. NMFS (2021) recommends the following habitat areas to be mapped:

- Soft Bottom habitats (i.e., mud and/or sand);
- Complex habitats (i.e., submerged aquatic vegetation (SAV), shell/shellfish, and/or hard bottom substrate);
- Heterogeneous Complex habitats (i.e., mix of soft and complex stations within a delineated area);
- Large Grained Complex habitats (e.g., large boulders); and
- Benthic Features (i.e., ripples, megaripples, and sand bedforms).

As described in Section 5.2.1 of Appendix II-B of the COP, multibeam, side scan, and backscatter data were used to define seafloor composition based on the acoustic reflectivity which is a function of the bottom texture, roughness, slope, relief, and sediment grain size. Initial habitat boundaries were made using sonar data to delineate zones with different sediment types. Then, ground truthing samples (grabs, video, and vibracores) were classified using the NMFS-modified Coastal and Marine Ecological Classification Standard (CMECS) classification system (NMFS 2021), which was then translated into a final classification of either a Soft, Complex, or Complex Mix (both soft and complex samples) for each station. Based on reflectivity of sonar and classifications of video transects and grab samples, each delineated area was assigned to one of the four NMFS (2021) habitat categories: Complex, Heterogeneous Complex, Large Grained Complex, or Soft Bottom. Sonar-delineated boundaries that bordered other boundaries of the same habitat category were kept as separate boundaries (i.e., not merged) to illustrate differences in sonar data that showed potentially different ground conditions (i.e., variation in quantity or type of Complex habitat). Benthic Features, including bedforms and Organic Mud were mapped using the sonar data. Organic Mud, though not a Benthic Feature specified in the NMFS (2021) mapping guidelines, may be mapped as a separate Benthic Feature. In addition, larger scale characterizations of the Massachusetts Wind Energy Area (MA WEA) from Guida et al. (2017) were used to describe the regional setting.

Large scale maps of bottom habitats and benthic features located within the Offshore Development Area of Vineyard Northeast following NMFS (2021) are presented in Annex A.

2.1.1 Lease Area

Habitat within the Lease Area was evaluated using geophysical trackline data, vibracores, benthic grab samples, and underwater video transects collected in 2019 and 2022.

Based on reconnaissance data from 2019 surveys, the seafloor within the Lease Area consists of mainly Soft Bottom habitat, with an area of Heterogeneous Complex habitat located in the central-eastern portion (Figure 2.1-1). The 38 grab samples and 25 video transects collected in 2019 show that Soft Bottom habitat ranges from Very Coarse/Coarse Sand to Sandy Mud, with coarser grained material in the northeast and finer grained material in the southwest and northernmost tip of the Lease Area. The Heterogenous Complex area includes northwest to southeast trending furrows that contain clam shell rubble mixed with sand surrounded by Soft Bottom habitat. No Complex or Large Grained Complex habitat is present within the Lease Area. Examples of grab and video samples collected during the 2019 survey are shown in Table 2.1-1.

In 2022, an additional 39 benthic grab samples from 14 benthic stations were collected in the Lease Area, and these results corroborated with the findings of the 2019 surveys. Most of the grab samples were classified as Soft Bottom habitat with only one sample classified as Very Coarse/Coarse Sand and the remaining 35 Soft Bottom samples classified as Medium Sand or finer. Three samples were classified as biogenic-origin Shell substrate, and one of the Medium Sand samples had enough shell particles to classify under the CMECS Shell subgroup qualifier (Medium Sand with Shell). These Shell samples were collected in the central and northern portion of the Lease Area, near where the Massachusetts OECC intersects the northernmost point of the Lease Area.

Most (92%) of the Lease Area consists of Soft Bottom habitat, with a small area (8%) of Heterogeneous Complex habitat (Table 2.1-2). Habitat maps were made using ground truthing samples collected in 2019 and 2022. Benthic features present within the Lease Area include ripples and megaripples, with areas of pitted sand surrounding the shell-filled furrows. The megaripples are present in the northeast corner of the Lease Area and the ripples occur in relatively isolated areas east and west of the shell furrow area. These conditions were identified by multibeam echo sounding and side scan sonar imaging techniques that have been ground truthed via benthic grab samples, underwater video, borings, and cone penetration tests, as described above, and further verified via historic grab sample and still photo data (Guida et al. 2017; Stokesbury 2013, 2014).

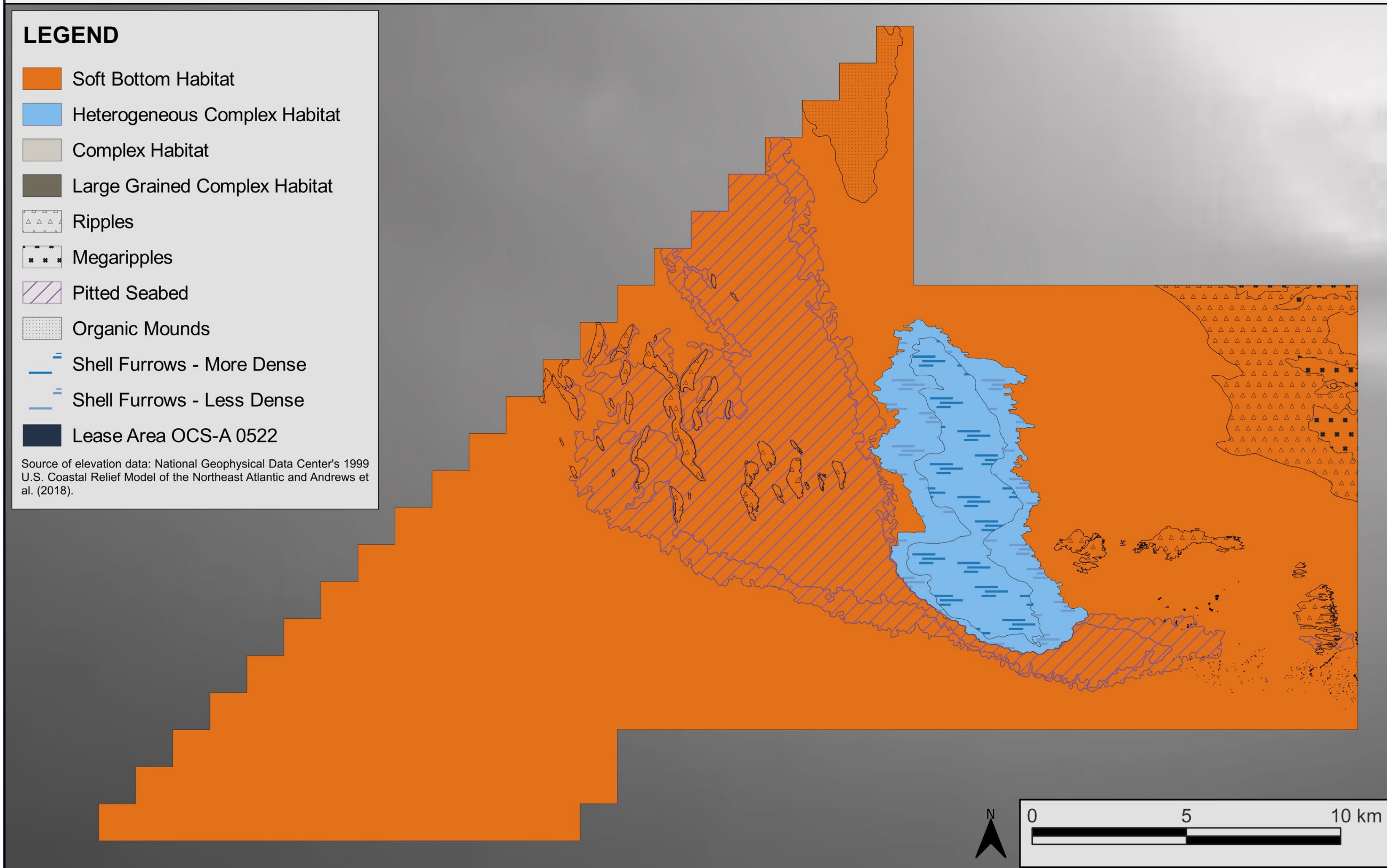


Figure 2.1-1

NMFS Habitat Mapping Lease Area

VINEYARD NORTHEAST

VINEYARD OFFSHORE

Table 2.1-1 Examples of CMECS Defined Substrates Captured During 2019 Underwater Video and Benthic Grab Sampling Throughout the Lease Area

CMECS Substrate and NMFS (2021) Designations	Example Sample Information	Example Sample Image
Fine/Very Fine Sand; Soft Bottom	Grab 522-19-GB09 0% gravel	
Muddy Sand; Soft Bottom	Grab 522-19-GB21 0% gravel	

Table 2.1-1 Examples of CMECS Defined Substrates Captured During 2019 Underwater Video and Benthic Grab Sampling Throughout the Lease Area (Continued)

CMECS Substrate and NMFS (2021) Designations	Example Sample Information	Example Sample Image
Sandy Mud; Soft Bottom	Grab 522-19-GB38 0% gravel	
Medium Sand; Soft Bottom	Grab 522-19-GB18 1% gravel	

Table 2.1-1 Examples of CMECS Defined Substrates Captured During 2019 Underwater Video and Benthic Grab Sampling Throughout the Lease Area (Continued)

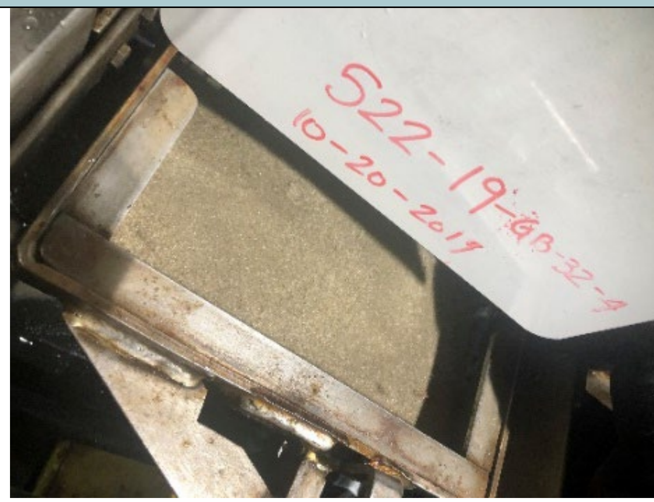
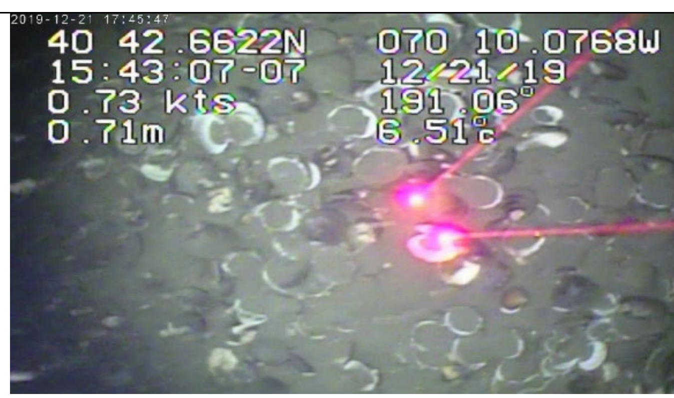
CMECS Substrate and NMFS (2021) Designations	Example Sample Information	Example Sample Image
Very Coarse/Coarse Sand; Soft Bottom	Grab 522-19-GB32 0% gravel	
Fine Sand/Mud; Soft Bottom	Video Transect Still Image VT 10	
Fine Sand/Mud with Clam Shell Rubble; Complex	Video Transect Still Image VT11	

Table 2.1-1 Examples of CMECS Defined Substrates Captured During 2019 Underwater Video and Benthic Grab Sampling Throughout the Lease Area (Continued)

CMECS Substrate and NMFS (2021) Designations	Example Sample Information	Example Sample Image
Shell Rubble with Fine Substrate; Complex	Grab 522-19-GB04 N/A% gravel (no recovery)	

Table 2.1-2 Benthic Habitat Classification in the Lease Area

Habitat Type	Lease Area		
	Km²	Acres	%
Complex	0	0	0
Heterogenous Complex	41	10,174	8
Large Grained Complex	0	0	0
Soft Bottom	495	122,195	92

2.1.2 Massachusetts OECC

Data from the 2022 field program, publicly available datasets of benthic samples (usSEABED and United States Geological Survey (USGS) East-Coast Sediment Texture Database), and sonar data (NOAA) show a diverse array of habitat types within the Massachusetts OECC. In the eastern portion of the OECC closest to the Lease Area, Soft Bottom habitat is the dominant habitat type. Within this section of Soft Bottom habitat, isolated mounds of organic mud were found directly outside the Lease Area and further down the corridor. Interspersed areas containing ripple scour depressions were found in between the areas of organic sediment.

The area bordering Southwest Shoal contains gravel with estimated grain sizes ranging from pebble/granule to boulders in varying concentrations. This area is primarily characterized as Heterogeneous Complex habitat, with localized areas of Complex habitat present. There are potentially boulders within this area that could be classified as Large Grained Complex due to their size of greater than 4 meters (m) (13.1 feet [ft]), but because these isolated boulders do not cover 50% of the seafloor as required by the NMFS Recommendations (2021) to meet the substrate subclasses of Bedrock or Megaclast, the habitat was classified as Complex rather than Large Grained Complex.

Soft Bottom habitats became more common north of Southwest Shoal until close to the landfall, though occasional isolated patches of Heterogeneous Complex habitat containing Gravelly Sand and Sandy Gravel were present. There is a 3.2 km (2.0 mi) area of Heterogeneous Complex habitat with interspersed Complex habitat near the landfall, after which the remainder of the corridor is Soft Bottom habitat.

Benthic features present in the Massachusetts OECC include mainly ripple scour depressions located in the eastern and western portions of the route. Additional ripple scour depressions are also present on the western portion of the OECC, where they tend to be smaller and have a thin, elongated shape oriented in the north-to-south direction.

Specific to the 2022 survey results, 117 grab samples were collected from 27 benthic stations within the Massachusetts OECC. Most (81%) samples were classified as Soft Bottom habitat with 15 Very Coarse/Coarse Sand samples and the remaining 80 Soft Bottom samples were Medium Sand or finer. Twenty-two samples were Complex habitats, with 13 Gravelly Sand samples (11%) and nine Sandy Gravel samples (8%).

In the eastern portion of the Massachusetts OECC between the Lease Area and Vineyard Wind 1 (Lease Area OCS-A 501), Soft Bottom habitat of Fine/Very Fine Sand dominated all benthic grab samples. As the corridor continues north and below Martha's Vineyard, sediment grain size slightly increases with an even mix of Fine/Very Fine to Medium Sand and Very Coarse/Coarse Sand. This same evenness of fine and coarse sand continues as the corridor heads west, with one Gravelly Sand sample occurring. Before the Massachusetts OECC turns to head directly north, sediments continue to become coarser with an even mix of Medium to Very Coarse/Coarse sand and Gravelly Sand, as well as two samples of Sandy Gravel. As the cable corridor travels past Noman's Island and approaches Massachusetts state waters, grab samples become finer with Fine/Very Fine Sand and Muddy Sand dominating and occasional Gravelly Sand and Sandy Gravel Samples. This sediment composition remains similar as the corridor crosses into Massachusetts state waters, with relatively more Sandy Gravel and Gravelly Sand and then only Fine/Very Fine Sand and Medium Sand as it approaches landfall.

The Massachusetts OECC consists of mainly Soft Bottom habitat (81%), followed by Heterogeneous Complex habitat (16%), and less than 4% Complex habitat (Figure 2.1-2, Table 2.1-3).

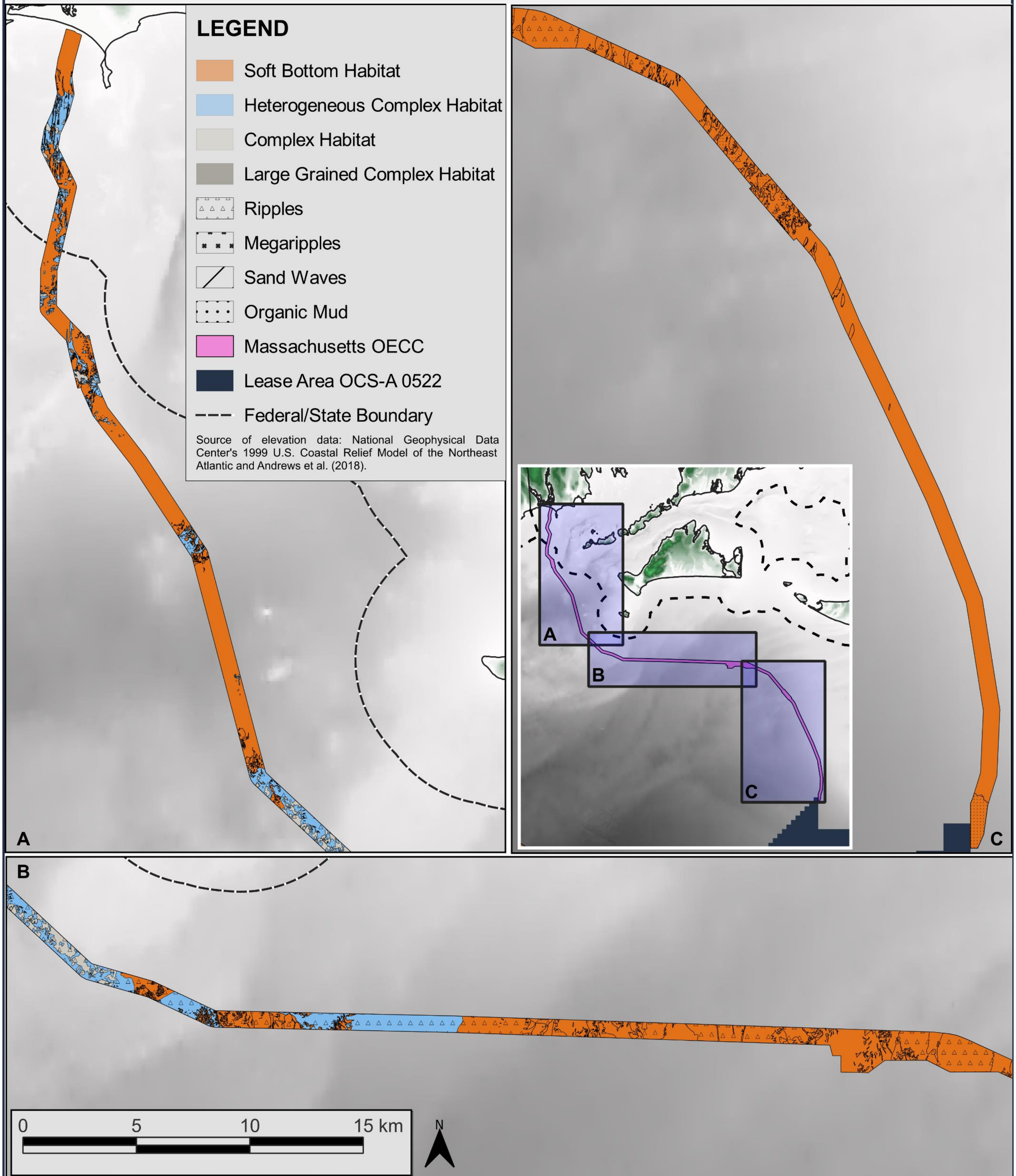


Figure 2.1-2

NMFS Habitat Mapping Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Table 2.1-3 Benthic Habitat Classification in the Massachusetts OECC

Habitat Type	Massachusetts OECC		
	km²	Acres	%
Complex	3.42	844	4
Heterogenous Complex	15.06	3,721	16
Large Grained Complex	0	0	0
Soft Bottom	78.44	19,382	81

2.1.3 Connecticut OECC

The 2022 field program data (sonar and results from benthic grab samples, video transects, and vibracores) and publicly available datasets of benthic grab samples (usSEABED and USGS East-Coast Sediment Texture Database) were used to characterize the habitats present within the Connecticut OECC. Due to the large size of the Connecticut OECC and the presence of multiple landfall sites, the description of the habitat varies across the route.

Heading west from the Lease Area and north towards landfall, the data show mainly Soft Bottom habitat comprised of Muddy Sand, Fine/Very Fine Sand, Medium Sand, and Very Coarse/Coarse Sand with occasional areas of Heterogeneous Complex habitat containing isolated areas of Gravelly Sand. Areas closest to the Lease Area contain Sandy Mud and Muddy Sand as the primary substrate type. Approaching and within state waters, the habitat appears to become more variable with areas of Heterogeneous Complex and Complex habitats, especially within the deeper portions.

Approaching the Niantic Beach Landfall Site, the habitat transitions to primarily Soft Bottom, though there are some rock outcroppings on the eastern side of the OECC. Dense macroalgae is present along the area, which appears to be covering shell hash or shell rubble in some areas. Eelgrass was also observed in two video transects near the Niantic Beach Landfall Site. The habitats in the vicinity of the Ocean Beach Approach and Eastern Point Beach Approach vary from Soft Bottom, Heterogeneous Complex, and Complex substrates. There were samples close to shore of both the approaches that indicated the presence of eelgrass, at least in the form of occasional strands and clumps.

Benthic features are present and dispersed throughout the Connecticut OECC, ranging from rippled areas in the offshore portion of the corridor to sand waves near and within Connecticut state waters.

Specific to the 2022 survey results, 255 grab samples were collected from 65 benthic stations within the Connecticut OECC. The majority (72%) of samples were classified as Soft Bottom habitat with 26 Very Coarse/Coarse Sand samples and the remaining 157 Soft Bottom samples were Medium Sand or finer. Seventy-two samples were classified as Complex habitats, with 41

Gravelly samples (16%), 27 Gravel Mixes (11%), two Gravel samples (>1%), and two biogenic Shell samples (>1%). Eleven samples were null in the dataset and presumed to be failed grabs. Gravel-sized shell fragments composed more than 10 percent of the sample in 29 of benthic grabs. Thirteen of these samples were classified as Complex (Gravelly Sand, Sandy Gravel, Shell) and 16 were classified as Soft Bottom (Muddy Sand, Medium Sand, Very Coarse/Coarse Sand).

In the eastern and central portion of the Connecticut OECC between the Lease Area and Connecticut state waters, Soft Bottom habitat dominated almost all benthic grab samples with Muddy Sand transitioning to Medium Sand and Very Coarse/Coarse Sand. As the corridor continues west and approaches Connecticut and New York state waters, sediment grain size slightly increases with Very Coarse/Coarse Sand dominating with one sample classified as Gravelly Sand. As the Connecticut OECC crosses over from federal into New York state waters, sediment composition becomes an even mix of coarser sands (Medium Sand and Very Coarse/Coarse Sand) and Gravelly Sand/Sandy Gravel. Biogenic Shell is also present as a qualifier in one Medium Sand sample and one Gravelly Sand sample. This evenness of the two sample types continues until Gravelly Sand, Sandy Gravel, and Pebble/Granule dominate as the Connecticut OECC approaches Connecticut state waters. Of the three potential landfall sites, the Niantic Beach Approach consists of almost entirely Sandy Gravel and Gravelly Sand, and then Muddy Sand as it approaches land. The Ocean Beach Approach and the Eastern Point Beach Approach are dominated by Fine/Very Fine Sand with few Gravelly Sand and Muddy Sand samples as they approach the landfall sites.

The Connecticut OECC consists of mainly Soft Bottom benthic habitat (ranging from 73-75% depending on the landfall site), followed by Heterogeneous habitat (ranging from 15-18% depending on the landfall site), and Complex habitat (ranging from 7-12% depending on the landfall site; see Figure 2.1-3a, Figure 2.1-3b, Table 2.1-4).

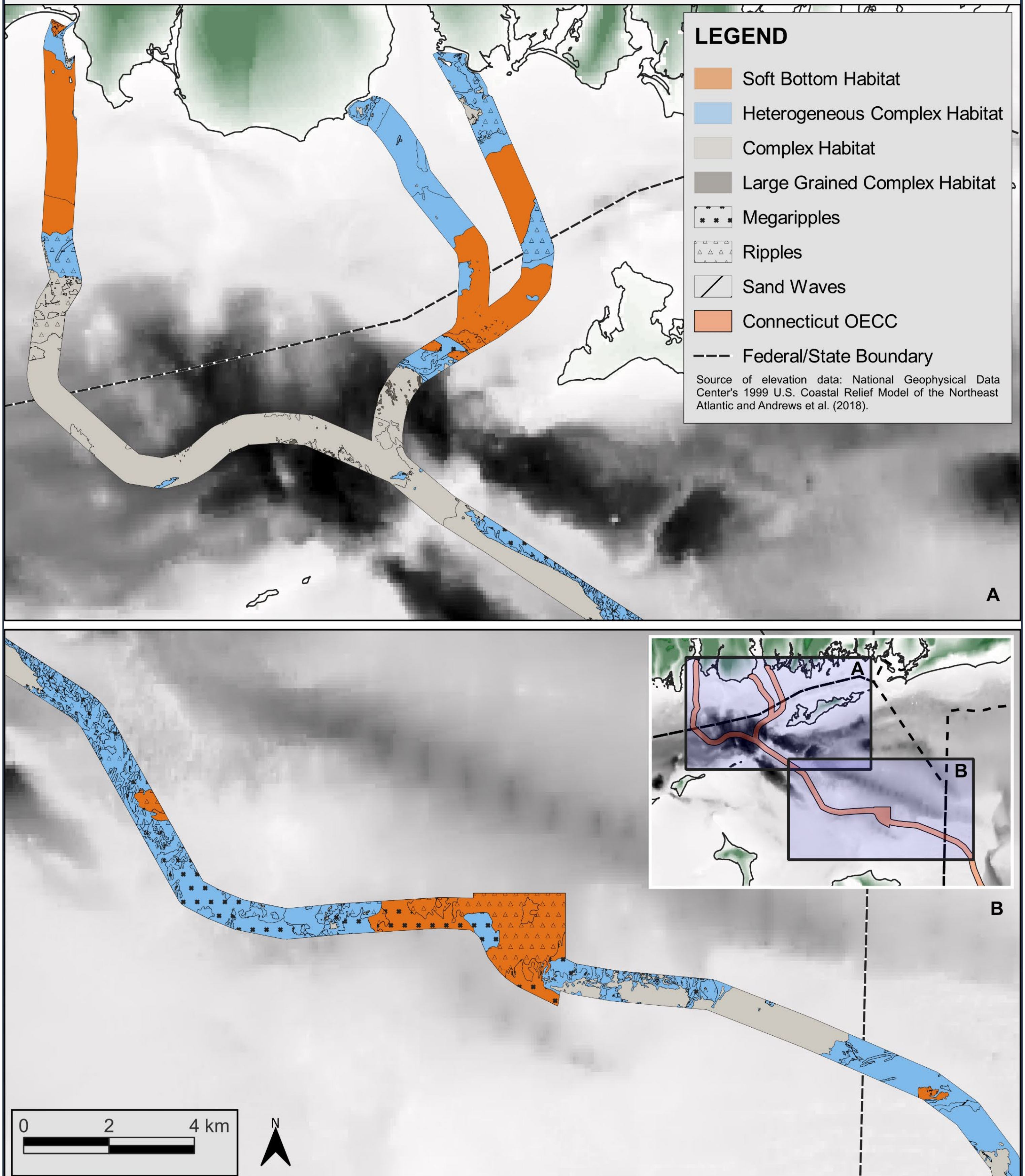


Figure 2.1-3a
NMFS Habitat Mapping Connecticut OECC Nearshore

VINEYARD NORTHEAST
VINEYARD OFFSHORE

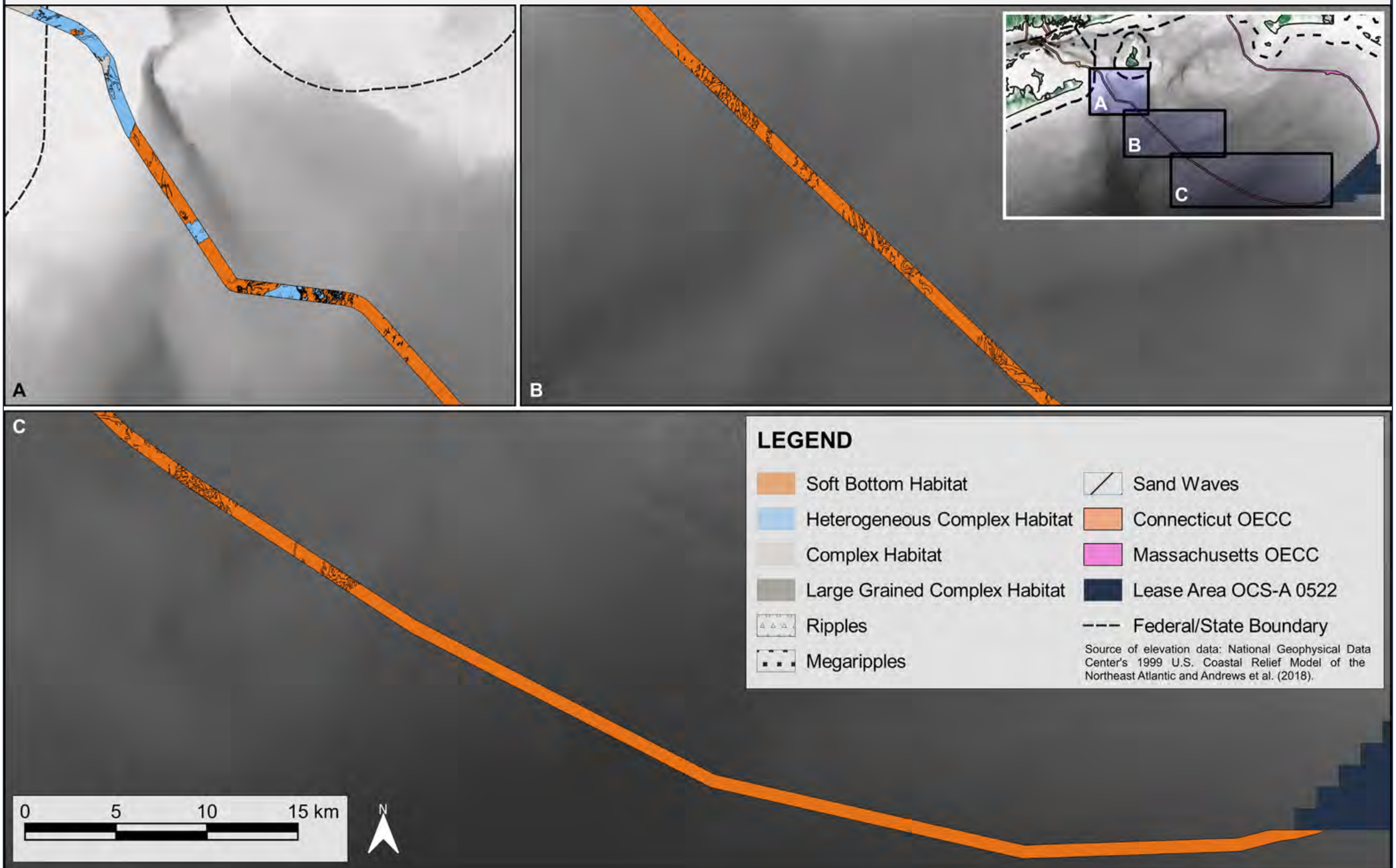


Figure 2.1-3b

NMFS Habitat Mapping Connecticut OECC Offshore

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Table 2.1-4 Benthic Habitat Classification in the Connecticut OECC

Habitat Type	Connecticut OECC Using Eastern Point Beach Approach			Connecticut OECC Using Ocean Beach Approach			Connecticut OECC Using Niantic Beach Approach		
	km^2	Acres	%	km^2	Acres	%	km^2	Acres	%
Complex	9	2,227	7	8.85	2,191	7	16	3,942	12
Heterogenous Complex	22.04	5,454	17	22.74	5,628	18	20	4,952	15
Large Grained Complex	0.11	28	0.09	0.11	28	0.09	0.03	8	0.02
Soft Bottom	95.5	23,638	75	94.02	23,271	75	95	23,524	73

3 EFH Designations in the Offshore Development Area

The EFH designations described in this section correspond to those currently accepted and designated by the New England Fishery Management Council (NEFMC), Mid-Atlantic Fishery Management Council (MAFMC), South Atlantic Fishery Management Council (SAFMC), and NOAA Fisheries Highly Migratory Species Division (NEFMC 2017). Many EFH designations are determined for each cell in a 10′ latitude by 10′ longitude square grid in state and federal waters. The Lease Area intersects six cells, the Massachusetts OECC intersects 11 cells, and the Connecticut OECC intersects 16 cells (Figure 3.0-1). The specific FMPs with protective designations of EFH include:

- New England Fishery Management Council
    - Northeast Multispecies FMP
    - Atlantic Sea Scallop FMP
    - Monkfish FMP
    - Atlantic Herring FMP
    - Skate FMP
- Mid-Atlantic Fishery Management Council
    - Atlantic Mackerel, Squid, and Butterfish FMP
    - Spiny Dogfish FMP
    - Summer Flounder, Scup, and Black Sea Bass FMP
    - Bluefish FMP
    - Atlantic Surf Clam and Ocean Quahog FMP
- NOAA Fisheries Highly Migratory Species Division
    - Consolidated Atlantic Highly Migratory Species FMP
- South Atlantic Fishery Management Council
    - Coastal Migratory Pelagics FMP

Both substrate and water habitats are designated as EFH for 46 fish species within the Lease Area, Massachusetts OECC, and Connecticut OECC (see Table 3.0-1). A HAPC is also designated for juvenile Atlantic cod (*Gadus morhua*) and overlaps with a small portion of the Massachusetts OECC (Figure 3.0-1). The EFH and HAPC designations that overlap with the Offshore Development Area are described for individual species in Section 3.1.

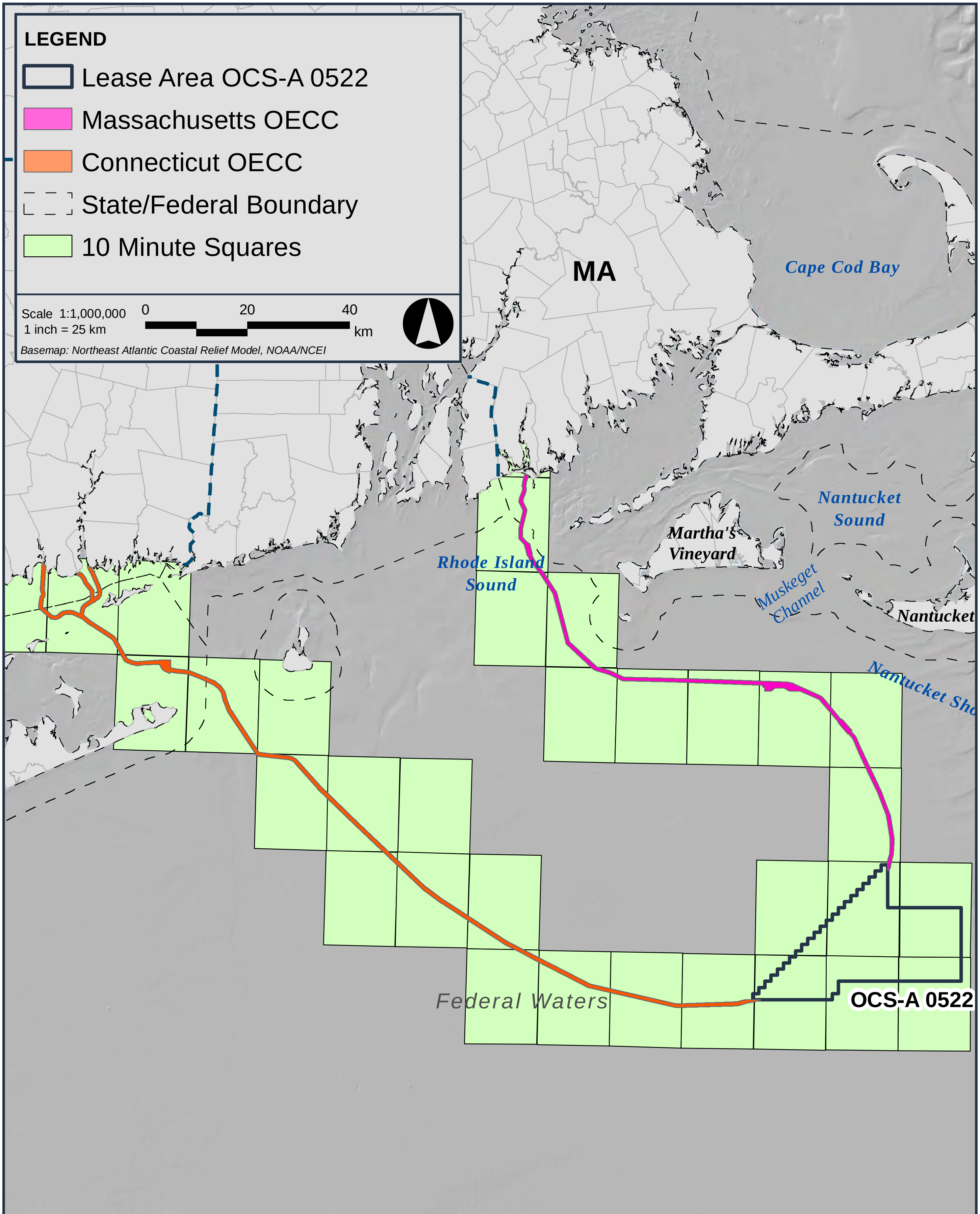


Figure 3.0-1
EFH Grid Units that Intersect with the Offshore Development Area

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Bottom habitats protected as EFH range from areas with substrates comprised of cobble or gravel (Complex habitat) for juvenile Atlantic cod, to areas with muddy and sandy substrates (Soft Bottom habitat) for juvenile and adult winter flounder (*Pseudopleuronectes americanus*). The importance of bottom habitat varies between species and life stages. Coarse substrate, such as gravel or cobble, is considered EFH for the egg, larval, and juvenile life stages of many species because it provides a place for fish to find food, hide from predators, and shelter from strong currents. Studies have found that survivorship of juvenile Atlantic cod was enhanced in areas with coarse substrates (Lindholm et al. 2001; Grabowski et al. 2018). Alternatively, flatfish, such as winter flounder, prefer sandy or muddy habitats where they can easily bury themselves to avoid predation or wait for prey (Pereira et al. 1999).

Based on data from the 2022 field program, Heterogeneous Complex habitat is expected to be limited, occurring primarily in portions of the OECCs, and not in the Lease Area (see Appendix II-B). These coarser substrates, like pebble-cobble and boulders, are important habitat for the juveniles of some fish species, like Atlantic cod (Grabowski et al. 2018). Other bottom habitats, such as sand bedforms, are also important habitat for fish species and provide structured habitat in sandy areas, where such habitat is typically void. Some evidence suggests that sand bedform habitats can enhance fish survival by providing refuge from predators (Scharf et al. 2006).

In addition to hard substrate, benthic flora is also considered EFH and HAPC for fauna in the region. Submerged aquatic vegetation, like eelgrass (*Zostera marina*), form important habitat that provides forage opportunities and refuge to fish and invertebrate species (Hily and Bouteille 1999). Eelgrass beds are not expected in the Massachusetts OECC based on existing Massachusetts Department of Environmental Protection maps (MassGIS 2022) but may be present as isolated patches along portions of the Connecticut OECC, which was confirmed with 2022 benthic sampling.

Water column or pelagic habitats protected as EFH range throughout the water column for different species and life stages. For example, surface waters are designated as EFH for witch flounder (*Glyptocephalus cynoglossus*) eggs, while the entire water column is designated EFH for juvenile and adult bluefin tuna (*Thunnus thynnus*), and demersal waters are designated EFH for juvenile and adult scup (*Stenotomus chrysops*). Although demersal fish species are strongly associated with bottom substrates, many species have pelagic egg and larval stages and use currents for dispersal of the early life stages. Pelagic species reside within the water column during all life stages and may occupy different strata based on the stage. For example, Atlantic mackerel (*Scomber scombrus*) eggs are free-floating and remain near the water surface, while larvae are typically observed in mid-water column below 10 m (32.8 ft).

Daily, seasonal, and annual ocean current patterns and production regimes dictate the foraging and migratory behaviors of some pelagic species. Highly migratory pelagic fish, such as Atlantic albacore tuna (*Thunnus alalunga*), are generally only observed in northern Atlantic waters for two months to take advantage of productive late summer/early fall production in September and October. Frontal zones, or areas where water masses converge, are particularly important pelagic habitat as they are often important feeding locations where plankton become concentrated. The location of the Lease Area is susceptible to intrusions of warm water from off the shelf or cold shelf water from the Gulf of Maine that could periodically create fronts and associated times of increased presence of pelagic species, particularly in the summer and fall (see Section 3.2 of COP Volume II for additional information).

EFH has been designated for the following species for one or more life stages in the Lease Area and/or OECCs (see Table 3.0-1). Table 3.0-2 provides a summary of the annual presence of each life stage of the EFH species within the Offshore Development Area. Review of underwater video transects collected in 2022 across the entire Offshore Development Area of Vineyard Northeast has been incorporated into this EFH Assessment to provide additional insight into species presence and habitat use.

Table 3.0-1 EFH Designated Species and HAPC in the Offshore Development Area

Species	Eggs			Larvae/ Neonate[1]			Juveniles			Adults			HAPC
	MA OECC	CT OECC	Lease Area	MA OECC	CT OECC	Lease Area	MA OECC	CT OECC	Lease Area	MA OECC	CT OECC	Lease Area	
Acadian redfish (*Sebastes fasciatus)*	-	-	-		P	P	-	-	P, HC	-	-	-	-
American plaice (*Hippoglossoides platessoides*)	-	P	-	P	P	P	-	-	-	-	-	-	-
Atlantic albacore tuna (*Thunnus alalunga)*	-	-	-	-	-	-	P	P	P	P	P	P	-
Atlantic bluefin tuna *(Thunnus thynnus)*[3]	-	-	-	-	-	-	P	P	P	P	P	P	-
Atlantic butterfish *(Peprilus triacanthus)*	P	P	P	P	P	P	S	S	S	S	S	S	-
Atlantic cod *(Gadus morhua)*	C	C	C	C	C	C	C	C	C	C	C	C	MA OECC[5]
Atlantic herring *(Clupea harengus)*	HC	HC	HC	P	P	P	P, HC	P, HC	P, HC	P, HC	P, HC	P, HC	-
Atlantic mackerel *(Scomber scombrus)*	P	P	P	P	P	P	P	P	P	P	P	P	-
Atlantic sea scallop (*Placopecten magellanicus*)	C, S	C, S	C, S	C, HC	C, HC	C, HC	C, HC	C, HC	C, HC	S, HC	S, HC	S, HC	-
Atlantic skipjack tuna *(Katsuwonus pelami)*	-	-	-	-	-	-	P	P	P	P	P	P	-
Atlantic surf clam *(Spisula solidissima)*	-	-	-	-	-	-	S	S	-	S	-	S	-
Atlantic wolffish *(Anarhichas lupus)*[2,3]	C	-	-	P, HC	-	-	HC	-	-	HC	-	-	-

Table 3.0-1 EFH Designated Species and HAPC in the Offshore Development Area (Continued)

Species	Eggs			Larvae/ Neonate[1]			Juveniles			Adults			HAPC
	MA OECC	CT OECC	Lease Area	MA OECC	CT OECC	Lease Area	MA OECC	CT OECC	Lease Area	MA OECC	CT OECC	Lease Area	
Atlantic yellowfin tuna (*Thunnus albacares*)	-	-	-	-	-	-	P	P	P	P	P	-	-
Barndoor skate (*Dipturus laevis*)[1]	-	-	-	-	-	-	C, S	C, S	C, S	C, S	C, S	C, S	-
Basking shark (*Cetorhinus maximus*)[3]	-	-	-	P	P	P	P	P	P	P	P	P	-
Black sea bass *(Centropristis striata)*	P	-	-	P	-	-	C, HC	C, HC	C, HC	C, HC	-	C, HC	-
Blue shark (*Prionace glauca)*	-	-	-	P	P	P	P	P	P	P	P	P	-
Bluefish *(Pomatomus saltatrix)*	-	P	-	-	P	-	P	P	-	P	P	P	-
Common thresher shark *(Alopias vulpinus)*[2]	-	-	-	P	P	P	P	P	P	P	P	P	-
Dusky shark *(Carcharhinus obscurus)*[2, 3]	-	-	-	P	P	P	P	P	P	P	P	P	-
Haddock *(Melanogrammus aeglefinus)*	C, S	-	C, S	P	P	P	P, HC	P, HC	P, HC	-	HC	HC	-
Little skate *(Leucoraja erinacea)*	-	-	-	-	-	-	S, HC	S, HC	S, HC	S, HC	S, HC	S, HC	-
Longfin inshore squid *(Loligo pealeii)*	C, S, HC	C, S, HC	-	-	-	-	P	P	P	P	P	P	-
Monkfish *(Lophius americanus)*	P	P	P	P	P	P	S, HC	S, HC	S, HC	S, HC	S, HC	S, HC	-

Table 3.0-1 EFH Designated Species and HAPC in the Offshore Development Area (Continued)

Species	Eggs			Larvae/ Neonate[1]			Juveniles			Adults			HAPC
	MA OECC	CT OECC	Lease Area	MA OECC	CT OECC	Lease Area	MA OECC	CT OECC	Lease Area	MA OECC	CT OECC	Lease Area	
Northern shortfin squid *(Illex illecebrosu)*	-	-	-	-	-	-	-	P	-	P	-	-	-
Ocean pout *(Macrozoarces americanus)*	C	C	C	-	-	-	S, HC	S, HC	-	S, HC	S, HC	S, HC	-
Ocean quahog *(Artica islandica)*	-	-	-	-	-	-	S, HC	S, HC	S, HC	S, HC	S, HC	S, HC	-
Pollock (*Pollachius virens)*	P	P	-	P	P	P	S, HC	S, HC	-	-	S, HC	-	-
Porbeagle shark *(Lamna nasus)*[2]	-	-	-	P	P	P	P	P	P	P	P	P	-
Red hake *(Urophycis chuss)*	P	P	P	P, S, HC	P, S, HC	P, S, HC	S, HC	S, HC	S, HC	S	S	S	-
Sand tiger shark (*Carcharias taurus*)	-	-	-	HC	HC	-	HC	HC	-	-	-	-	-
Sandbar shark *(Carcharhinus plumbeus)*	-	-	-	-	-	-	P	P	-	P	P	-	-
Scup *(Stenotomus chrysops)*	P	P	-	P	P	-	S, HC	S, HC	S, HC	S, HC	S, HC	S, HC	-
Shortfin mako shark *(Isurus oxyrinchus)*[2]	-	-	-	P	P	P	P	P	P	P	P	P	-
Silver hake (*Merluccius bilinearis*)	P	P	P	P	P	P	S	S	S	S	S	S	-
Smooth dogfish (*Mustelus canis*)[2]	-	-	-	S, HC	S, HC	S, HC	S, HC	S, HC*	S, HC*	S, HC	S, HC	S, HC	-

Table 3.0-1 EFH Designated Species and HAPC in the Offshore Development Area (Continued)

Species	Eggs			Larvae/ Neonate[1]			Juveniles			Adults			HAPC
	MA OECC	CT OECC	Lease Area	MA OECC	CT OECC	Lease Area	MA OECC	CT OECC	Lease Area	MA OECC	CT OECC	Lease Area	
Spiny dogfish (*Squalus acanthias*)	-	-	-	-	-	-	-	-	P	P	P	P	-
Summer flounder (*Paralichthys dentatus*)	S, P	S, P	S, P	P	P	P	S, HC	S, HC	S, HC	S, HC	S, HC	S, HC	Areas of SAV
Tiger shark (*Galeocerdo cuvier*)	-	-	-	-	-	-	P	P	P	P	P	P	-
White hake (*Urophycis tenuis*)	-	-	-	P	-	-	P, S, HC	P, S, HC	P, S, HC	S, HC	S, HC	S, HC	-
White shark (*Carcharodon carcharias*)[2]	-	-	-	P	P	-	P	P	P	P	P	P	-
Windowpane flounder (*Scophthalmus aquosus*)	P	P	P	P	P	P	S	S	S	S	S	S	-
Winter flounder (*Pseudopleuronectes americanus*)	S, HC	S, HC	-	S, HC	S, HC	S, HC	S, HC	S, HC	S, HC	S, HC	S, HC	S, HC	-
Winter skate (*Leucoraja ocellata*)	-	-	-	-	-	-	S, HC	S, HC	S, HC	S, HC	S, HC	S, HC	-
Witch flounder (*Glyptocephalus cynoglossus*)	P	P	P	P	P	P	-	P, S	P, S	S, HC	S, HC	S, HC	-
Yellowtail flounder (*Limanda ferruginea*)	P	P	P	P	P	P	S	S	S	S	S	S	-

Notes:
1. Shark species emerge from egg cases fully developed and are referred to as neonates.
2. Indicates EFH designations are the same for all life stages or designations are not specified by life stage.
3. "-" indicates EFH has not been designated for this life stage or the life stages
4. * indicates sub-adult life stage
5. HAPC is designated for juvenile Atlantic cod in a small portion of the Massachusetts OECC (in nearshore waters).
6. MA OECC = Massachusetts OECC; CT OECC = Connecticut OECC; C = Complex Habitat; HC = Heterogeneous Complex; P = Pelagic; S = Soft Bottom Habitat

Table 3.0-2 Monthly Presence of Each Life Stage of EFH Species in the Offshore Development Area

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Acadian redfish (*Sebastes fasciatus*)	-	-	J A	L A	L A	L A	L A	L A	L J A	L J A	J A	-
American plaice (*Hippoglossoides platessoides*)	E	E	EL	EL	EL	EL	EL	L	L	L	-	-
Atlantic albacore tuna (*Thunnus alalunga*)[2]	-	-	-	-	-	J	J	J A	J A	J A	-	-
Atlantic bluefin tuna (*Thunnus thynnus*)[2]	-	-	-	-	-	-	J A	J A	J A	J A	J A	-
Atlantic butterfish (*Peprilus triacanthus*)[2]	J A	J A	E J A	E J A	E J A	All	All	All	L J A	L J A	L J A	J A
Atlantic cod (*Gadus morhua*)[2]	E J A	E J A	All	All	All	J A	J A	J A	E J A	E J A	E J A	E J A
Atlantic mackerel (*Scomber scombrus*)[2]	A	A	A	E L A	All	All	J A	J A	A	A	A	A
Atlantic herring (*Clupea harengus*)[2]	All	All	All	All	A	A	A	All	All	All	All	All
Atlantic sea scallop (*Placopecten magellanicus*)[2]	J A	J A	J A	J A	J A	All	All	All	All	All	L J A	L J A
Atlantic skipjack tuna (*Katsuwonus pelami*)[2]	-	-	-	-	J A	J A	J A	J A	J A	J A	J A	-
Atlantic surf clam (*Spisula solidissima*)[2]	All	All	All	All	All	All	All	All	All	All	All	All
Atlantic wolffish (*Anarhichas lupus*)[3]	All	All	All	All	All	All	All	All	All	All	All	All
Atlantic yellowfin tuna (*Thunnus albacares*)[2]	-	-	-	-	-	J A	J A	J A	J A	-	-	-
Barndoor skate (*Dipturus laevis*)[3]	-	-	-	J A	J A	J A	J A	J A	J A	J A	-	-
Basking shark (*Cetorhinus maximus*)	E A	E A	-	-	-	J A	J A	J A	A	A	A	E A
Black sea bass (*Centropristis striata*)[2]	-	-	-	J A	All	All	All	All	All	All	L J A	J A
Blue shark (*Prionace glauca*)	-	-	-	-	J A	J A	J A	J A	J A	J A	-	-
Bluefish (*Pomatomus saltatrix*)[2]	-	-	-	-	-	J A	J A	J A	J A	J A	-	-
Common thresher shark (*Alopias vulpinus*)[2]	All	All	All	All	All	All	All	All	All	All	All	All
Dusky shark (*Carcharhinus obscurus*)	-	-	-	-	-	J A	J A	J A	J A	-	-	-
Haddock (*Melanogrammus aeglefinus*)[2]	L J A	L J A	All	All	All	L J A	L J A	J A	J A	J A	J A	J A
Little skate (*Leucoraja erinacea*)[2]	All	All	All	All	All	All	All	All	All	All	All	All
Longfin inshore squid (*Loligo pealeii*)[2]	All	All	All	All	All	All	All	All	All	All	All	All
Monkfish (*Lophius americanus*)[2]	J A	J A	All	All	All	All	All	All	All	J A	J A	J A
Northern shortfin squid (*Illex illecebrosu*)[2]	A	A	A	A	A	A	A	A	A	A	A	A

Table 3.0-2 Monthly Presence of Each Life Stage of EFH Species in the Offshore Development Area (Continued)

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ocean pout (*Macrozoarces americanus*)	All	All	L J A	L J A	L J A	J A	J A	J A	J A	J A	All	All
Ocean quahog (*Artica islandica*)[2]	All	All	All	All	All	All	All	All	All	All	All	All
Pollock (*Pollachius virens*)[2]	E L	E L		J	J	J	J	J	J	-	E	E L
Porbeagle shark (*Lamna nasus*)[3]	All	All	All	All	All	All	All	All	All	All	All	All
Red hake (*Urophycis chuss*)[2]	J A	J A	J A	J A	All	All	All	All	All	All	All	L J A
Sand tiger shark (*Carcharias taurus*)	-	-	-	-	N J	N J	N J	N J	N J	-	-	-
Sandbar shark (*Carcharhinus plumbeus*)	-	-	-	-	-	J A	J A	J A	J A	-	-	-
Scup (*Stenotomus chrysops*)[2]	-	-	-	-	All	All	All	All	L J A	L J A	-	-
Shortfin mako shark (*Isurus oxyrinchus*)[3]	-	-	-	-	-	J A	J A	J A	J A	J A	-	-
Silver Hake *(Merluccius bilinearis)*[2]	All	All	All	All	All	All	All	All	All	All	All	All
Smooth dogfish (*Mustelus canis*)[2, 3]				All	All	All	All	All	All	All	All	
Spiny dogfish (*Squalus acanthias*)[2]	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
Summer flounder *(Paralichthys dentatus)*[2]	All	All	E J A	E J A	E J A	J A	J A	J A	L J A	All	All	All
Tiger shark (*Galeocerdo cuvier*)	-	-	-	-	-	J A	J A	J A	J A	-	-	-
White hake (*Urophycis tenuis*)[2]	-	-	-	-	-	E J	E J	E J	E J	E J	J	-
White shark *(Carcharodon carcharias)*[3]	-	-	-	-	J A	J A	J A	J A	J A	J A	J A	-
Windowpane flounder *(Scophthalmus aquosus)*[2]	J A	J A	J A	J A	J A	J A	All	All	J A	J A	J A	J A
Winter flounder *(Pseudopleuronectes americanus)*[2]	J A	E J A	All	All	All	All	L J A	J A	J A	J A	J A	J A
Winter skate (*Leucoraja ocellata*)[2]	J	J	J A	J A	J A	-	-	-	J A	J A	J A	J
Witch flounder *(Glyptocephalus cynoglossus)*[2]	L J A	L J A	All	All	All	All	All	All	All	All	L J A	L J A
Yellowtail flounder *(Limanda ferruginea)*[2]	J A	J A	J A	E J A	All	All	L J A	J A	J A	J A	J A	J A

Notes:

1. E=Eggs, L=Larvae, N=Neonate, J=Juvenile, A=Adult, All=All life stages potentially present throughout the year, and R=Rare.
2. Species of commercial or recreational importance.
3. Indicates EFH designations are the same for all life stages or designations are not specified by life stage.

3.1 Individual Species EFH and HAPC

Acadian Redfish

Acadian redfish (*Sebastes fasciatus*) EFH is designated in the Connecticut OECC and the Lease Area for the larval life stage, and in the Lease Area for the juvenile life stage. Acadian redfish is a long-lived, slow-growing, benthic species. They mature between five to nine years, with copulation occurring from October to January (NOAA 2016). Eggs are internally fertilized and released as larvae from April through August, with a peak in late May to early June (Pikanowski et al. 1999). Newly spawned larvae are found in the top 10 m (33 ft) of the water column. Juveniles move to the bottom around four to five months old. Adults make diurnal vertical migrations, feeding on krill. When planktonic, they feed mostly during daylight, while juveniles and adults feed actively during the night (Steele 1957). Mean seasonal depths for adults on the northeast continental shelf are 171 m (561 ft) in the spring, 153 m (502 ft) in the summer, and 169 m (554 ft) in the fall (Murawski 1993). Redfish are common in the Gulf of Maine, and in the deeper waters north and west of George's Bank.

American Plaice

American plaice (*Hippoglossoides platessoides*) EFH is designated in the Connecticut OECC for egg life stages, and in both OECCs and the Lease Area for larval life stages. Area designated as EFH includes scattered pelagic habitats in the Gulf of Maine, Georges Bank, and southern New England. Eggs and larvae are passively transported via currents and while eggs have been mostly observed farther north of the Offshore Development Area, larvae have been observed between Georges Bank and Delaware (Johnson 2004).

Atlantic Albacore Tuna

Albacore tuna (*Thunnus alalunga*) EFH is designated in both OECCs, and the Lease Area for juvenile and adult life stages. EFH for juvenile albacore tuna is designated as offshore the US Atlantic east coast from Cape Cod to Cape Hatteras. Juveniles migrate to northeastern Atlantic waters in the summer for feeding. Adult albacore tuna EFH is also designated along the US Atlantic east coast from Cape Cod to Cape Hatteras generally farther offshore than EFH for juveniles. Adults are commonly found in northern Atlantic waters in September and October for feeding. Albacore tuna are top pelagic predators and opportunistic foragers (NMFS 2009).

Atlantic Bluefin Tuna

Bluefin tuna (*Thunnus thynnus*) EFH is designated in both OECCs, and the Lease Area for juvenile and adult life stages. EFH for juvenile bluefin tuna is waters off Cape Cod to Cape Hatteras. EFH for adult bluefin tuna is pelagic waters from the mid-coast of Maine to southern New England. Bluefin tuna inhabit northeastern waters to feed and move south to spawning grounds in the spring. Both juveniles and adults exhibit opportunistic foraging behaviors and diets typically consist of fish, jellyfish, and crustaceans (Atlantic Bluefin Tuna Status Review Team 2011; NOAA Fisheries 2020c).

Atlantic Butterfish

Atlantic butterfish (*Peprilus triacanthus*) EFH is designated in both OECCs and the Lease Area for all life stages. EFH is designated for butterfish eggs in pelagic habitats with depths under 1,500 m (4,921 ft) and average temperatures between 6.5 to 21.5° Celsius (°C [48–71 °F]) in inshore estuaries and embayments from Massachusetts Bay to the south shore of Long Island, New York, in Chesapeake Bay, and in patches on the continental shelf/slope from Maine southward to Cape Hatteras, North Carolina. EFH for butterfish larvae is designated as pelagic habitats in inshore estuaries and embayments from Boston Harbor to Chesapeake Bay and over the continental shelf, from the Gulf of Maine to Cape Hatteras.

Butterfish larvae are common in high salinity and mixing zones where bottom depths are between 41–350 m (134–1,148 ft). EFH for juvenile and adult butterfish is pelagic habitats in inshore estuaries and embayments from Massachusetts Bay to Pamlico Sound on the inner and outer continental shelf from the Gulf of Maine to Cape Hatteras. Juvenile and adult butterfish are generally found over sand, mud, and mixed substrates in bottom depths between 10–280 m (33–918 ft] (Cross et al. 1999). Juvenile and adult butterfish feed primarily on planktonic prey though adults may eat squids and fishes as well (Cross et al. 1999). Butterfish are found in the Offshore Development Area at all life stages throughout the year and are present in nearshore areas in the fall, and therefore may be impacted by cable installation (NEFSC n.d.).

Atlantic Cod

Atlantic cod EFH is designated in both OECCs, and the Lease Area for all life stages (egg, larvae, juvenile, and adult). EFH for Atlantic cod eggs is designated as surface waters from the Gulf of Maine to southern New England. Cod eggs are found in the fall, winter, and spring in water depths less than 110 m (361 ft). EFH for larval cod is pelagic waters (depths of 30–70 m [98–230 ft]) from the Gulf of Maine to southern New England and are primarily observed in the spring (Lough 2004). EFH for juvenile cod is designated as bottom habitats with substrates composed of cobble or gravel from the Gulf of Maine to southern New England. EFH for adult cod is designated as bottom habitats with substrates composed of rocks, pebbles, or gravel from the Gulf of Maine to southern New England and the middle Atlantic south to Delaware Bay. Inshore juvenile Atlantic cod HAPC is designated in coastal areas (from the shore to 20 m [66 ft] depth contour) from Maine to Rhode Island, and inshore waters around Cape Cod to Martha's Vineyard and Nantucket (NEFMC 2017) (Figure 3.1-1). These areas include all habitats within both OECCs and the Lease Area that contain structurally complex areas, including eelgrass, mixed sand and gravel, and rocky habitats (NEFMC 2017). These habitats are particularly important for juvenile Atlantic cod as it provides protection from predation and readily available prey sources. In 2022, the NEFMC proposed framework adjustments to the

C:\Users\Stephen.Davies\Documents\MXD Vineyard Northeast\Figure 3.0-2 Juv Cod HAPC.mxd

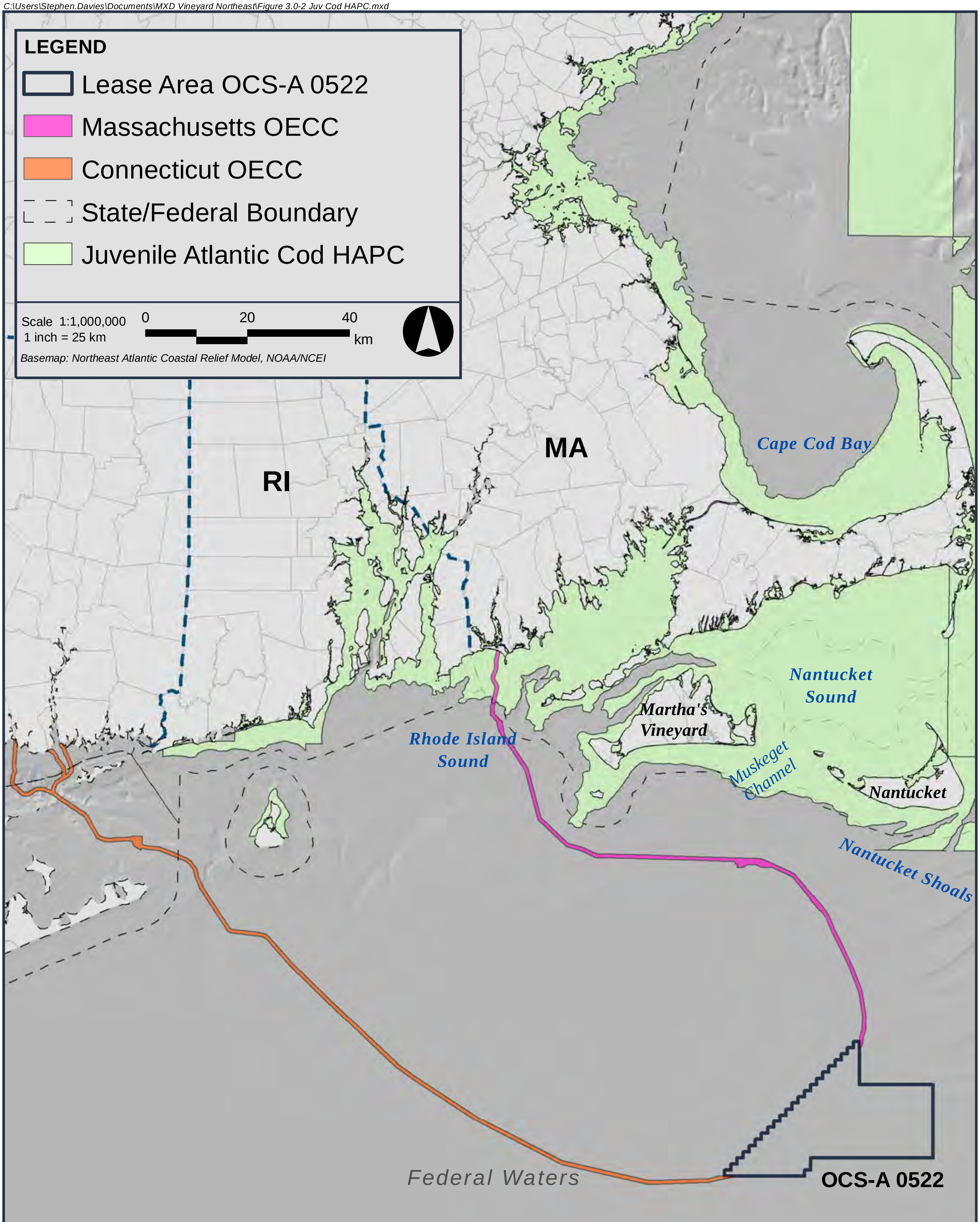


Figure 3.1-1

Juvenile Atlantic Cod Habitat Area of Particular Concern

VINEYARD NORTHEAST
VINEYARD OFFSHORE

Atlantic cod HAPC specific to spawning activity include the following: 1) no action / no new HAPC designations; 2) designating cod spawning grounds on and surrounding Cox Ledge as a HAPC; 3) designating the spawning grounds on and around Cox Ledge and any future cod spawning grounds identified in southern New England as HAPCs; 4) designating all areas in southern New England with complex habitats as a HAPC; and 5) designating the area overlapping offshore wind lease sites in Southern New England as a HAPC (NEFMC 2022).

Cod spawn primarily in bottom habitats composed of sand, rocks, pebbles, or gravel during fall, winter, and early spring (Fahay et al. 1999) and cod spawning grounds have been documented throughout Nantucket Shoals and southern New England (Weiss et al. 2005; Kovach et al. 2010; DeCelles et al. 2017). In surveys conducted by Weiss et al. (2005) in western Georges Bank and Nantucket Shoals, adult and larval cod were collected within areas corresponding to their respective EFH designations while less of an agreement was seen for juveniles of this species. Juvenile and adult cod are opportunistic foragers and consume a wide variety of items including small crustaceans, benthic invertebrates, and fish (Lough 2004). A total of 17.1 kg (37.7 lb) of Atlantic cod was caught in the Lease Area during fisheries monitoring surveys conducted from 2019 to 2021(He and Rillahan 2020a; 2020b; 2021). Cod accounted for 0.2%, 0.6%, and 1.5% of the total catch in the three surveys where cod was encountered (Fall 2019, Winter 2020, Winter 2021). Lengths ranged from 21 to 68 cm (n=22) representing both juvenile and adult size classes. The low cod abundance inside the Lease Area is consistent with Atlantic cod distribution data compiled by the NEFMC (NEFMC 2022) and may be driven by the lack of complex habitat within the Lease Area. Atlantic cod telemetry research (S. Cadrin, UMass Dartmouth-SMAST) is currently ongoing around Cox Ledge in southern New England in the vicinity of Lease Area OCS-A 0517 and Lease Area OCS-A 0486 though no further information is currently available.

Atlantic Herring

Atlantic herring (*Clupea harengus*) EFH is designated in both OECCs, and the Lease Area for all life stages. Herring eggs adhere to the bottom; therefore, EFH is designated as inshore and offshore benthic habitats mainly in the Gulf of Maine, Georges Bank, and Nantucket Shoals in depths of 5–90 m (16–295 ft) on coarse sand, pebbles, cobbles, and boulders and/or macroalgae (NEFMC 2017). EFH for larval Atlantic sea herring is pelagic waters in the Gulf of Maine, Georges Bank, and southern New England. Larvae are free-floating and generally observed between August and April in areas with water depths from 50–90 m (164–295 ft). EFH for juvenile and adult herring is pelagic and bottom habitats in the Gulf of Maine, Georges Bank, and southern New England. Juvenile and adult herring are found in areas with water depths from 20–130 m (66–427 ft). Herring opportunistically feed on zooplankton, with forage species changing as herring size increases (Reid et al. 1999).

Atlantic Mackerel

Atlantic mackerel EFH is designated in both OECCs, and the Lease Area for all life stages. EFH for mackerel (egg and larval stages) is pelagic habitats in inshore estuaries and embayments from Great Bay to Long Island, inshore and offshore waters of the Gulf of Maine, and on the continental shelf from Georges Bank to Cape Hatteras (Studholme et al. 1999). Eggs float in the upper 10–15m (33–49 ft) of the water column, while larvae can be found in depths ranging from 10–130m (33–427 ft) (Studholme et al. 1999). EFH for juvenile Atlantic mackerel is designated in pelagic waters in the OECC. The depth preference of juvenile mackerel shifts seasonally as they are generally found higher in the water column (20–50 m [66–164 ft]) in the fall and summer, deeper (50–70 m [66–230 ft]) in the winter, and widely dispersed (30–90 m [98–295 ft]) in the spring (NEFSC n.d.; Studholme et al. 1999). EFH for adult mackerel includes pelagic habitats the same region as for juveniles, but in waters with bottom depths less than 170 m (230 ft). Juvenile and adult mackerel feed on small crustaceans, larval fish, and other pelagic species.

Atlantic Sea Scallop

Atlantic sea scallop (*Placopecten magellanicus*) EFH is designated in both OECCs, and the Lease Area for all life stages (egg, larvae, juveniles, adults). All life stages have the same EFH spatial designation, which extends across much of the greater Atlantic region. Because sea scallop eggs are heavier than seawater and remain on the seafloor until the larval stage, EFH is designated in benthic habitats in inshore areas and the continental shelf. During the larval stage, scallops are free-swimming and occur within the water column and near the seafloor. EFH for the larval stage (referred to as "spat") includes benthic and pelagic habitats in inshore and offshore areas through the region. Hard substrate is particularly important as it provides essential habitat for settling larvae, which were found to have higher survival rates when attaching to hard surfaces rather than shifting sand or macroalgae. EFH for juvenile and adult sea scallops include sand and gravel substrates in the benthic habitats in depths of 18–110 m (59–361 ft) (NEFMC 2017).

Atlantic Skipjack Tuna

Skipjack tuna (*Katsuwonus pelami*) EFH is designated in both OECCs and the Lease Area for juvenile and adult life stages. EFH for adult skipjack tuna includes coastal and offshore habitats between Massachusetts and South Carolina. EFH for juveniles is delineated within the same region, except in offshore waters only. Skipjack tuna are opportunistic foragers that feed primarily in surface waters but have also been caught in longline fisheries at greater depths (NMFS 2017).

Atlantic Surf Clam

Atlantic surf clam (*Spisula solidissima*) EFH is designated in the Massachusetts OECC for the juvenile and adult life stages. EFH is also designated for the Connecticut OECC for the juvenile life stage and the Lease Area for adult life stages. EFH for surf clams is throughout the substrate, to a depth of 0.9 m (3 ft) below the water/sediment interface, from the eastern edge of Georges Bank and the Gulf of Maine throughout the Atlantic exclusive economic zone (EEZ). Surf clams are generally located from the tidal zone to a depth of about 38 m (125 ft) (Cargnelli et al. 1999b).

Atlantic Wolffish

Atlantic wolffish (*Anarhichas lupus*) EFH is designated in the Massachusetts OECC for all life stages. EFH for wolffish eggs is bottom habitats over the continental shelf and slope within the Gulf of Maine south to Cape Cod. Wolffish eggs are deposited in rocky substrates in brood nests and are present throughout the year. EFH for wolffish larvae is water from the surface to the seafloor within the Gulf of Maine south to Cape Cod. EFH for juvenile and adult wolffish is bottom habitats of the continental shelf and slope within the Gulf of Maine south to Cape Cod. The depth range for all life stages ranges from 40–240 m (131–787 ft). Spawning is thought to occur in September and October. Wolffish utilize rocky habitats for shelter and nesting and softer substrate habitats for feeding (NOAA 2007). Although the diets of wolffish can vary, generally they feed on mollusks, crustaceans, and echinoderms (NOAA Fisheries 2020b). Wolffish biomass has shown a consistent downward trend since the 1980s and continues to decline because of capture as bycatch in the otter trawl fishery (NOAA Fisheries 2020b).

Atlantic Yellowfin Tuna

Yellowfin tuna (*Thunnus albacares*) EFH is designated in both OECCs and the Lease Area for the juvenile life stage and in both OECCs for the adult life stage. EFH for juveniles and adults is in offshore pelagic and coastal waters from Cape Cod to the mid-eastern coast of Florida and North Carolina, respectively. The diet of yellowfin tuna primarily consists of *Sargassum* or *Sargassum*-associated fauna (NMFS 2009).

Barndoor Skate

Barndoor skate (*Dipturus laevis*) EFH is designated for juveniles and adults in both OECCs and the Lease Area. Barndoor skates have a relatively wide range that extends from Newfoundland to North Carolina, and includes benthic habitats on the continental shelf, in depths between 40–400 m (131–1,312 ft), and on the continental slope, in depths up to 750 m (2,461 ft), within Georges Banks and southern New England. Substrates included in the EFH are mud, sand, and gravel (NEFMC 2017). In southern New England, both juveniles and adults were most frequently observed in the summer, with few rare sightings of adults during the winter (Packer et al. 2003a).

Basking Shark

Basking shark (*Cetorhinus maximus*) EFH is designated in both OECCs and the Lease Area for all life stages. EFH is designated for all life stages because of insufficient data to distinguish EFH between size classes. EFH for juvenile and adult basking sharks is designated in the US Atlantic east coast from the Gulf of Maine to the northern Outer Banks of North Carolina (NMFS 2017). Basking sharks are thought to give birth to young measuring about 180 cm. Basking sharks are generally observed in the northwestern and eastern Atlantic coastal regions from

April to October and are thought to follow zooplankton distributions (Sims et al. 2003). Basking shark aggregations have been observed offshore Cape Cod, Martha's Vineyard, and Morihes Inlet, Long Island (NOAA 2016).

Black Sea Bass

Black sea bass (*Centropristis striata*) EFH is designated at all life stages within the Massachusetts OECC. EFH for the juvenile life stage is present in the Connecticut OECC and Lease Area, and EFH for the adult life stage is present in the Lease Area. EFH for eggs is the estuaries where they are common and encounter mixing waters. Eggs are found in waters over the continental shelf from May through October. EFH for larvae is the pelagic waters over the continental shelf while juvenile and adult black sea bass is demersal waters over the continental shelf from the Gulf of Maine to Cape Hatteras (Steimle et al. 1999e). Juveniles prey on benthic and epibenthic crustaceans and small fish while adults tend to forage more generally for crustaceans, fish, and squids. Adults are generally associated with structurally complex habitats. Juveniles and adults are most commonly observed in water depths equal to those in the Lease Area and OECCs in the spring, summer, and fall (Drohan et al. 2007).

Blue Shark

Blue shark (*Prionace glauca*) EFH is designated in both OECCs and the Lease Area for neonate, juvenile, and adult life stages. EFH for neonate blue shark is in areas offshore Cape Cod through New Jersey (NMFS 2017). EFH for juvenile and adult blue sharks is waters from the southern part of the Gulf of Maine to Cape Hatteras (Lent 1999). Blue sharks are highly migratory and observed in New England from late May through October. Blue sharks feed primarily on small pelagic fishes and cephalopods (Nakano et al. 2008).

Bluefish

Bluefish (*Pomatomus saltatrix*) EFH is designated in the Connecticut OECC for all life stages, the Massachusetts OECC for juvenile and adult life stages, and in the Lease Area for the adult life stage. In the northern Atlantic Ocean, eggs and larvae are found in pelagic waters over the continental shelf at mid-shelf depths from April through August. Juveniles and adults occur in estuaries from June through October. As adults, they are highly migratory depending on the season and size of the individuals in the schools. Bluefish opportunistically forage on regionally and seasonally abundant fish species.

Common Thresher Shark

Common thresher (*Alopias vulpinus*) shark EFH is designated in both OECCs and the Lease Area for neonate, juvenile, and adult life stages. EFH for all life stages is coastal and pelagic waters from Cape Cod to North Carolina and in other localized areas off the Atlantic coast.

Common thresher sharks occur in coastal and oceanic waters but are more common within 64–80 km (35–43 NM) of the shoreline. Small pelagic fishes and pelagic crustaceans make up much of common thresher shark diet (NMFS 2017).

Dusky Shark

Dusky shark (*Carcharhinus obscurus*) EFH is designated in both OECCs and the Lease Area for neonate, juvenile, and adult life stages. EFH for neonate dusky sharks includes offshore areas of southern New England to Cape Lookout, North Carolina (NMFS 2017). EFH for juvenile and adult dusky sharks is waters over the continental shelf from southern Cape Cod to Florida (NMFS 2009). Dusky sharks migrate to northern areas of their range in the summer and return south in the fall as water temperatures decrease. Throughout their range, dusky sharks forage on bony fishes, cartilaginous fishes, and squid (Cortés et al. 2006). Although commercial and recreational fishing is prohibited, the main threat to the dusky shark population is from bycatch and illegal harvest.

Haddock

Haddock (*Melanogrammus aeglefinus*) EFH is designated in the Lease Area for all life stages. Eggs, juveniles, and larval life stages have EFH designations in the Massachusetts OECC, with juveniles, larvae, and adult life stages designated within the Connecticut OECC. Although adult haddock spawn near the sea floor, eggs are buoyant and are suspended in the water column. EFH for haddock eggs is surface waters over Georges Bank southwest to Nantucket Shoals and some coastal areas from Massachusetts Bay to Cape Cod Bay (Cargnelli et al. 1999a). Adult spawning generally occurs from February to May and eggs are observed from March through May (Brodziak 2005). EFH for haddock larvae is surface waters from Georges Bank to Delaware Bay and some coastal areas from Massachusetts Bay to Cape Cod Bay. Larvae can be observed from January through July with peaks in April and May and feed on phytoplankton, copepods, and invertebrate eggs. EFH for juvenile haddock is benthic habitats as shallow as 20 m (66 ft). EFH for adult haddock is bottom habitat with substrate consisting of broken ground, pebbles, smooth hard sand, and smooth areas between rocky patches on Georges Bank and around Nantucket Shoals. Adult haddock are demersal benthivores and primarily consume ophiuroids and amphipods (Brodziak 2005; Cargnelli et al. 1999a). Haddock was one of the dominant species captured in the Northeast Fisheries Science Center (NEFSC) Multispecies Bottom Trawl Surveys in spring, summer, and fall. Adult haddock move offshore into deeper waters in the winter, which may explain the lower capture rates during this season (Brodziak 2005; NEFSC n.d.).

Little Skate

Little skate (*Leucoraja erinacea*) EFH is designated in both OECCs and the Lease Area for juvenile and adult life stages. EFH is similar for both life stages and includes intertidal and sub-tidal benthic habitats in coastal waters of the Gulf of Maine and in the mid-Atlantic region. EFH primarily occurs on sand and gravel substrates, but also is found on mud (NEFMC 2017).

Longfin Inshore Squid

Longfin inshore squid (*Loligo pealeii*) EFH is designated in the Lease Area for juvenile (pre-recruit), and adult (recruit) life stages, and in both OECCs for eggs, juvenile, and adult life stages. EFH for longfin inshore squid eggs is inshore and offshore bottom habitats from Georges Bank to Cape Hatteras. Longfin inshore squids lay eggs in masses referred to as "mops" that are demersal and anchored to various substrates and hard bottom types, including shells, lobster pots, fish traps, boulders, submerged aquatic vegetation, sand, and mud (Jacobson 2005). Female longfin squid lay these egg mops during three-week periods, which can occur throughout the year (Hendrickson 2017). Known longfin squid spawning grounds, which coincide with areas of concentrated squid fishing, intersect with the OECC. EFH for juveniles and adults, also referred to as pre-recruits and recruits, is pelagic habitats inshore and offshore continental shelf waters from Georges Bank to South Carolina. Pre-recruits and recruits inhabit inshore areas in the spring and summer and migrate to deeper, offshore areas in the fall to overwinter (Jacobson 2005). Forage base for longfin inshore squid varies with individual size, where small squids feed on planktonic organisms and large squids feed on crustaceans and small fishes (Jacobson 2005).

Monkfish

Monkfish (*Lophius americanus*) EFH is designated in both OECCs and the Lease Area for all life stages. EFH for monkfish eggs and larvae is surface and pelagic waters of the Gulf of Maine, Georges Bank, southern New England, and the middle Atlantic south to Cape Hatteras. Monkfish eggs float near the surface in veils that dissolve and release zooplanktonic larvae after one to three weeks (MADMF 2022). Monkfish eggs and larvae are generally observed from March to September. EFH for demersal juvenile and adult monkfish is bottom habitats composed of a sand-shell mix, algae covered rocks, hard sand, pebbly gravel, or mud along the outer continental shelf in the middle Atlantic, mid-shelf off southern New England, and all areas of the Gulf of Maine. EFH for adult monkfish also includes the outer perimeter of Georges Bank (Steimle et al. 1999a). Per the Southern New England Juvenile Fish Habitat Research study, adult monkfish were present in the Rhode Island/Massachusetts Wind Energy Areas (RI/MA WEA) during sampling that occurred December through April (Siemann and Smolowitz 2017). Larval monkfish feed on zooplankton; juveniles feed on small fish, shrimp, and squid; and adult monkfish eat other monkfish, crabs, lobsters, squid, and octopus (MADMF 2022).

Northern Shortfin Squid

Northern shortfin squid (*Illex illecebrosus*) EFH is designated in the Connecticut OECC for juvenile life stage and in the Massachusetts OECC for the adult life stage. EFH for adult northern shortfin squid is pelagic habitat on the continental shelf and slope from Georges Bank to South Carolina and in inshore waters of the Gulf of Maine and southern New England. Adult northern shortfin squid primarily forage for fish, euphausiids, and smaller squids (MAFMC and NOAA 2011).

Ocean Pout

Ocean pout (*Macrozoarces americanus*) EFH is designated in the Lease Area for egg and adult life stages. In the Massachusetts and Connecticut OECCs, EFH is designated for the eggs, juvenile, and adult life stages. All ocean pout life stages are demersal and therefore have similar EFH designations. EFH for all life stages is bottom habitats in the Gulf of Maine, Georges Bank, southern New England and the middle Atlantic south to Delaware Bay (Steimle et al. 1999d). Ocean pout eggs are laid in masses on hard bottom surfaces and develop from late fall and winter. Larvae are generally observed from late fall through spring. Juveniles and adults can be found throughout the year, though they move and shift habitats seasonally to remain in preferred temperature range (2–10 °C [36–50 °F]) (Steimle et al. 1999d). Primary prey species shift depending on location. Ocean pout near Nantucket Shoals target Jonah crabs (*Cancer borealis*), though sand dollars are also common in their diet (Steimle et al. 1999d).

Ocean Quahog

Ocean quahog (*Artica islandica*) EFH is designated in both OECCs and the Lease Area for juvenile and adult life stages. EFH for all life stages is designated throughout the substrate, to a depth of 0.9 m (3 ft) below the water/sediment interface from Georges Bank and the Gulf of Maine throughout the Atlantic EEZ (Cargnelli et al. 1999c). Ocean quahogs feed on phytoplankton and support the diet of invertebrate and fish predators, including sea stars, ocean pout, haddock, and Atlantic cod (Cargnelli et al. 1999c).

Pollock

Pollock (*Pollachius virens*) EFH is designated in the Lease Area for the larval life stage, while the Connecticut OECC has designations for all life stages. The Massachusetts OECC has EFH designations for egg, larval, and juvenile life stages. Pollock eggs are buoyant upon fertilization and occur in the water column (Cargnelli et al. 1999d). EFH for pollock eggs is pelagic inshore and offshore habitat in the Gulf of Maine, Georges Bank, and southern New England (NEFMC 2017). The larval stage lasts between three and four months and is also pelagic. EFH designations for larvae are similar to those for eggs and includes pelagic inshore and offshore habitats in the Gulf of Maine, Georges Bank, and farther south in the Mid-Atlantic region, with bays and estuaries also included in these regions. As juveniles, pollock migrate between inshore and offshore waters with movements typically linked to water temperatures (Cargnelli et al. 1999d). Due to these migrations, EFH for juvenile pollock is designated as inshore and offshore pelagic and benthic habitats intertidal zone to 180 m (591 ft) in the Gulf of Maine, Long Island Sound, and Narragansett Bay, between 40 and 180 m (131–591 ft) on western Georges Bank and the Great South Channel, and in mixed and full salinity waters in a number of bays and estuaries north of Cape Cod. Habitat types included in this designation consist of rocky bottom habitats with attached macroalgae and shallow eelgrass beds, which provide refuge from predators (NEFMC 2017). Adult pollock typically remain farther offshore than the EFH areas designated for larvae in the Offshore Development Area.

Porbeagle Shark

Porbeagle shark (*Lamna nasus*) EFH is combined for all life stages due to insufficient data on the individual life stages and designated EFH overlaps with both OECCs and the Lease Area. EFH for porbeagle shark includes offshore and coastal waters of the Gulf of Maine (excluding Cape Cod and Massachusetts Bay) and offshore waters from Georges Bank to New Jersey. Porbeagle sharks commonly inhabit deep, cold temperate waters and forage primarily on fish and cephalopod species (NMFS 2017).

Red Hake

Red hake (*Urophycis chuss*) EFH is designated in both OECCs and the Lease Area for all life stages. EFH for red hake eggs and larvae is surface waters of the Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras. Red hake eggs are generally observed from May through November while larvae are commonly observed from May through December. EFH for juvenile red hake is bottom habitats with a substrate of shell fragments in the Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras (Steimle et al. 1999b). Juvenile red hake are pelagic and congregate around floating debris for a time before descending to the bottom (Steimle et al. 1999b). EFH for adult red hake is bottom habitats in depressions with sandy or muddy substrates in the Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras. Although adult red hake are generally demersal, they can be found in the water column (Steimle et al. 1999b). Red hake larvae primarily consume copepods; juveniles prey upon small benthic and pelagic crustaceans; and adults prey upon benthic and pelagic crustaceans, fish, and squid (Steimle et al. 1999b).

Sand Tiger Shark

Sand tiger shark (*Carcharias taurus*) EFH is designated in both OECCs for neonates and juveniles (NMFS 2017). EFH for sand tiger shark neonates is along the US Atlantic east coast from Cape Cod to northern Florida. Neonate sand tiger sharks inhabit shallow coastal waters within the 25 m (82 ft) isobath (NMFS 2017). EFH for juvenile sand tiger sharks is designated in habitats between Massachusetts and New York and between New Jersey and Florida (NMFS 2017). The sand tiger shark is a Species of Concern because population levels are estimated to be only 10% of pre-fishery conditions. Population declines were primarily caused by historic overfishing while continued decline is due to capture as bycatch. Although fishing is restricted for sand tiger sharks, low fecundity has limited their ability to recover (Carlson et al. 2009).

Sandbar Shark

Sandbar shark (*Carcharhinus plumbeus*) EFH is designated in both OECCs for the juvenile and adult life stages. EFH for juvenile sandbar shark includes coastal areas of the US Atlantic between southern New England and Georgia (NMFS 2017). EFH for adult sandbar sharks is coastal areas from southern New England to Florida. Sandbar sharks are a bottom-dwelling shark species that primarily forages for small bony fishes and crustaceans (NMFS 2009).

Scup

Scup EFH is designated in the Lease Area for juvenile and adult life stages and in both OECCs for all life stages. EFH for eggs is estuaries from May through August, and May through September for larvae. EFH for juvenile and adult scup are the inshore and offshore demersal waters over the continental shelf from the Gulf of Maine to Cape Hatteras (Steimle 1999c). Juvenile scup feed mainly on polychaetes, epibenthic amphipods, and small crustaceans, mollusks, and fish eggs while adults have a similar diet, they also feed on small squid, vegetable detritus, insect larvae, sand dollars, and small fish (Steimle et al. 1999c). Scup occupy inshore areas in the spring, summer, and fall and migrate offshore to overwinter in warmer waters on the outer continental shelf (Steimle et al. 1999c). Scup was a dominant finfish species captured in the NEFSC Multispecies Bottom Trawl survey during spring, summer, and fall surveys and in the Massachusetts Division of Marine Fisheries trawl surveys in the spring and fall.

Shortfin Mako Shark

Shortfin mako shark (*Isurus oxyrinchus*) EFH is designated in the Lease Area and both OECCs for all life stages. EFH for all life stages is combined and considered the same due to insufficient data needed to differentiate EFH by life stage. EFH for shortfin mako shark is coastal and offshore habitats from Cape Cod to Cape Lookout, North Carolina and additional offshore areas in the Gulf of Maine, Florida, and Gulf of Mexico. Shortfin mako shark feed on swordfish, tuna, other sharks, clupeids, crustaceans, and cephalopods (NOAA Fisheries 2020a).

Silver Hake

Silver hake (*Merluccius bilinearis*), also known as whiting, has EFH designated in the Lease Area and both OECCs for all life stages. EFH for the egg and larval stages is surface waters of the Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras. Whiting eggs and larvae are observed all year with peaks in egg observations from June through October and peaks in larvae observations from July through September. EFH for juvenile and adult life stages is bottom habitats of all substrate types in the Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras (Morse et al. 1999). Silver hake are considered ravenous predators at all feeding life stages. Adults are semi-pelagic, nocturnal predators and primarily feed on fish, crustaceans, and squid (Lock and Packer 2004).

Smooth Dogfish

Due to insufficient information on the individual life stages (neonate, juvenile, and adult), EFH for smooth dogfish (*Mustelus canis*) is designated for all life stages combined and occurs in both OECCs and the Lease Area. EFH for smooth dogfish includes coastal areas and inshore bays and estuaries from Cape Cod Bay to South Carolina (NMFS 2017). Smooth dogfish are primarily demersal and undergo temperature stimulated migrations between inshore and offshore waters. Throughout their region, diets are dominated by invertebrates, especially American lobster (*Homarus americanus*); however, they also feed on small bony fishes throughout New England (NMFS 2017).

Spiny Dogfish

Spiny dogfish (*Squalus acanthias*) EFH is designated in the Lease Area for the juvenile and adult life stage. EFH is designated in both OECCs and the Lease Area for sub-adult and adult life stages. EFH for juvenile and adult spiny dogfish is waters on the continental shelf from the Gulf of Maine through Cape Hatteras (McMillan and Morse 1999). Pups are born in the offshore wintering grounds from November to January. Spiny dogfish primarily feed on fish, squid, and ctenophores, which they detect through olfaction, vision, acoustics, and sensing electrical fields. Spiny dogfish are a dominant finfish species in the MA WEA throughout the year (NEFSC n.d.) and are most common from the winter through the spring.

Summer Flounder

Summer flounder EFH is designated in both OECCs and the Lease Area for all life stages. EFH for eggs and larvae is pelagic waters found over the continental shelf from the Gulf of Maine to Cape Hatteras. Eggs are generally observed between October and May, while larvae are found from September through February. EFH for juvenile and adult summer flounder is demersal waters over the continental shelf from the Gulf of Maine to Cape Hatteras. In addition to EFH designations, there are also HAPC designations throughout the region. HAPC is designated as areas of all native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH (Packer et al. 1999). Juvenile summer flounder inhabit inshore areas such as salt marsh creeks, seagrass beds, and mudflats in the spring, summer, and fall and move to deeper waters offshore in the winter. Adults inhabit shallow coastal and estuarine areas during the warmer seasons and migrate offshore during the winter (Packer et al. 1999). Summer flounder are opportunistic feeders and diets generally correspond to prey availability in relation to flounder size, with smaller individuals primarily consuming crustaceans and polychaetes and larger individuals focusing more on fish prey (Packer et al. 1999).

Tiger Shark

Tiger shark (*Galeocerdo cuvier*) EFH is designated in both OECCs and the Lease Area for the juvenile and adult life stage. EFH for the juvenile life stage extends from Georges Bank to the Florida Keys in offshore pelagic habitats associated with the continental shelf break at the seaward extent of the US EEZ boundary (NMFS 2017). Tiger sharks are a warm water shark species and primarily remain south of the Mid-Atlantic Bight; however, they will occasionally travel farther north during the warmer summer months (NMFS 2017).

White Hake

White hake (*Urophycis tenuis*) EFH is designated in the Lease Area and the Connecticut OECC for juvenile and adult life stages, and the Massachusetts OECC for larval, juvenile, and adult life stages. Eggs are buoyant and occur in the water column; therefore, EFH is designated as pelagic habitats in the Gulf of Maine, including Massachusetts and Cape Cod Bays, and the outer continental shelf and slope (NEFMC 2017). Juveniles are pelagic until they reach a certain length and become demersal (Chang et al. 1999a). EFH for the juvenile stage is designated as intertidal and sub-tidal estuarine and marine habitats in the Gulf of Maine, Georges Bank, and southern New England, including mixed and high salinity zones in a number of bays and estuaries north of Cape Cod, to a maximum depth of 300 m (984 ft) (NEFMC 2017). For juveniles, EFH occurs on fine-grained, sandy substrates in eelgrass, macroalgae, and un-vegetated habitats. EFH for adults also occurs in fine-grained, muddy, substrates but also in mixed sand and rocky habitats.

White Shark

White shark (*Carcharodon carcharias*) EFH is designated in both OECCs for the neonate life stage, and both OECCs and the Lease Area for the juvenile, and adult life stages. EFH for neonates is inshore waters out to 105 km (57 NM) from Cape Cod to New Jersey. EFH for juvenile and adult white shark is combined and includes inshore waters out to 105 km (57 NM) from Cape Ann, Massachusetts to Cape Canaveral, Florida (NMFS 2017). White shark primarily consume fish as neonates and juveniles below 300 centimeters (120 inches) total length. Once they reach lengths greater than 300 centimeters (120 inches), white sharks begin consuming marine mammals primarily (Estrada et al. 2006).

Windowpane Flounder

Windowpane flounder (*Scophthalmus aquosus*) EFH is designated in both OECCs and the Lease Area for all life stages. EFH for eggs is surface waters around the perimeter of the Gulf of Maine, Georges Bank, southern New England, and the middle Atlantic south to Cape Hatteras. Windowpane flounder eggs are generally observed from July to August in northern Atlantic areas. EFH for larvae is pelagic waters around the perimeter of the Gulf of Maine, Georges Bank, southern New England, and the middle Atlantic south to Cape Hatteras. EFH for juvenile and adult life stages is bottom habitats that consist of mud or fine-grained sand substrate around the perimeter of the Gulf of Maine, Georges Bank, southern New England, and the middle Atlantic south to Cape Hatteras (Chang et al. 1999b). Juvenile and adult windowpane flounder feed on small crustaceans, especially mysid and decapod shrimp, and fish larvae (Chang et al. 1999b).

Winter Flounder

Winter flounder EFH is designated in the Lease Area for larval, juvenile, and adult life stages, and in both OECCs for all life stages. EFH for eggs is bottom habitats with sandy, muddy, mixed sand/mud, and gravel substrates on Georges Bank, the inshore areas of Gulf of Maine, southern New England, and the middle Atlantic south to Delaware Bay. Eggs are primarily observed from February through June. EFH for larvae is pelagic and bottom waters in Georges Bank, the inshore areas of the Gulf of Maine, southern New England, and the middle Atlantic south to Delaware Bay. Larvae are generally observed from March through July. EFH for juvenile and adult winter flounder is bottom habitats with muddy or sandy substrate in Georges Bank, the inshore areas of the Gulf of Maine, southern New England, and the middle Atlantic south to Delaware Bay. Winter flounder spawning occurs in the winter with peaks in February and March (Pereira et al. 1999). Previous research has reported that winter flounder spawning is confined to shallow inshore waters; however, a study conducted by the Coonamessett Farm Foundation, Inc. identified gravid and, recently, spent winter flounder females in the offshore areas of southern New England, indicating that winter flounder spawning is not confined to shallow inshore waters (Siemann and Smolowitz 2017). Winter flounder are considered opportunistic feeders throughout each life stage and consume a wide range of prey. Adults feed on bivalves, eggs, and fish, but shift diets based on prey availability (Pereira et al. 1999).

Winter Skate

Winter skate (*Leucoraja ocellate*) EFH is designated in both OECCs and the Lease Area for juvenile and adult life stages (NEFMC 2017). EFH for juvenile and adult winter skate includes sand and gravel substrates in sub-tidal benthic habitats in depths from the shore to 80–90 m (262–295 ft) from eastern Maine to Delaware Bay, on the continental shelf in southern New England and the mid-Atlantic region, and on Georges Bank. As a demersal species, winter skate consume a large variety of demersal prey including polychaetes, amphipods, and crustaceans (Packer et al. 2003b).

Witch Flounder

Witch flounder EFH is designated in the Lease Area and the Connecticut OECC for all life stages, and for egg, larvae, and adult life stages in the Massachusetts OECC. EFH for eggs is surface waters of the Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras. EFH for larvae is surface waters to 250 m (820 ft) in the Gulf of Maine, Georges Bank, the continental shelf off southern New England, and the middle Atlantic south to Cape Hatteras. Witch flounder eggs are generally observed from March through October, while larvae are observed from March through November (Cargnelli et al. 1999e). Witch flounder diet consists primarily of polychaetes and crustaceans (Cargnelli et al. 1999e).

Yellowtail Flounder

Yellowtail flounder (*Limanda ferruginea*) EFH is designated in both OECCs and the Lease Area for all life stages. EFH for eggs and larvae is surface waters of Georges Bank, Massachusetts Bay, Cape Cod Bay, and the southern New England continental shelf south to Delaware Bay. Eggs are most often observed from April through June and larvae are observed from May through July. EFH for juvenile and adult yellowtail flounder is bottom habitats with sandy or mixed sand and mud substrates on Georges Bank, the Gulf of Maine, and the southern New England shelf south to Delaware Bay (Johnson et al. 1999). Yellowtail flounder forage primarily for benthic macrofauna and diets largely consist of amphipods, polychaetes, and crustaceans (Johnson et al. 1999).

4 Potential Impacts and Proposed Avoidance, Minimization, and Mitigation Measures

The potential impact producing factors (IPFs) that may affect essential fish habitat during the construction, operations and maintenance (O&M), and/or decommissioning of Vineyard Northeast are presented in Table 4.0-1.

Table 4.0-1 Impact Producing Factors for Essential Fish Habitat Assessment

Impact Producing Factors	Construction	Operations and Maintenance	Decommissioning
Seafloor Disturbance and Habitat Modification	•	•	•
Suspended Sediments and Deposition	•	•	•
Entrainment and Impingement	•	•	•
Electromagnetic Fields		•	
Noise	•	•	•

Potential effects to EFH were assessed using the maximum design scenario for Vineyard Northeast's offshore facilities as described in Section 1.5 of COP Volume II.

4.1 Seafloor Disturbance and Habitat Modification

Temporary to long-term seafloor disturbance and habitat modification may occur from the installation, maintenance, and decommissioning of Vineyard Northeast components in the Lease Area and OECCs. These components include foundations (for the WTG, ESP, and booster station), scour protection, export cables, inter-array and inter-link cables, and cable protection (if required). Long-term habitat modification may result from installation of foundations, scour protection, and cable protection (if required). Additional temporary habitat modification may result from installation, maintenance, and decommissioning of export, inter-array and inter-link cables; pre-installation activities (such as sand bedform dredging, boulder clearance, and a pre-lay grapnel run); and usage of equipment that contacts the seafloor (such as jack-up vessels, vessel anchors or spud legs).

Table 4.1-1 provides the estimated long-term and temporary seafloor impacts by habitat type. Values are primarily based the percentage of each habitat type in the Lease Area and OECC (as described in Section 2.1) and should be considered approximate since the specific locations of long-term and temporary impacts (such as placement of cable protection and location of any needed dredging) are highly dependent upon the ongoing export cable engineering process and the final selected cable routes.

Table 4.1-1 Summary of Maximum Potential Seafloor Disturbance by Habitat Type

Habitat Type	Lease Area		Massachusetts OECC		Connecticut OECC Using Eastern Point Beach Approach		Connecticut OECC Using Ocean Beach Approach		Connecticut OECC Using Niantic Beach Approach	
	Long-Term	**Temp.**	**Long-Term**	**Temp.**	**Long-Term**	**Temp.**	**Long-Term**	**Temp.**	**Long-Term**	**Temp.**
Complex	0 km^2 (0 acres)	0 km^2 (0 acres)	0.17 km^2 (42 acres)	0.2 km^2 (48 acres)	0.114 km^2 (28 acre)	0.49 km^2 (122 acres)	0.114 km^2 (28 acre)	0.48 km^2 (120 acre)	0.087 km^2 (22 acre)	0.78 km^2 (193 acres)
Heterogenous Complex	0.16 km^2 (40 acres)	0.57 km^2 (140 acres)	0.14 km^2 (35 acres)	0.67 km^2 (165 acres)	0.05 km^2 (13 acres)	0.79 km^2 (194 acres)	0.05 km^2 (12 acres)	0.81 km^2 (199 acres)	0.05 km^2 (12 acres)	0.65 km^2 (161 acres)
Large Grained Complex	0 km^2 (0 acres)	0 km^2 (0 acres)	0 km^2 (0 acres)	0 km^2 (0 acres)	0 km^2 (0 acres)	0.035 km^2 (8.8 acres)	0 km^2 (0 acres)	0.036 km^2 (9 acres)	0 km^2 (0 acres)	0.001 km^2 (0.2 acres)
Soft Bottom	1.87 km^2 (461 acres)	6.59 km^2 (1,627 acres)	0.04 km^2 (10 acres)	3.49 km^2 (862 acres)	0.006 km^2 (2 acres)	2.84 km^2 (703 acres)	0.006 km^2 (2 acres)	2.8 km^2 (691 acres)	0.006 km^2 (1 acres)	2.88 km^2 (711 acres)
Total	2.03 km^2 (502 acres)	7.15 km^2 (1,767 acres)	0.35 km^2 (87 acres)	4.35 km^2 (1,075 acres)	0.17 km^2 (42 acres)	4.16 km^2 (1,028 acres)	0.17 km^2 (42 acres)	4.13 km^2 (1,019 acres)	0.14 km^2 (35 acres)	4.31 km^2 (1,066 acres)

Note:
1. Numbers may not sum perfectly due to rounding.

Direct impacts from seafloor disturbance during construction, maintenance activities, or decommissioning include the physical displacement, injury, and mortality of organisms and conversion of habitat types in both the Lease Area and OECCs. Sessile and slow-moving benthic and demersal species including those that create habitat and early life stages of invertebrates and fishes such as eggs and larvae are most at risk of injury and death from physical trauma as foundations, scour protection, cables, anchors, anchor lines, jack-up legs, and spud legs contact the seafloor. Export, inter-array, and inter-link cable installation and maintenance may affect organisms down to the target cable burial depth beneath stable seafloor of 1.5–2.5 m (5–8 ft),[2] or deeper where dredging is required prior to cable installation, and foundation installation may affect organisms down to the maximum foundation penetration depth as listed in Sections 3.3 and 3.4 of COP Volume I. Overall, these impacts are expected to be localized and limited to the relatively small impact areas from construction (Table 4.1-1). In addition, the MA WEA was selected by BOEM because it contains very little sensitive finfish and invertebrate habitat (Guida et al. 2017). Mobile species and life stages including demersal and pelagic fishes and benthic and pelagic invertebrates are expected to be impacted temporarily as they move to avoid physical contact and motions perceived as threats. These temporary avoidance impacts occur over a relatively short period and are comparable to existing disturbances by vessel traffic and fishing gear with organisms expected to return after the action ceases. Impacts from sedimentation during construction are discussed in Section 4.2.

Temporary habitat modifications, including temporary alterations to bathymetry, may occur during construction. Within the Lease Area, temporary habitat modifications may particularly affect EFH of benthic and demersal species that associate with soft bottom habitats. Dynamic, sandy physical habitat begins to recover substantially within a few months of disturbance and can fully recover abundance within two years and recover biomass and diversity in two to four years (Van Dalfsen and Essink 2001; Dernie et al. 2003). There is potential for EFH of structure-associated benthic and demersal species to be affected if and where complex habitat is present. Some nearshore hard-bottom habitats within Offshore Development Area may be designated as HAPC for juvenile Atlantic cod (HAPC for cod specifically includes mixed sand and gravel and rocky habitats). Additionally, these structurally complex habitats provide shelter and refuge habitat for small fishes and invertebrates and substrates for attachment epibenthic organisms (Auster 1998). Effects could range from increased seafloor relief to limited impacts from loss of key prey species due to mortality in affected areas. However, these effects are considered temporary because habitats are expected to begin recovery once construction, maintenance, or decommissioning activities are completed, and the local severity of these impacts is comparable to ongoing fishing dredge impacts along the Northeast US shelf and potential impacts are relatively small in spatial scale (Table 4.1-1). For vessels other than cable laying vessels (which must maintain tension on anchor lines), where it is considered impossible

---

2 Unless the final Cable Burial Risk Assessment (CBRA) indicates that a greater burial depth is necessary and taking into consideration technical feasibility factors, including thermal conductivity.

or impracticable to avoid a sensitive seafloor habitat when anchoring, the use of mid-line anchor buoys will be considered (where feasible and considered safe) as a potential measure to reduce impacts from anchor line sweep. A fisheries monitoring plan will be developed to monitor key indicators before and after construction; such monitoring may be part of regional monitoring efforts.

Long-term modification/conversion of habitat type may affect EFH of benthic/demersal and pelagic fishes. Foundations and scour protection will create hard/complex habitat in the water column and along the seafloor that previously did not exist, and cable protection will cover existing habitat with anthropogenic hard bottom. The Proponent intends to avoid or minimize the use of cable protection to the greatest extent feasible through careful site assessment and thoughtful selection of the most appropriate cable installation tool to achieve sufficient burial. Foundations, scour protection, and cable protection are expected to have localized benefits for structure-associated species through the conversion of habitat, with potential localized adverse impacts to species that prefer fine substrates. Research focused on changes in community assemblages related to habitat around offshore wind farms found that species that prefer complex habitat became newly established after installation while communities in nearby soft-bottom habitats remained unchanged (Stenberg et al. 2015). The newly created foundation structure throughout the water column can be compared to the addition of artificial reefs which have been shown to lead to ecological benefits (Langhamer 2012). Some of these benefits observed around WTGs include increased biodiversity and abundances of fishes (Wilhelmsson et al. 2006; Andersson and Öhman 2010; Riefolo et al. 2016; Raoux et al. 2017). Addition of foundations may also alter trophic dynamics from the bottom up through the introduction of new surfaces for filter feeders to colonize and consume plankton (Coates et al. 2014; Slavik et al. 2017). However, the habitat created by the addition of offshore components also has potential to benefit non-indigenous species and provide a mechanism for wider dispersal of potentially harmful non-indigenous species through a steppingstone effect (Glasby et al. 2007) resulting in localized impacts to the finfish and invertebrates such as blue mussels and fishes that consume them. Cable protection is expected to have similar impacts in places where it is placed on fine substrate, but, where it is placed on hard/complex habitat, it may have temporary negative impacts to structure-oriented species until it is colonized by the benthic community.

Overall, any such long-term changes due to the introduction of foundations, scour protection, and cable protection are only anticipated to affect a small percentage of the available habitat in the Lease Area and OECCs. For example, long-term impacts are only 0.4% of the total size of the Lease Area. Additionally, the Proponent's goal is to minimize the use of cable protection to the greatest extent possible through a careful route assessment and the selection of the most appropriate cable burial tool for each segment of the cable route.

Eelgrass, important EFH habitat for many species and included in the designation of HAPC for summer flounder, was observed at least in the form of occasional strands and clumps within the Offshore Development Area, specifically along portions of the Connecticut OECC near the

Niantic Beach Landfall Site (Section 2.1.3). However, the cables will be routed within the OECC to avoid impacts to any potential eelgrass. In addition, presence of any native species of macroalgae, seagrasses, or freshwater and tidal macrophytes in any size bed, as well as loose aggregations qualify that habitat type as HAPC for summer flounder. Presence of these habitat types as determined by noted in site characterization surveys and will be avoided.

During decommissioning, all offshore components will be removed, although the offshore cables may be retired in place or removed. Temporary effects from decommissioning are expected to be similar to those experienced during construction. The long-term modifications of habitat are expected to be reversed upon decommissioning when offshore components are removed below the mudline (unless cable and scour protection are retired in place, in which case they will continue to function as hard/complex bottom unless buried by sedimentation).

4.2 Suspended Sediments and Deposition

Temporary increases in suspended sediments and subsequent sediment deposition may occur in the Lease Area and OECCs from the installation, maintenance, and decommissioning of export cables, inter-array cables, inter-link cables, foundations, and scour protection. Specifically, sediment is expected to be suspended into the water column during cable pre-installation activities (e.g., sand bedform dredging, boulder clearance, and a pre-lay grapnel run), cable installation, seabed preparation prior to foundation installation (if needed), installation of cable protection (where required), the use of other equipment that contacts the seafloor (e.g., jack-up vessels, vessel anchors, or spud legs), and excavation of the temporary horizontal directional drilling (HDD) exit pit. The majority of these activities would occur during construction, with potential for limited maintenance if cables require repair or maintenance; however, any maintenance impacts would be expected to be far less than those from construction activities. Impacts from suspended sediments and deposition would be temporary and confined to a small area close to the location of the installation activity.

Direct effects on EFH from suspended sediments will temporarily impact water column EFH and can include visual impairment, asphyxiation, and reduced filter feeding abilities of species within the habitat. Severity of impacts from suspended sediments during construction, maintenance activities, or decommissioning would vary based on the concentration and duration of suspended material. Sediment is suspended regularly by storm events so many species are adapted to sediment impacts from suspended sediments. As discussed in Section 4.6 of COP Volume II, reduced growth and oxygen consumption of bivalves can occur when sediment concentrations of 100 milligrams per liter (mg/L) persist for two days (Wilber and Clarke 2001). Sublethal effects (i.e., non-lethal asphyxiation) were observed for adult white perch (*Morone americana*) when 650 mg/L of suspended sediments persisted for five days (Sherk et al. 1974). Lethal effects for other adult fish species can occur at concentrations greater than 1,000 mg/L that persist for at least 24 hours (Sherk et al. 1974; Wilber and Clarke 2001). Fish eggs and larvae are typically more sensitive, with delayed hatching observed for white perch at a sediment concentration of 100 mg/L for one day (Sherk et al. 1974). Therefore, 100 mg/L for 24 hours is considered a conservative threshold for impacts from suspended sediments. As described in Section 4.5 of COP Volume II, concentrations of 10 mg/L for 24 hours could potentially affect settlement of extremely sensitive life stages (i.e., coral larvae) and is therefore considered an extremely conservative threshold.

Direct effects on EFH from the resettlement of suspended sediments will temporarily impact water column EFH and can include mortality or injury, particularly for immobile species or life stages and habitat disturbance/conversion from burial and smothering. Severity of impacts from deposited sediments during construction, maintenance activities, or decommissioning would vary based on the thickness of material and habitat type. As discussed in Section 4.5, some infaunal bivalves can withstand deposition levels up to 300 mm (12 in) (Essink 1999). Sessile or seafloor surface-dwelling species, such as blue mussels and queen scallops (*Aequipecten opercularis*), are more sensitive to deposition levels and lethal effects have been observed with burial depths between 20–100 mm (0.8–4 in) (Essink 1999; Hendrick et al. 2016). For demersal eggs (fish [e.g., Atlantic wolffish (*Anarhichas lupus)*, Atlantic herring, and winter flounder], squid [e.g., longfin inshore squid], and whelk species), deposition greater than 1 mm (0.04 in) can result in the burial and mortality of that life stage (Berry et al. 2011). Therefore, sediment deposition thicknesses of 1 mm (0.04 in) and 20 mm (0.8 in) are considered the conservative thresholds for demersal eggs and shellfish, respectively.

To assess the impacts of suspended sediments and deposition, sediment transport modeling was completed for three activities: export cable and inter-array cable installation, HDD exit pit construction,[3] and sand bedform dredging (see Appendix II-P). Activities were modeled separately within the Lease Area, Massachusetts OECC, and the Connecticut OECC. Model results provided the following estimates of the durations and concentrations of suspended sediment during construction:

- **Export and inter-array cable installation:** Above-ambient total suspended solids (TSS) concentrations substantially dissipate within one to two hours and fully dissipate in less than four to 12 hours. The modeling analyses predict that suspended sediment concentrations induced by installation of the cables will largely be of short duration, confined to the near-bottom portion of the water column, and will return to ambient conditions within several hours after the installation device has passed. Additionally, if a pre-pass jetting run (using a jet plow or jet trencher) were to be conducted along the route (see Section 3.5.4 of COP Volume I), it is anticipated this would occur with sufficient time for any suspended sediment concentrations to return to ambient conditions prior to cable installation.

[3] As described in Appendix II-P, the modeling for HDD exit pit construction focused on backfilling since it may result in greater water quality effects than excavation under the conservative assumption that dredged material is released at the water surface.

- **HDD exit pit construction:** Above-ambient TSS concentrations may be present throughout the entire water column because sediments were released at the water surface but are predicted to return to ambient conditions within six hours.
- **Sand bedform dredging and dumping:** Above-ambient TSS concentrations originating from the potential dredging equipment are intermittent along the route and coincide with the representative dredge locations (due to drag arm disturbances at the seafloor) and representative dumping locations. Above-ambient TSS concentrations substantially dissipate within two to three hours and fully dissipate within either four to six hours (for the Lease Area, Massachusetts OECC, and Eastern Point Beach Approach model scenarios) or six to 12 hours (for the Niantic Beach Approach and the Connecticut OECC model scenarios).

Since suspended sediments are expected to dissipate within 12 hours for all modeled scenarios and do not exceed the conservative effects threshold of concentrations of 100 mg/L for 24 hours or 200 mg/L for 12 hours, suspended sediments from construction and operation activities are not expected to have lethal or sublethal effects to finfish and invertebrates in the Offshore Development Area. In addition, suspended sediments are expected to be localized, with high concentrations not expected to travel greater than a few kilometers (few miles) from the centerline.

Model results also provided estimates of the extent, area, and range of thicknesses of deposited sediment during construction (Appendix II-P). Model results for export cable and inter-array cable installation, HDD exit pit construction, and sand bedform dredging and dumping provided the following estimates:

- **Export and inter-array cable installation:** The model predicted a depositional thickness between 1 mm (0.04 in) and 10 mm (0.4 in).
- **HDD exit pit construction:** The model predicted a depositional thickness of less than 5 mm (0.2 in) for the Massachusetts Landfall Site HDD Exit Pit Construction model scenario and less than 100 mm (4 in) for the Connecticut Landfall Site HDD Exit Pit Construction model scenario, although it is noted that only a small area (0.02 km^2 [5 acres]) near the Connecticut HDD exit pit is predicted to have greater than 20 mm (0.8 in) of deposition.
- **Sand bedform dredging and dumping:** The model predicted the cumulative sediment deposition from the representative sand bedform dredging simulations within the Lease Area, Massachusetts OECC, and Connecticut OECC to be less than 5 mm (0.2 in) and to remain close to the drag arm disturbances (i.e., within 0.09 km of the disturbance location) and within the OECC. The deposition associated with overflow and dumping exceeded a thickness of 100 mm (4 in) but was predicted to remain around the dump locations (i.e., within 0.1 km [0.06 mi] to 0.43 km [0.27 mi] depending

on the simulation), with a thickness of 1 to 5 mm (0.04 to 0.2 in) occurring in isolated and patchy locations depending on the location of the prevailing currents at the time of release.

For export cable installation and HDD exit pit construction, the model predicted that deposition in most areas would be below the 20 mm (0.8 in) sensitivity threshold for shellfish, with only a small area (0.02 km^2 [5 acres]) predicted to have deposition above 20 mm (0.8 in). If a pre-pass jetting run (using a jet plow or jet trencher) were to be conducted along the route (see Section 3.5.4 of COP Volume I), the predicted deposition is expected be similar to that of the export cable installation scenario and remain below the 10 mm (0.4 in) threshold. Sufficient time is also anticipated between the pre-pass jetting run and cable installation to allow for some of this sediment deposition to settle out due to the forcing of surrounding currents.

Dredging and dumping activities are predicted to result in additional areas receiving deposition above 20 mm (0.8 in), primarily due to dumping activities at discrete locations along each OECC and within the Lease Area. The modeled areas with predicted deposition above 20 mm (0.8 in) range between 0.04 km^2 (10 acres) to 0.92 km^2 (227 acres) depending on the location (Lease Area, Massachusetts OECC, or Connecticut OECC and associated landfall sites). However, the potential impact to finfish and invertebrate resources from deposition above 20 mm (0.8 in) is a small portion of the available habitat. For example, the extent of deposition above 20 mm (0.8 in) along the Connecticut OECC using the Niantic Beach Approach, the scenario with the highest sediment deposition results from modeling (Appendix II-P), is expected to be restricted to a maximum distance of 0.43 km (0.27 mi) from the route centerline (Appendix II-P). Additionally, if all of the area that would be impacted by the predicted deposition above 20 mm (0.8 in) along the Connecticut OECC using the Niantic Approach was conservatively assumed to be heterogeneous complex and complex habitat (Appendix II-D), this would only potentially impact approximately 3% of the available habitat within the OECC, with additional habitat available in the regions surrounding the OECC. Similarly, since the areas of sediment deposition above 20 mm (0.8 in) are predicted to be less for the Massachusetts OECC and Lease Area than for the Connecticut OECC, the percentage of habitat impacted is expected to be an even smaller portion of the available habitat. For this reason, though there are expected to be short-term to longer term (several years) impacts on the finfish and invertebrate resources along the Connecticut OECC, Massachusetts OECC, and Lease Area, these are not anticipated to result in population-level effects. In addition, a benthic habitat monitoring plan has been developed (Appendix II-R) to monitor recovery after construction in areas with sensitive habitats where similar post-construction monitoring has not already been conducted for other projects (such as along the OECCs).

4.3 Entrainment and Impingement

Localized entrainment and potentially impingement of planktonic life stages of finfish and invertebrates within water column EFH may occur in the Lease Area and OECCs from the installation, maintenance, and decommissioning of export cables, inter-array cables, inter-link cables, foundations, and scour protection. Short-term impacts may result from vessel cooling systems used during all phases and from other pump intakes including the potential use of jetting equipment to install export, inter-array, and inter-link cables. If the selected ESP includes high voltage direct current (HVDC) equipment, impacts may result from the cooling water intake structure (CWIS) which may be required.[4]

Direct impacts from entrainment could be mortality of entrained organisms in both the Lease Area and OECCs. Impacts from impingement can range from injury to mortality. The rate of entrainment and impingement are dependent on the physical characteristics of the intake and composition of the local finfish and invertebrate community. The size of the intake screen controls the maximum size of organisms that can be entrained while intake flow velocities determine the capability of organisms to avoid entrainment and impingement. The intake flow volume influences the total number of organisms that may be impacted. Planktonic organisms, such as some egg and larval fish and invertebrates, are most at risk of mortality from entrainment due to their small size and zero to limited swimming ability. Although survival rates of entrained organisms may vary (Mayhew et al. 2000), it is conservatively assumed that entrained eggs and larvae would experience 100% mortality rates.

An HVDC CWIS is expected to intake up to 8.75 million gallons (33.1 million liters) per day throughout the operational period, which is roughly 0.0001% of the volume of water within the Lease Area assuming an average depth of 50 m (164 ft). Based on this volume and because more than 25% of the intake volume will be used for cooling, this new facility will be subject to the Track One requirements for new facilities defined at § 125.84(b) as it pertains to Section 316(b) of the Clean Water Act. Therefore, an additional permitting process will be performed in coordination with the US Environmental Protection Agency (EPA) prior to construction of a CWIS that will further evaluate the potential impacts from entrainment and impingement. Intake screen designs can be modified to reduce intake velocities, so it is expected that impingement will not be a significant impact for most species.

Jetting equipment may be used to install export, inter-array, and inter-link cables during the construction period and could withdraw up to 0.71 million gallons (2.7 million liters) per hour when in use. However, due to the relatively short period of use, the total volume of entrained water from jetting equipment is expected to be at least two orders of magnitude less than the volume entrained over the life of the CWIS. In addition, modeling at nearby South Fork Wind

---

4 This analysis assumes an open-loop CWIS is required; however, the HVDC ESP(s) could potentially use closed-loop water cooling (where no water is withdrawn from or discharged to the sea) if such technology becomes technically and commercially feasible. Although this technology is not currently available in the offshore wind market, the Proponent is aware of a number of firms that are working to develop and test closed loop cooling systems for use in offshore wind HVDC ESPs.

(2019) and Cape Wind (MMS 2008) found entrainment impacts from jet plow cable installation to be small relative to total zooplankton abundance. Vessel CWIS volumes are also expected to be minimal relative to HVDC CWIS volumes.

To estimate the impacts of entrainment from an HVDC CWIS, an assessment using anticipated flow rates and local zooplankton data was completed as described in (Appendix II-N). Model results provided estimates of the composition and magnitude of intake mortality for ichthyoplankton and total other zooplankton. Additionally, equivalent losses of age one fish were calculated for some species. Based on seasonal mean densities and entrained water volumes, annual estimated ichthyoplankton losses from CWIS entrainment are expected to range from 0 to 10.2 million fish larvae depending on the species. Annual estimated zooplankton losses are expected to be 13.5 billion individuals. When considering the high mortality rates for fish early life stages, the number of equivalent age one fishes lost to entrainment are expected to be typically less than 10,000 individuals per species annually, which is a fraction of a percent of annual commercial landings for most species. Based on the magnitudes of the results, ecological and socioeconomic effects from entrainment on EFH resources by the HVDC CWIS will likely be undetectable.

4.4 Electromagnetic Fields

Electromagnetic fields (EMFs) would be produced by energized export, inter-array, and inter-link cables during operation. EMFs consist of two components: electric fields and magnetic fields (MFs). The characteristics of the EMF can vary greatly depending on the energy flow of electricity and the type of current: HVAC vs. HVDC (Tricas 2012). Due to cable configuration and shielding, electric fields are not expected in the marine environment from Vineyard Northeast cables. Therefore, the following discussion describes EMF generally and then focuses on MFs when discussing the potential effects from Vineyard Northeast. As described further in Sections 3.5 and 3.6 of COP Volume I, export cables in the Connecticut OECC will use HVDC transmission technology and export cables in the Massachusetts OECC may use HVDC or HVAC transmission technology, although HVDC is more likely. Inter-array cables are expected to be HVAC cables but could also be HVDC cables; inter-link cables are expected to be the same cable type as the offshore export cables or the inter-array cables.

Effects on finfish and invertebrates from EMF are not fully understood but can include disorientation and other behavioral responses (e.g., avoidance, changes in prey detection or feeding activity) (Riefolo et al. 2016). Severity of impacts from EMF during operation would vary based on the strength of the EMF and the electromagnetic sensitivity of organisms. Of species potentially present in the Offshore Development Area, electromagnetic sensitivity has been primarily documented in elasmobranchs (sharks, skates, and rays), as well as some teleost fish species (ray-finned fishes), and invertebrates such as cancer crabs. The effects of EMF would be localized because EMFs produced by cables decrease with distance. In addition, at the target burial depth for the cables (1.5–2.5 m [5–8 ft] beneath stable seafloor),[5] EMFs at the seabed would be expected to be weak and likely only detectable by demersal species (Normandeau et al. 2011). In areas where seafloor type potentially prohibits cable burial, cable protection would serve as a similar although thinner barrier to exposure.

A white paper review study funded by BOEM determined that HVAC EMFs produced by power transmission cables would result in negligible, if any, effects on bottom-dwelling commercial and recreational fish species and no negative effects on pelagic commercial and recreational fish species in southern New England (Snyder et al. 2019). Other reviews have concluded that effects of HVDC and HVAC EMFs on invertebrates can be measurable but generally not at the EMF strengths of offshore wind projects (Albert et al. 2020; Gill and Desender 2020). For example, there is some evidence of attraction to HVDC EMF for a species of *Cancer* crab at an EMF strength hundreds of times greater than expected based on modeling for Vineyard Northeast (Scott et al. 2021; Appendix II-O). Similarly, although there were changes in the behavior of little skate, an elasmobranch, and American lobster in the presence of energized HVDC cables, EMFs from cables did not act as a barrier to movement in any way (Hutchison et al. 2018, 2020). Other research investigating habitat use around energized cables found no evidence that fishes or invertebrates were attracted to or repelled by EMFs emitted by HVAC cables (Love et al. 2017).

For HVDC cables, other manmade sources of perturbations to Earth's steady DC geomagnetic field in coastal environments include shore-based structures such as docks, jetties, and bridges; sunken ships; pipelines; and ferromagnetic mineral deposits (Normandeau et al. 2011; CSA Ocean Sciences Inc. and Exponent 2019). Additionally, Normandeau et al. (2011) reported that MF impacts nearby to these sources can be on the order of tens of milliGauss (mG), while CSA Ocean Sciences Inc. and Exponent (2019) observed that undersea sources of DC MFs including steel ships and bridges can create DC MFs up to 100 times greater than MFs from DC submarine cables.

For HVAC cables, a seven-year study reported the first findings in the US of the response of demersal fish and invertebrates to construction and operation of an offshore wind project (Wilber et al. 2022). This study reported findings for analyses of catch data from monthly demersal trawl surveys conducted by local fisherman and scientists during construction and operation of the Block Island Wind Farm. This study did not report findings supporting harmful impacts of EMF from the project 60-hertz (Hz) alternating current (AC) submarine export cables or other offshore electrical infrastructure on local demersal fish and invertebrates, and instead reported evidence of increased populations of several fish species near the wind farm during the operation time period relative to the reference areas.

---

5 Unless the final CBRA indicates that a greater burial depth is necessary and taking into consideration technical feasibility factors, including thermal conductivity.

To assess the potential effects of Vineyard Northeast, modeling of MFs from HVDC and HVAC cables was completed as described in (Appendix II-O).[6] Model results provided estimates of the magnitude and extent of MFs from a range of loads during operation and for cables that are either buried at a depth of 1.5 m (5 ft) or surface-laid. Surface laid cables are assumed to have 0.5 m (1.6 ft) thick cable protection covering. Modeling demonstrated that MFs at the seafloor from the buried cables decline with distance, with a maximum MF directly above the centerline that decreases rapidly with distance (Table 4.4-1 and Table 4.4-2; Appendix II-O). Tables 4.4-1 and 4.4-2 show the rapid drop-off in MF levels with increased lateral distance from the HVAC cables or HVDC cable bundles for each of the modeling scenarios. More specifically, the analysis shows >95 to >99% reductions in MF levels at lateral distances of ±25 ft (±7.6 m) from the from the centerlines of HVAC cables or HVDC cable bundles; and at lateral distances of ±25 ft (±7.6 m), there is a negligible difference in MF levels for the buried versus the surface-laid cables. Based on the results, MFs are likely only able to be sensed, if at all, directly over the buried cable centerline. Therefore, any effects from EMF on the suitability of EFH are expected to be localized with only behavioral impacts, if any at all, for most finfish and invertebrate species.

Table 4.4-1 Summary of Modeled Magnetic Fields for HVDC Offshore Export Cables, as Deviations from Earth's Steady DC Magnetic Field

Cable Voltage	Installation Scenario[2]	DC Magnetic Field Deviation[1,3] (mG)			
		Maximum (above cables)	± 10 ft	± 25 ft	± 50 ft
±320 kV	Buried	-268 to 271	-49.9 to 51.8	-11.5 to 11.5	-2.9 to 2.9
	Surface-laid	-266 to 2,039	-72.4 to 72.5	-11.5 to 11.5	-2.8 to 2.8
±525 kV	Buried	-296 to 300	-55.4 to 57.8	-12.9 to 12.9	-3.3 to 3.3
	Surface-laid	-268 to 2,207	-81.0 to 81.2	-12.9 to 12.9	-3.2 to 3.2

Notes:

1. Magnetic fields are presented as the deviation from the Earth's steady DC magnetic field of 508 mG and are maximum positive and negative deviations across modeling cases that include two representative cable orientations (north-south and east-west) and both possible current flow direction scenarios for each representative cable orientation. Negative values are the maximum reductions below the Earth's steady DC magnetic field of 508 m mG.
2. Magnetic fields at the seabed are reported for buried cables. Surface-laid cables are assumed to have 0.5-m (1.6-ft) thick cable protection covering. For these scenarios, magnetic fields are reported at the top of the cable protection, specifically at 0.65 m (2.14 ft) for the ±320-kV cables, and 0.67 m (2.20 ft) for the ±525-kV cables.
3. Horizontal distance is measured from the center of the cable bundle.

[6] Modeling was focused on export cables because inter-array cables are expected to have lower currents and MFs. Inter-link cables are expected to have similar or lower MFs.

Table 4.4-2 Summary of Modeled Magnetic Fields for HVAC Offshore Export Cables

Cable Voltage	Installation Scenario[1]	AC Magnetic Field[2] (mG)			
		Maximum	± 10 ft	± 25 ft	± 50 ft
230 kV, 3-phase	Buried	191	43.6	9	2.8
	Surface-laid	1,243	54	9.3	2.8
345 kV, 3-phase	Buried	214	49.6	10.2	3.1
	Surface-laid	1,354	61.6	10.7	3.2

Notes:

1. Magnetic fields at the seabed are reported for buried cables. Surface-laid cables are assumed to have 0.5-m (1.6-ft) thick cable protection covering. For these scenarios, magnetic fields are reported on top of the cable protection, specifically at 0.79 m (2.58 ft) for 220-kV cables, and 0.82 m (2.68 ft) for 345-kV cables.
2. Horizontal distance is measured from the center of the cable bundle.
   The offshore export cable MF modeling assumes straight-laid phase-conductor cable cores, as opposed to the actual helical or "twisted" phase-conductor cores. A helical design achieves a considerable degree of magnetic field cancellation, hence the modeled MF levels are expected to be overestimates of actual MF levels.

4.5 Noise

Temporary to long-term increases in noise may occur in the Lease Area and OECCs from the installation, operation, maintenance, and decommissioning of export cables, inter-array cables, inter-link cables, foundations. The intensity and duration of noises is expected to vary based on activity. Temporary construction noise is expected to be include both repetitive, high-intensity (impulsive) sounds produced by pile driving, and continuous (non-impulsive), lower-frequency sounds produced by vessel propulsion, drilling, vibratory installation of monopiles, and cable pre-installation/installation activities. Noise will also be produced during unexploded ordinance (UXO) detonation (if UXO detonation is needed). Long-term operational noise is expected to be continuous (non-impulsive) noise from WTGs and vessel traffic. Additional continuous noise may also be produced temporarily during cable maintenance or aircraft activities.

Effects of Sound on Finfish and Invertebrates

Direct effects on EFH from noise can include decreased suitability in the form of behavioral changes, stress responses, injury, and mortality of finfish and invertebrates. Severity of impacts from noise during construction, maintenance activities, or decommissioning would vary based on the duration and intensity of sound and biology (e.g., auditory system and swim bladder presence) of the fish. Impulsive sounds can lead to mortality, ruptured gas bladders and damage to surrounding organs, damage to auditory processes, and altered behavior in some fish species (Popper and Hastings 2009; Casper et al. 2012; Riefolo et al. 2016). Continuous noise typically has lower sound pressure levels but can result in avoidance behavior that interferes with feeding and breeding, alter schooling behaviors and migration patterns, and can mask important environmental auditory cues (CBD 2012; Barber 2017). In general, the presence of a swim bladder makes a fish more susceptible to injury from sounds because loud, usually impulsive, noises (i.e., impact pile driving, explosions) can cause swim bladders to vibrate with enough force to inflict damage to tissues and organs around the bladder (Halvorsen et al. 2011; Casper et al. 2012). Risk of injury occurs at the lowest noise levels in fishes with swim bladders connected to the inner ear, such as Atlantic herring and Atlantic cod. In addition, species that exhibit spawning site fidelity, such as Atlantic cod (Zemeckis et al. 2014), may experience a disruption in communication and reproductive behavior if spawning occurs within the noise-affected area. The least sound sensitive fish species, which do not have a swim bladder, include both flatfishes and elasmobranchs (Thomsen et al. 2006; Popper et al. 2014). Noise could also affect the functionality and sensitivity of the sensory systems of marine invertebrates, but most studies on these effects have been performed *ex situ*, making it difficult to control and assess the acoustic conditions and typically only measure and report on the pressure component of sound. Additionally, most crustacean species lack swim bladders and are considered less sensitive to sound, however, understanding of the impact of sound and vibration on invertebrates is limited by a dearth of data (Edmonds et al. 2016).

Popper et al. (2014) determined injury and mortality thresholds for three groups of fishes from impact pile driving (see Table 4.5-1 for values). The three groups include fishes with swim bladders whose hearing does not involve the swim bladder or other gas volumes (e.g., tuna [*Thunnus* sp.] or Atlantic salmon); fishes whose hearing does involve a swim bladder or other gas volume (e.g., Atlantic cod or Atlantic herring); and fishes without a swim bladder (e.g., sharks) that can sink and settle on the substrate when inactive (Popper et al. 2014; Carroll et al. 2017). NMFS published "interim guidance" thresholds for peak onset of injury or behavior regardless of source type, fish size, or hearing type, and a cumulative Sound Exposure Level (SEL) onset of injury or mortality for fish less than and greater than two grams (0.07 ounces) (Oestman et al. 2009) (Table 4.5-1 and Table 4.5-2).

Table 4.5-1 Acoustic Thresholds Used to Evaluate Impacts to Fish Exposed to Impact Pile Driving Sound

Faunal Group	Impairment				Behavior
	Recoverable Injury		Temporary Threshold Shift	Masking	
	L_{PK}	$L_{E,24hr}$	$L_{E,24hr}$		
Fishes without swim bladder	>213	>216	>>186	(N) Moderate (I) Low (F) Low	(N) High (I) Moderate (F) Low
Fishes with swim bladder not involved in hearing	>207	203	>186	(N) Moderate (I) Low (F) Low	(N) High (I) Moderate (F) Low
Fishes with swim bladder involved in hearing	>207	203	186	(N) High (I) High (F) Moderate	(N) High (I) High (F) Moderate

Notes:
1. Adapted from ANSI-accredited Popper et al. 2014; all thresholds are unweighted. Recoverable injury thresholds were modeled for this study.
2. L_{PK} = peak sound pressure (dB re 1 μPa); $L_{E,24hr}$ = 24 hr cumulative sound exposure level (dB re 1 $μPa^2·s$).
3. N = near (tens of meters), I = intermediate (hundreds of meters), and F = far (thousands of meters).
4. >> = much greater than

Table 4.5-2 General Interim Acoustic Thresholds for Fish Currently Used or Recommended by NMFS and BOEM for Impact Pile Driving

Fish Group	Injury[1,2]		Behavior[3]
	L_{PK}	$L_{E,24hr}$	L_p
Fish ≥2 g	206 [4,5]	187 [4,5]	150 [5]
Fish <2 g		183[4,5]	
Fish without swim bladder[6]	213	216	-
Fish with swim bladder not involved in hearing[6]	207	210	-
Fish with swim bladder involved in hearing[6]	207	207	-

Notes:
1. All thresholds are unweighted.
2. L_{PK} = peak sound pressure (dB re 1 μPa); $L_{E,24hr}$ = 24 hr cumulative sound exposure level (dB re 1 $μPa^2·s$).
3. L_p = root mean square sound pressure (dB re 1 μPa).
4. NMFS recommended criteria adopted from the Fisheries Hydroacoustic Working Group (Oestman et al. 2009).
5. References in the NMFS Greater Atlantic Regional Fisheries Office (NMFS GARFO 2016) tool: Andersson et al. (2007), Mueller-Blenkle et al. (2010), Purser and Radford (2011), Wysocki et al. (2007).
6. Popper et al. 2014.

Foundation Installation

Foundation installation is expected to require impact pile driving and may also require the use of a vibratory hammer and/or drilling. Potential effects from each of these activities are described below. Results of the modeling for foundation installation activities, provided in Appendix II-E, were used to calculate modeled distances to potential fish injury and behavioral thresholds.

Impact Pile Driving

Impact pile driving would result in temporary, transient, repetitive, and discontinuous high intensity impulsive noise during construction. Field measurements of pile driving show that source, or near-source, levels are typically in the range of 210 to 250 dB re 1 µPa (McHugh 2005; Tougaard et al. 2009a; Bailey et al. 2010) and frequency is predominantly <1 kilohertz (kHz) (Robinson et al. 2007; Tougaard et al. 2009b), although they can extend to much higher frequencies (MacGillivray 2018), including at least 100 kHz (Tougaard et al. 2009b).

Sound thresholds derived from Popper et al. (2014) indicate that pile driving sound above 207 dB peak can lead to mortality of the most sensitive fish species, such as Atlantic herring, while noise above 186 dB can lead to impairment. Longfin squid, an invertebrate, had no physical harm but exhibited a startle response to recorded pile driving sound played at 190–194 dB but habituated quickly and startle responses typically diminished within the first eight strikes, but the response returned when the squid were tested again 24 hours later (Jones et al. 2020). In their more recent study, when playing pile driving noise to mating squid, Jones et al. (2023) found no significant effects on the occurrence rates of agnostic behaviors, mate guarding, mating and egg laying, when compared to silent control trials. From this study, Jones et al. (2023) conclude that while there can be some disturbance to some non-reproductive behaviors, the results of their study show that species with limited opportunity to reproduce can tolerate intense stressors to secure reproductive success. The effects of impulsive sound on fish eggs and larvae have also been studied in the context of offshore pile driving. Common sole (*Solea solea*) larvae exposed to impulsive stimuli up to a SEL of 206 dB re 1 $\mu Pa^2 \cdot s$ (corresponding to 100 strikes at a distance of 100 m [328 ft]) had no statistically significant differences in mortality (Bolle et al. 2012). Published exposure guidelines for fish eggs and larvae based on pile driving data proposed a precautionary threshold for mortality of fish eggs and larvae of greater than 207 dB re 1 µPa PK, which was noted by the publisher to likely be conservative (Popper et al. 2014).

There are no studies available on the potential effects of pile driving sounds on plankton and no established acoustic thresholds for plankton. Although use of air guns is not a proposed action, they provide insight on potential effects from impulsive sound. The results from air gun studies on plankton are mixed, varying from no significant effects on mortality (Parry et al. 2002) to a maximum horizontal effect-range of 1.2 km (0.65 nautical mile [NM]) in which decreases in zooplankton abundance with mortality in adult and larval zooplankton increased two- to three-fold when compared to controls (McCauley et al. 2017). The Commonwealth Scientific and

Industrial Research Organization (CSIRO) (Richardson et al. 2017) simulated the large-scale impact of a seismic survey on zooplankton on the Northwest Shelf of Western Australia using the mortality rate found by McCauley et al. (2017). The major findings of the CSIRO study were that seismic activity had substantial impacts on zooplankton populations on a local scale within or close to the survey area; however, on a regional scale, the impacts were minimal and not discernible over the entire Northwest Shelf Bioregion. The study found that the zooplankton biomass recovered to pre-seismic levels inside the survey area, and within 15 km (8 NM) of the area, within three days following the completion of the survey. This relatively quick recovery was due to the fast growth rates of zooplankton as well as the dispersal and mixing of zooplankton from both inside and outside of the impacted region (Richardson et al. 2017). Another study found that the potential effects of seismic pulses of 221 dB re 1 $\mu Pa^2 \cdot s$ to zooplankton are limited to within approximately 10 m (33 ft) from the seismic source with immediate mortality rates of up to 30% of copepods when compared to controls (Fields et al. 2019).

There has also been a suite of studies examining potential impacts from air guns on a variety of invertebrate life stages. New Zealand scallop (*Pecten novaezelandiae*) larvae exposed to extended periods of air gun signals during their ontogeny had increases in abnormality and mortality rates (Aguilar de Soto et al. 2013). Blue mussel clearance (i.e., filtration rate) increased with pile driving noise, likely in response to increased metabolic demands triggered by stress (Spiga et al. 2016). High-intensity, low-frequency sound exposure to crustaceans and mollusks do not appear to result in immediate mass mortality events (Carroll et al. 2017; Edmonds et al. 2016; Day et al. 2016) but may have longer-term effects (Day et al. 2016). Specifically, tail tonicity (i.e., extension) and righting behavior, reflexes used in lobster fishery industries in grading animals for their likelihood of survival, were assessed in southern rock lobster (*Jasus edwardsii*) and significant responses to righting responses were observed after exposure to air gun sounds. André et al. (2011) and Solé et al. (2013) provide evidence of acoustic trauma in four cephalopod species—common cuttlefish (*Sepia officinalis*), common octopus (*Octopus vulgaris*), European squid (*Loligo vulgaris*), and southern shortfin squid (*Illex condietii*)—which they exposed (underwater) for two hours to low-frequency sweeps between 50–400 Hz (1 second duration) generated by an in-air speaker. The measured level at the animals' position was 157 dB re 1 μPa with peak levels (unspecified) up to 175 dB re 1 μPa. Both studies reported permanent and substantial morphological and structural alterations of the sensory hair cells of the statocysts following noise exposure, with no indication of recovery. In a more recent experiment, Solé et al. (2017) exposed common cuttlefish to tonal sweeps between 100–400 Hz in a controlled exposure experiment in open water. Their results showed a clear statistical relationship between the cellular damage detected in the sensory cells of the individuals exposed to the sound sweeps and their distance from the sound source. The maximal particle motion level was 0.7 ms^{-2} (2.3 ft^{-2}) observed at 1 m (3.3 ft) depth, the pressure reached levels of 139–142 dB re 1 μPa^2. The reported sound pressure levels were only slightly higher than the hearing threshold determined for longfin squid measured by Mooney et al. (2010). The maximum particle motion (reported in terms of particle acceleration) reported by Solé et al. (2017) is in the same order of magnitude as the behaviorally thresholds measured at 100 Hz by Packard et al. (1990) using a standing wave acoustic tube.

In general, the impacts from pile driving will depend on an individual's proximity to the source, intensity of noise, and sensitivity to sound. However, Vineyard Northeast plans to implement mitigation actions including a soft-start procedure to the pile driving process, which delivers initial pile drives at a lower intensity, allowing mobile species to move out of the activity area before the full-power pile driving begins. In addition, the Proponent will use a noise abatement system (NAS) to reduce sound levels by a target of approximately 10 dB and adhere to an anticipated time of year restriction on pile driving between January 1 and April 30 to protect North Atlantic right whales (see Section 4.7 of COP Volume II), which may also confer protection to fish that occur within the Offshore Development Area during that timeframe. In addition, while there have been no recorded catches of Atlantic sturgeon within the Lease Area by commercial fisheries in the analyzed period between 1989 and 2000, for commercial data or by research surveys up through 2007 (Stein et al. 2004; Dunton et al. 2010), this species is known to move offshore into water depths of 20–50 m (66–164 ft) during the winter and early spring (December to March); therefore, the anticipated time of year restriction may also benefit Atlantic sturgeon in the unlikely event that any are present within the Lease Area during the winter and early spring months.

To assess the impacts of noise during construction, acoustic modeling of pile driving (see Appendix II-E) was completed assuming broadband noise attenuation levels of 10, 12, and 15 dB in relation to thresholds of mortality and recoverable injury for fishes with different hearing structures (based on thresholds in Popper et al. 2014). Model results provided estimates of the magnitude and extent of noise from a range of noise attenuation levels during construction. The severity and duration of the impacts from the acoustic modelling were characterized for each component based on existing studies and literature. The characteristics and potential effects of noise from other offshore components were assessed based on existing studies and literature. Impacts to marine species were conservatively assessed based on 10 dB of noise attenuation. Sound with peak sound pressure (dB re 1 μPa) up to 200 dB was predicted to occur for typical piles. Applying the thresholds for potential injury for fish (Oestman et al. 2009) with 10 dB attenuation levels, Tables 4.5-3 and 4.5-4 show the maximum radial distance to PK sound levels associated with 4.25 m jacket foundation piles and 14 m monopile foundation piles. Radial distances from the piling source to regulatory-defined thresholds for SEL are also shown in Tables 4.5-3 and 4.5-4. These estimates do not consider animals avoiding loud sounds (aversion) or implementation of mitigation measures other than sound attenuation using a noise abatement system. Popper et al. (2014) does not define quantitative acoustic thresholds for behavioral response in fish. NMFS GARFO (2016) uses a 150 dB sound pressure levels (SPL) behavioral threshold for all fish. The maximum range to the threshold defining potential injury across all foundation types is 40 km (22 NM) with 10 dB attenuation level (for fish of less than 2 g in winter and considering the post-piling installation of 8 pin-piles of 4.25 m [14 ft] diameter). NMFS GARFO (2016) defines a broad behavioral criterion for all fish, which corresponds to a maximum range to threshold of 15.74 km (8.5 NM), considering the installation of 14 m monopiles at an approximate impact pile driving energy of 6,600 kJ. However, impairment from pile driving noise is less likely to occur during construction because a soft-start technique will be employed, and mobile fishes and invertebrates will be able to leave the area before full strength pile driving occurs.

Table 4.5-3 Summary Acoustic Model Radial Distances (in m) for Post-Piled Jacket Pin Piles to Thresholds Used to Evaluate Potential Impacts to Fish from Impact Pile Driving Sound

Faunal group	Metric	Threshold	Attenuation level (dB)			
			0	10	12	15
Fish without swim bladder	L_{PK}	>213	146	20	-	-
	L_E	>216	3,624	1,018	730	462
Fish with swim bladder not involved in hearing	L_{PK}	>207	356	100	63	28
	L_E	203	12,516	4,875	4,012	2,823
Fish with swim bladder involved in hearing	L_{PK}	>207	356	100	63	28
	L_E	203	12,516	4,875	4,012	2,823
Fish ≥2 g	L_{PK}	206	484	108	89	45
	L_E	187	84,740	23,231	18,218	13,739
Fish <2 g	L_{PK}	206	484	108	89	45
	L_E	183	85,311	39,560	29,395	20,584
All fish (behavioral disturbance)	L_p	150	80,699	16,864	13,727	9,824

Notes:
1. Radial distances ($R_{95\%}$) for auditory injury threshold for fish exposed to impulsive sound are in meters.
2. Numbers represent the maximum radial distance estimated at each of the two modeling sites across summer/winter seasons and all piling energy levels, for varying levels of attenuation.
3. L_{PK} = peak sound pressure (dB re 1 μPa).
4. $L_{E,24hr}$ = 24 hr cumulative sound exposure level (dB re 1 $\mu Pa^2 \cdot s$).
5. L_p = root mean square sound pressure (dB re 1 μPa).

Table 4.5-4 Summary Acoustic Model Radial Distances (in m) for WTG Monopiles to Thresholds Used to Evaluate Potential Impacts to Fish from Impact Pile Driving Sound

Faunal group	Metric	Threshold	Attenuation level (dB)			
			0	10	12	15
Fish without swim bladder	L_{PK}	>213	179	28	-	-
	L_E	>216	1,875	412	313	172
Fish with swim bladder not involved in hearing	L_{PK}	>207	539	108	89	28
	L_E	203	6,463	2,666	2,140	1,474
Fish with swim bladder involved in hearing	L_{PK}	>207	539	108	89	28
	L_E	203	6,463	2,666	2,140	1,474

Table 4.5-4 Summary Acoustic Model Radial Distances (in m) for WTG Monopiles to Thresholds Used to Evaluate Potential Impacts to Fish from Impact Pile Driving Sound (Continued)

Faunal group	Metric	Threshold	Attenuation level (dB)			
			0	10	12	15
Fish ≥2 g	L_{PK}	206	573	128	100	60
	L_E	187	21,386	9,957	8,668	6,964
Fish <2 g	L_{PK}	206	573	128	100	60
	L_E	183	30,250	13,468	11,727	9,218
All fish (behavioral disturbance)	L_p	150	41,176	15,740	13,604	1,086

Notes:

1. Radial distances ($R_{95\%}$) for auditory injury threshold for fish exposed to impulsive sound are in meters.
2. Numbers represent the maximum radial distance estimated at each of the two modeling sites across summer/winter seasons and all piling energy levels, for varying levels of attenuation.
3. L_{PK} = peak sound pressure (dB re 1 μPa).
4. $L_{E,24hr}$ = 24 hr cumulative sound exposure level (dB re 1 $\mu Pa^2 \cdot s$).
5. L_p = root mean square sound pressure (dB re 1 μPa).

Vibratory Pile Setting

A vibratory hammer could be used to install the monopile through surficial sediments in a controlled fashion to avoid the potential for a "pile run," where the pile could drop quickly through the looser surficial sediments and destabilize the installation vessel, risking the integrity of the vessel and safety of the crew. Once the pile has penetrated the surficial sediments with the vibratory hammer, an impact hammer would be used for the remainder of the installation. During vibratory pile driving, piles are driven into the substrate due to longitudinal vibration motion at the hammer's operational frequency and corresponding amplitude. This causes the soil to liquefy, allowing the pile to penetrate into the seabed. Sounds generated by vibratory pile setting are non-impulsive, which are known to be less damaging than impulsive sounds to marine fauna (Tsouvalas et al. 2016; Zykov et al. 2016; Molnar et al. 2020).

There are few data on the effects of vibratory pile driving on fish. Further, generalizations can be difficult because sound affects species differently, particularly with regards to the presence or absence of a swim bladder and its proximity to the ear. Nedwell et al. (2003) detected no changes in activity level or startle response in brown trout, a species without specialized hearing structures, when exposed to vibratory piling at close ranges (<50 m [164 ft]). There are no direct data available on the behavioral response to continuous noise in fish species with more specialized hearing. The masking of communicative signals, as well as signals produced by predators and prey, may be the most likely behavioral impact to fish (Popper and Hawkins 2019). However, the effect is expected to be short term (Popper et al. 2014). Additionally, high risks of any behavioral impacts from continuous sound sources (e.g., vibratory pile driving) are likely to only occur at close range to the source (Popper et al. 2014).

There are no data linking continuous noise to mortality or permanent injury in fish (Popper et al. 2014). Continuous noise has been linked to temporary threshold shift (TTS) in some fish species; however, exposure times to these sounds were at least 12 hours (Amoser and Ladich 2003; Smith et al. 2006).

There is a lack of data involving the effects of vibratory pile installations on invertebrates. Among marine invertebrates, some can detect particle motion and are sensitive to noise (Popper et al. 2014; André et al. 2016; Jézéquel et al. 2023). Invertebrates generally do not possess air-filled spaces like lungs, middle ears, or swim bladders; thus, they have been considered less susceptible than fish to noise and vibration. Invertebrates display measurable behavioral responses to noise, such as interruptions to feeding and resource gathering, startle responses, and escape behaviors (Mooney et al. 2010; Roberts et al. 2015).

To assess the impacts of underwater sound to fish, vibratory pile setting followed by impact pile driving scenarios were modeled (see Appendix II-E) with 10, 12, and 15 dB attenuation levels. Tables 4.5-5 and 4.5-6 show the maximum radial distance to PK and SEL associated with 4.25 m jacket foundation piles and 14 m monopile foundation piles, respectively.

Table 4.5-5 Summary Acoustic Model Radial Distances (in m) for 14 m WTG Monopiles to Thresholds Used to Evaluate Potential Impacts to Fish from Vibratory Pile Setting Followed by Impact Pile Driving Sound

Faunal group	Metric	Threshold	Attenuation level (dB)			
			0	10	12	15
Fish without swim bladder	L_{PK}	>213	179	28	0	0
	L_E	>216	1,984	467	328	184
Fish with swim bladder not involved in hearing	L_{PK}	>207	539	108	89	28
	L_E	203	6,671	2,774	2,259	1,565
Fish with swim bladder involved in hearing	L_{PK}	>207	539	108	89	28
	L_E	203	6,671	2,774	2,259	1,565
Fish ≥2 g	L_{PK}	206	573	128	100	60
	L_E	187	22,211	10,372	8,915	7,223
Fish <2 g	L_{PK}	206	573	128	100	60
	L_E	183	31,492	13,888	12,095	9,491
All fish (behavioral disturbance)	L_p	150	41,176	15,740	13,604	10,860

Notes:
1. Radial distances ($R_{95\%}$) for auditory injury threshold for fish exposed to impulsive sound are in meters.
2. Numbers represent the maximum radial distance estimated at each of the two modeling sites across summer/winter seasons and all piling energy levels, for varying levels of attenuation.
3. L_{PK} = peak sound pressure (dB re 1 μPa).
4. $L_{E,24hr}$ = 24 hr cumulative sound exposure level (dB re 1 $\mu Pa^2 \cdot s$).
5. L_p = root mean square sound pressure (dB re 1 μPa).

Table 4.5-6 Summary Acoustic Model Radial Distances (in m) for 4.25 m Jacket Pin Piles to Thresholds Used to Evaluate Potential Impacts to Fish from Vibratory Pile Setting Followed by Impact Pile Driving Sound

Faunal group	Metric	Threshold	Attenuation Level (dB)			
			0	10	12	15
Fish without swim bladder	L_{PK}	>213	130	0	0	0
	L_E	>216	3,680	1,040	740	470
Fish with swim bladder not involved in hearing	L_{PK}	>207	290	60	50	0
	L_E	203	12,660	4,940	4,070	2,860
Fish with swim bladder involved in hearing	L_{PK}	>207	290	60	50	0
	L_E	203	12,660	4,940	4,070	2,860
Fish ≥2 g	L_{PK}	206	330	90	60	20
	L_E	187	84,750	23,470	18,380	13,890
Fish <2 g	L_{PK}	206	330	90	60	20
	L_E	183	85,310	40,030	29,700	20,830
All fish (behavioral disturbance)	L_p	150	50,590	13,730	11,120	8,060

Notes:

1. Radial distances ($R_{95\%}$) for auditory injury threshold for fish exposed to impulsive sound are in meters.
2. Numbers represent the maximum radial distance estimated at each of the two modeling sites across Summer/Winter seasons and all piling energy levels, for varying levels of attenuation.
3. L_{PK} = peak sound pressure (dB re 1 μPa).
4. $L_{E,24hr}$ = 24 hr cumulative sound exposure level (dB re 1 $\mu Pa^2 \cdot s$).
5. L_p = root mean square sound pressure (dB re 1 μPa).

Drilling

During the construction phase of Vineyard Northeast, there may be instances when large sub-surface boulders or hard sediment layers are encountered during pile driving, requiring drilling operations to pass through these barriers. Vineyard Northeast estimates that foundations could potentially require up to 6 hours of drilling per day in addition to pile driving operations for the installation of wind turbines. To assess the impacts of underwater sound produced by drilling activities, modeled distances to potential fish injury and behavioral thresholds were calculated. The maximum acoustic radial distances results are shown in Table 4.5-7 with the full set of modeling results provided in Appendix I of Appendix II-E.

During drilling activities, a drill head produces vibrations that propagate as sound through the sediment and water column (Hall and Francine 1991; Nguyen 1996; Willis et al. 2010). Most measurements of offshore drilling sounds have been made for oil exploration and production drilling. The sound levels associated with those drilling operations have been documented to be within the hearing range of fish injury and behavioral thresholds (Popper et al. 2014). Underwater sound emitted by project construction drilling activities is not expected to produce injury to marine fauna but is likely to be audible and could elicit temporary behavioral responses.

It is unclear whether the sound emitted by marine drilling activities is likely to impact the behavior of fish. McCauley (1998) determined that any effects to fish from sounds produced by marine drilling activity would likely be temporary behavioral changes within a few hundred meters of the source. For instance, measured source levels during drilling operations reached 120 dB at 3–5 km, which may have caused fish avoidance (McCauley 1998). The available literature suggests that continuous sound produced by drilling operations may mask acoustic signals of fish that convey important environmental information (McCauley 1994; Popper et al. 2014). Recordings of planktivorous fish choruses showed that the fish were still active during drilling operations off the coast of the Timor Sea; however, it is likely that partial masking of their calls would have occurred (McCauley 1998).

There are no data to support a clear link between anthropogenic sound and permanent injury or mortality in fish, particularly with non-impulsive sound sources (Popper and Hawkins 2019). Continuous sound has been linked to TTS in some species of fish; however, exposure times to these sounds were at least 12 hours (Amoser and Ladich 2003; Smith et al. 2006). The sounds emitted by marine drilling operations for wind farm construction are expected to be short-term and intermittent. Acoustic masking to fish from drilling could occur during the short-term drill events.

There are very few data on the effect of sound from drilling on marine invertebrates. Solé et al. (2022) reported a decreased survival rate in cephalopod (cuttlefish) larvae exposed to drilling sound levels (167 dB re 1 μPa^2). Importantly, levels below 163 dB re 1 μPa^2 did not elicit severe damage. Evidence from research on the levels of particle motion associated with behavioral responses in blue mussels indicates that the threshold of sensitivity in this species falls within vibration levels measured near blasting, pile driving, and impact drilling (Roberts et al. 2015). Studies have indicated reception of vibration in bivalves and an associated behavioral response, which included closing syphons and, in more active mollusks, moving away from the substrate (Mosher 1972; Ellers 1995; Kastelein 2008).

Drilling activities produce non-impulsive sounds that may cause hearing damage or behavioral responses in marine mammals, sea turtles, and fish. Distances to potential injury and behavioral disruption of marine animals are computed here by propagating measured drilling source levels in the construction area and then comparing the resulting sound fields to regulatory thresholds. The modeled ensonified areas are combined with the planned drilling schedules and predicted species densities to estimate the number of marine mammals and sea turtles that will be exposed above thresholds for injury and behavioral response.

Table 4.5-7 Summary Acoustic Model Radial Distances (in m) to Thresholds Used to Evaluate Potential Impacts to Fish from Drilling

Faunal group	Metric	Threshold	Maximum Rmax (m)
Fish without swim bladder	L_E	>216	<20 m*
Fish with swim bladder not involved in hearing	L_E	203	81
Fish with swim bladder involved in hearing	L_E	203	81
Fish ≥2 g	L_E	187	1,468
Fish <2 g	L_E	183	2,476
All fish (behavioral disturbance)	L_p	150	455

*<20 m refers to ranges that were below the modeling resolution.

Unexploded Ordnances

Acoustic modeling also assessed the effects of detonation of UXO and/or discarded military munitions (DMM). As described in Section 3.10.2 of COP Volume I, if potential UXO and/or DMM are discovered in the Lease Area or OECCs, the Proponent will prioritize avoidance of UXO/DMM wherever possible by micro-siting structures and cables around the object. Where avoidance is not possible (e.g., due to layout restrictions, presence of archaeological resources, etc.), UXO/DMM will be relocated or otherwise disposed of (e.g., via deflagration [burning without detonating], detonation, or dismantling the UXO/DMM to extract explosive components). The exact number and type of UXO/DMM that may be present, and which subset of those UXO/DMM cannot be avoided by micro-siting, are unknown at this time (further evaluation is ongoing). For the purposes of impact analyses, the Proponent conservatively assumes that up to two UXO in the Lease Area, four UXO in the Massachusetts OECC, and four UXO in the Connecticut OECC may need to be detonated in place (each detonation would occur on different days). The potential acoustic impacts of UXO/DMM detonation on finfish are further assessed in Appendix J of Appendix II-E.

Underwater explosive detonations generate impulsive sound waves with high pressure levels that could cause disturbance and/or injury to marine fauna. An explosion produces hot gases that create a large oscillating sphere and a shock wave (Chapman 1985). The extreme increase in pressure followed by a decrease to below ambient pressure caused by an explosive shock wave can cause injury to soft tissues, membranes, and cavities filled with air (Keevin and Hempen 1997). However, these sound producing events produce a short signal duration, and the extent of impact will depend on the proximity of the receiver to the detonation.

Injury to fish from exposures to explosion are called barotrauma injuries. Rapid changes in gas volume and rapid changes in the solubility of gas in the blood and tissues cause barotrauma injuries. When pressure increases, solubility increases and vice versa. Injury mechanisms include bubble formation in fluids/tissues (i.e., decompression sickness), and rapidly expanding gas-filled bodies (i.e., swim bladder) that push against surrounding tissues, thereby damaging surrounding tissues (Carlson 2012; Halvorsen et al. 2012).

Effects of detonation pressure exposures to fish have been assessed according to the Lpk limits for onset of mortality or injury leading to mortality due to explosives, as recommended by the American National Standards Institute (ANSI) expert working group (Popper et al. 2014).

Currently, there is no available information describing the effect of sound on invertebrates related to UXO detonation. Particle motion changes may cause behavioral response, injury, mortality, sensory damage, and physiological changes (Fitzgibbon et al. 2017; McCauley et al. 2017). Vibration caused by anthropogenic sound, such as UXO detonation, can propagate to the seabed (Roberts and Elliott 2017). Researchers have reported substrate-borne vibrations from anthropogenic sound can alter invertebrate behavior (Roberts et al. 2015, 2016).

To assess the impacts of underwater sound during UXO detonation, acoustic modeling was completed for two charge sizes at six separate modeling sites with different depths (see Appendix J of Appendix II-E) assuming 10 dB broadband noise attenuation levels. Table 4.5-8 shows the maximum acoustic radial distance to PK sound level thresholds for all fish.

Table 4.5-8 Summary Acoustic Model Radial Distances (in m) to Thresholds Used to Evaluate Potential Impacts to Fish from Unexploded Ordnance (UXO)

Faunal group	Metric	Threshold	Attenuation level (dB)	
			0	10
All fishes	L_{PK}	>229	852.1	292.2

Notes:
1. Radial distances ($R_{95\%}$) for auditory injury threshold for fish exposed to impulsive sound are in meters.
2. Numbers represent the maximum radial distance estimated.
3. L_{PK} = peak sound pressure (dB re 1 μPa).

<u>Vessel Noise</u>

Vessel traffic associated with construction, operation, and decommissioning would result in temporary, transient, and continuous non-impulsive noise primarily originating from the vessel propulsion system. Sound emission from vessels, especially vessels using dynamic positioning, depends on vessel operational state and is strongly weather-dependent. Zykov et al. (2013) and McPherson et al. (2019) report a maximum broadband source level of 192 dB re 1 μPa for numerous vessels with varying propulsion power using dynamic positioning. Vessel noise can present a chronic impact for fish species (Popper 2003), whose communication is mainly based on low-frequency sound signals (Ladich and Myrberg 2006; Myrberg and Lugli 2006). Continuous noise greater than or equal to 158 dB root-mean-square (rms) for 12 hours can lead to behavioral disturbance, while noise above 170 dB rms for 48 hours can lead to injury (Popper et al. 2014; Hawkins and Popper 2017). Vessel noise can also cause avoidance behavior that interferes with feeding and breeding, alter schooling behaviors and migration patterns, and mask important environmental auditory cues (Barber 2017; CBD 2012). Recent studies have shown that vessel noise can induce endocrine stress response (Wysocki et al. 2006); diminish hearing ability; and mask intra-specific relevant signals in exposed fish species (Scholik and Yan 2002; Amoser et al. 2004; Vasconcelos et al. 2007; Codarin et al. 2009). Masking communication is of concern because although fishes are generally not loud (120 dB re 1 µPa [at 1 m (3.3 ft)], with the loudest on the order of 160 dB re 1 µPa), species make unique noises that allow for individual identification (Normandeau Associates 2012). In addition, vessel noise has the capacity to provoke short-term changes in the spatial position and group structure of pelagic fish in the water column (Buerkle 1973; Olsen et al. 1983; Schwarz and Greer 1984; Soria et al. 1996; Vabø et al. 2002; Handegard et al. 2003; Mitson and Knudsen 2003; Ona et al. 2007; Sarà et al. 2007). Fish can respond to approaching vessels by diving towards the seafloor or by moving horizontally out of a vessel's path (Ona et al. 2007; Berthe and Lecchini 2016). Nedelec et al. (2014) investigated the response of reef-associated fish by exposing them in their natural environment to playback of motorboat sounds. They found that juvenile fish increased hiding and ventilation rate after a short-term boat sound playback, but responses diminished after long-term playback, indicating habituation to sound exposure over longer durations. These results were corroborated by Holmes et al. (2017) who also observed short-term behavioral changes in juvenile reef fish after exposure to boat noise as well as desensitization over longer exposure periods. Therefore, areas of high vessel traffic may result in habituation by localized fishes. As stated in the BOEM Environmental Assessment and the Alternative Energy Programmatic Environmental Impact Statement that were prepared for the assessment and designation of wind energy areas by BOEM, regular vessel traffic occurs throughout this area; thus, implying that biological resources in the area are presumably habituated to this noise (BOEM 2007; BOEM 2014).

Operational Sounds

Operation of WTGs would result in variable, mostly continuous (i.e., during power generation) non-impulsive noise. Underwater noise level is related to WTG power and wind speed, with increased wind speeds creating increased underwater sound (Wahlberg and Westerberg 2005). Operational noise from WTGs is low frequency (60–300 Hz) and at relatively low sound pressure levels near the foundation (100–151 dB re 1 µPa) and decreases to ambient within 1 km (0.6 mi) (Tougaard et al. 2009a, 2009b; Lindeboom et al. 2011; Dow Piniak et al. 2012; HDR 2019).

At high wind speeds, Wahlberg and Westerberg (2005) estimated permanent avoidance by fish would only occur within a range of 4 m (13 ft) of a WTG. In a study on fish near the Svante wind farm in Sweden, Atlantic cod and roach (*Rutilus rutilus*) catch rates were significantly higher near WTGs when rotors were stopped, which could indicate fish attraction to WTG structures and avoidance to generated noise (Westerberg 2000 as cited in Thomsen et al. 2006). Alternatively, no avoidance behavior was detected, and fish densities increased around WTG foundations of the Lillgrund offshore wind farm in Sweden (Bergström et al. 2013). In addition, ambient noise can influence how fish detect other sounds and a change in background noise could alter how fish perceive and react to biological noise stimuli (Popper and Fay 1993). Ambient noise within the 70.8–224 Hz frequency band in the MA WEA and RI/MA WEA was measured to be between 96 dB and 103 dB 50% of the time with greater sound levels 10% of the time (Kraus et al. 2016).

Underwater sound radiated from operating WTGs is low-frequency and low level (Nedwell and Edwards 2004). At distances of 14 to 20 m from operational WTGs in Europe, underwater sound pressure levels ranged from 109 dB to 127 dB re 1µPa (Tougaard et al. 2009a; b). Pangerc et al. (2016) recorded sound levels at ~50 m from two individual 3.6 megawatt (MW) WTGs monopile foundations over a 21-day operating period. Miller and Potty (2017) measured an SPL of 100 dB re 1 µPa within 50 m of five General Electric Haliade 150–6 MW wind turbines with a peak signal frequency of 72 Hz. At the Block Island Wind Farm off Rhode Island, sound levels were found to be 112–120 dB re 1 µPa near the WTG when wind speeds were 2–12 m/s and the WTG sound levels declined to ambient within 1 km from the WTG (Elliott et al. 2019). Tougaard et al. (2009a; b) found that sound level from three different WTG types in European waters was only measurable above ambient sound levels at frequencies below 500 Hz, and Thomsen et al. (2016) suggest that at approximately 500 m from operating WTGs, sound levels are expected to approach ambient levels.

Two recent meta-papers (Tougaard et al. 2020; Stöber and Thomsen 2021) assessed WTG operational sounds by extracting sound levels measured at various distances from operating WTGs from currently available reports. Both studies found sounds to generally be higher for higher powered WTGs; thus, distances to a given sound threshold are likely to be greater for higher powered WTGs. However, as Stöber and Thomsen (2021) point out, direct drive technology could reduce these distances substantially. Importantly, no measurements exist for these larger turbine sizes and few measurements have been made for direct drive turbines so the uncertainty in these estimates is large.

Overall, current literature indicates noise generated from the operation of wind farms is minor and does not cause injury or lead to permanent avoidance at distances greater than 1 km (0.6 mi) (Wahlberg and Westerberg 2005; Stenberg et al. 2015), with potential to have minimal effects at much closer distances up to within a few meters of the WTG (Bergström et al. 2013) such as masking auditory sensitivity and communication of fishes within a few tens of meters of WTGs (Zhang et al. 2021).

Subsea Cables

Previous impact assessment studies for various cable projects have concluded that sound related to subsea cable installation or cable operation is not a significant issue (Austin et al. 2005; Nedwell et al. 2003). This was based on the prediction that anticipated sound levels would not exceed existing ambient sound levels in the area, although background sound level measurements were often not presented (Meißner et al. 2006). Subsea cables are expected to produce low-frequency tonal vibration sound in the water, since Coulomb forces between the conductors cause the HVAC lines to vibrate at twice the frequency of the current (direct current cables do not produce a similar tonal sound because the current is not alternating). Anticipated SPLs arising from the vibration of alternating current cables during operation are significantly lower than SPLs that may occur during cable installation (Meißner et al. 2006) and may be undetectable in the ambient soundscape of the Offshore Development Area, especially after consideration of the 1.5–2.5 m (5–8 ft) target burial depth beneath stable seafloor.[7]

4.6 Summary of Avoidance, Minimization, and Mitigation Measures

The Proponent's proposed measures to avoid, minimize, and mitigate potential effects to EFH during Vineyard Northeast are summarized below:

- Offshore export cable installation will avoid sensitive habitats including eelgrass beds and hard/complex bottom sediments, where feasible.
- The Proponent will require the cable installation contractor to prioritize the least environmentally impactful cable installation alternative(s) that are practicable for each segment of cable.
- For vessels other than cable laying vessels (which must maintain tension on anchor lines), where it is considered impossible or impracticable to avoid a sensitive seafloor habitat when anchoring, the use of mid-line anchor buoys will be considered (where feasible and considered safe) as a potential measure to reduce impacts from anchor line sweep.
- At the landfall sites, HDD is expected to be used to avoid or minimize disturbance to coastal habitats by drilling underneath them.
- Cables will be buried wherever possible, reducing the effects of EMFs. In areas where seafloor type potentially prohibits cable burial, or at cable crossings, cable protection would serve as a similar barrier to exposure.
- The Proponent's goal is to minimize the use of cable protection to the greatest extent possible through a careful route assessment and the selection of the most appropriate cable burial tool for each segment of the cable route.
- The Proponent will apply a soft-start procedure to the pile driving process, which delivers initial pile drives at a lower intensity, allowing mobile species to move out of the activity area before the full-power pile driving begins.

[7] Unless the final CBRA indicates that a greater burial depth is necessary and taking into consideration technical feasibility factors, including thermal conductivity.

- A noise abatement system will be used to reduce sound levels by a target of approximately 10 dB during pile driving.

- The Proponent does not intend to conduct pile driving between January 1 and April 30 when higher numbers of North Atlantic right whales (NARW) are expected to be present in the Offshore Development Area. This will reduce the potential impacts to NARW and other species with similar seasonal presence in the region, including Atlantic cod and other soniferous species during their potential spawning seasons.

- A benthic habitat monitoring plan framework has been developed (see Appendix II-R) to monitor recovery after construction in areas with sensitive habitats where similar post-construction monitoring has not already been conducted for other projects (such as along the OECCs).

- A fisheries monitoring plan will be developed to monitor key indicators before and after construction; such monitoring may be part of regional monitoring efforts.

- WTGs and ESPs will also be widely spaced, leaving a large portion of the Lease Area undisturbed by WTG and ESP installation.

5 Conclusions

The EFH IPFs during the construction, O&M, and decommissioning of Vineyard Northeast include seafloor disturbance and habitat modification, suspended sediments and deposition, entrainment and impingement, EMFs, and noise. Most potential impacts to EFH are expected to be temporary and/or localized. Direct habitat alterations from the installation of WTG/ESP foundations, scour protection, and potential cable protection have the potential to result in long term (lasting for the duration of Vineyard Northeast operations) impacts to EFH, specifically by converting soft-bottom habitat or open pelagic habitat to complex habitat; this could have certain beneficial effects by creating artificial reef effects. However, the long-term seafloor disturbance impacts would be expected to impact less than 0.4% of the total Lease Area (Table 4.1-1). The Proponent plans to avoid, minimize, and mitigate all potential impacts to EFH, wherever possible.

6 References

Aguilar de Soto NA, Delorme N, Atkins J, Howard S, Williams J, Johnson M. 2013. Anthropogenic noise causes body malformations and delays development in marine larvae. Sci Rep. 3(2831):1–5.

Albert, L., F. Deschamps, A. Jolivet, F. Olivier, L. Chauvaud, and S. Chauvaud. 2020. A current synthesis on the effects of electric and magnetic fields emitted by submarine power cables on invertebrates. Marine Environmental Research 159:104958. DOI: 10.1016/j.marenvres.2020.104958

Amoser S, Ladich F. 2003. Diversity in noise-induced temporary hearing loss in otophysine fishes. J Acoust Soc Am. 113(4): 2170-2179.

Amoser S, Wysocki LE, Ladich F. 2004. Noise emission during the first powerboat race in an alpine lake and potential impact on fish communities. J Acoust Soc Am. 116(6):3789-3797.

Andersson MH, Dock-Åkerman E, Ubral-Hedenberg R, Öhman MC, Sigray P. 2007. Swimming behavior of roach (*Rutilus rutilus*) and three-spined stickleback (*Gasterosteus aculeatus*) in response to wind power noise and single-tone frequencies. AMBIO: A Journal of the Human Environment 36(8): 636-638.

Andersson MH & Öhman MC. 2010. Fish and sessile assemblages associated with wind-turbine constructions in the Baltic Sea. Marine and Freshwater Research, 61: 642–650.

André M, Kaifu K, Solé M, van Der Schaar M, Akamatsu T, Balastegui A, Sánchez AM, and Castell JV. 2016. Contribution to the understanding of particle motion perception in marine invertebrates. (Chapter 6) In Popper, A.N. and A.D. Hawkins (eds.). The Effects of Noise on Aquatic Life II. Volume 875. Springer, New York. pp. 47-55. https://doi.org/10.1007/978-1-4939-2981-8_6.

André M, Solé M, Lenoir M, Durfort M, Quero C, Mas A, Lombarte A, van der Schaar M, López-Bejar M, Morell M, Zaugg S, Houégnigan L. 2011. Low-frequency sounds induce acoustic trauma in cephalopods. Front Ecol Environ. 10: 18-28.

Atlantic Bluefin Tuna Status Review Team. 2011. Status Review Report of Atlantic Bluefin Tuna *Thunnus thynnus*. Report to National Marine Fisheries Service, Northeast Regional Office. March 22, 2011. 104 pp.

Auster PJ. 1998. A conceptual model of the impacts of fishing gear on the integrity of fish habitats. Cons Biol. 12:1–6.

Austin ME, MacGillivray AO, Racca RG, Hannay DE, Sneddon H (JASCO Research Ltd.). 2005. BC Hydro & Power Authority Vancouver Island 230kv transmission reinforcement project: Atmospheric and underwater acoustics assessment. Jacques Whitford.

Bailey H, Senior B, Simmons D, Rusin J, Picken G, Thompson PM. 2010. Assessing underwater noise levels during pile-driving at an offshore windfarm and its potential effects on marine mammals. Mar Pollut Bull. 60:888–897.

Barber MR. 2017. Effects of Hydraulic Dredging and Vessel Operation on Atlantic Sturgeon Behavior in a Large Coastal River [dissertation]. Richmond, VA: Virginia Commonwealth University, Richmond, Virginia. 55 p. Available from: https://scholarscompass.vcu.edu/cgi/viewcontent.cgi?article=5928&context=etd

Bergström L, Sundqvist F, Bergström U. 2013. Effects of an offshore wind farm on temporal and spatial patterns in the demersal fish community. Mar Ecol Prog Ser. 485: 199–210.

Berry WJ, Rubinstein NI, Hinchey EH, Klein-MacPhee, G, Clarke DG. 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, Tennessee, June 5-8, 2011. Retrieved from http://nerdt.org/wp-content/uploads/2014/12/WEDA_Berry.pdf.

Berthe C, Lecchini D. 2016. Influence of boat noises on escape behaviour of white-spotted eagle ray *Aetobatus ocellatus* at Moorea Island (French Polynesia). Comptes Rendus Biologies. 339(2):99–103.

Bolle LJ, de Jong CAF, Bierman SM, van Beek PJ, van Keeken OA, Wessels PW, van Damme CJ, Winter HV, de Haan D, Dekeling RP. Common sole larvae survive high levels of pile-driving sound in controlled exposure experiments. PLoS ONE. 2012; 7:e33052.

Brodziak, JKT. 2005. Essential fish habitat source document: Haddock, *Melanogrammus aeglefinus*, life history and habitat characteristics. 2nd edition. NOAA Tech Memo NMFS NE,196, 64 pp.

Buerkle U. 1973. Gill-net catches of cod (*Gadus morhua l.*) in relation to trawling noise. Mar Behav Physiol. 2:277–281.

[BOEM] Bureau of Ocean Energy Management. 2014. Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore Massachusetts Revised Environmental Assessment. BOEM. OCS EIS/EIA BOEM 2014-603.

[BOEM] Bureau of Ocean Energy Management. 2007. Programmatic Environmental Impact Statement for Alternative Energy Development and Production and Alternate Use of Facilities on the Outer Continental Shelf. Final Environmental Impacts Statement. OCS EIS/EA MMS 2007-046. Available from https://www.boem.gov/Guide-To-EIS/

Cargnelli LM, Griesbach, SJ, Berrien PL, Morse WW, Johnson DL. 1999a. Essential fish habitat source document: Haddock, *Melanogrammus aeglefinus* life history and habitat characteristics. NOAA Tech Memo NMFS NE, 139, 29 pp.

Cargnelli LM, Griesbach, SJ, Packer DB, Weissberger E. 1999b. Essential fish habitat source document: Atlantic surfclam, *Spisula solidissima*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE, 148, 20 pp.

Cargnelli LM, Griesbach, SJ, Packer DB, Weissberger E. 1999c. Essential fish habitat source document: ocean quahog, *A. islandica*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE, 142, 22 pp.

Cargnelli LM, Griesbach SJ, Packer DB, Berrien PL, Johnson DL, Morse WW. 1999d. Essential fish habitat source document: Pollock, *Pollachius virens*, life history and habitat characteristics. NOAA Tech Memo 131; 30 p.

Cargnelli LM, Griesbach SJ, Packer DB, Berrien PL, Morse WW, Johnson DL. 1999e. Essential fish habitat source document: Witch flounder *Glyptocephalus cynoglossus* life history and habitat characteristics. NOAA Tech Memo NMFS NE, 139, 29 pp.

Carlson JK, McCandless, CT, Cortés E, Grubbs RD, Andrews KI, MacNeil MA, Musick JA. 2009. An Update on the Status of the Sand Tiger Shark, *Carcharias taurus*, in the northwest Atlantic Ocean. NOAA Technical Memorandum NMFS-SEFSC-585, 23 p.

Carlson TJ. 2012. Barotrauma in fish and barotrauma metrics. The Effects of Noise on Aquatic Life. Springer New York, 2012.

Carroll AG, Przeslawski R, Duncan A, Gunning M, Bruce B. 2017. A critical review of the potential impacts of marine seismic surveys on fish & invertebrates. Mar Pollut Bull. 4(1):9–24.

Casper BM, Popper AN, Matthews F, Carlson TJ, Halvorsen MB. 2012. Recovery of barotrauma injuries in chinook salmon *Oncorhynchus tshawytscha* from exposure to pile driving sound. PLoS ONE; 7(6): e39593. Available from doi:10.1371/journal.pone.0039593.

Chang S, Berrien PL, Johnson DL, Morse WW. 1999b. Essential fish habitat source document: Windowpane *Scophthalmus aquosus* life history and habitat characteristics. NOAA Tech Memo NMFS NE, 137, 32 pp.

Chang S, Morse WW, Berrien PL. 1999a. Essential fish habitat source document: White hake, *Urophycis tenuis*, life history and habitat characteristics. NOAA Tech Memo NMFS NE 136; 23 p.

Chapman NR. 1985. Measurement of the waveform parameters of shallow explosive charges. J Acoust Soc Am. 78.2 (1985): 672-681.

Coates DA, Deschutter Y, Vincx M, Vanaverbeke J. 2014. Enrichment and shifts in macrobenthic assemblages in an offshore wind farm area in the Belgian part of the North Sea. Marine Environmental Research, 95: 1–12.

Codarin A, Wysocki LE, Ladich F, Picciulin M. 2009. Effects of ambient and boat noise on hearing and communication in three fish species living in a marine protected area (Miramare, Italy). Mar Pollut Bull. 58(12):1880–1887.

[CBD] Convention on Biological Diversity. 2012. Scientific Synthesis on the Impacts of Underwater Noise on Marine and Coastal Biodiversity and Habitats. Notes from: Subsidiary Body on Scientific, Technical and technological Advice, Sixteenth meeting; Montreal.

Cortés E, Brooks E, Apostolaki P, Brown CA. 2006. Stock assessment of dusky shark in the US Atlantic and Gulf of Mexico. Panama City Laboratory Contribution, 6(05).

Cross JN, Zetlin CA, Berrien PL, Johnson DL, McBride C. 1999. Essential fish habitat source document. Butterfish *Peprilus triacanthus* life history and habitat characteristics. NOAA Tech Memo NMFS NE, 145, 59 pp.

CSA Ocean Sciences Inc., Exponent. 2019. Evaluation of potential EMF effects on fish species of commercial or recreational fishing importance in Southern New England. Report to US Department of the Interior, Bureau of Ocean Energy Management (BOEM) OCS Study BOEM 2019-049. 62p.

Day RD, McCauley RD, Fitzgibbon QP, Hartmann K, Semmens JM (Institute for Marine and Antarctic Studies). 2016. Assessing the impact of marine seismic surveys on southeast Australian scallop and lobster fisheries. University of Tasmania, Hobart: Fisheries Ressearch & Development Corporation. FRDC Project No 2012/008.

DeCelles GR, Martins D, Zemeckis DR, Cadrin SX. 2017. Using fishermen’s ecological knowledge to map Atlantic cod spawning grounds on Georges Bank. ICES J Mar Sci. 74: 1587–1601.

Dernie, K. M., Kaiser, M. J., & Warwick, R. M. 2003. Recovery rates of benthic communities following physical disturbance. Journal of Animal Ecology, 72 (6),1043–1056.

Dow Piniak WE, Eckert SA, Harms CA, Stringer EM. 2012. Underwater Hearing Sensitivity of the Leatherback Sea Turtle (*Dermochelys coriacea*): Assessing the Potential Effect of Anthropogenic Noise. Herndon, Virginia: U.S. Department of the Interior, Bureau of Ocean Energy Management, Headquarters. OCS Study BOEM 2012-01156.

Drohan AF, Manderson JP, Packer DB. 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.

Dunton KJ, Jordaan A, McKown KA, Conover DO, Frisk MG. 2010. Abundance and distribution of Atlantic sturgeon (*Acipenser oxyrinchus*) within the Northwest Atlantic Ocean, determined from five fishery-independent surveys. Fish. Bull. 108:450–465.

Edmonds NJ, Firmin CJ, Goldsmith D, Faulkner RC, Wood DT. 2016. A review of crustacean sensitivity to high amplitude underwater noise: data needs for effective risk assessment in relation to UK commercial species. Mar Poll Bull. 108: 5–11.

Ellers O. 1995. Discrimination among wave-generated sounds by a swash-riding clam. The Biological Bulletin 189(2): 128-137. https://doi.org/10.2307/1542463.

Elliott J, Khan AA, Lin YT, Mason T, Miller JH, Newhall AE, Potty GR, Vigness-Raposa KJ. 2019. Field observations during wind turbine operations at the Block Island Wind Farm, Rhode Island. Final report by HDR for the US Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs. OCS Study BOEM 2019-028. 281 p. https://espis.boem.gov/final%20reports/BOEM_2019-028.pdf.

Essink, K. 1999. Ecological effects of dumping of dredged sediments; options for management. Journal of Coastal Conservation 5, 69–80.

Estrada JA, Rice AN, Natanson LJ, Skomal GB. 2006. The use of isotopic analysis of vertebrae in reconstructing ontogenetic feeding ecology in white sharks. *Ecology*, 87, 829–834.

Fahay MP, Berrien PL, Johnson DL, Morse WW. 1999. Essential fish habitat source document: Atlantic cod, *Gadus morhua*, life history and habitat characteristics. NOAA Tech Memo NMFS NE, 124, 50 p.

Fields DM, Handegard NO, Dalen J, Eichner C, Malde K, Karlsen Ø, Skiftesvik AB, Durif CMF, Browman HI. 2019. Airgun blasts used in marine seismic surveys have limited effects on mortality, and no sublethal effects on behaviour or gene expression, in the copepod *Calanus finmarchicus*. ICES J Mar Sci. 76(7):2033–2044.

Fitzgibbon QP, Day RD, McCauley RD, Simon CJ, Semmens JM. 2017. The impact of seismic air gun exposure on the haemolymph physiology and nutritional condition of spiny lobster, *Jasus edwardsii.* Mar. Pollut. Bull. 125: 146–156.

Gill AB, Desender M. 2020. Risk to animals from electromagnetic fields emitted by electric cables and marine renewable energy devices. In Copping AE, Hemery LG (Eds.), OES-Environmental 2020 State of the Science Report: Environmental Effects of Marine Renewable Energy Development Around the World. Report for Ocean Energy Systems (OES). (pp. 86–103).

Glasby TM, Connell SD, Holloway MG, Hewitt CL. 2007. Nonindigenous biota on artificial structures: could habitat creation facilitate biological invasions? Mar Biol. 151: 887–895.

Guida, V, Drohan A, Welch H, McHenry J, Johnson D, Kentner V, Brink J, Timmons D, Estela-Gomez E. 2017. Habitat Mapping and Assessment of Northeast Wind Energy Areas. U.S. Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2017-088. November 1, 2013. Prepared in Collaboration between Gulf of Maine Research Institute and University of Maine.

Hall JD, Francine J. 1991. Measurements of underwater sounds from a concrete island drilling structure located in the Alaskan sector of the Beaufort Sea. J Acoust Soc Am. 90(3): 1665-1667. https://doi.org/10.1121/1.401907

Halvorsen MB, Casper BM, Woodley CM, Carlson TJ, Popper AN. 2011. Predicting and mitigating hydroacoustic impacts on fish from pile installations. Washington, D.C: National Cooperative Highway Research Program, Transportation Research Board, National Academy of Sciences. NCHRP Res Results Digest 363, Project 25–28.

Halvorsen MB, et al. 2012. Effects of exposure to pile-driving sounds on the lake sturgeon, Nile tilapia and hogchoker. Proceedings of the Royal Society B: Biological Sciences 279.1748: 4705-4714.

Handegard NO, Michalsen K, Tjostheim D. 2003. Avoidance behavior in cod, *Gadus morhua*, to a bottom trawling vessel. Aquat Living Resour. 16: 265–270.

Hawkins AD, Popper AN. 2017. A sound approach to assessing the impact of underwater noise on marine fishes and invertebrates. ICES J Mar Sci. 74(3): 635–651.

HDR. 2019. Field Observations During Wind Turbine Operations at the Block Island Wind Farm, Rhode Island. U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs. Final Report. OCS Study BOEM 2019-028. 281 p.

He P, Rillahan C. 2021. Vineyard Wind Demersal Trawl Survey Winter 2021 Seasonal Report – 522 Lease Area. Progress Report #7. Vineyard Wind LLC. SMAST-CE-REP-2021-099. 43 p.

He P, Rillahan C. 2020a. Vineyard Wind Demersal Trawl Survey Fall 2019 Seasonal Report – 522 Lease Area. Progress Report #3. Vineyard Wind LLC. SMAST-CE-REP-2020-084. 44 p.

He P, Rillahan C. 2020b. Vineyard Wind Demersal Trawl Survey Winter 2020 Seasonal Report – 522 Lease Area. Progress Report #4. Vineyard Wind LLC. SMAST-CE-REP-2020-087. 35 p.

Hendrick VJ, Hutchison ZL, Last KS. 2016. Sediment burial intolerance of marine macroinvertebrates. PLos One, 11(2) e0149114.

Hendrickson LC. 2017. Longfin Inshore Squid (*Doryteuthis (Amerigo) pealeii*) Stock Assessment Update for 2017. NMFS. 11 pp.

Holmes LJ, McWilliam J, Ferrari MCO, McCormick MI. 2017. Juvenile damselfish are affected but desentize to small motor boat noise. J Exp Mar Bio Eco. 494:63–68.

Hutchison ZL, Gill AB, Sigray P, He H, King JW. 2020. Anthropogenic electromagnetic fields (EMF) influence the behaviour of bottom-dwelling marine species. Sci Rep. 10: 4219.

Hutchison ZL, Sigray P, He H, Gill AB, King J, Gibson C. 2018. Electromagnetic Field (EMF) Impacts on Elasmobranch (shark, rays, and skates) and American Lobster Movement and Migration from Direct Current Cables. U.S. Department of the Interior, Bureau of Ocean Energy Management, Sterling VA. OCS Study BOEM 2018-003.

Jacobson LD. 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.

Jézéquel Y, Cones S, Mooney TA. 2023 Sound sensitivity of the giant scallop (*Placopecten magelanicus*) is life stage, intensity, and frequency dependent. J Acoust Soc Am. 153.2: 1130-1137.

Johnson DL, Morse WW, Berrien PL, Vitaliano JJ. 1999. Essential fish habitat source document. Yellowtail flounder, *Limanda ferruginea*, life history and habitat characteristics. Northeast Fisheries Science Center (U.S.). NOAA Technical Memorandum NMFS-NE; 140. https://staging-noaa.cdc.gov/view/noaa/3137. Accessed April 27, 2022

Johnson DL. 2004. Essential fish habitat source document. American Plaice, *Hippoglossoides platessoides* life history and habitat characteristics. Northeast Fisheries Science Center (U.S.). NOAA Technical Memorandum NMFS-NE; 123. https://staging-noaa.cdc.gov/view/noaa/3098

Jones IT, Schumm M, Stanley JA, Hanlon RT, Mooney TA. 2023. Longfin squid reproductive behaviours and spawning withstand wind farm pile driving noise, ICES Journal of Marine Science, fsad117.

Jones IT, Stanley JA, and Mooney TA. 2020. Impulsive pile driving noise elicits alarm responses in squid (*Doryteuthis pealeii*). Mar Pollut Bull. 150:14 p.

Kastelein RA. 2008. Effects of vibrations on the behaviour of cockles (bivalve molluscs). Bioacoustics 17(1-3): 74-75. https://doi.org/10.1080/09524622.2008.9753770.

Keevin TM, GL Hempen. 1997. The Environmental Effects of Underwater Explosions with Methods to Mitigate Impacts. US Army Corps of Engineers, St. Louis, MO, USA.

Kraus SD, Leiter S, Stone K, Wikgren B, Mayo C, Hughes P, Kenney RD, Clark CW, Rice AN, Estabrook B, Tielens J. 2016. Northeast Large Pelagic Survey Collaborative Aerial and Acoustic Surveys for Large Whales and Sea Turtles. Sterling, Virginia: U.S. Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2016-054.

Kovach AI, Breton TS, Berlinsky DL, Maceda L, Wirgin I. 2010. Fine-scale spatial and temporal genetic structure of Atlantic cod off the Atlantic coast of the USA. Mar Ecol Prog Ser. 410: 177–195.

Ladich F, Myrberg AA. 2006. Agonistic behavior and acoustic communication. In Communication in Fishes (Ladich F, Collins SA, Moller P, and Kapoor BG, eds.), pp. 121–148.

Lent R. 1999. Final fishery management plan for Atlantic tunas, swordfish and sharks, Vol. 2. U.S. Department of Commercial Fisheries, NOAA, NMFS, Washington, D.C., 302 pp.

Lindeboom HJ, Kouwenhoven HJ, Bergman MJN, Bouma S, Brasseur S, Daan R, Fijn RC, de Haan D, Dirksen S et al. 2011. Short-term ecological effects of an offshore wind farm in the Dutch coastal zone; a compilation. Environmental Research Letters 6(3): 1-13. https://doi.org/10.1088/1748-9326/6/3/035101.

Lock MC, Packer DB. 2004. Essential fish habitat source document: Silver hake *Merluccius bilinearis* life history and habitat characteristics. NOAA Tech Memo NMFS NE, 135, 42 pp.

Lough RG. 2004. Essential fish habitat source document: Atlantic cod *Gadus morhua* life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE, 190, pp. 1–94.

Love MS, Nishimoto MM, Clark S, McCrea M, Bull AS. 2017. The organisms living around energized submarine power cables, pipe, and natural sea floor in the inshore waters of Southern California. Bulletin, Southern California Academy of Sciences 116(2), pp.61–87.

MacGillivray A. 2018. Underwater noise from pile driving of conductor casing at a deep-water oil platform. J Acoust Soc Am. 143(1):450–459.

[MADMF] Massachusetts Division of Marine Fisheries. 2022. Monkfish. Retrieved from https://www.mass.gov/service-details/learn-about-monkfish. Accessed April 27, 2022.

[MAFMC and NOAA] Mid Atlantic Fishery Management Council and National Oceanic and Atmospheric Administration. 2011. Amendment 11 to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan. Retrieved from http://static.squarespace.com/static/511cdc7fe4b00307a2628ac6/t/518968c5e4b0884a65fe5067/1367959749407/Amendment%2011%20FEIS%20-%20FINAL_2011_05_12.pdf#page=236

MassGIS. 2022. MassMapper: An interactive map for Massachusetts. Available at https://maps.massgis.digital.mass.gov/MassMapper/MassMapper.html. Accessed May 23, 2022.

Mayhew D, Jensen L, Hanson D, Muessig P. 2000. A comparative review of entrainment survival studies at power plants in estuarine environments. Environ. Sci. Pol., 3: 295–301.

McCauley RD. 1994. The environmental implications of offshore oil and gas development in Australia - seismic surveys. In: Neff JM & Young PC (eds.). Environmental Implications of Offshore Oil and Gas Development in Australia - The Findings of an Independent Scientific Review Swan. Australian Petroleum Exploration Association, Sydney. 19-122 p.

McCauley RD. 1998. Radiated underwater noise measured from the drilling rig Ocean General, rig tenders Pacific Ariki and Pacific Frontier, fishing vessel Reef Venture and natural sources in the Timor Sea, northern Australia. Report Number C98-20. Report by Centre for Marine Science and Technology (CMST) for Shell Australia. https://cmst.curtin.edu.au/wp-content/uploads/sites/4/2016/05/1998-19.pdf.

McCauley RD, Day RD, Swadling KM, Fitzgibbon QP, Watson RA, Semmens JM. 2017. Widely used marine seismic survey air gun operations negatively impact zooplankton. Nat Ecol Evol. 1(7): 1–8. https://doi.org/10.1038/s41559-017-0195.

McHugh R. Hydroacoustic measurements of piling operations in the North Sea, and Pamguard - passive acoustic monitoring guardianship open-source software. Paper presented at: National Physical Laboratory Underwater Noise Measurement Seminar Series 13th October 2005; Teddington, UK.

McMillan DG, Morse WW. 1999. Essential fish habitat source document: Spiny dogfish, *Squalus acanthias* life history and habitat characteristics. NOAA Tech Memo NMFS NE, 150, 28 pp.

McPherson CR, Quijano JE, Weirathmueller MJ, Hiltz KR, Lucke K (JASCO Applied Sciences). 2019. Browse to north-west-shelf noise modelling study: Assessing marine fauna sound exposures. Jacobs. Technical report.

Meißner K, Schabelon H, Bellebaum J, Sordyl H. 2006. Impacts of submarine cables on the marine environment: A literature review. Germany: Institute of Applied Ecology Ltd for the Federal Agency of Nature Conservation.

Miller JH, Potty GR. 2017. Overview of underwater acoustic and seismic measurements of the construction and operation of the Block Island Wind Farm. J Acoust Soc Am. 141(5): 3993-3993. https://doi.org/10.1121/1.4989144.

Minerals Management Service (MMS). 2008. Cape Wind Energy Project. Final Environmental Impact Statement. MMS EIS-EA OCS Publication No. 2008-040.

Mitson RB, Knudsen HP. 2003. Causes and effects of underwater noise on fish abundance estimation. Aquat Living Resour. 16(3):255–263.

Molnar M, Buehler D, Oestman R, Reyff J, Pommerenck K, Mitchell B. 2020. Technical Guidance for the Assessment of Hydroacoustic Effects of Pile Driving on Fish. Report CTHWANP-RT-20-365.01.04. Report by California Department of Transportation (CALTRANS), Division of Environmental Analysis. 532 p. https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/hydroacoustic-manual.pdf.

Mooney TA, Hanlon RT, Christensen-Dalsgaard J, Madsen PT, Ketten DR, Nachtigall PE. 2010. Sound detection by the longfin squid (*Loligo pealeii*) studied with auditory evoked potentials: Sensitivity to low-frequency particle motion and not pressure. J Exp Biol. 213(21):3748–3759.

Morse WW, Johnson DL, Berrien PL, Wilk SJ. 1999. Essential fish habitat source document: Silver hake, *Merluccius bilinearis* life history and habitat characteristics. NOAA Tech Memo NMFS NE, 135, 50 pp.

Mosher JI. 1972. The responses of *Macoma balthica* (Bivalvia) to vibrations. Journal of Molluscan Studies 40(2): 125-131. https://doi.org/10.1093/oxfordjournals.mollus.a065209.

Mueller-Blenkle C, McGregor PK, Gill AB, Andersson MH, Metcalfe J, Bendall V, Sigray P, Wood DT, Thomsen F. 2010. Effects of pile-driving noise on the behaviour of marine fish. COWRIE Ref: Fish 06-08, Technical Report. March 31, 2010.

Murawski SA. 1993. Climate change and marine fish distributions: Forecasting from historical analogy. Trans. Am. Fish. Soc. 122: 647–657.

Myrberg AA Jr., Lugli M. 2006. Reproductive behavior and acoustical interactions. In: Ladich F, Collin SP, Moller P, Kapoor BG, editors. Communication in Fishes. Vol 1 Acoustic and Chemical Communication. Enfield, NH: Science Publishers Inc.; 2006. 149–176 p.

Nakano H, Stevens JD. 2008. The biology and ecology of the blue shark *Prionace glauca*. Sharks of the open ocean: Biology, fisheries and conservation, pp. 140–151.

Nedelec SL, Radford AN, Simpson SD, Nedelec B, Lecchini D, Mills SC. 2014. Anthropogenic noise playback impairs embryonic development and increases mortality in a marine invertebrate. Sci Rep. 4: 5891.

Nedwell J, Langworthy J, Howell D (Subacoustech Ltd.). 2003. Assessment of sub-sea acoustic noise and vibration from offshore wind turbines and its impact on marine wildlife; initial measurements of underwater noise during construction of offshore windfarms, and comparison with background noise. Crown Estates Office. Report nr. 544 R 0424. 68 p.

Nedwell JR, Edwards B. 2004. A review of measurements of underwater man-made noise carried out by Subacoustech Ltd, 1993 – 2003. Document Number 534R0109. Report by Subacoustech Ltd. for ChevronTexaco Ltd., TotalFinaElf Exploration UK PLC, DSTL, Department of Trade and Industry, and Shell U.K. Exploration and Production Ltd. 131 p. http://www.subacoustech.com/information/downloads/reports/534R0109.pdf.

[NEFMC] New England Fishery Management Council. 2017. Omnibus Essential Fish Habitat Amendment 2: Volume II EFH and HAPC Designation Alternatives and Environmental Impacts.

[NEFMC] New England Fishery Management Council . 2022. Southern New England Habitat Area of Particular Concern Framework.

[NEFSC] NOAA Northeast Fisheries Science Center, Ecosystem Surveys Branch. N.D. Data downloaded February 18, 2022. "Multispecies Bottom Trawl Survey." Retrieved from https://www.fisheries.noaa.gov/inport/item/22557#childItems

Nguyen JP. 1996. Drilling: Oil and gas field development techniques. Balvet BB. (trans.). Editions TECHNIP. Institut Français du Pétrole, Paris. 384 p.

[NMFS GARFO] National Marine Fisheries Service Greater Atlantic Regional Fisheries Office. 2016. GARFO acoustics tool: Analyzing the effects of pile driving on ESA-listed species in the greater Atlantic region. NMFS. https://www.greateratlantic.fisheries.noaa.gov/protected/section7/guidance/consultation/index.html

[NMFS] National Marine Fisheries Service. 2009. Amendment 1 to the Final consolidated Atlantic Highly Migratory Species Fishery Management Plan. Silver Spring, Maryland: National Marine Fisheries Service, Office of Sustainable Fisheries, Highly Migratory Species Management Division.

[NMFS] National Marine Fisheries Service. 2017. Amendment 10 to the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan: Essential Fish Habitat. Silver Spring, Maryland: National Marine Fisheries Service, Office of Sustainable Fisheries, Highly Migratory Species Management Division. Silver Spring, MD. Public Document, pp. 442.

[NMFS] National Marine Fisheries Service. 2021. Recommendations for Mapping Fish Habitat. NMFS Greater Atlantic Fisheries Office Habitat Conservation and Ecosystem Services Division. March 2021. 22 p. https://media.fisheries.noaa.gov/2021-03/March292021_NMFS_Habitat_Mapping_Recommendations.pdf

[NOAA] National Oceanic and Atmospheric Administration Fisheries. 2020a. Atlantic Shortfin Mako Shark. Retrieved from https://www.fisheries.noaa.gov/species/atlantic-shortfin-mako-shark. Accessed April 28, 2022.

[NOAA] National Oceanic and Atmospheric Administration Fisheries. 2020b. Atlantic Wolffish. Retrieved from https://www.fisheries.noaa.gov//species/atlantic-wolffish. Accessed on April 28, 2022.

[NOAA] National Oceanic and Atmospheric Administration Fisheries. 2020c. Western Atlantic Bluefin Tuna. Retrieved from https://www.fisheries.noaa.gov/species/western-atlantic-bluefin-tuna. Accessed April 28, 2022.

[NOAA] National Oceanic and Atmospheric Administration. 2016. Amendment 10 to the 2006 Consolidated Atlantic Highly Migratory Species Fishery Management Plan: Essential Fish Habitat. Retrieved from https://www.fisheries.noaa.gov/action/amendment-10-2006-consolidated-hms-fishery-management-plan-essential-fish-habitat#:~:text=NOAA%20Fisheries%20conducted%20a%205-year%20review%20of%20Atlantic,HMS%20FMP%20was%20undertaken%20to%20update%20HMS%20EFH.?msclkid=f46f8271c7c611eca5cf1cabbcdf0dd1

Normandeau Associates, Inc. 2012. Effects of noise on fish, fisheries, and invertebrates in the US Atlantic and Arctic from energy industry sound-generating activities. US Dept. of the Interior, Bureau of Ocean Energy Management. Workshop Report. 72 p.

Normandeau Associates Inc., Exponent Inc., Tricas T, Gill A. 2011. Effects of EMFs from undersea power cables on elasmobranchs and other marine species (Final). Report to US Dept. of the Interior, Bureau of Ocean Energy Management, Regulation and Enforcement, Pacific OCS Region, Camarillo, CA. OCS Study BOEMRE 2011-09, 426p.

Oestman R, Buehler D, Reyff JA, Rodkin R. 2009. Technical guidance for assessment and mitigation of the hydroacoustic effects of pile driving on fish. Prepared for California Department of Transportation

Olsen K, Agnell J, Pettersen F, Løvik A. 1983. Observed fish reactions to a surveying vessel with special reference to herring, cod, capelin and polar cod. Paper presented at: Symposium of Fisheries Acoustics; FAO Fisheries Reports 300:131–138; 1983; Bergen, Norway.

Ona E, Godø OR, Handegard NO, Hjellvik V, Patel R, Pedersen G. 2007. Silent research vessels are not quiet. J Acoust Soc Am. 121(4): 145–150.

Packard A, Karlsen HE, Sand O. 1990. Low frequency hearing in cephalopods. J Comp Physiol A. 166(4):501–505.

Packer DB, Griesbach SJ, Berrien PL, Zetlin CA, Johnson DL, Morse WW. 1999. Essential fish habitat source document: Summer flounder *Paralichthys dentatus* life history and habitat characteristics. NOAA Tech Memo NMFS NE, 151, 88 pp.

Packer DB, Zetlin CA, Vitaliano JJ. 2003a. Essential fish habitat source document: Barndoor skate, *Dipturus laevis*, life history and habitat characteristics. NOAA Tech Memo NMFS NE 173; 23 p.

Packer DB, Zetlin CA, Vitaliano JJ. 2003b. Essential fish habitat source document: Winter skate, *Leucoraja ocellata*, life history and habitat characteristics. NOAA Tech Memo NMFS NE 179; 57 p.

Pangerc T, Theobald PD, Wang LS, Robinson SP, Lepper PA. 2016. Measurement and characterisation of radiated underwater sound from a 3.6 MW monopile wind turbine. J Acoust Soc Am. 140(4): 2913-2922. https://doi.org/10.1121/1.4964824.

Pereira JJ, Goldberg R, Ziskowski JJ, Berrien PL, Morse WW, Johnson DL. 1999. Essential fish habitat source document: Winter flounder *Pseudopleuronectes americanus* life history and habitat characteristics. NOAA Tech Memo NMFS NE, 138, 39 pp.

Popper AN, Fay RR. 1993. Sound detection and processing by fish: Critical review and major research questions. Brain Behav Evol. 41: 14–38.

Popper AN, Hastings MC. 2009. The effects of human-generated sound on fish. Integr Zool. 4(1): 43–52.

Popper AN, Hawkins AD, Fay RR, Mann DA, Barto IS, Carlson TJ, Coombs S, Ellison WT, Gentry RL, Halvorsen MB et al. 2014. Sound exposure guidelines for fishes and sea turtles: A Technical Report prepared by ANSI-Accredited Standards Committee S3/SC1 and registered with ANSI. ASA S3/SC1.4 TR-2014. SpringerBriefs in Oceanography. ASA Press and Springer. https://doi.org/10.1007/978-3-319-06659-2.

Popper AN, Hawkins AD. 2019. An overview of fish bioacoustics and the impacts of anthropogenic sounds on fishes (Review Paper). Journal of Fish Biology 94(5): 692-713. https://doi.org/10.1111/jfb.13948.

Popper AN. 2003. Effects of anthropogenic sounds on fishes. Fisheries. 28(10):24–31.

Purser J, Radford AN. 2011. Acoustic noise induces attention shifts and reduces foraging performance in Three-Spined Sticklebacks (*Gasterosteus aculeatus*). PLoS ONE 6(2): e17478. https://doi.org/10.1371/journal.pone.0017478.

Raoux A, Tecchio S, Pezy JP, Lassalle G, Degraer S, Wilhelmsson D, Cachera M, Ernande B, Le Guen C, Haraldsson M, et al. 2017. Benthic and fish aggregation inside an offshore wind farm: Which effects on the trophic web functioning? Ecological Indicators. 72:33–46.

Reid RN, Cargnelli LM, Griesbach SJ, Packer DB, Johnson DL, Zetlin CA, Morse WW, Berrien, PL. 1999. Essential fish habitat source document: Atlantic herring *Clupea harengus* life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE, 126, pp.48.

Richardson AJ, Matear RJ, Lenton A (CSIRO Oceans and Atmosphere). 2017. Potential impacts on zooplankton of seismic surveys. The Australian Petroleum Production and Exploration Association (APPEA). 34 p.

Riefolo L, Lanfredi C, Azzellino A, Tomasicchio GR, Felice DA, Penchev V, Vicinanza D. 2016. Offshore wind turbines: An overview of the effects on the marine environment. Presented at: 26th International Ocean and Polar Engineering Conference 2016. International Society of Offshore and Polar Engineers. 2016 June; Rhodes, Greece.

Roberts L, Cheesman S, Breithaupt T, Elliott M. 2015. Sensitivity of the mussel *Mytilus edulis* to substrate-borne vibration in relation to anthropogenically generated noise. Marine Ecology Progress Series 538: 185-195. https://doi.org/10.3354/meps11468.

Roberts L, Cheesman S, Hawkins AD. Effects of sound on the behavior of wild, unrestrained fish schools. The Effects of Noise on Aquatic Life II. Springer New York, 2016.

Roberts L, Elliott M. 2017. Good or bad vibrations? Impacts of anthropogenic vibration on the marine epibenthos. Science of the Total Environment 595: 255-268. https://doi.org/10.1016/j.scitotenv.2017.03.117.

Robinson SP, Lepper PA, Ablitt J. 2007. The measurement of the underwater radiated noise from marine piling including characterisation of a "soft start" period. Presented in: Proceedings of Oceans 2007. 2007 Aberdeen. 6 p.

Sarà G, Dean JM, D'Amato D, Buscaino G, Oliveri A, Genovese S, Ferro S, Buffa G, Lo Martire M, Mazzola S. 2007. Effect of boat noise on the behaviour of bluefin tuna *Thunnus thynnus* in the Mediterranean Sea. Mar Ecol Prog Ser. 331:243–253.

Scholik AR, Yan HY. 2002. Effects of boat engine noise on the auditory sensitivity of the fathead minnow, *Pimephales promelas*. Envion Biol Fish. 63(2):203–209.

Schwarz AL, Greer GL. 1984. Responses of pacific herring, *Clupea harengus pallasi*, to some underwater sounds. Can J Fish Aquat Sci. 41(8):1183–1192.

Scott K, Harsanyi P, Easton BAA, Piper AJR, Rochas CMV, Lyndon AR. 2021. Exposure to electromagnetic fields (EMF) from submarine power cables can trigger strength-dependent behavioural and physiological responses in edible crab, *Cancer pagurus* (L.). J. Mar. Sci. Eng. 776 16pp.

Sherk JA, O'Connor JM, Neumann DA, Prince RD, Wood KV. 1974. Effects of suspended and deposited sediments on estuarine organisms. Phase II. University of Maryland Natural Resources Institute, Reference 74-20, Solomons.

Siemann L, Smolowitz R. 2017. Southern New England Juvenile Fish Habitat Research Paper. OCS Study BOEM 2017-028. Retrieved from https://espis.boem.gov/final%20reports/5592.pdf. Accessed April 28, 2022.

Slavik K, Lemmen C, Zhang W, Kerimoglu O, Wirtz KW. 2017. The large scale impact of offshore windfarm structures on pelagic primary production in the southern North Sea. Hydrobiologia. doi: 10.1007/s10750-018-3653-5.

Smith ME, Coffin AB, Miller DL, Popper AN. 2006. Anatomical and functional recovery of the goldfish (*Carassius auratus*) ear following noise exposure. Journal of Experimental Biology 209(21): 4193-4202. https://doi.org/10.1242/jeb.02490.

Snyder DB, Bailey WH, Palmquist K, Cotts BRT, Olsen KR. 2019. Evaluation of Potential EMF Effects on Fish Species of Commercial or Recreational Fishing Importance in Southern New England. Sterling VA: U.S. Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2019-049.

Solé M et al. 2022. Commercial cuttlefish exposed to noise from offshore windmill construction show short-range acoustic trauma. Environmental Pollution 312: 119853.

Solé M, Lenoir M, Durfort M, López-Bejar M, Lombarte A, van der Schaar M, André M. 2013. Does exposure to noise from human activities compromise sensory information from cephalopod statocysts? Deep Sea Res Part II. 95:160–181.

Solé M, Sigray P, Lenoir M, van der Schaar M, Lalander E, Andre M. 2017. Offshore exposure experiments on cuttlefish indicate received sound pressure and particle motion levels associated with acoustic trauma. Sci Rep. 7:45899.

Soria M, Fréon P, Gerlotto F. 1996. Analysis of vessel influence on spatial behaviour of fish schools using a multi-beam sonar and consequences for biomass estimates by echo-sounder. ICES J Mar Sci. 53(2):453–458.

South Fork Wind Farm. 2019. Construction and Operations Plans Appendix O: Essential Fish Habitat Assessment. 188 pp.

Spiga I, Caldwell GS, Bruintjes R. 2016. Influence of pile driving on the clearance rate of the blue mussel, *Mytilus edulis*. Proc Meet Acoust. 27: 040005. doi: 10.1121/2.

Steele DH. 1957. The redfish (*Sebastes marinus L*.) in the western Gulf of St. Lawrence. J. Fish. Res. Board Can. 14: 899–924.

Steimle FW, Morse WW, Johnson DL. 1999a. Essential fish habitat source document: Goosefish, *Lophius americanus* life history and habitat characteristics. NOAA Tech Memo NMFS NE, 127, 40 p.

Steimle FW, Morse WW, Berrien PL, Johnson DL. 1999b. Essential fish habitat source document: Red hake *Urophycis chuss* life history and habitat characteristics. NOAA Tech Memo NMFS NE, 133, 34 p.

Steimle FW, Morse WW, Berrien PL, Johnson DL, Chang S. 1999c. Essential fish habitat source document: Scup *Stenotomus chrysops* life history and habitat characteristics. NOAA Tech Memo NMFS NE, 149, 39 pp.

Steimle FW, Morse WW, Berrien PL, Johnson DL, Zetlin CA. 1999d. Essential fish habitat source document: Ocean pout *Macrozoarces americanus* life history and habitat characteristics. NOAA Tech Memo NMFS NE, 129, 26 pp.

Steimle FW, Zetlin CA, Berrien PL, Chang S. 1999e. Essential fish habitat source document: Black sea bass, *Centropristis striata* life history and habitat characteristics. NOAA Tech Memo NMFS NE, 143, 50 p.

Stein BS, Friedland KD, Sutherland MR. 2004. Atlantic sturgeon marine distribution and habitat use along the northeastern coast of the United States. Transactions of the American Fisheries Society. 133: 527–537.

Stenberg C, Støttrup J, Deurs MV, Berg CW, Dinesen GE, Mosegaard H, Grome T, Leonhard SB. 2015. Long-term effects of an offshore wind farm in the North Sea on fish communities. Mar Ecol Prog Ser. 528: 257–265.

Stöber U, Thomsen F. 2021. How could operational underwater sound from future offshore wind turbines impact marine life? J Acoust Soc Am. 149(3): 1791-1795. https://doi.org/10.1121/10.0003760.

Studholme AL, Packer DB, Berrien PL, Johnson DL, Zetlin CA, Morse WW. 1999. Essential fish habitat source document: Atlantic mackerel *Scomber scombrus* life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE, 141, p.35.

Thomsen F, Lüdemann K, Kafemann R, Piper W. 2006. Effects of offshore wind farm noise on marine mammals and fish. Hamburg, Germany: COWRIE Ltd. 62 p.

Thomsen F, Gill AB, Kosecka M, Andersson M, André M, Degraer S, Folegot T, Gabriel J, Judd A, Neumann T, et al. 2016. MaRVEN – environmental impacts of noise, vibrations and electromagnetic emissions from marine renewable energy. European Commission. RTD- KI-NA-27-738-EN-N. Report for European Commission, Directorate General for Research and Innovation. 73 pp.

Tougaard J, Carstensen J, Teilmann J, Skov H, Rasmussen P. 2009a. Pile driving zone of responsiveness extends beyond 20 km for harbor porpoises (*Phocoena phocoena*). J Acoust Soc Am. 126(1):11–14.

Tougaard J, Henriksen OD, Miller LA. 2009b. Underwater noise from three types of offshore wind turbines: Estimation of impact zones for harbor porpoises and harbor seals. J Acoust Soc Am. 125(6): 3766-3773. https://doi.org/10.1121/1.3117444.

Tougaard J, Hermannsen L, Madsen PT. 2020. How loud is the underwater noise from operating offshore wind turbines? Journal of the Acoustical Society of America 148(5): 2885-2893. https://doi.org/10.1121/10.0002453.

Tricas TC. 2012. Effects of EMFs from Undersea Power Cables on Elasmobranchs and Other Marine Species; DIANE Publishing: Darby, PA, USA

Tsouvalas A, Metrikine AV. 2016. Structure-borne wave radiation by impact and vibratory piling in offshore installations: From sound prediction to auditory damage. Journal of Marine Science and Engineering 4(3): 44. https://doi.org/10.3390/jmse4030044.

Vabø R, Olsen K, Huse I. 2002. The effect of vessel avoidance of wintering Norwegian spring-spawning herring. Fish Res. 58: 59–77.

Van Dalfsen JA, Essink K. 2001. Benthic community response to sand dredging and shoreface nourishment in Dutch coastal waters. Senckenbergiana marit, 31(2),329–32.

Vasconcelos RO, Amorim MCP, Ladich F. 2007. Effects of ship noise on the detectability of communication signals in the lusitanian toadfish. J Exp Biol. 210(12): 2104-2112.

Wahlberg M, Westerberg H. 2005. Hearing in fish and their reactions to sounds from offshore wind farms. Mar Ecol Prog Ser. 288: 295–309. https://www.int-res.com/abstracts/meps/v288/p295-309/.

Weiss E, Sanderson M, Gerlach G. 2005. Population structure and essential fish habitat mapping of western Georges Bank cod. Final Report for Cooperative Research Partners' Program, Northeast Regional Office, National Marine Fisheries Service, 16 December 2005.

Wilber DH, Clarke DG. 2001. Biological effects of suspended sediments: a review of suspended sediment impacts on fish and shellfish with relation to dredging activities in estuaries. North American Journal of Fisheries Management 21, 855–875.

Wilber DH, Brown L, Griffin M, DeCelles GR, Carey DA. 2022. Demersal fish and invertebrate catches relative to construction and operation of North America's first offshore wind farm. ICES J. Mar. Sci. doi: 10.1093/icesjms/fsac051.

Wilhelmsson D, Malm T, Ohman M. 2006. The influence of offshore windpower on demersal fish. ICES Journal of Marine Science, 63: 775–784.

Willis MR, Broudic M, Bhurosah M, Masters I. 2010. Noise associated with small scale drilling operations. 3rd International Conference on Ocean Energy. 6 Oct 2010, Bilbao. pp. 1-5.

Wysocki LE, Dittami JP, Ladich F. 2006. Ship noise and cortisol secretion in European freshwater fishes. Biol Conserv. 128(4):501–508.

Wysocki LE, Amoser S, Ladich F. 2007. Diversity in ambient noise in European freshwater habitats: Noise levels, spectral profiles, and impact on fishes. J Acoust Soc Am. 121(5): 2559-2566. https://doi.org/10.1121/1.2713661.

Zhang X, Guo H, Chen J, Song J, Xu K, Kin J, Shouyu Z. 2021. Potential effects of underwater noise from wind turbines on the marbled rockfish (*Sebasticus marmoratus*). J Appl Ichthyol. 2021;00:1–9.

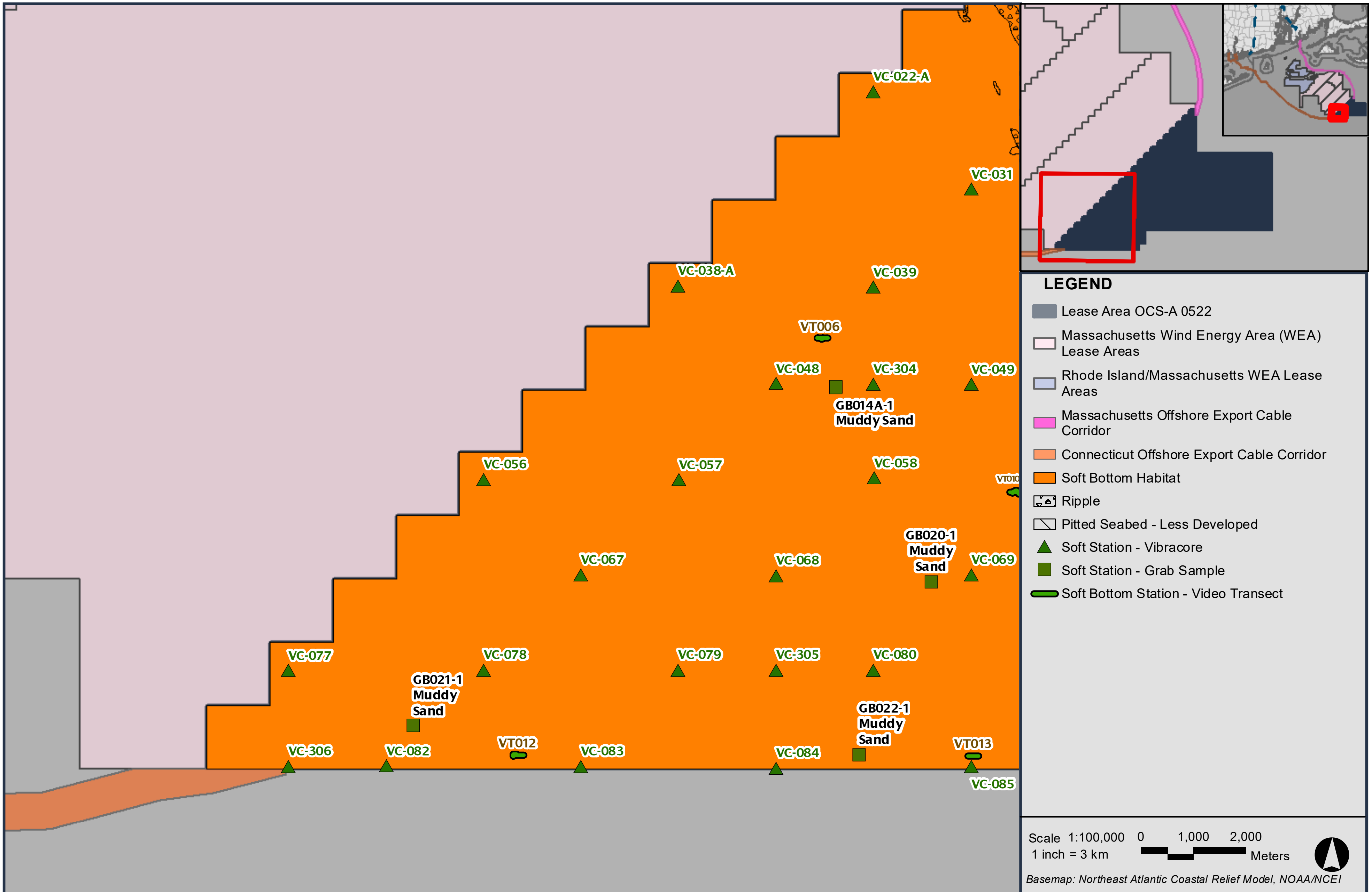
Zykov MM, Bailey L, Deveau TJ, Racca RG (JASCO Applied Sciences). 2013. South stream pipeline – Russian sector – underwater sound analysis. South Stream Transport B.V. Technical report.

Zykov MM, Deveau TJ, Zeddies DG. 2016. Modelling Underwater Sound Associated with Constructing Canaport Energy East Marine Terminal: Impact and Vibratory Pile Driving Noise. Document Number 01161, Version 3.0. Technical report by JASCO Applied Sciences for Stantec Consulting Ltd.

Zemeckis, DR, Hoffman, WS, Dean, MJ, Armstrong, MP, Cadrin SX. 2014. Spawning site fidelity by Atlantic cod (*Gadus morhua*) in the Gulf of Maine: implications for population structure and rebuilding. ICES J Mar Sci. 71(6): 1356–1365.

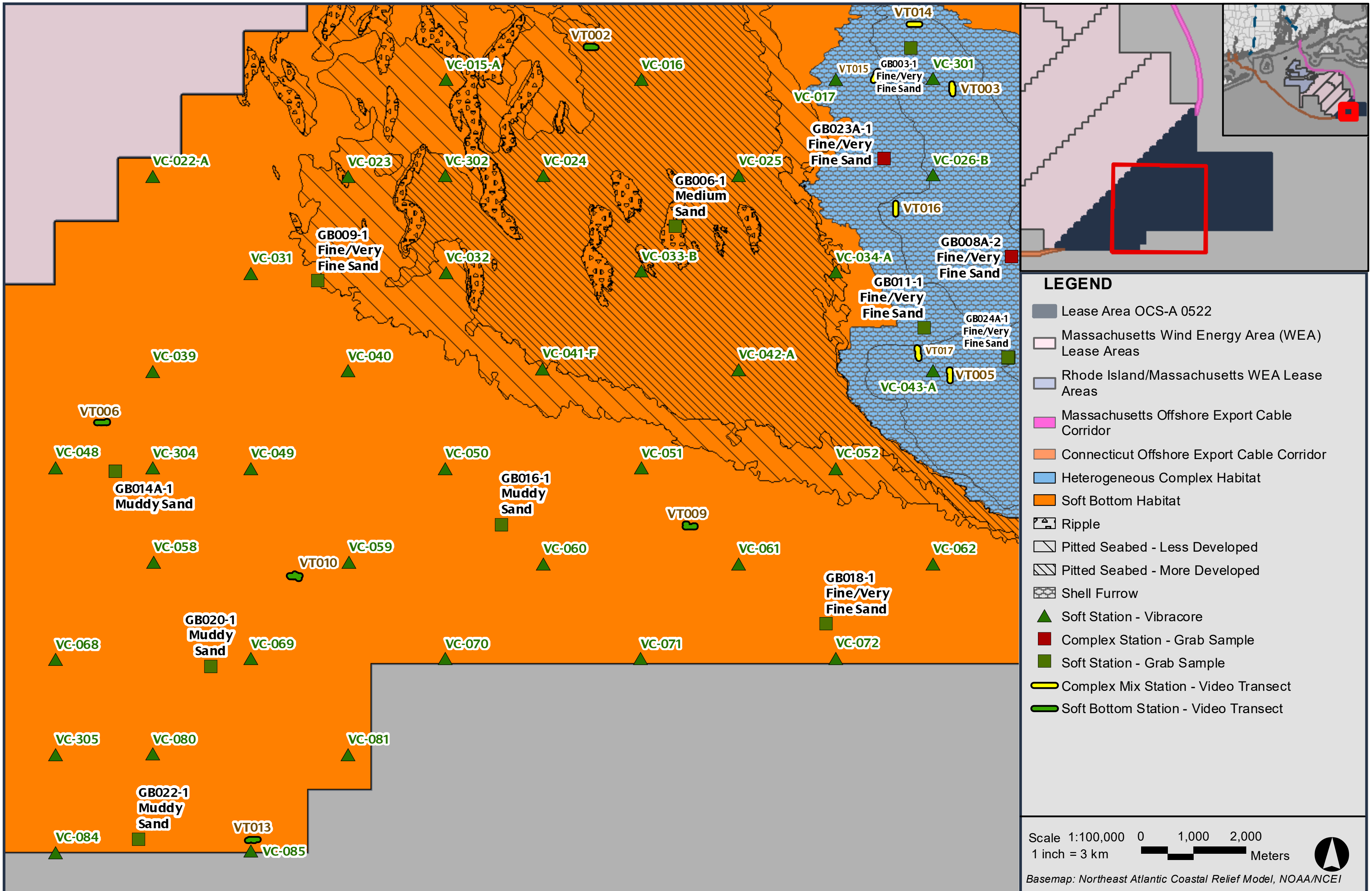
Annex A: Large-Scale Maps of Bottom Habitats and Benthic Features Located Withing the Offshore Development Area of Vineyard Northeast

Habitat maps included in Annex A display the characterized delineations of benthic habitat type and benthic features along with all ground truthing samples collected in the Offshore Development Area in 2019 and 2022. Four maps depict the Lease Area at a scale of 1:100,000 based on the extensive homogeneous nature of the habitat. Habitat along the OECCs is presented in a series of 550 maps at a scale of 1:5,000 based on the presence of Heterogenous Complex and Complex habitat observed throughout. For each series of maps, the kilometer posts (KP), grab and vibracore sample locations, HDD exit location, potential dredge location, and CMECS classification are provided.



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Lease Area

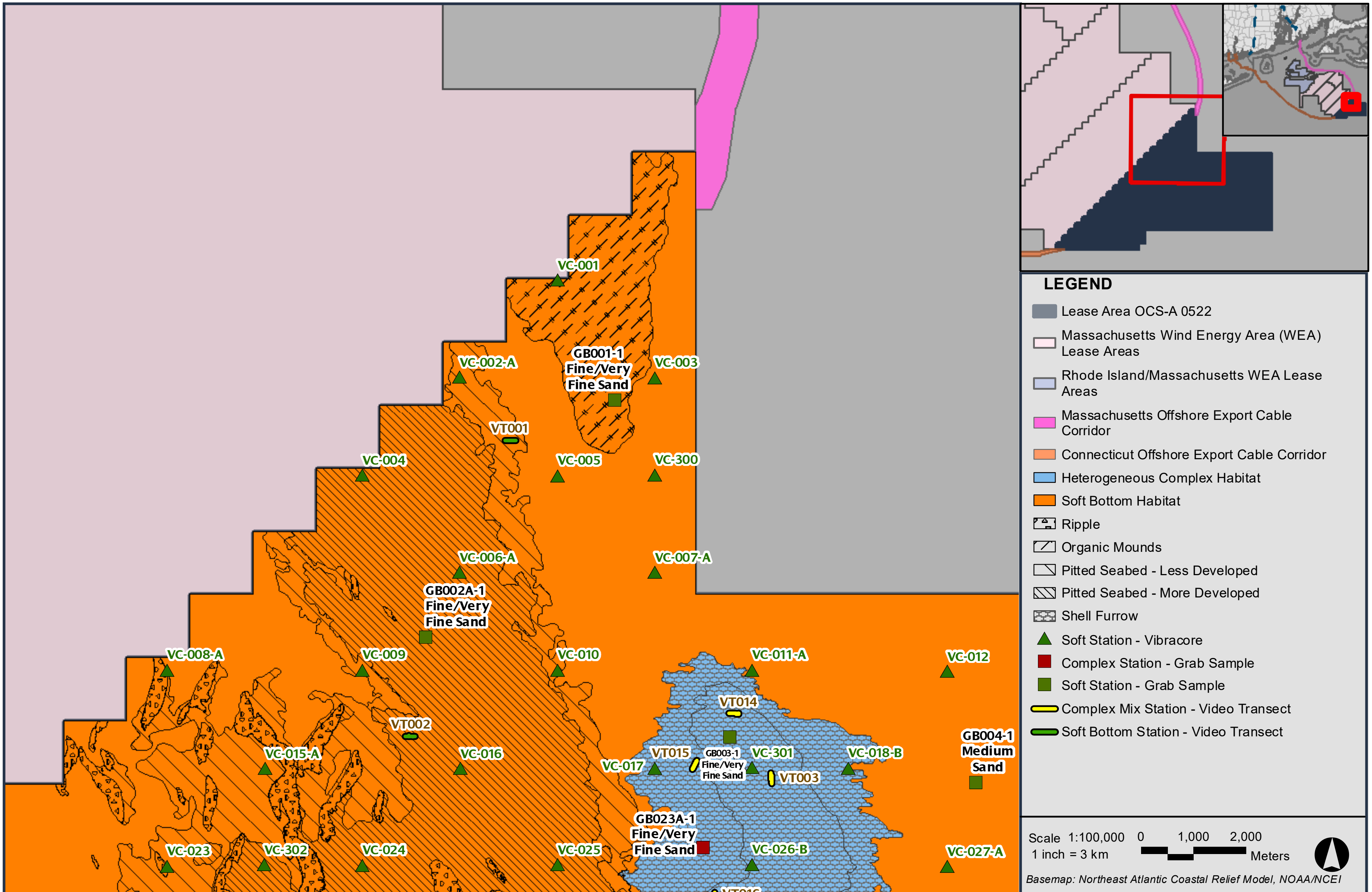
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Lease Area

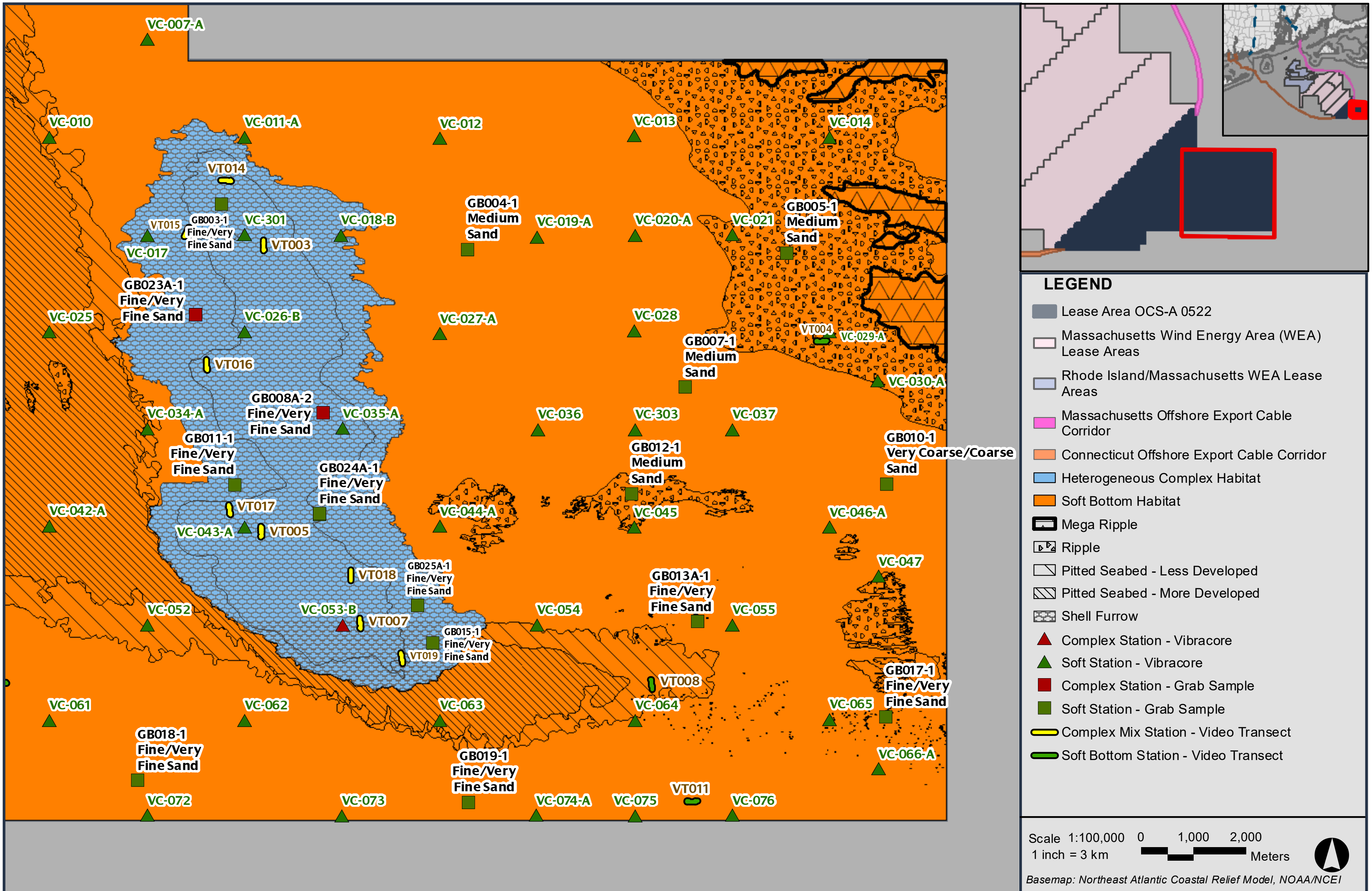
Page 2 of 4

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Lease Area

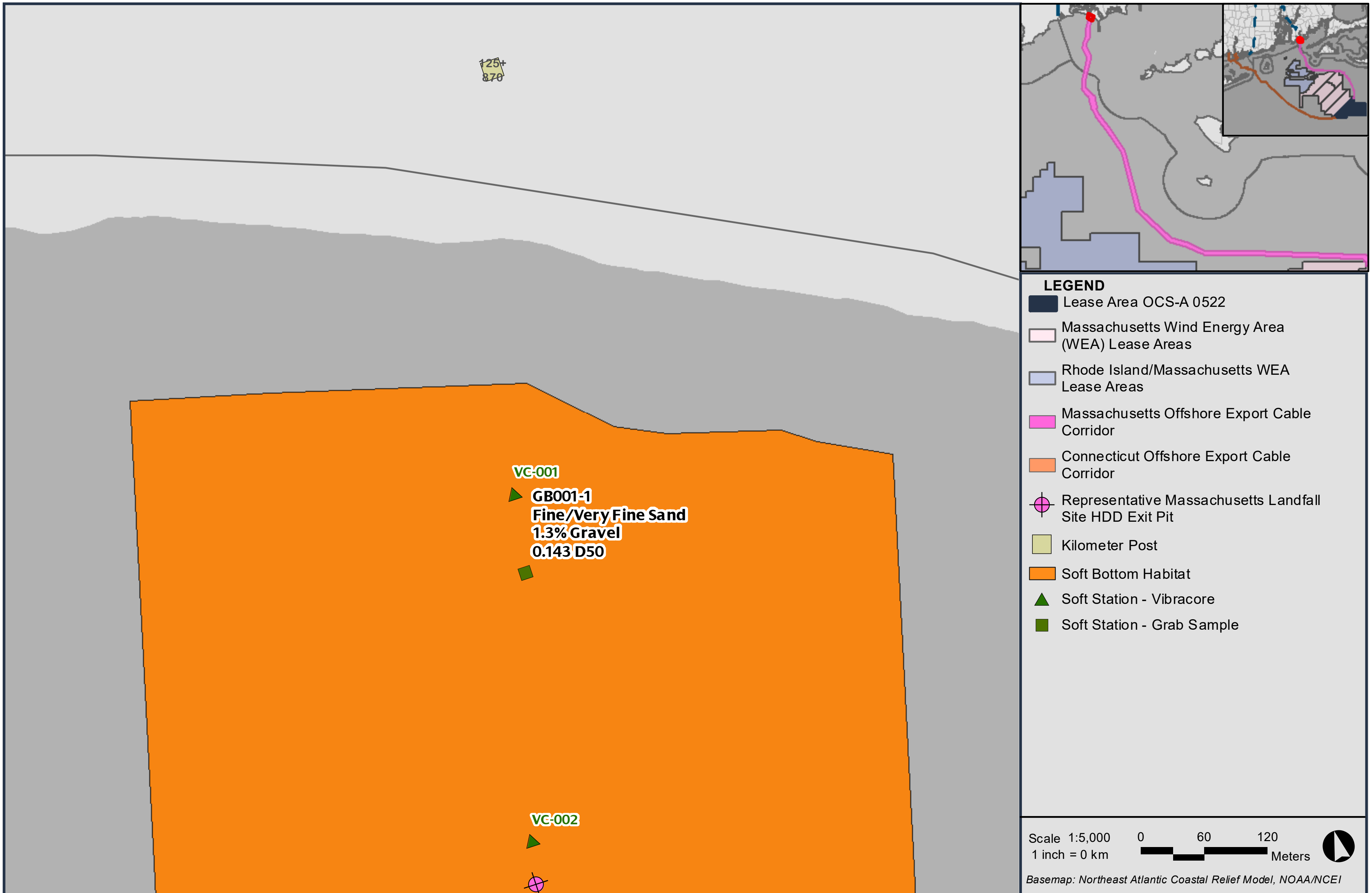
VINEYARD NORTHEAST
VINEYARD OFFSHORE



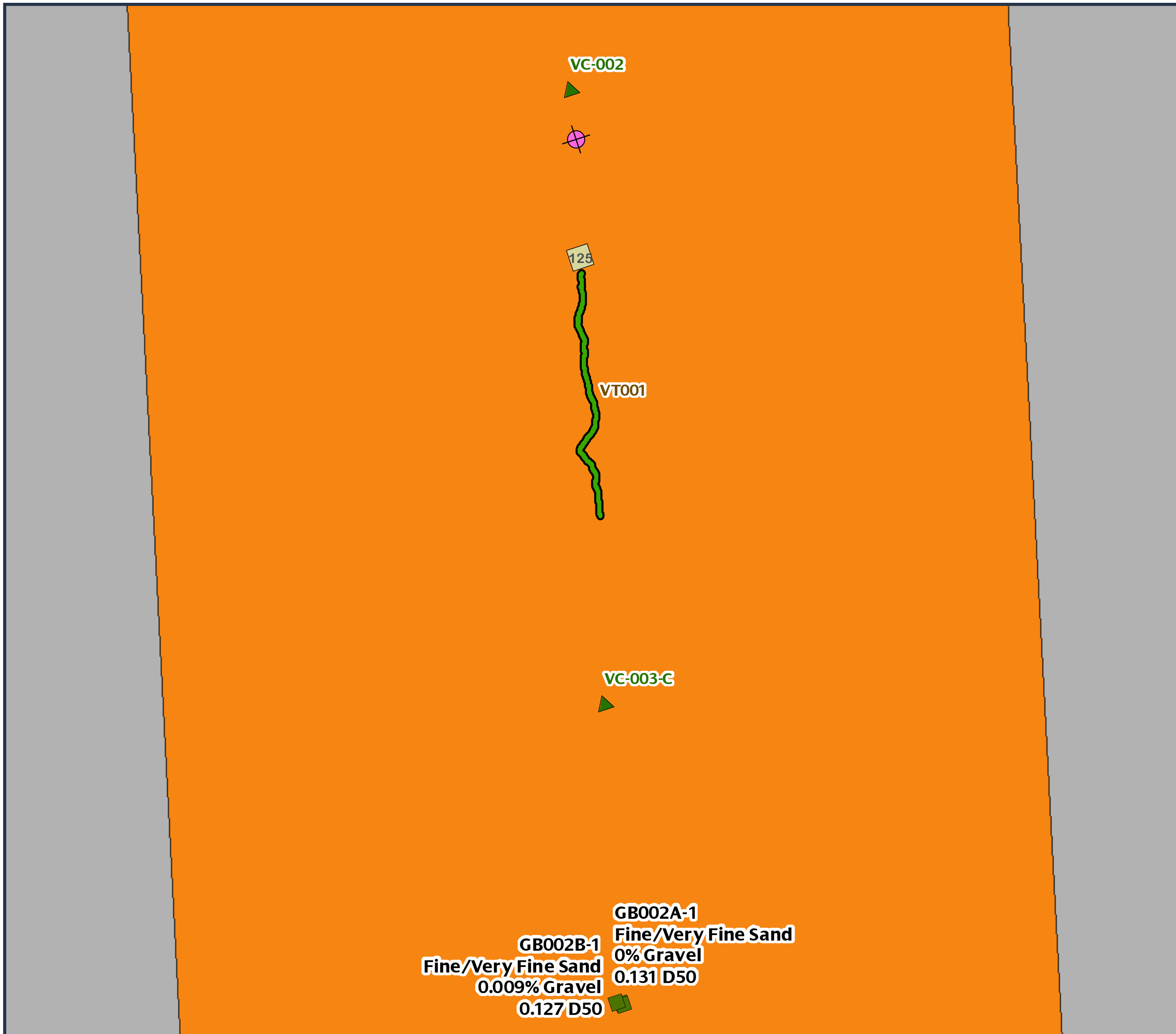
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Lease Area

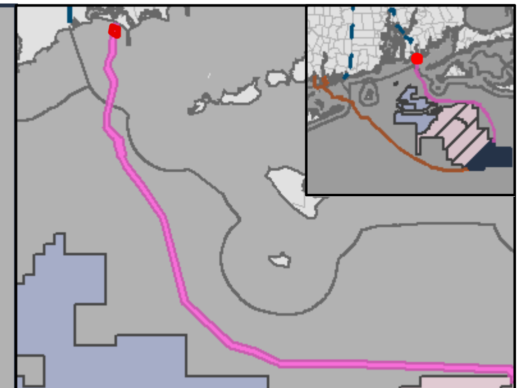
Page 4 of 4

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Representative Massachusetts Landfall Site HDD Exit Pit
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Station - Grab Sample
- Soft Bottom Station - Video Transect

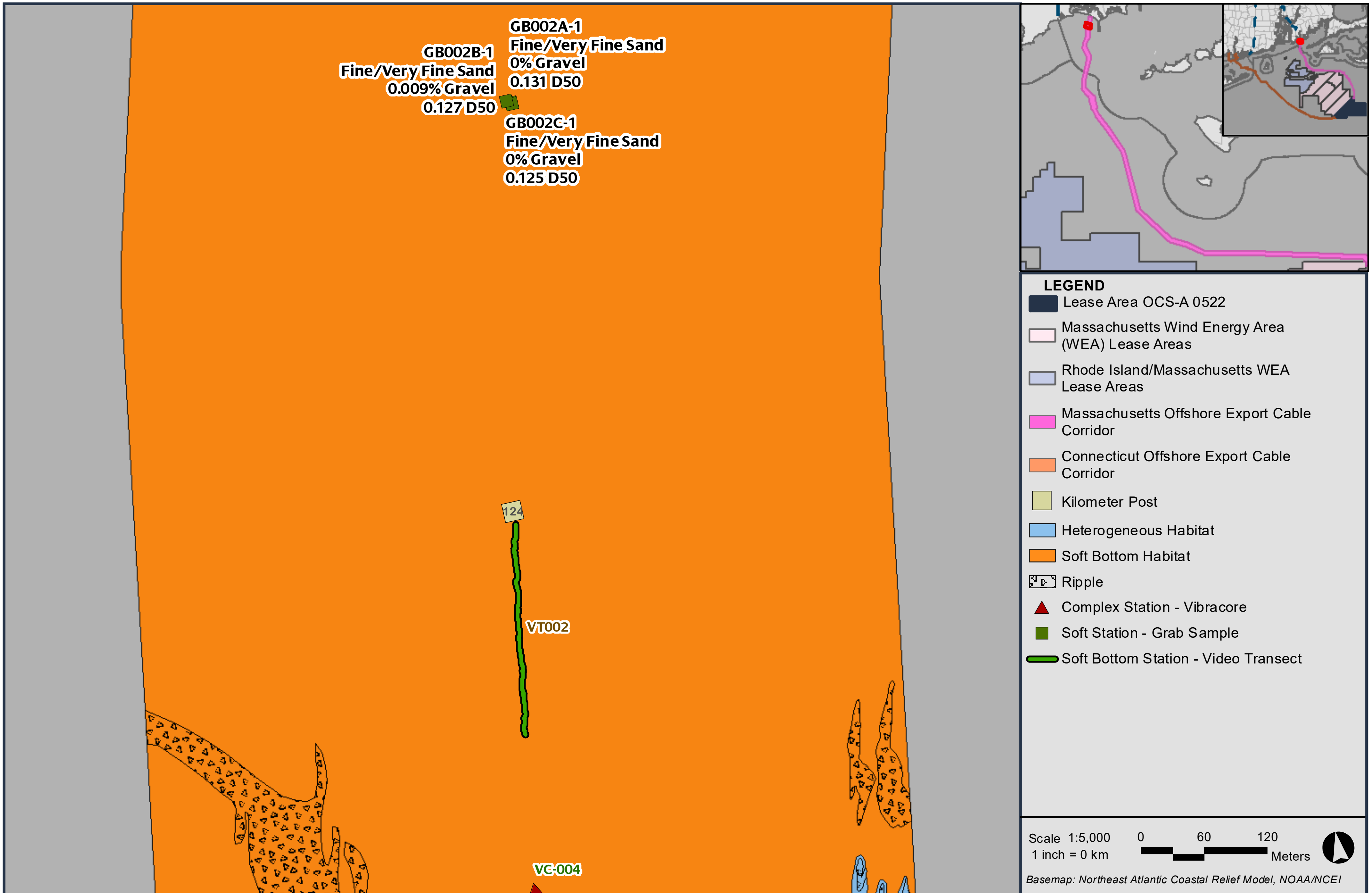
Scale 1:5,000
1 inch = 0 km

0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

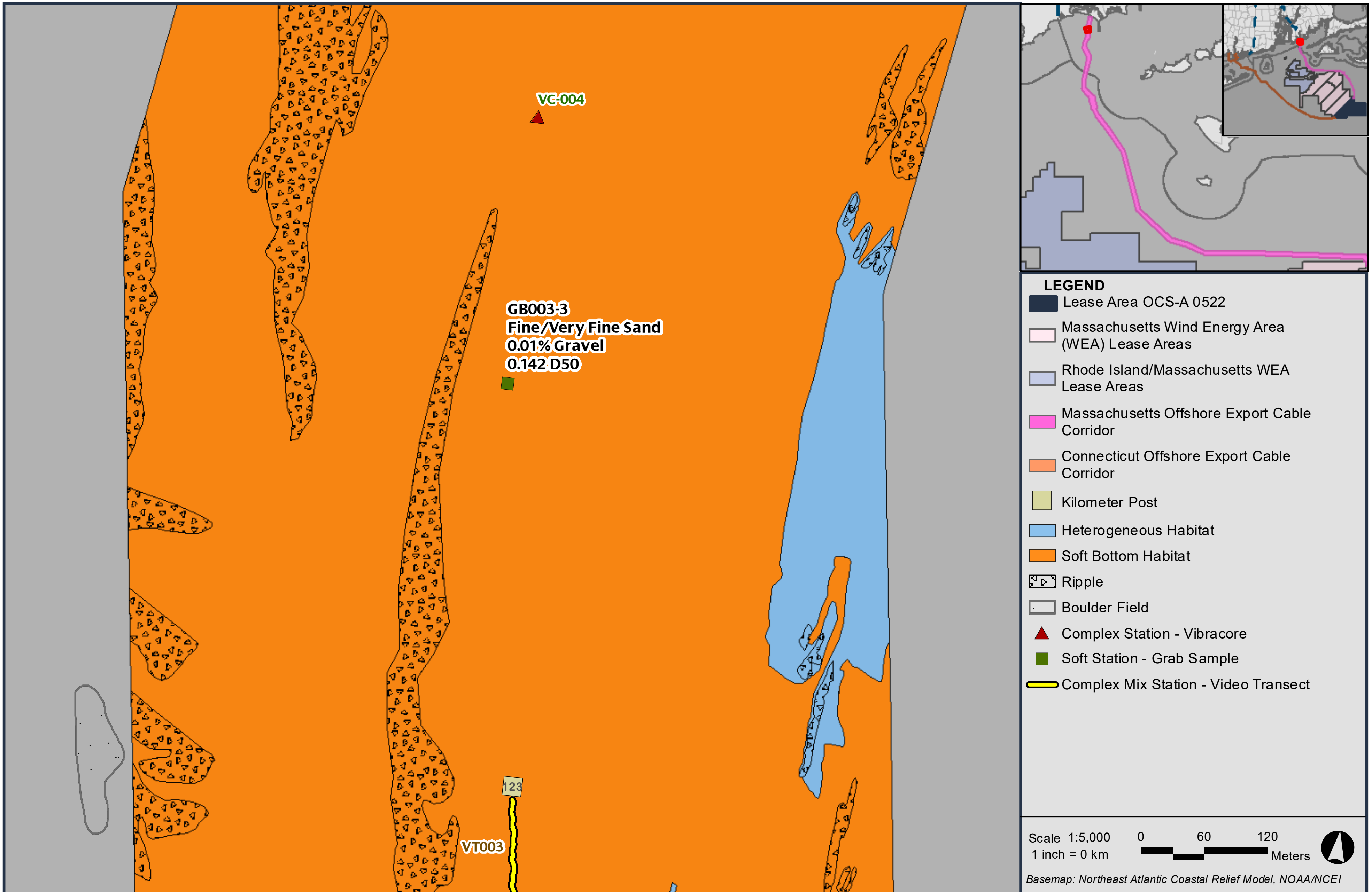
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



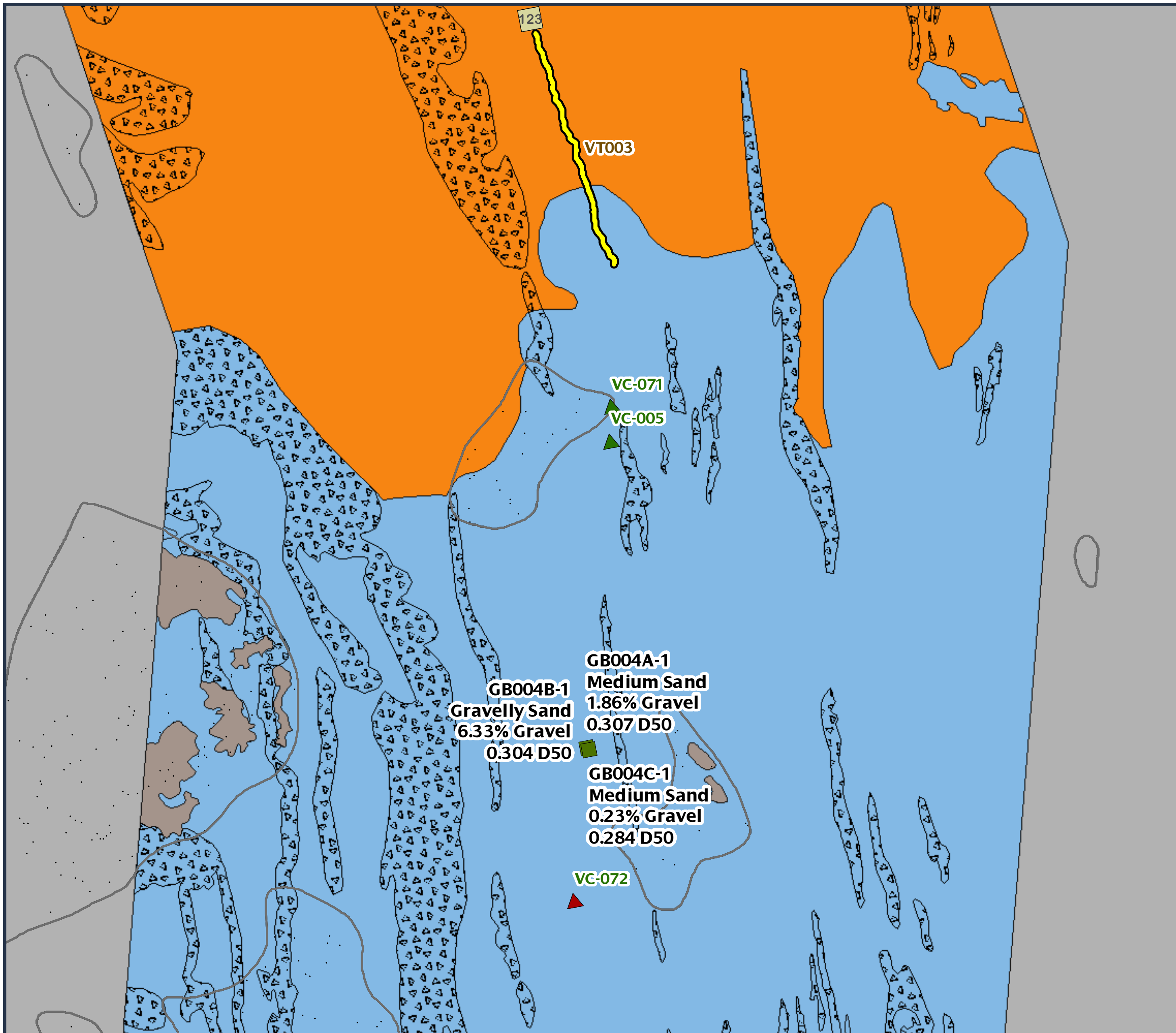
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

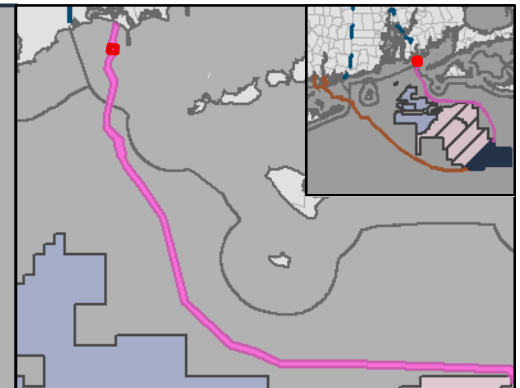
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Boulder Field
- Complex Station - Vibracore
- Soft Station - Vibracore
- Complex Station - Grab Sample
- Soft Station - Grab Sample
- Complex Mix Station - Video Transect

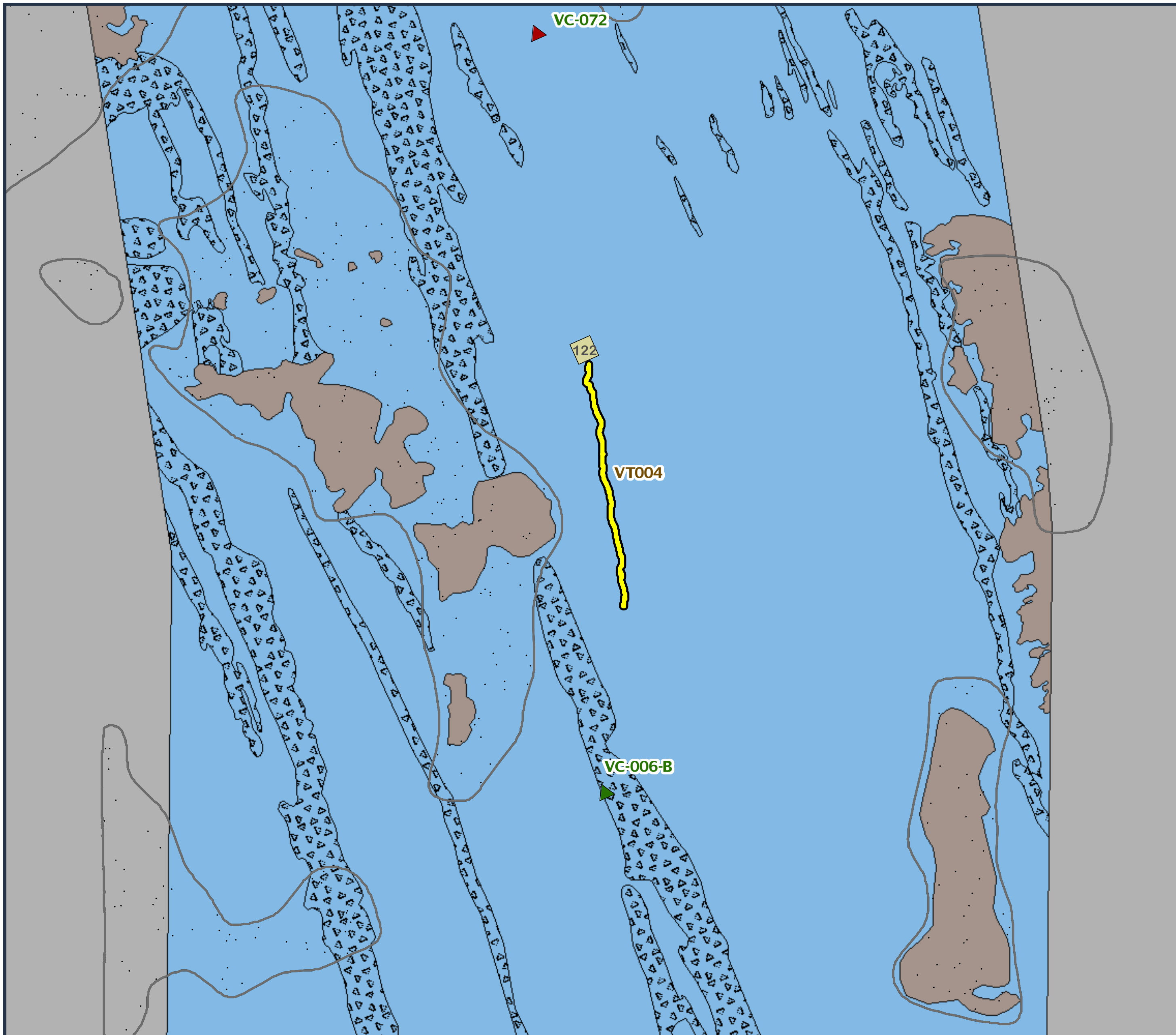
Scale 1:5,000
1 inch = 0 km

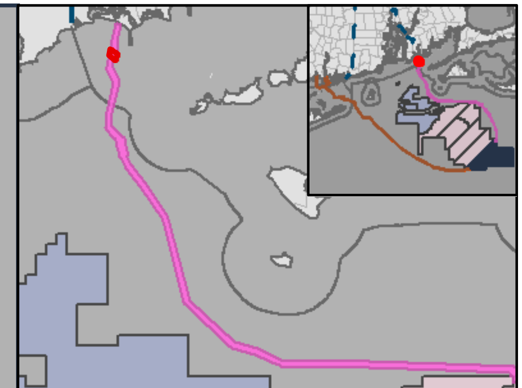
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

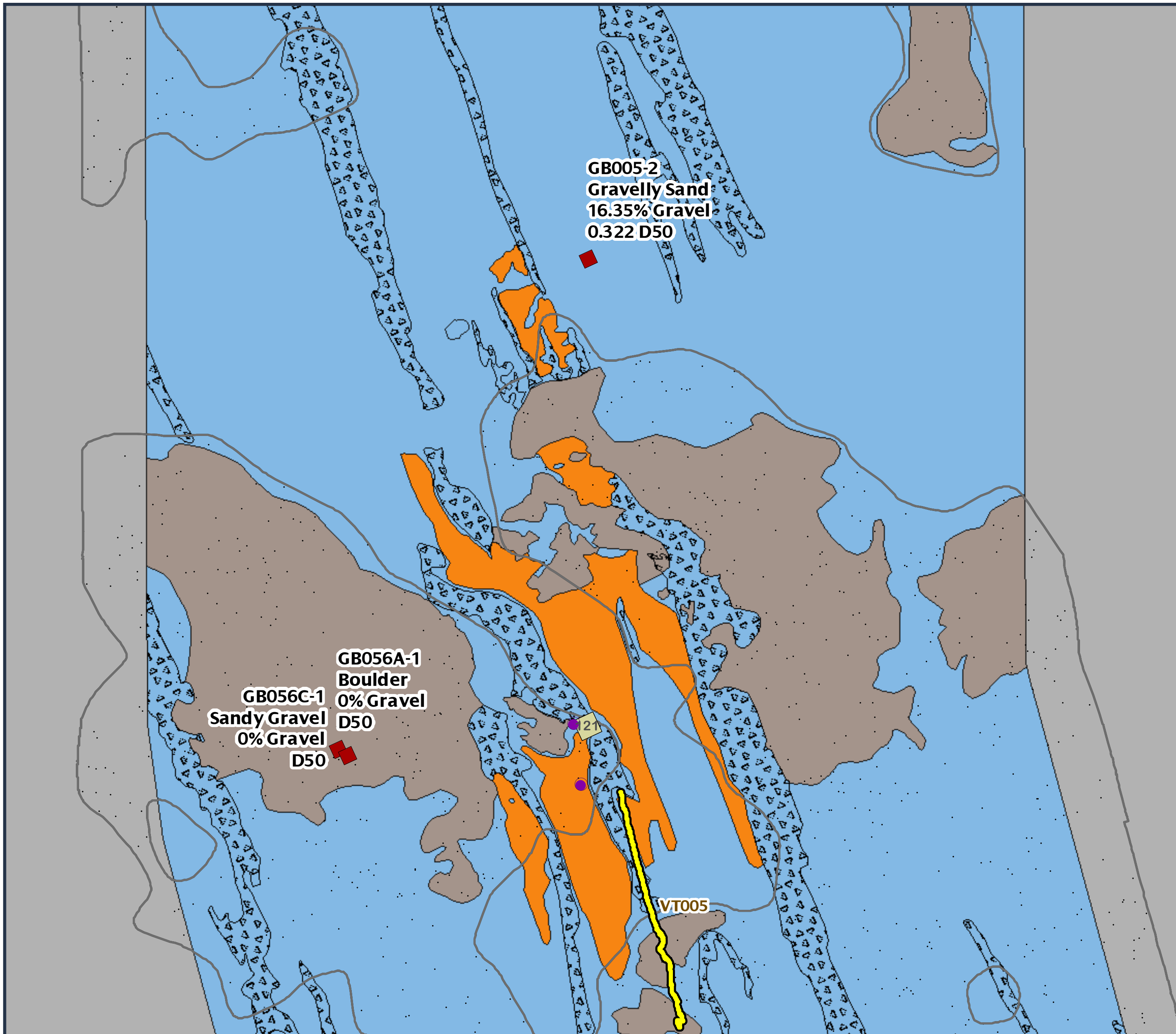
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Ripple
- Boulder Field
- Complex Station - Vibracore
- Soft Station - Vibracore
- Complex Mix Station - Video Transect

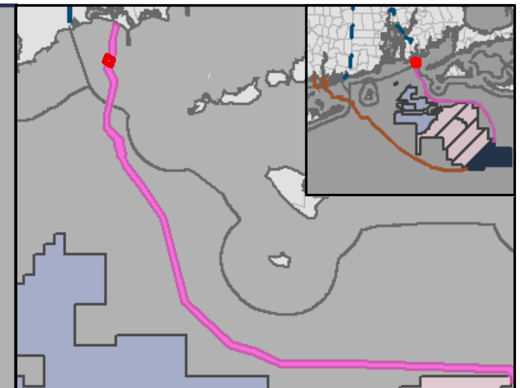
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Representative Massachusetts OECC Dredge Locations
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Boulder Field
- Complex Station - Grab Sample
- Complex Mix Station - Video Transect

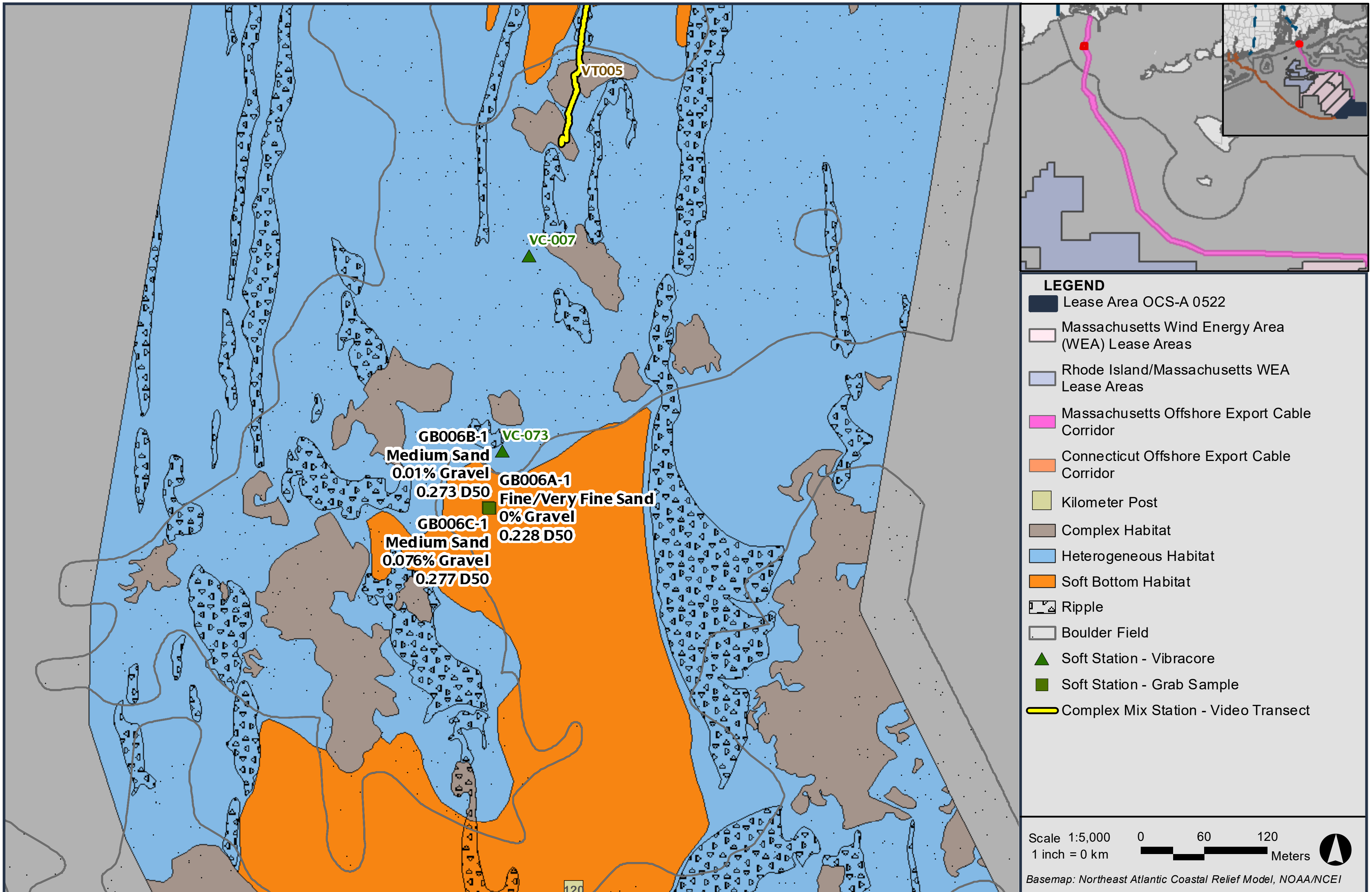
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

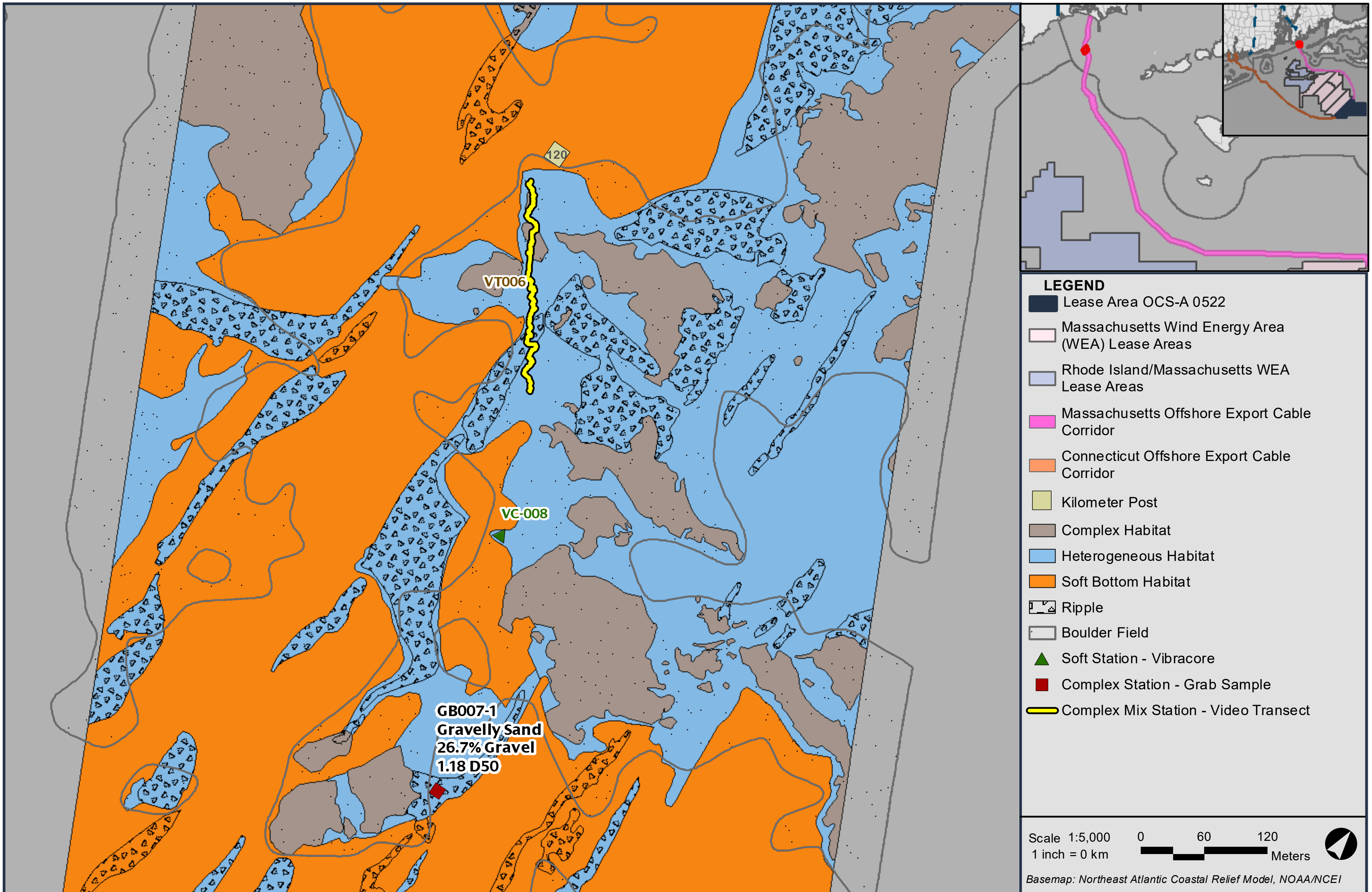
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

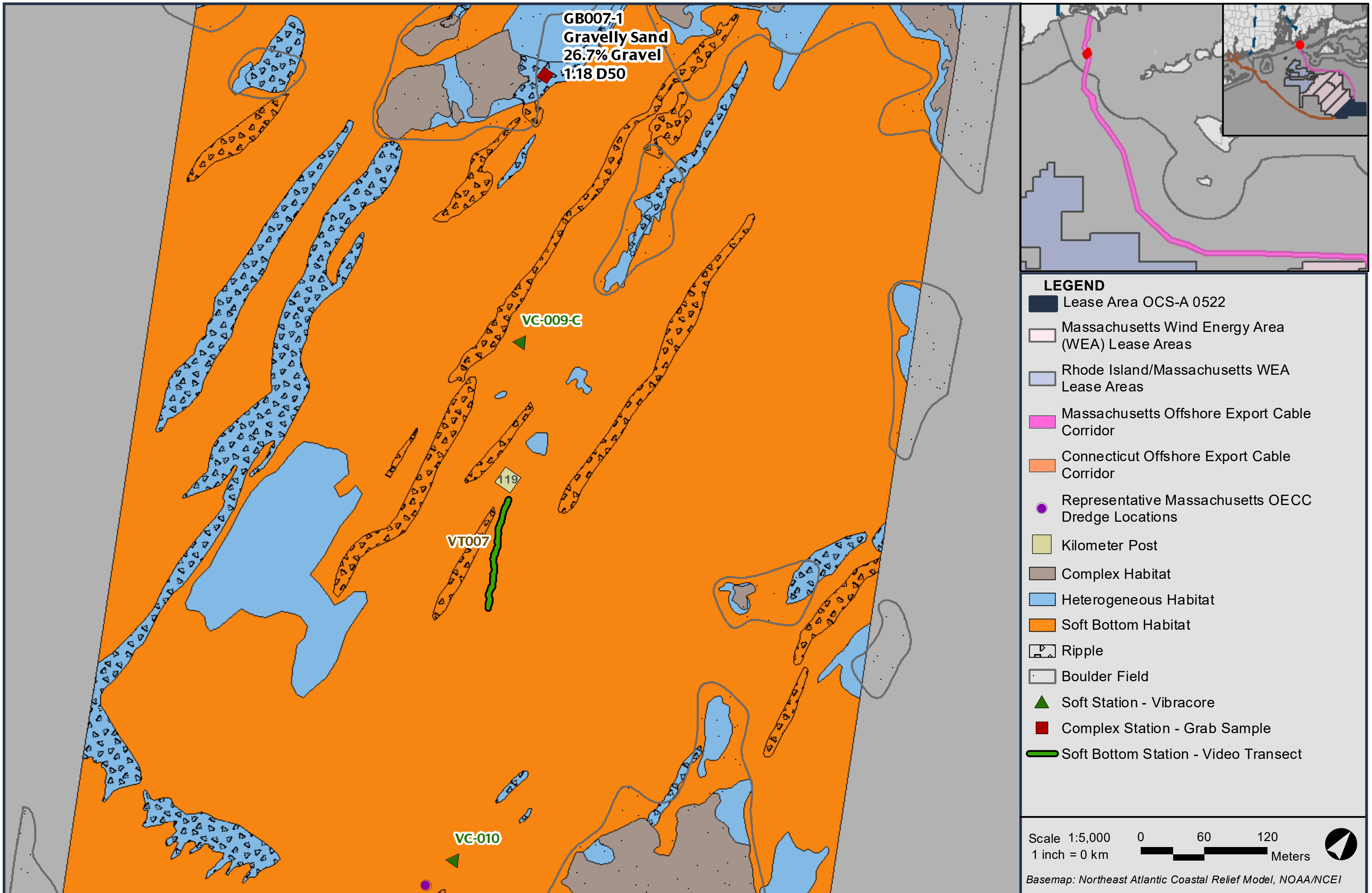
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

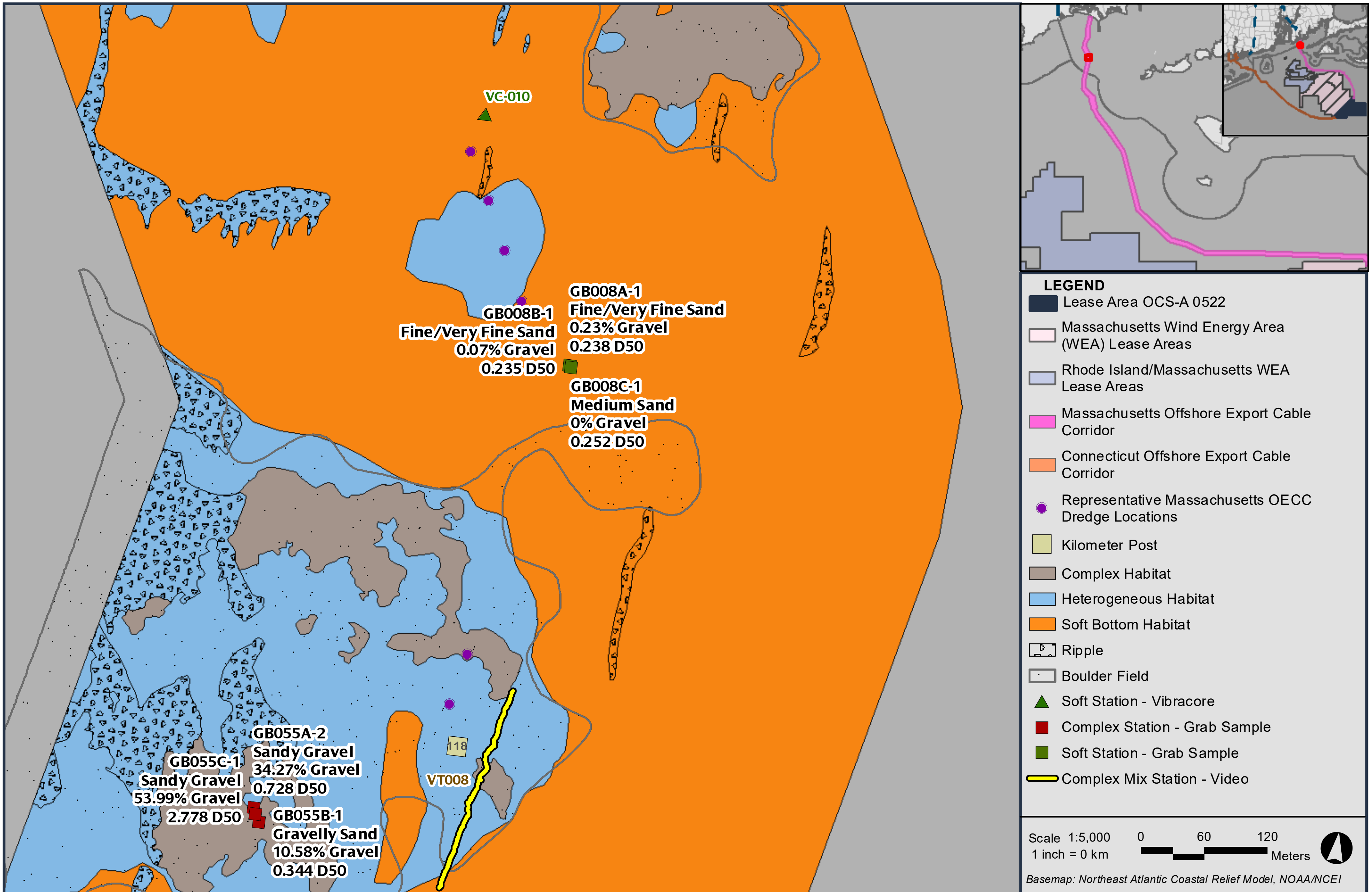
VINEYARD NORTHEAST

VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

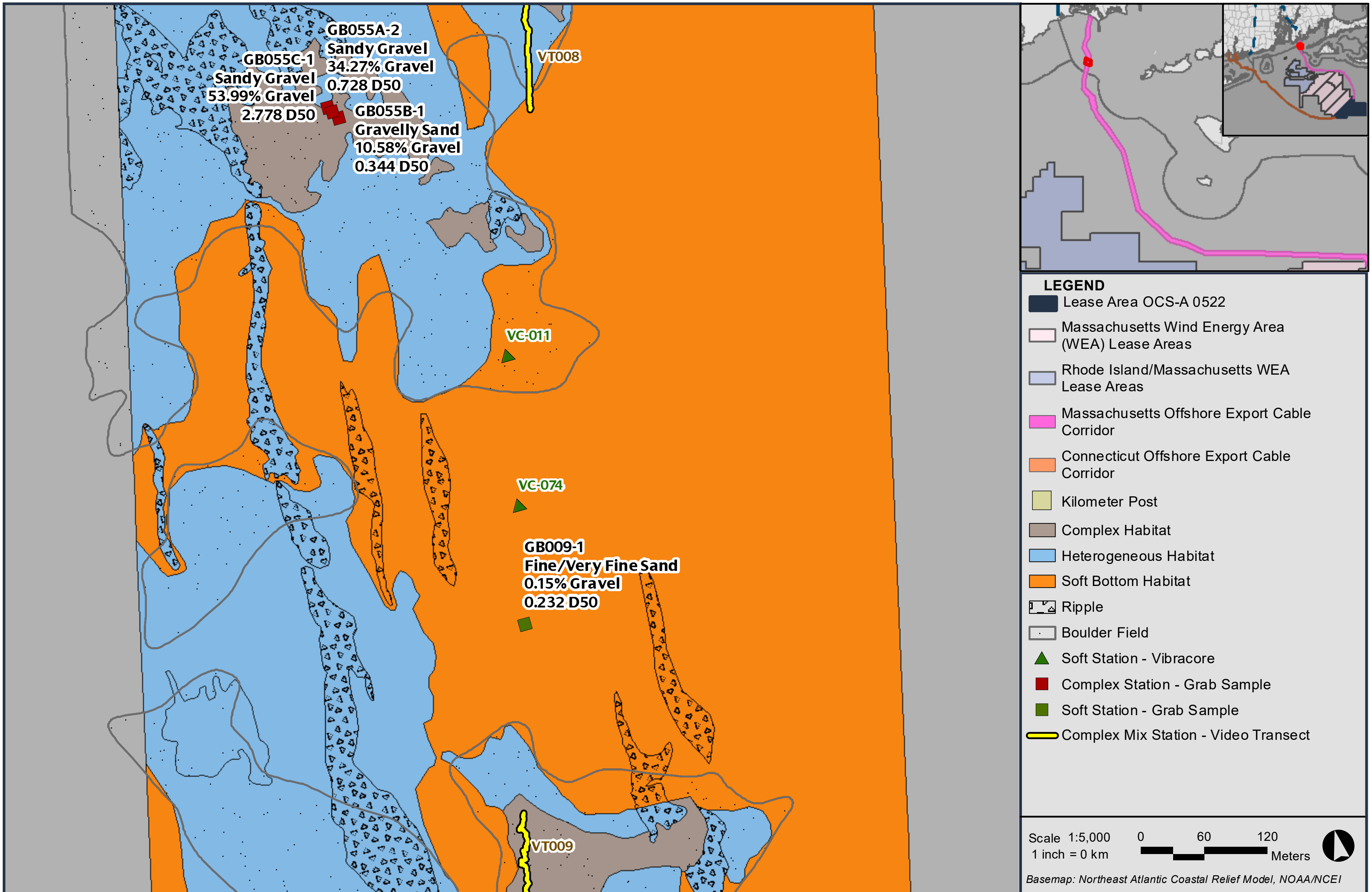
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

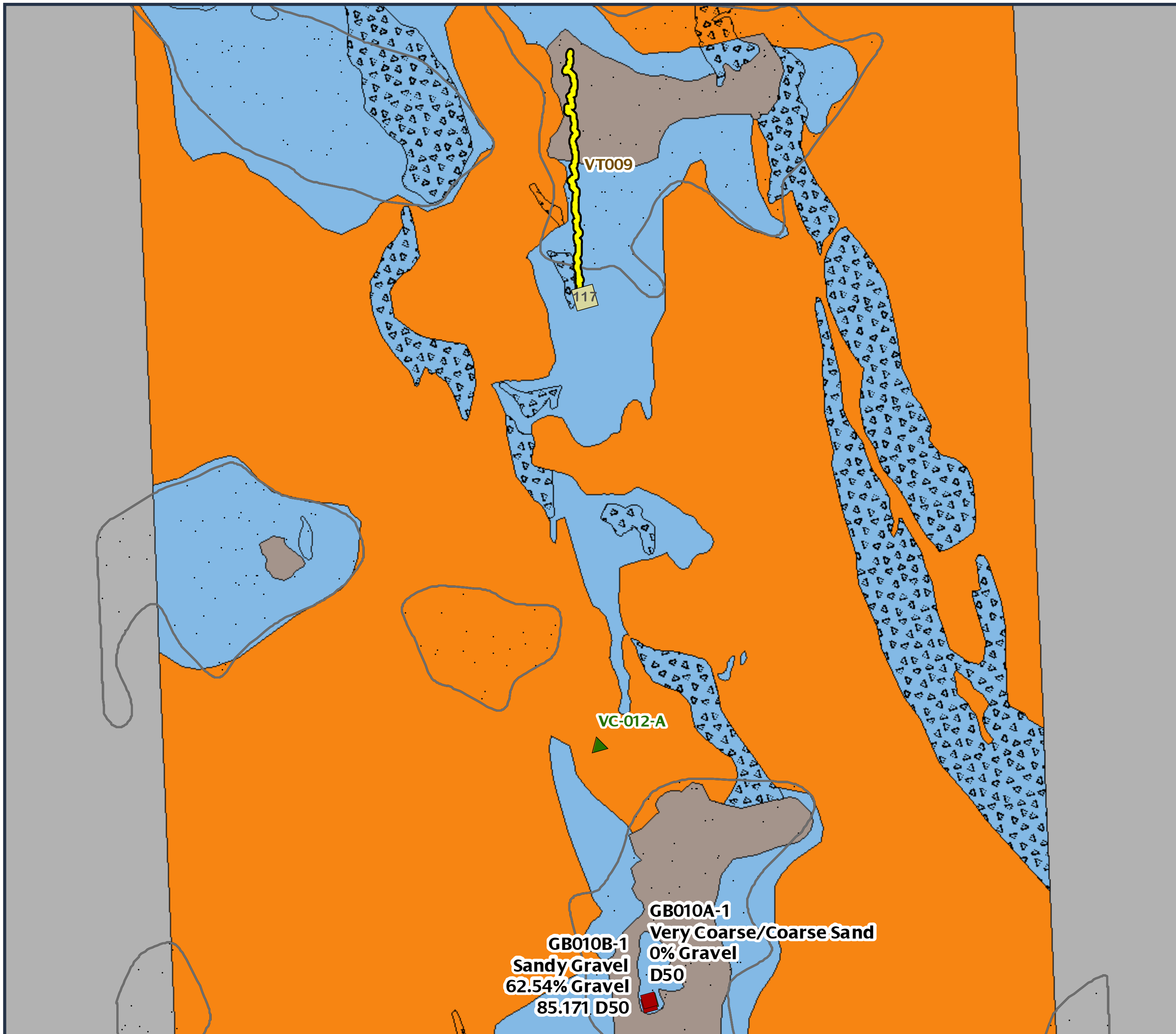
VINEYARD NORTHEAST

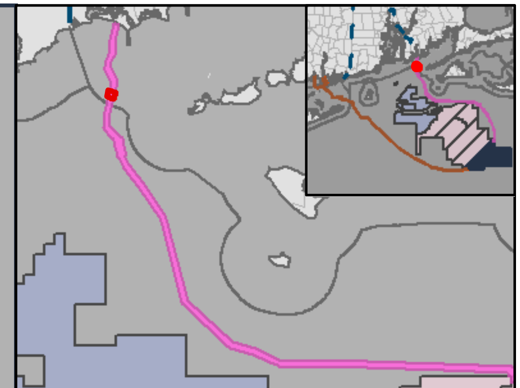
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Boulder Field
- Soft Station - Vibracore
- Complex Station - Grab Sample
- Soft Station - Grab Sample
- Complex Mix Station - Video

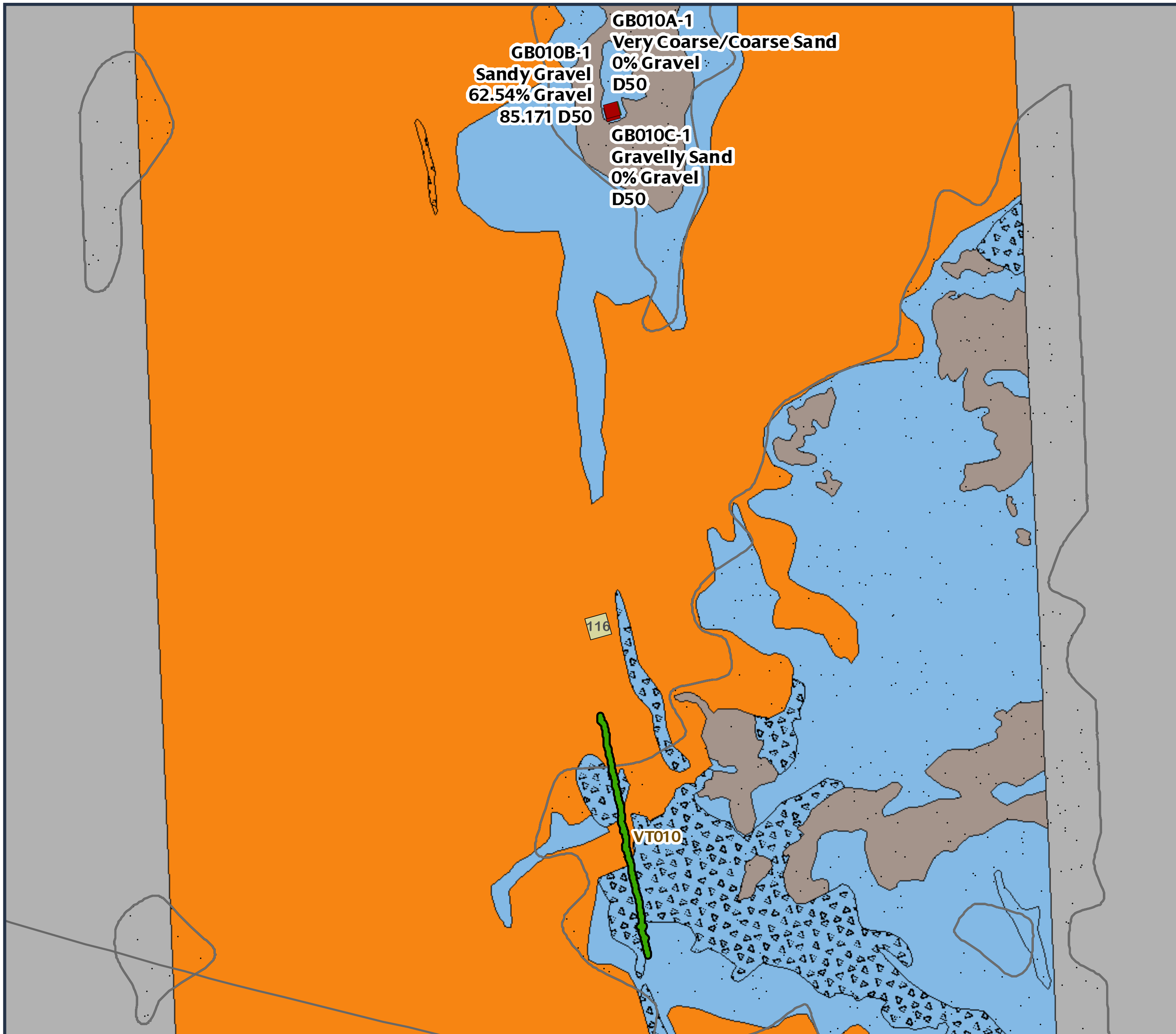
Scale 1:5,000
1 inch = 0 km

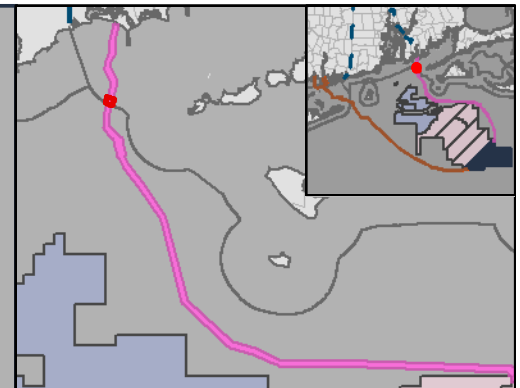
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Boulder Field
- Complex Station - Grab Sample
- Soft Station - Grab Sample
- Soft Bottom Station - Video Transect

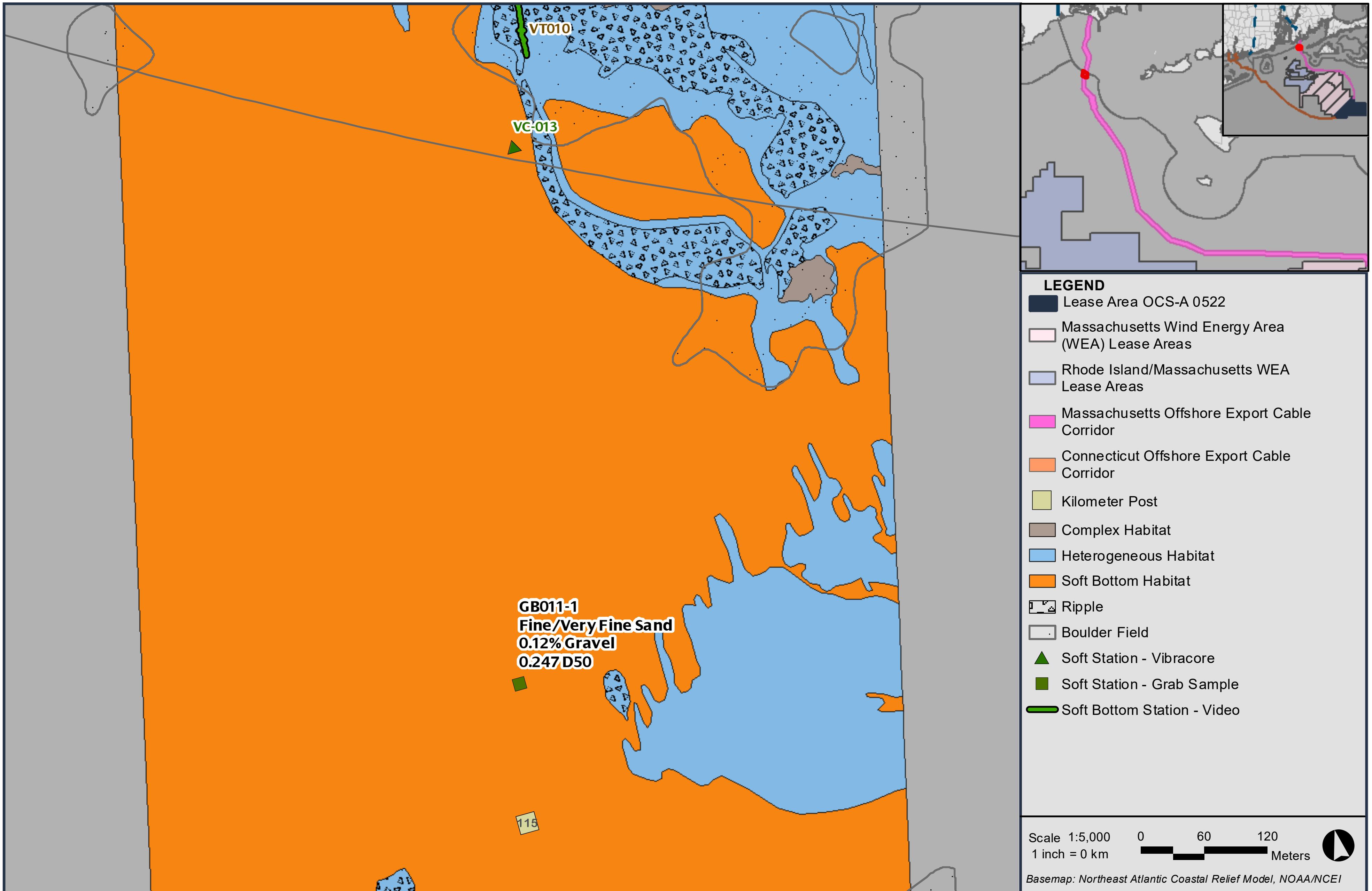
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

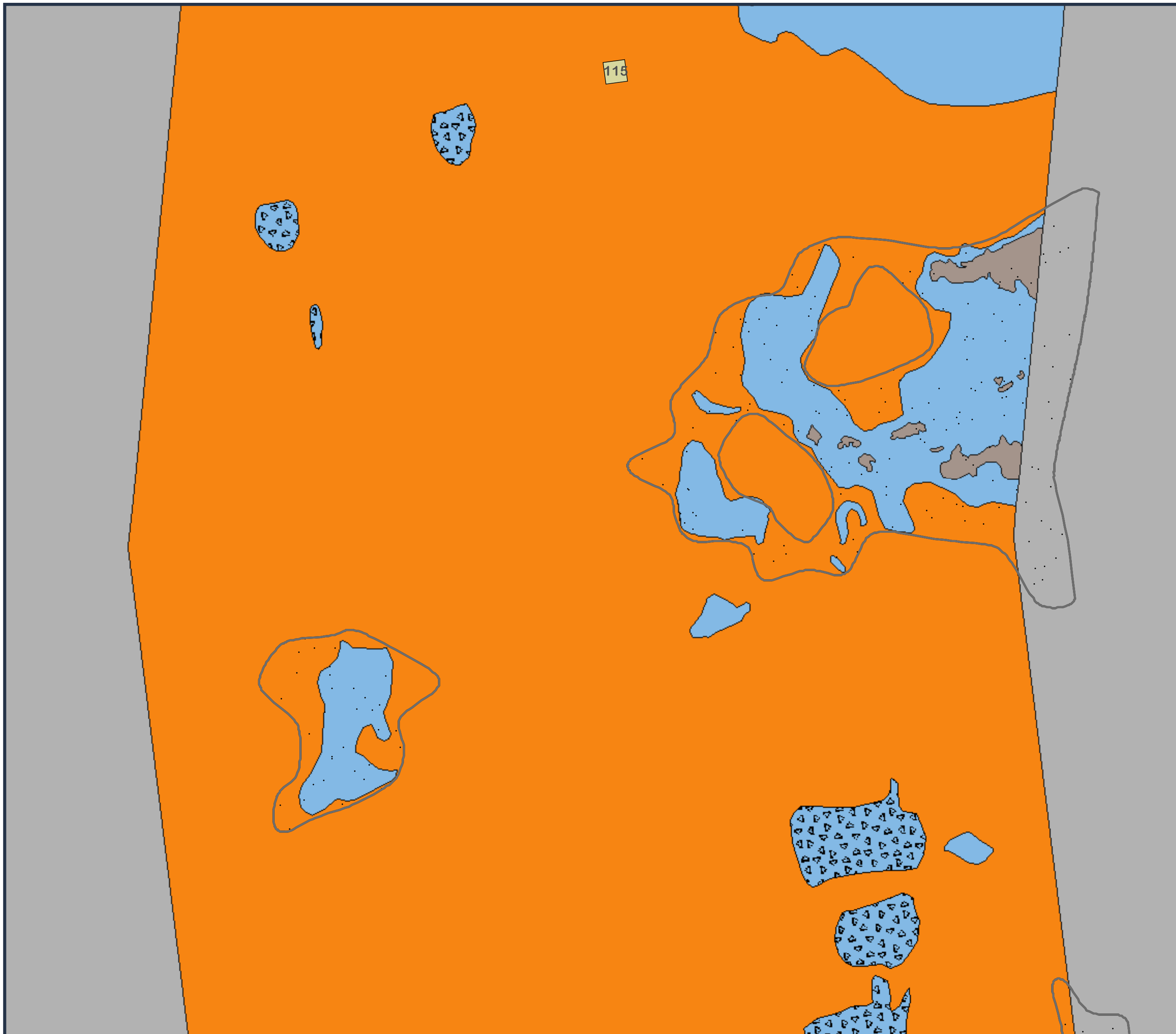
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

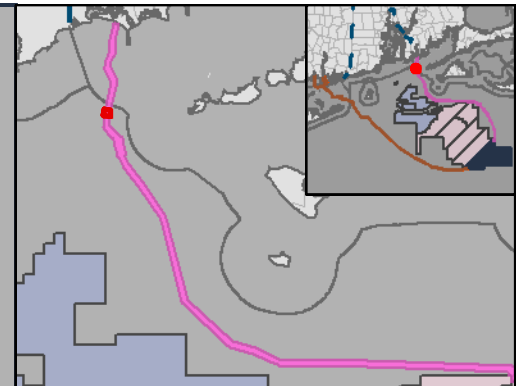
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





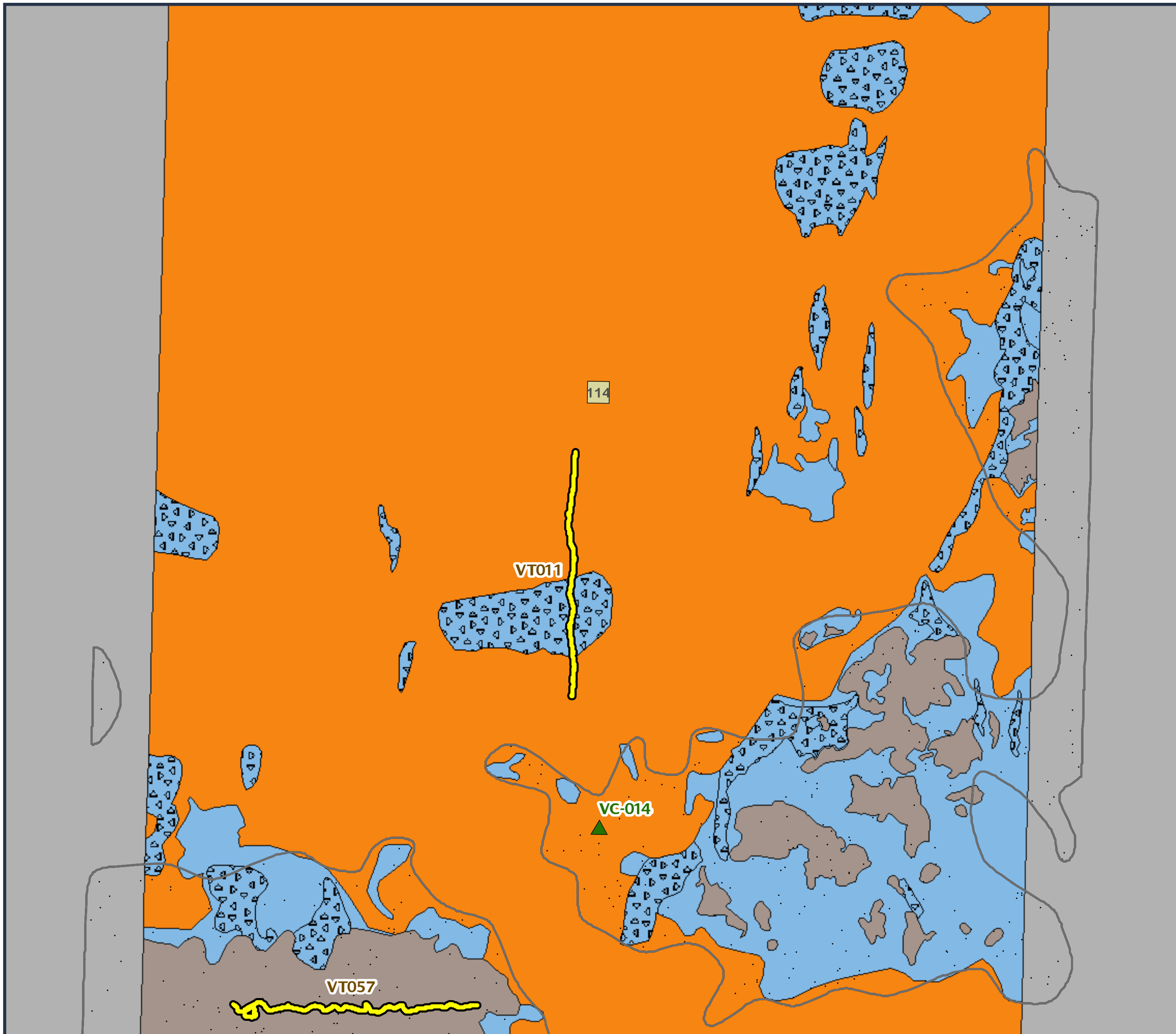
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Complex Habitat
Heterogeneous Habitat
Soft Bottom Habitat
Ripple
Boulder Field

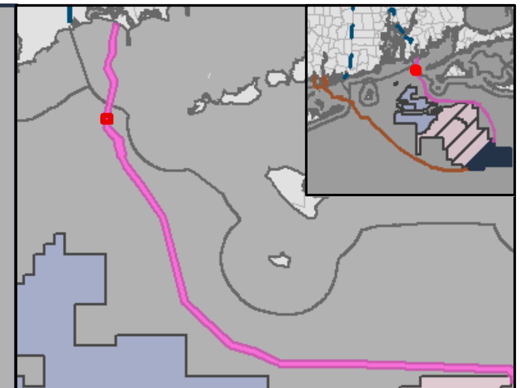
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Boulder Field
- Soft Station - Vibracore
- Complex Mix Station - Video

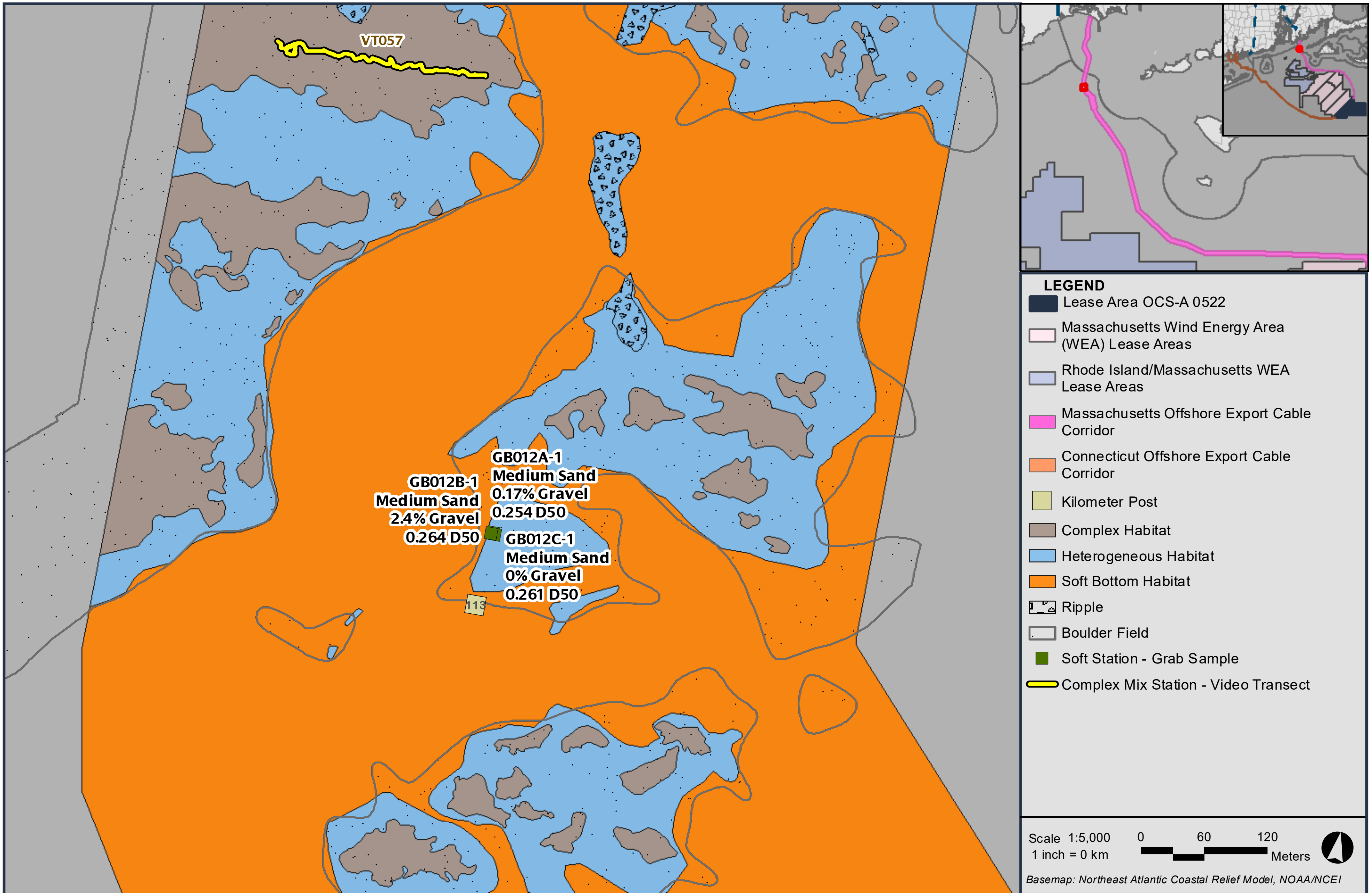
Scale 1:5,000
1 inch = 0 km

0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

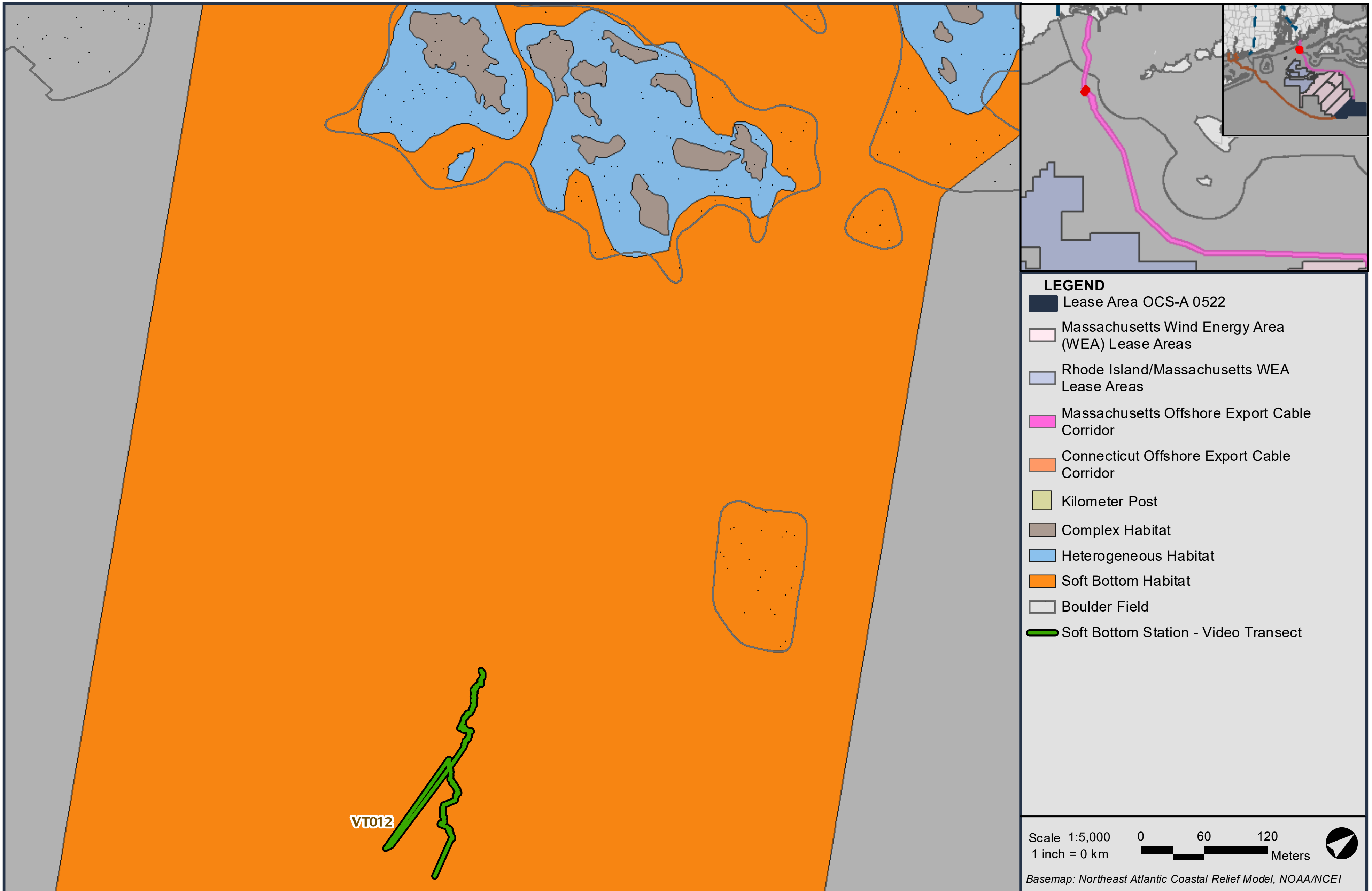
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Soft Bottom Habitat
- Boulder Field
- Soft Bottom Station - Video Transect

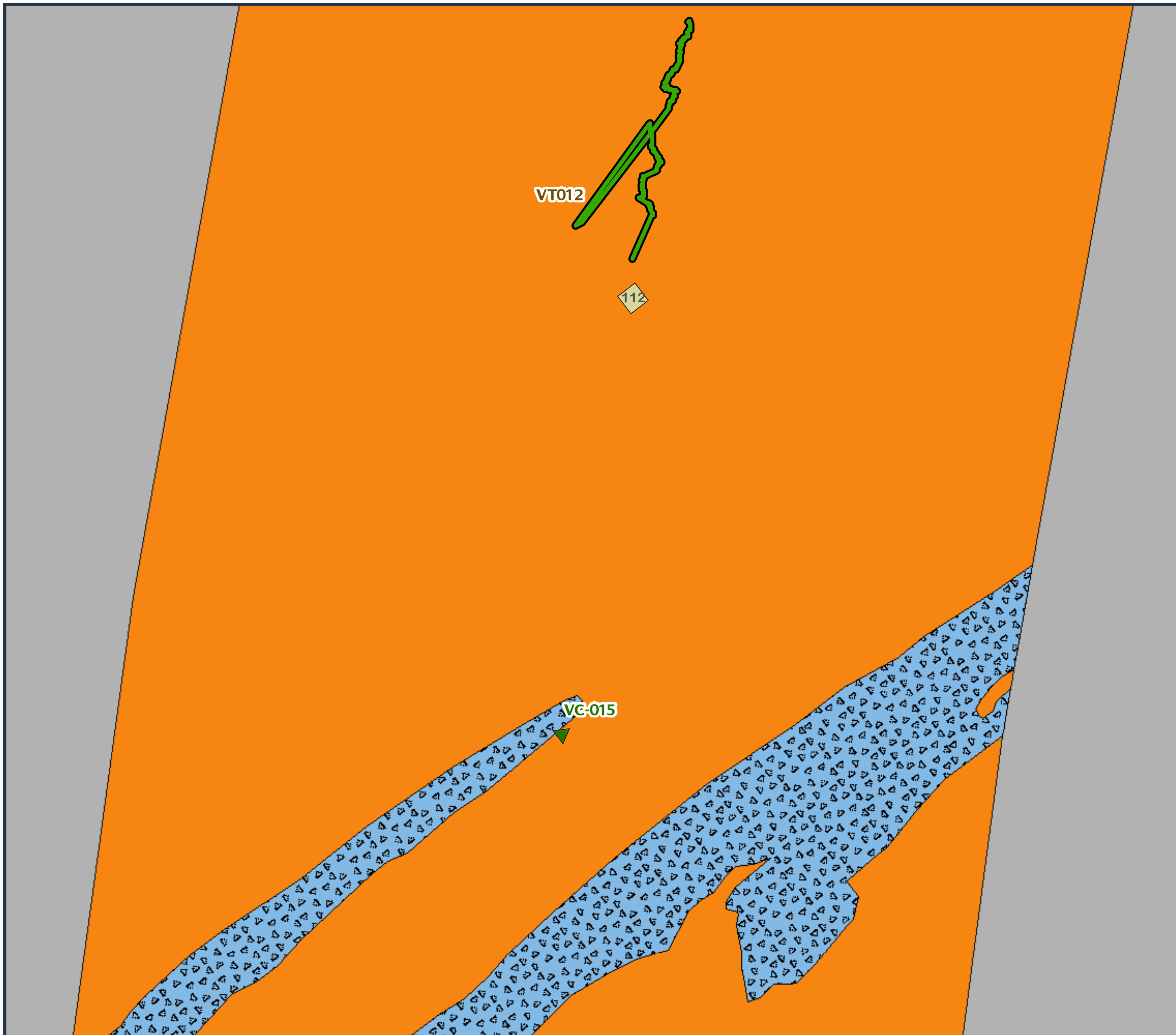
Scale 1:5,000
1 inch = 0 km

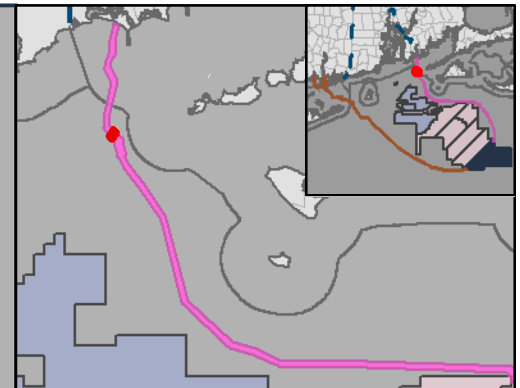
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

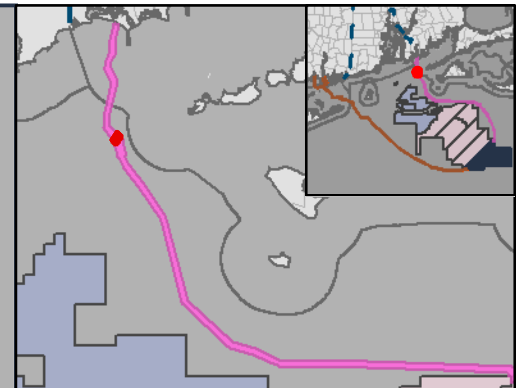
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Representative Massachusetts OECC Dredge Locations
- Kilometer Post
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Soft Station - Grab Sample

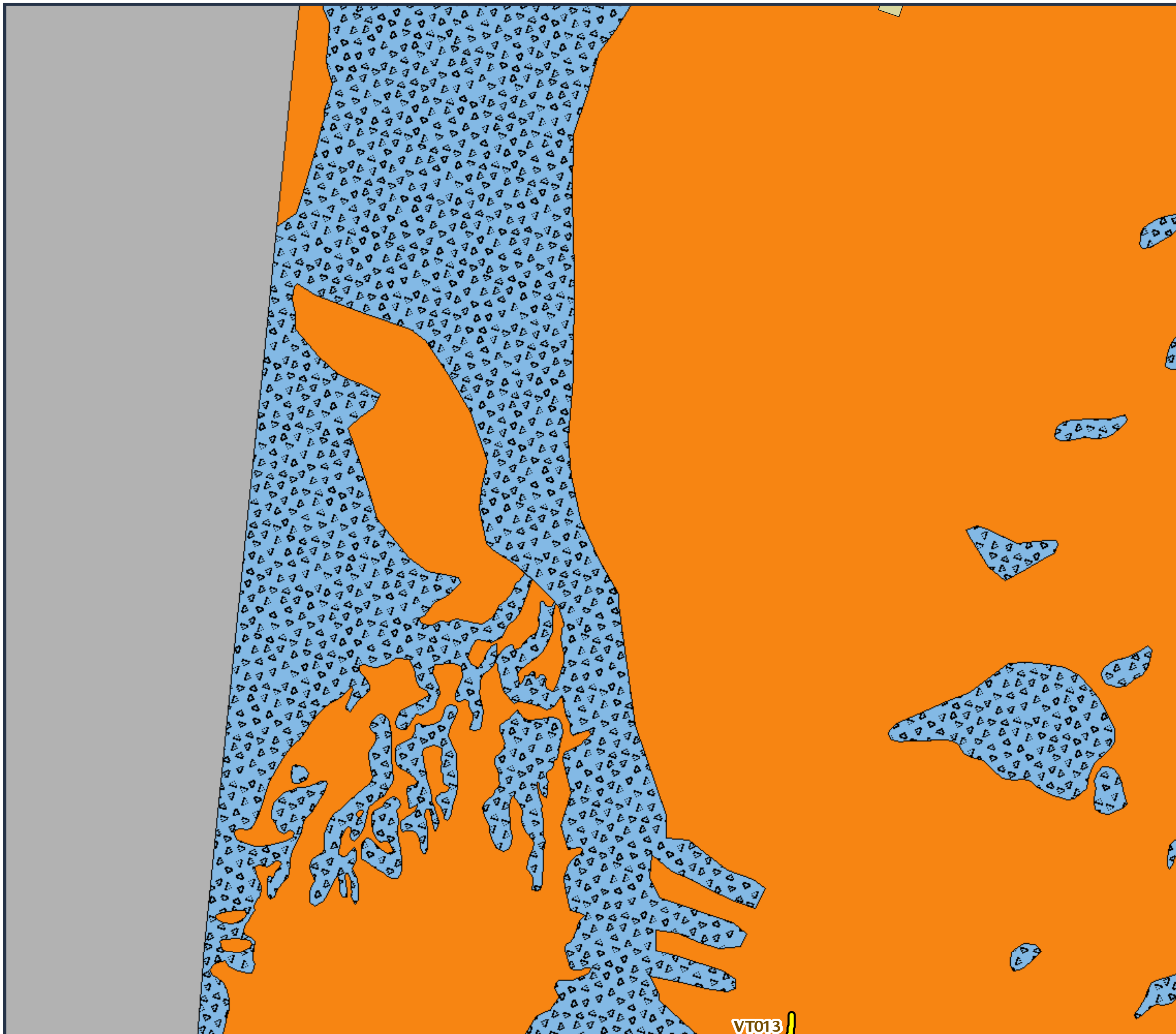
Scale 1:5,000
1 inch = 0 km

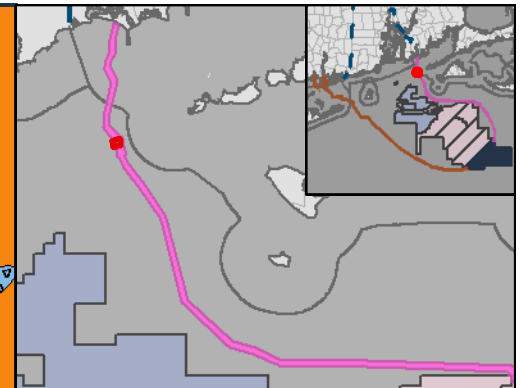
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





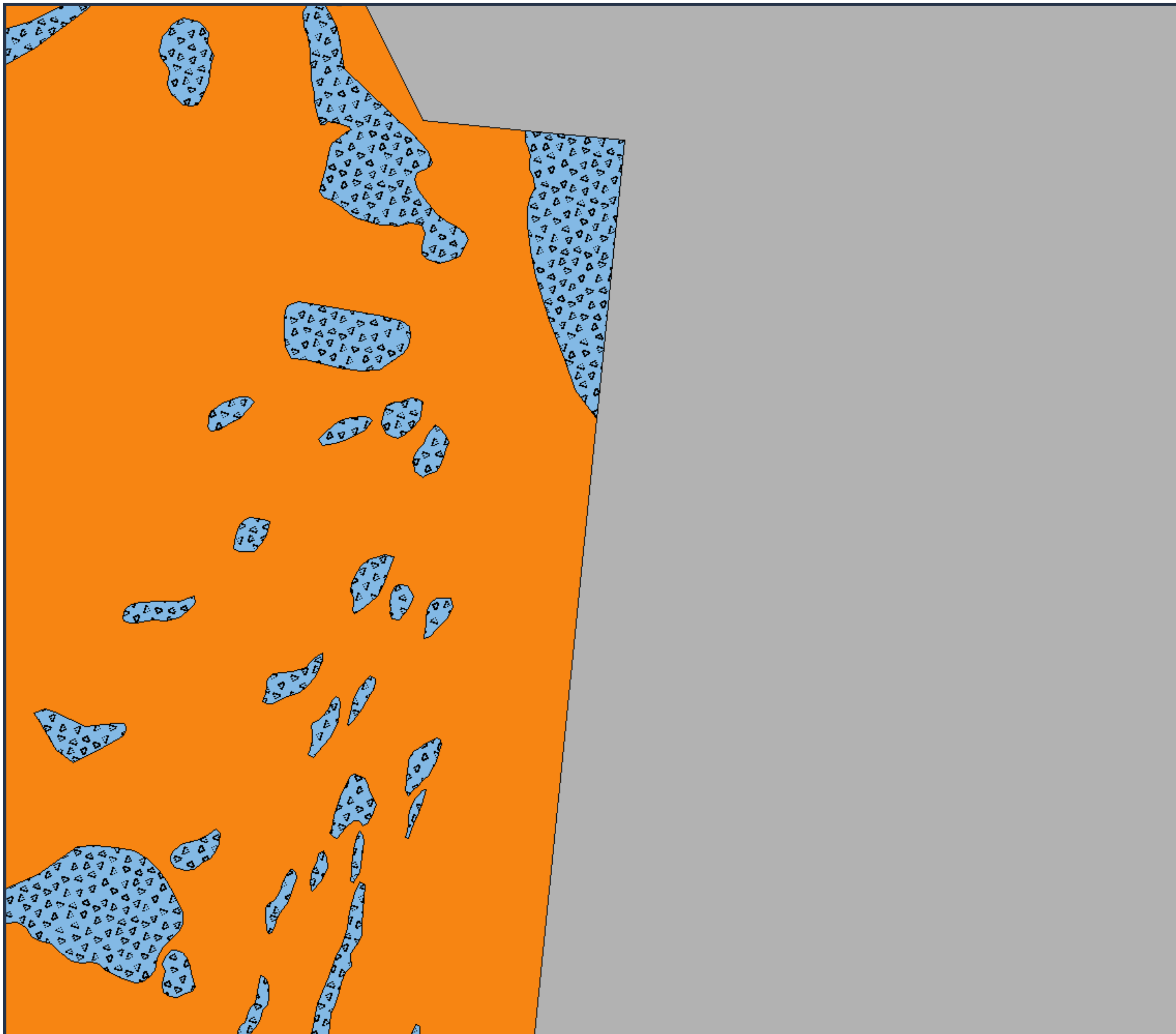
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Heterogeneous Habitat
Soft Bottom Habitat
Ripple
Complex Mix Station - Video Transect

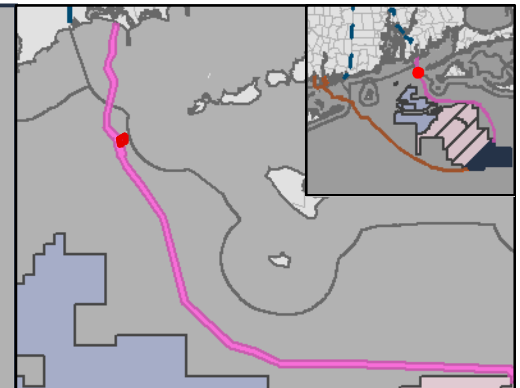
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

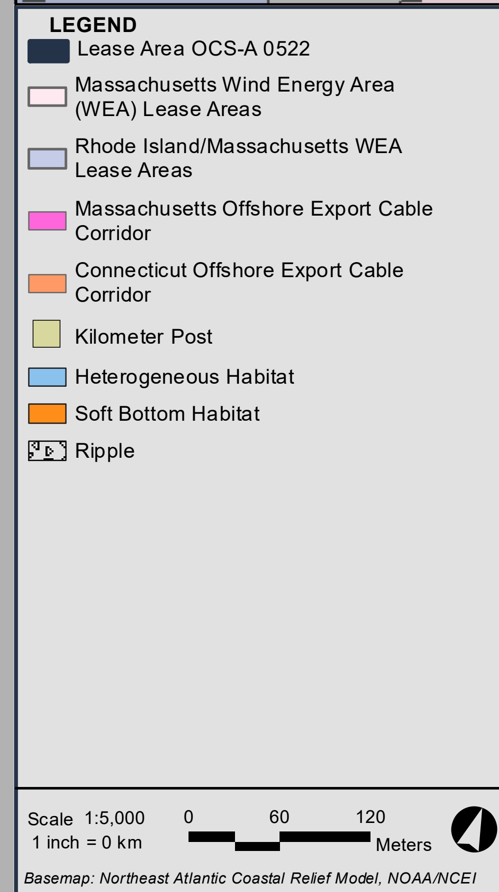
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



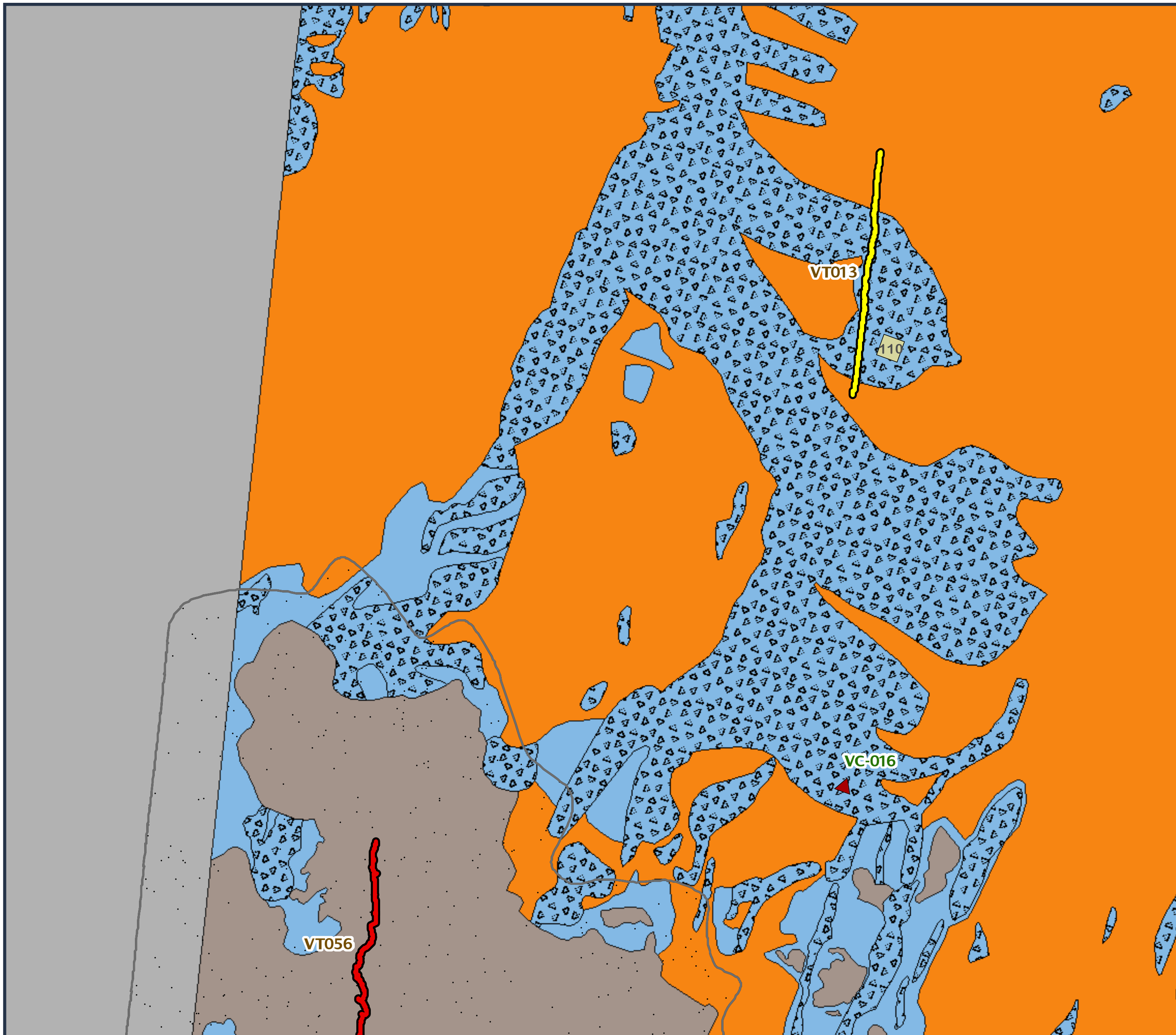


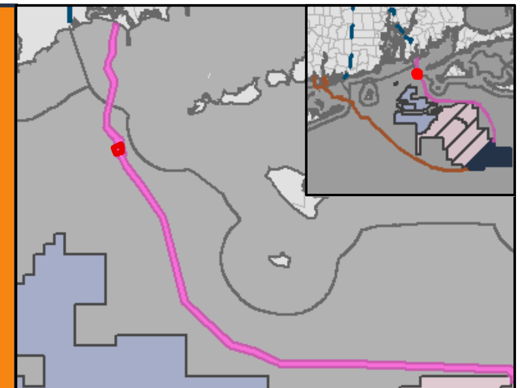


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Boulder Field
- Complex Station - Vibracore
- Complex Station - Video Transect
- Complex Mix Station - Video Transect

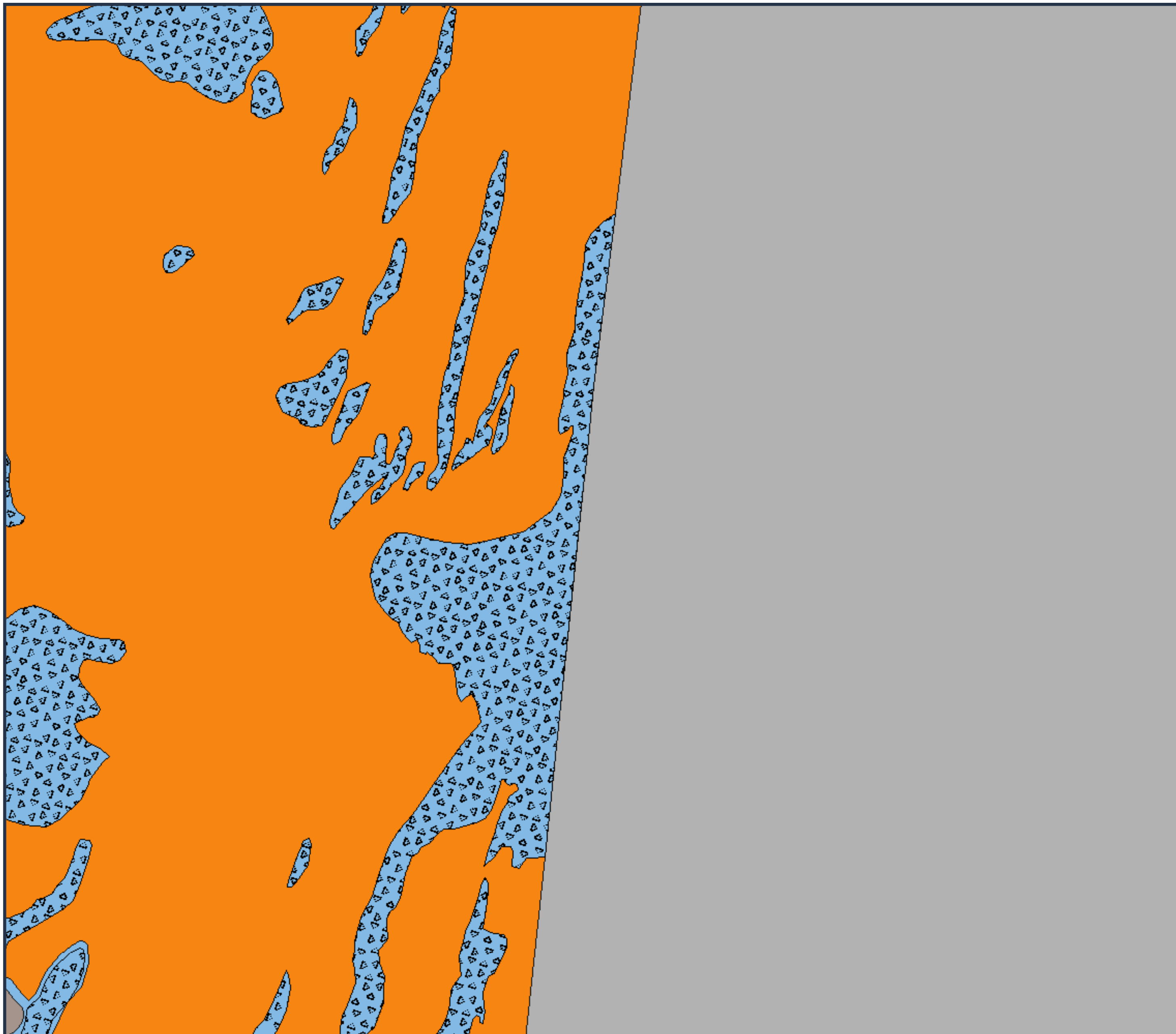
Scale 1:5,000
1 inch = 0 km

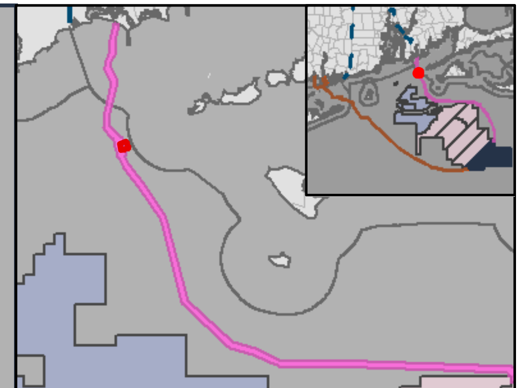
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple

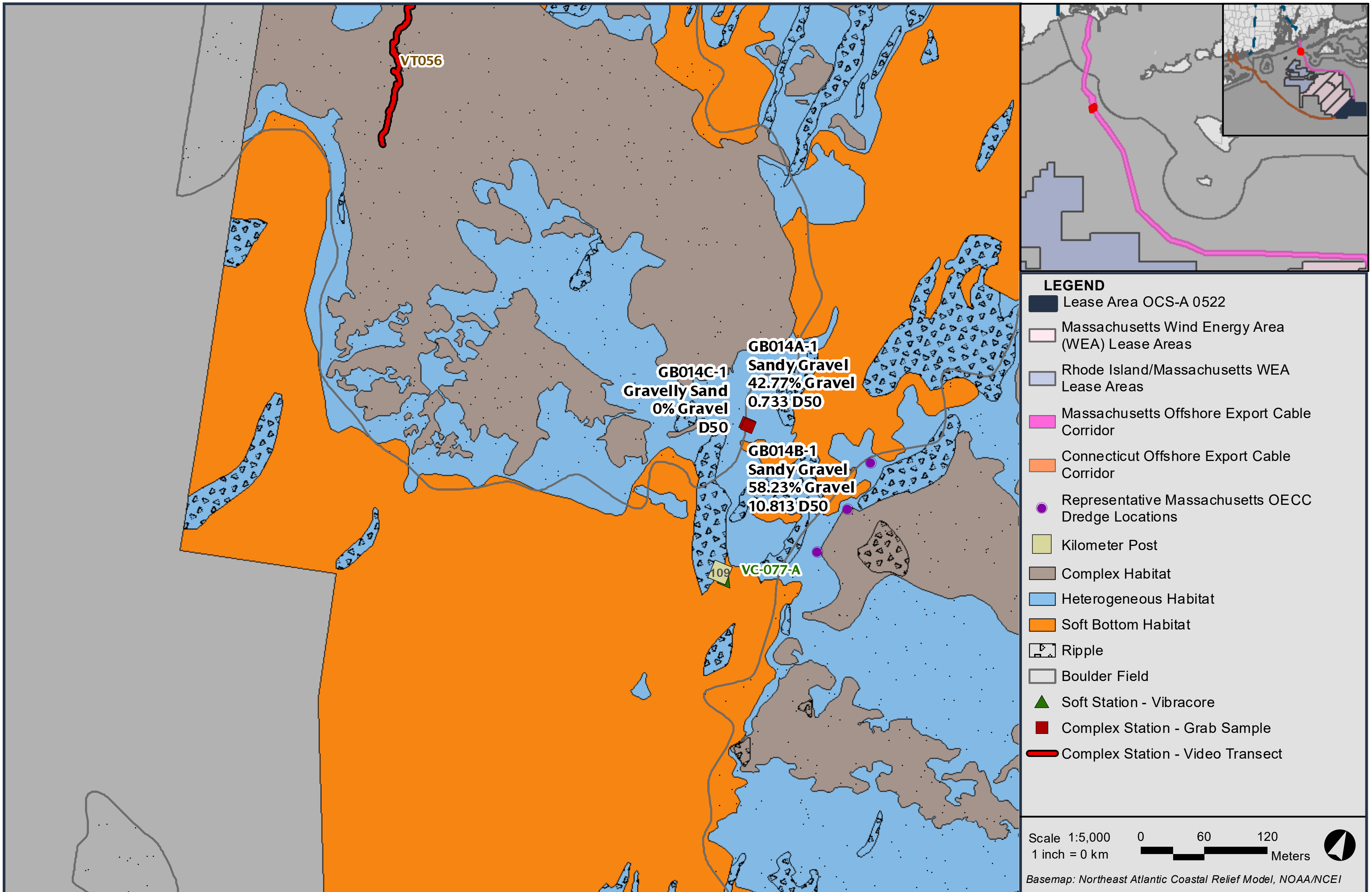
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

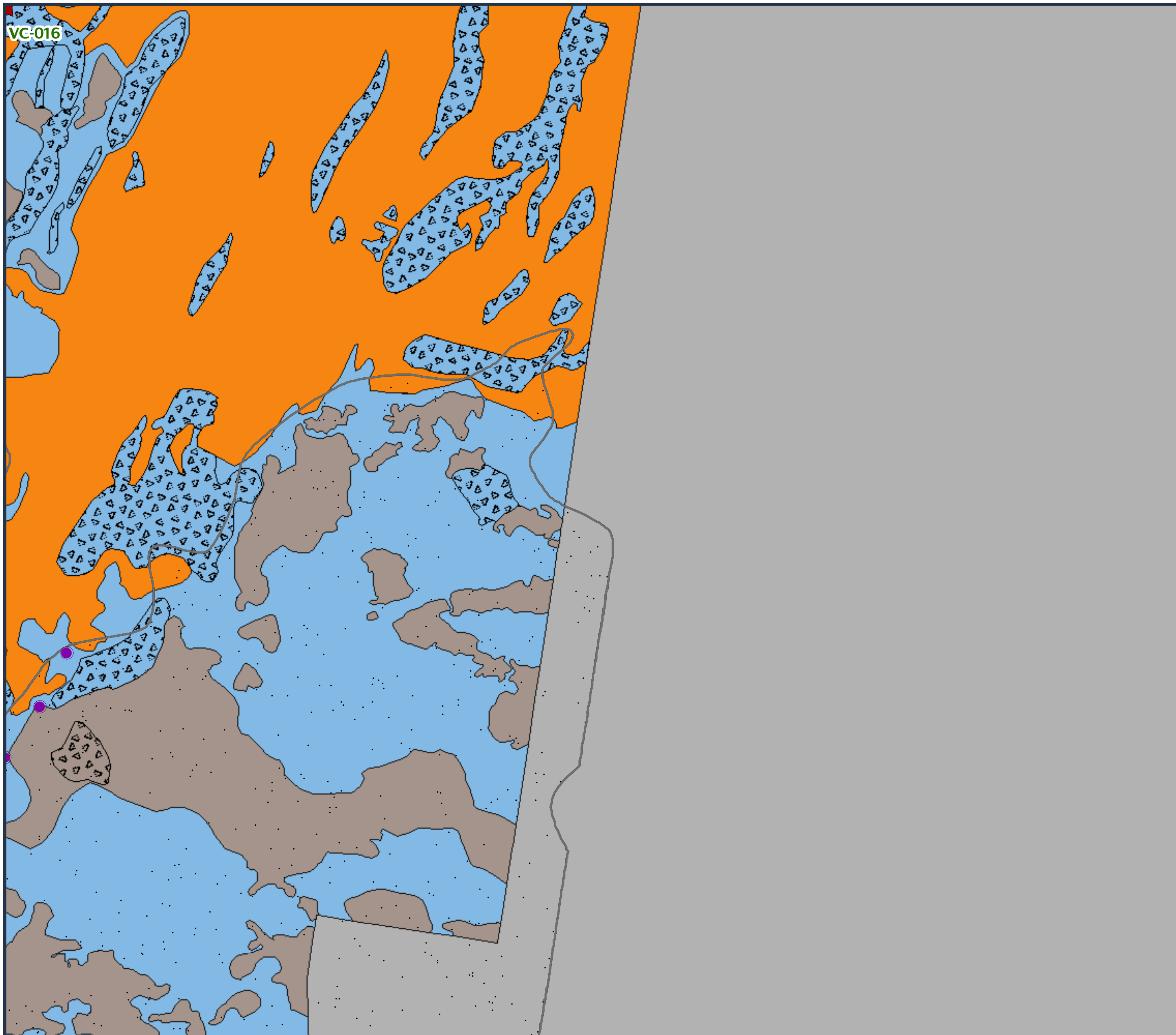
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

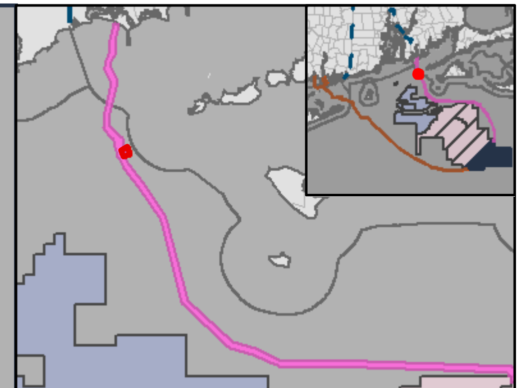
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Representative Massachusetts OECC Dredge Locations
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Boulder Field
- Complex Station - Vibracore

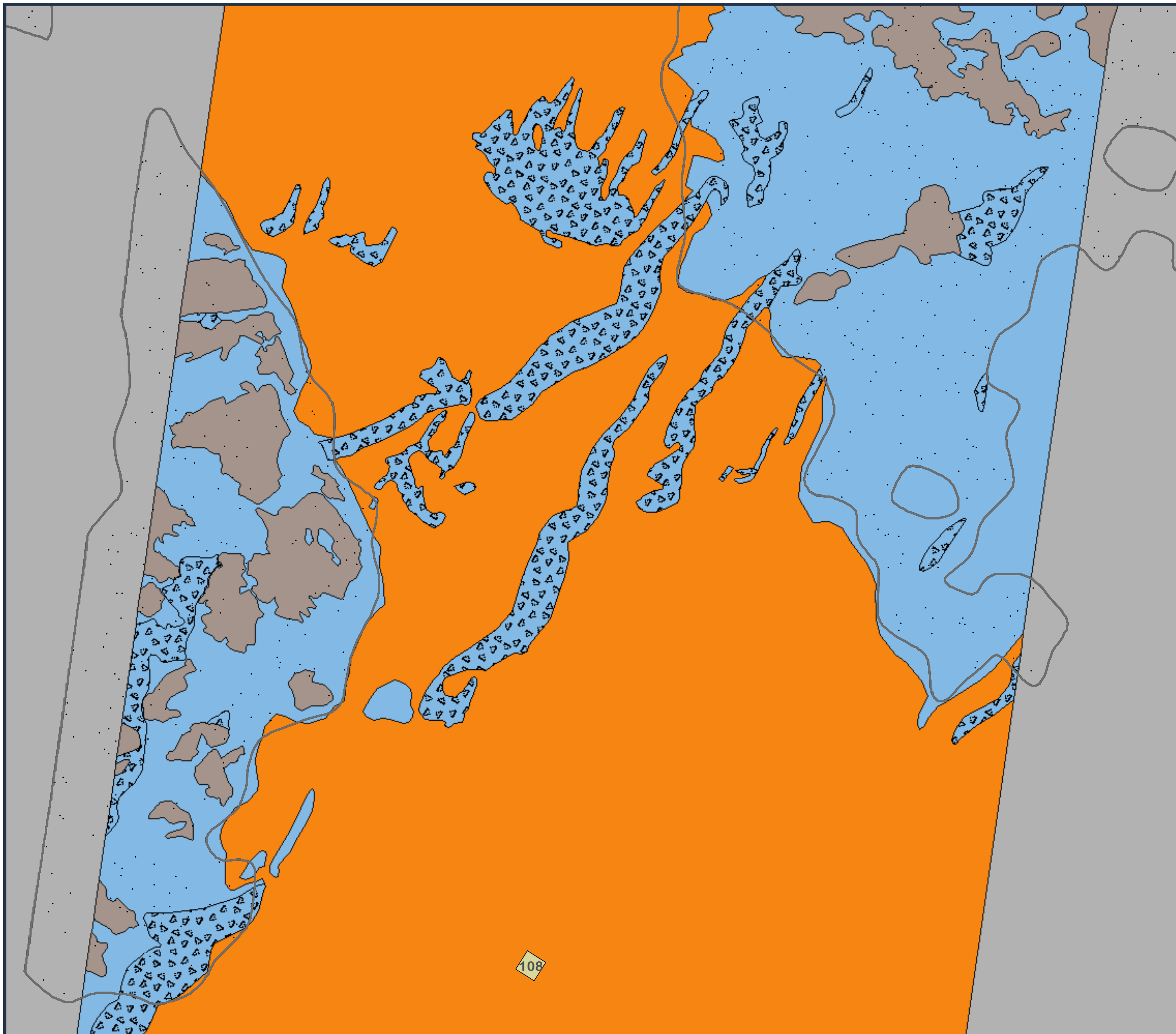
Scale 1:5,000
1 inch = 0 km

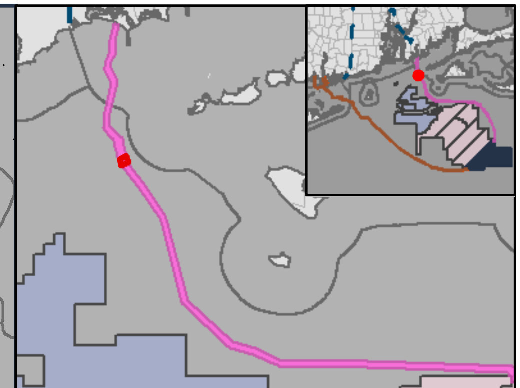
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Boulder Field

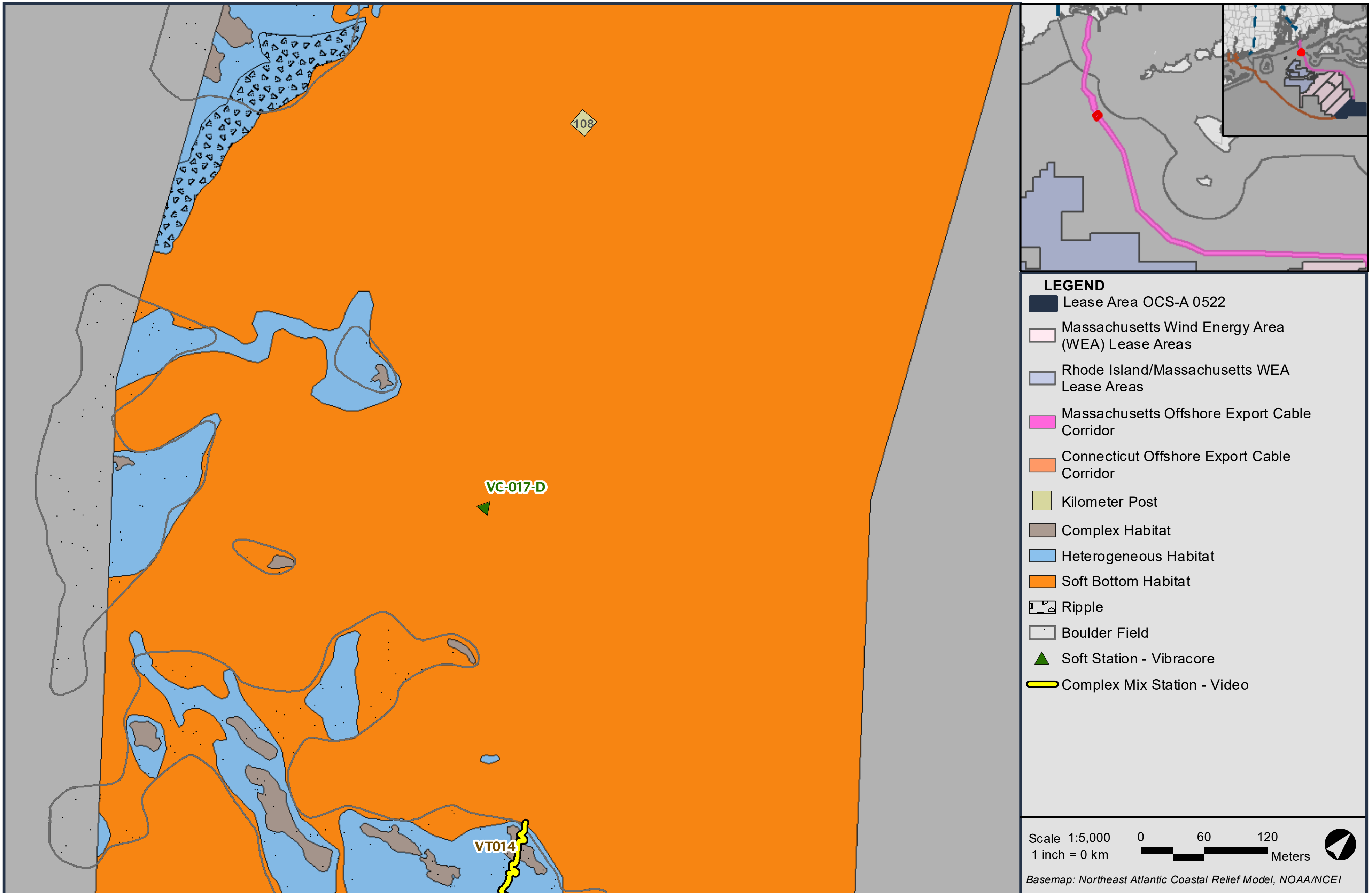
Scale 1:5,000
1 inch = 0 km

0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

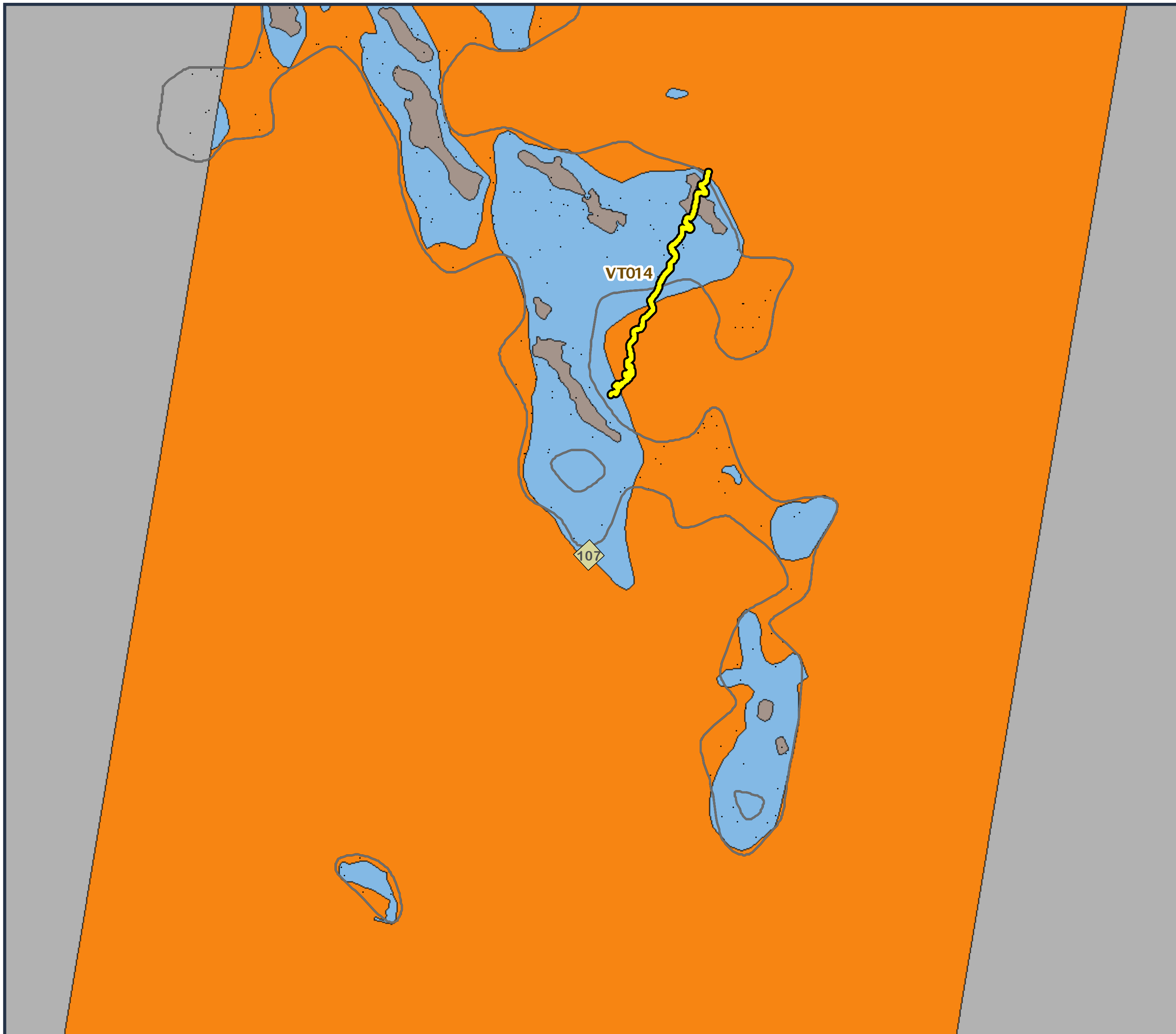
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

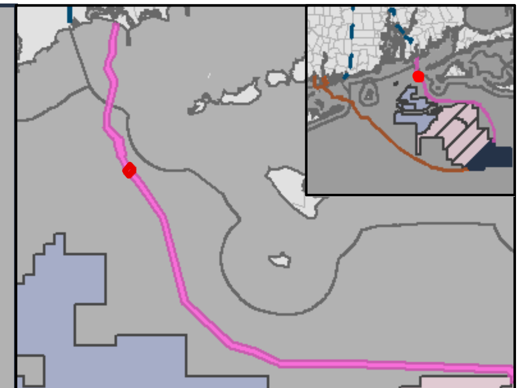
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Soft Bottom Habitat
- Boulder Field
- Complex Mix Station - Video Transect

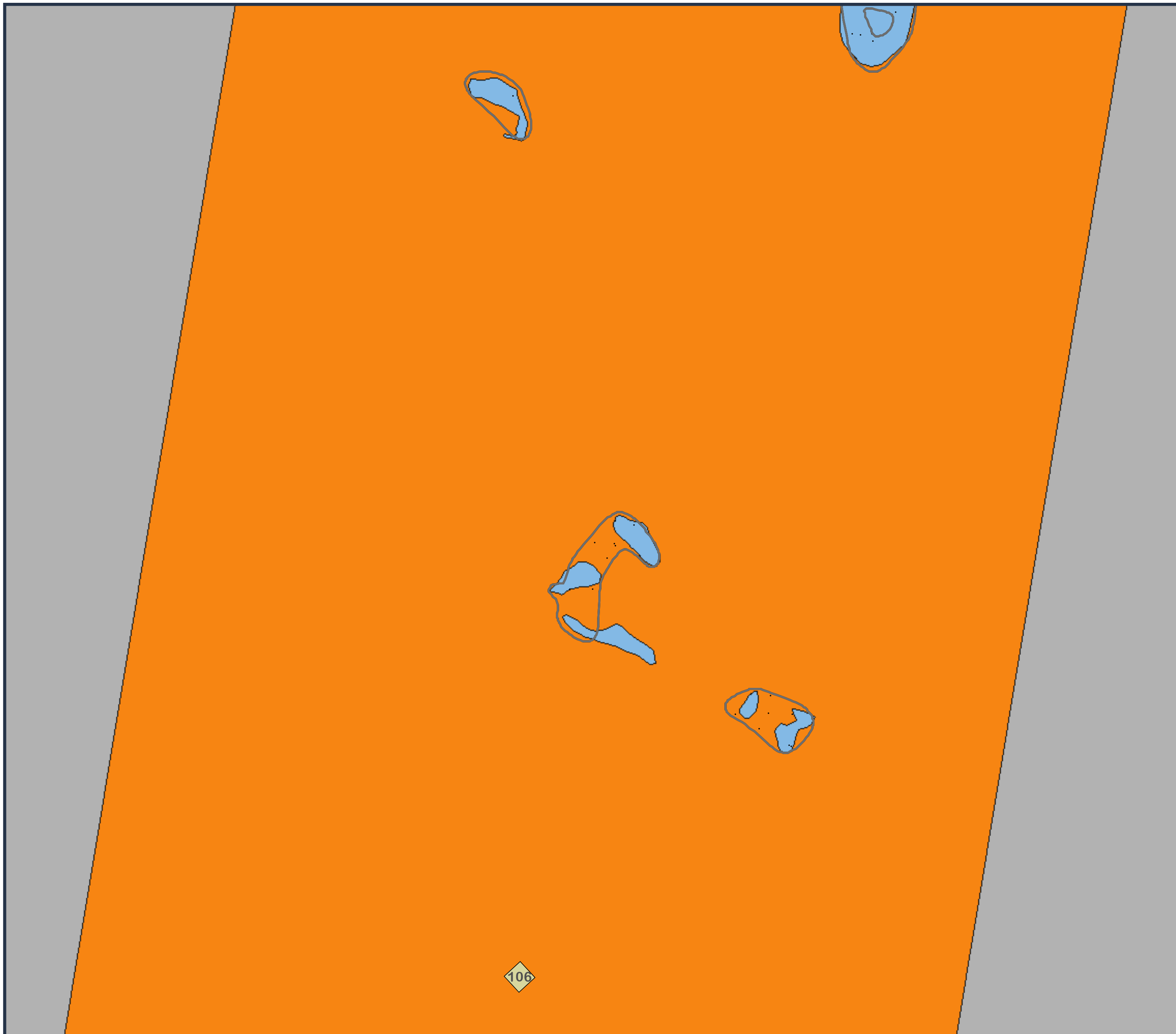
Scale 1:5,000
1 inch = 0 km

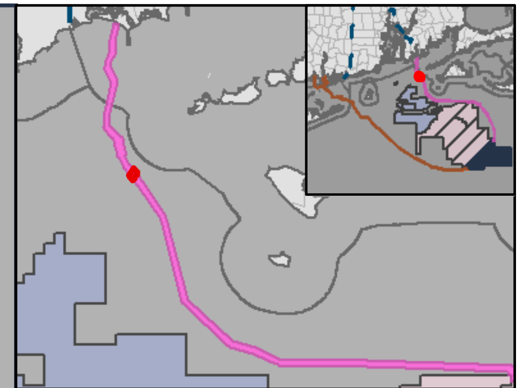
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Soft Bottom Habitat
- Boulder Field

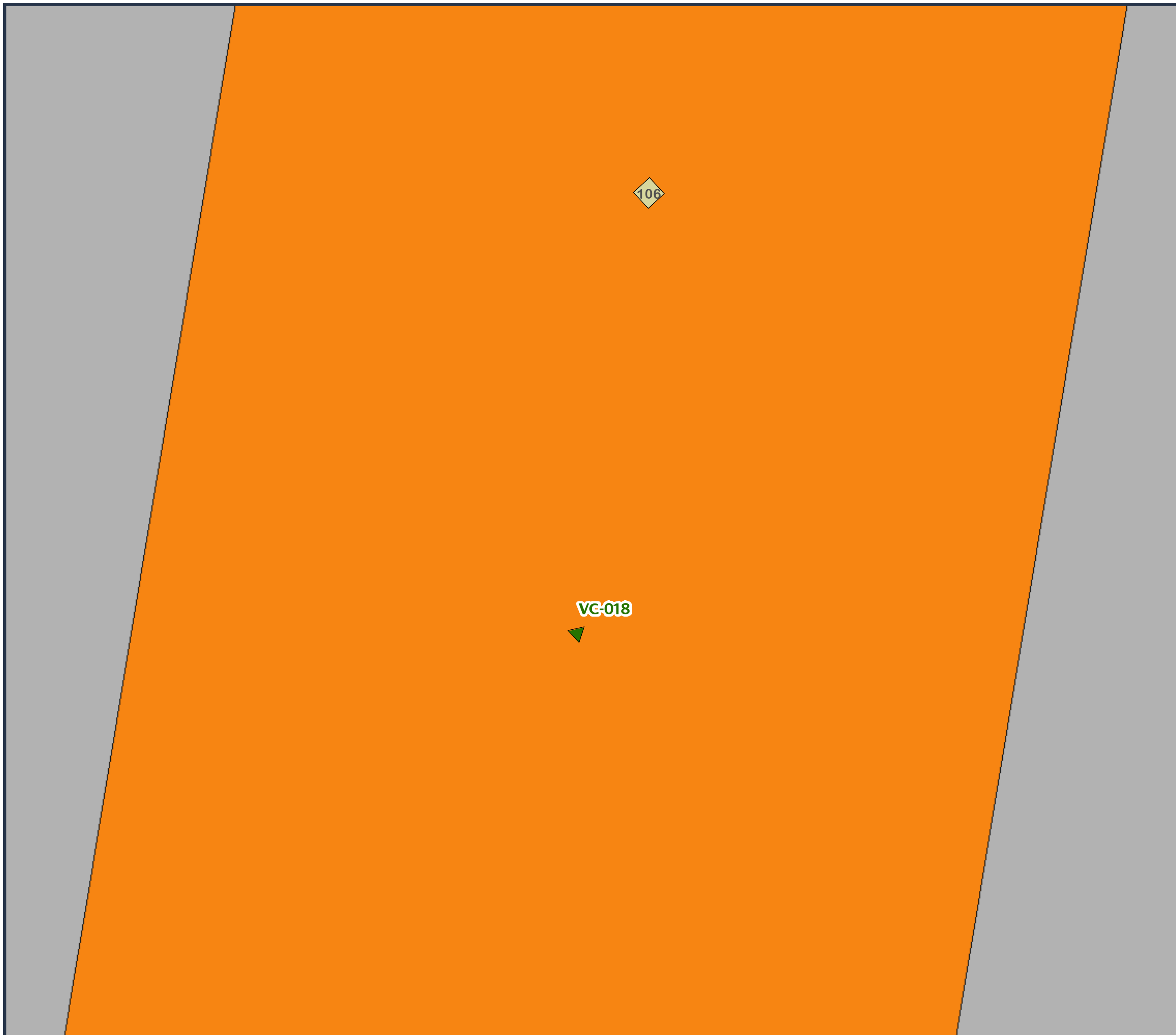
Scale 1:5,000
1 inch = 0 km

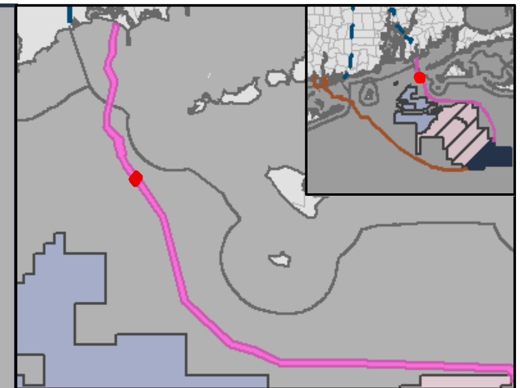
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





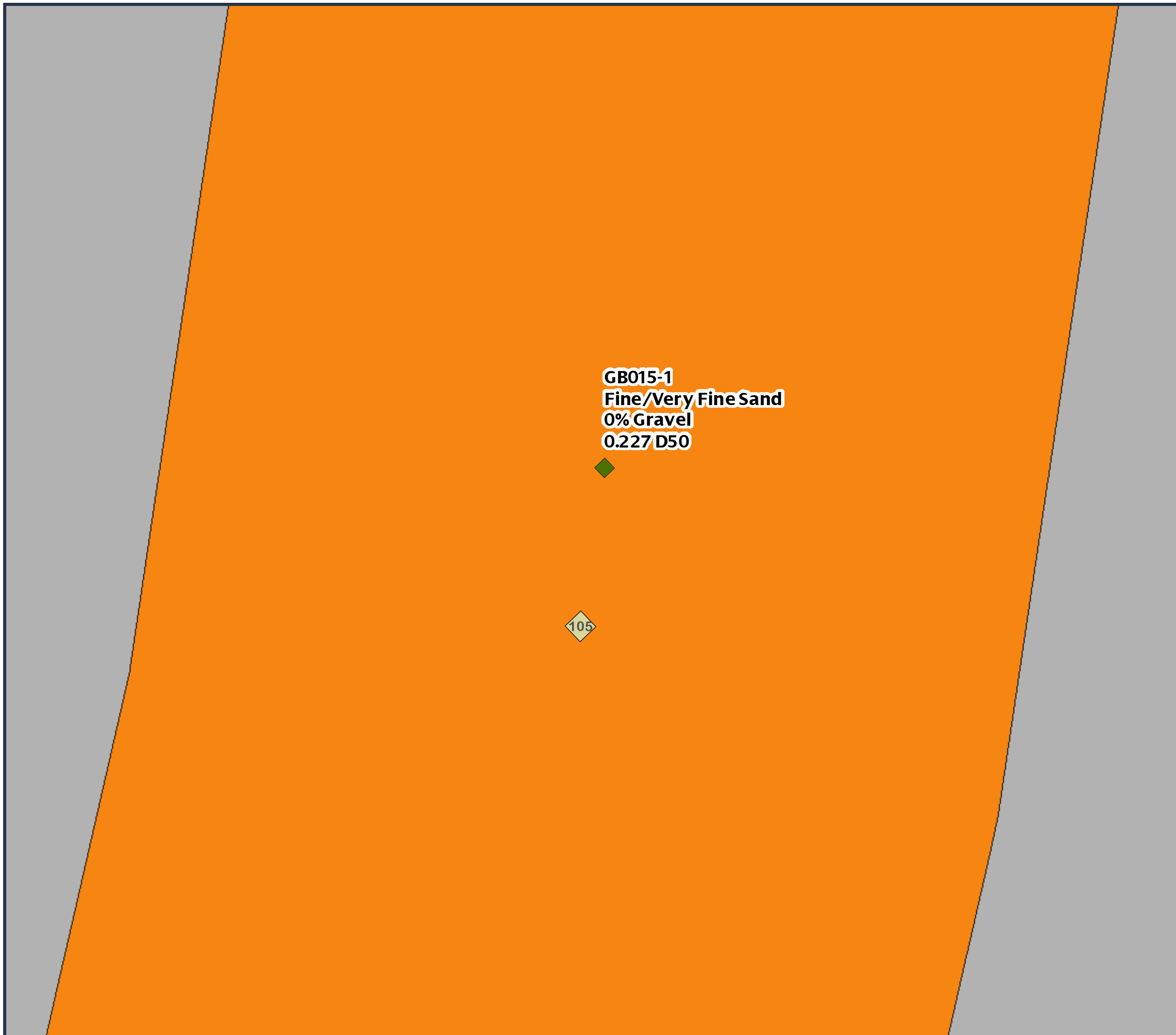
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Soft Station - Vibracore

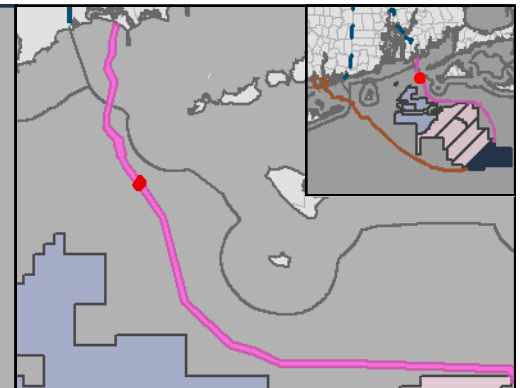
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST





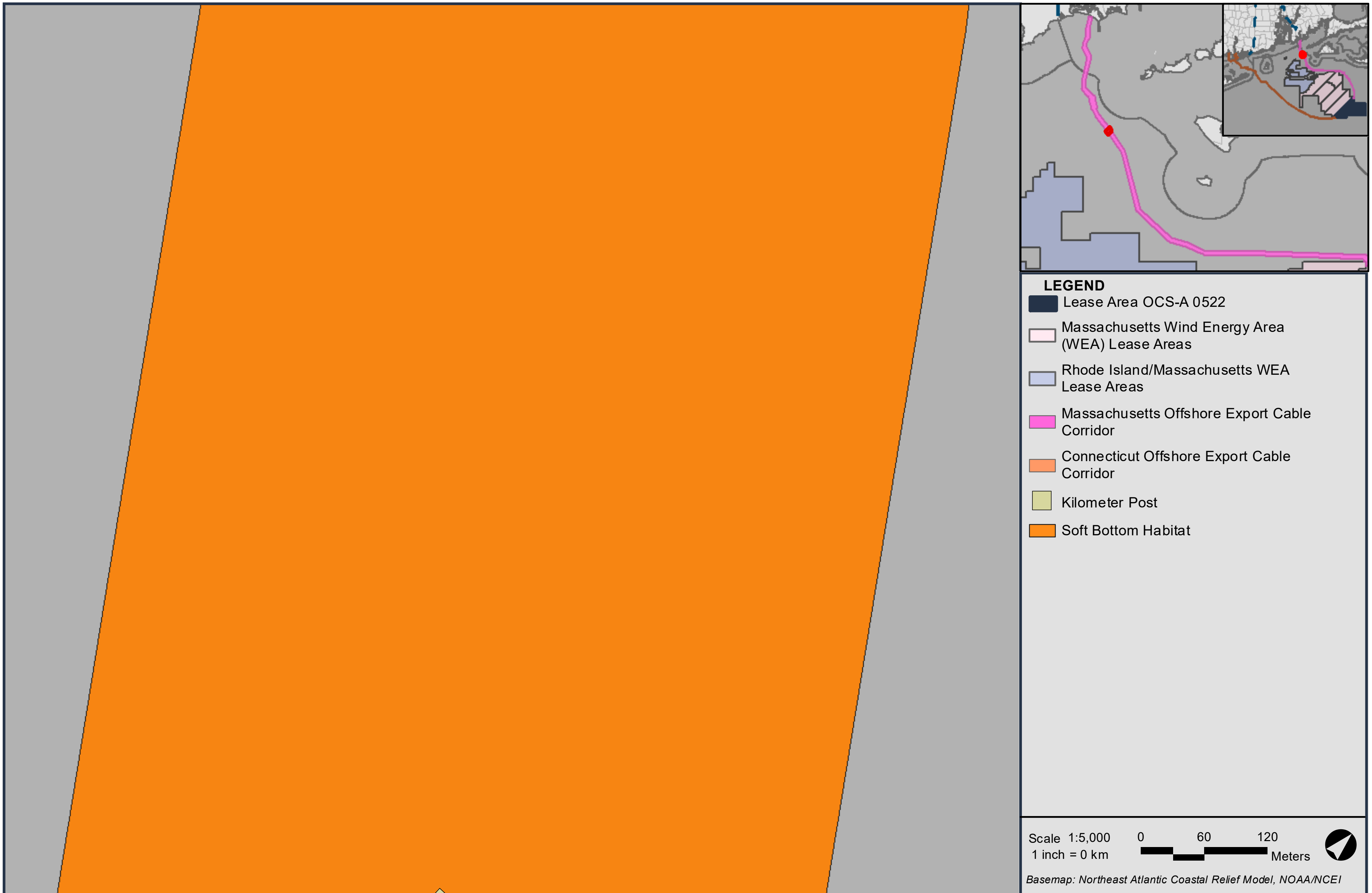
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample

Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

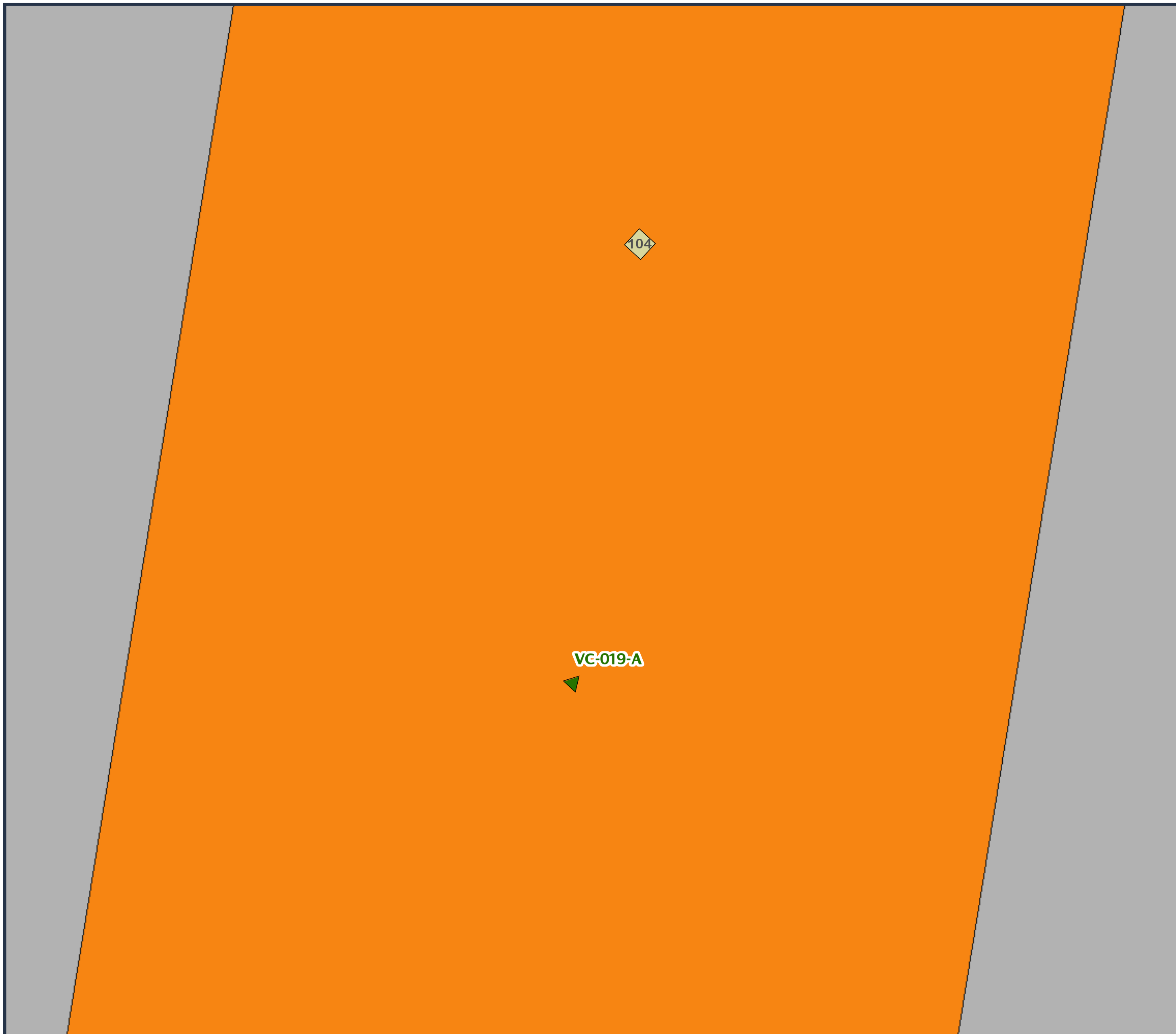
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

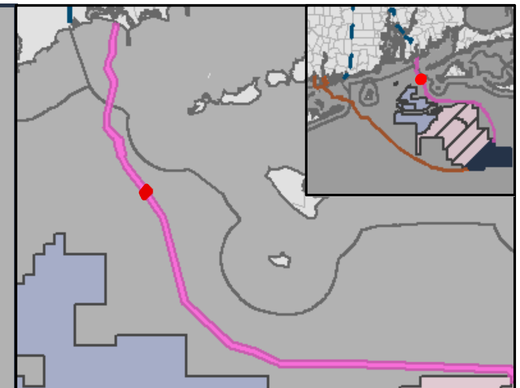
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





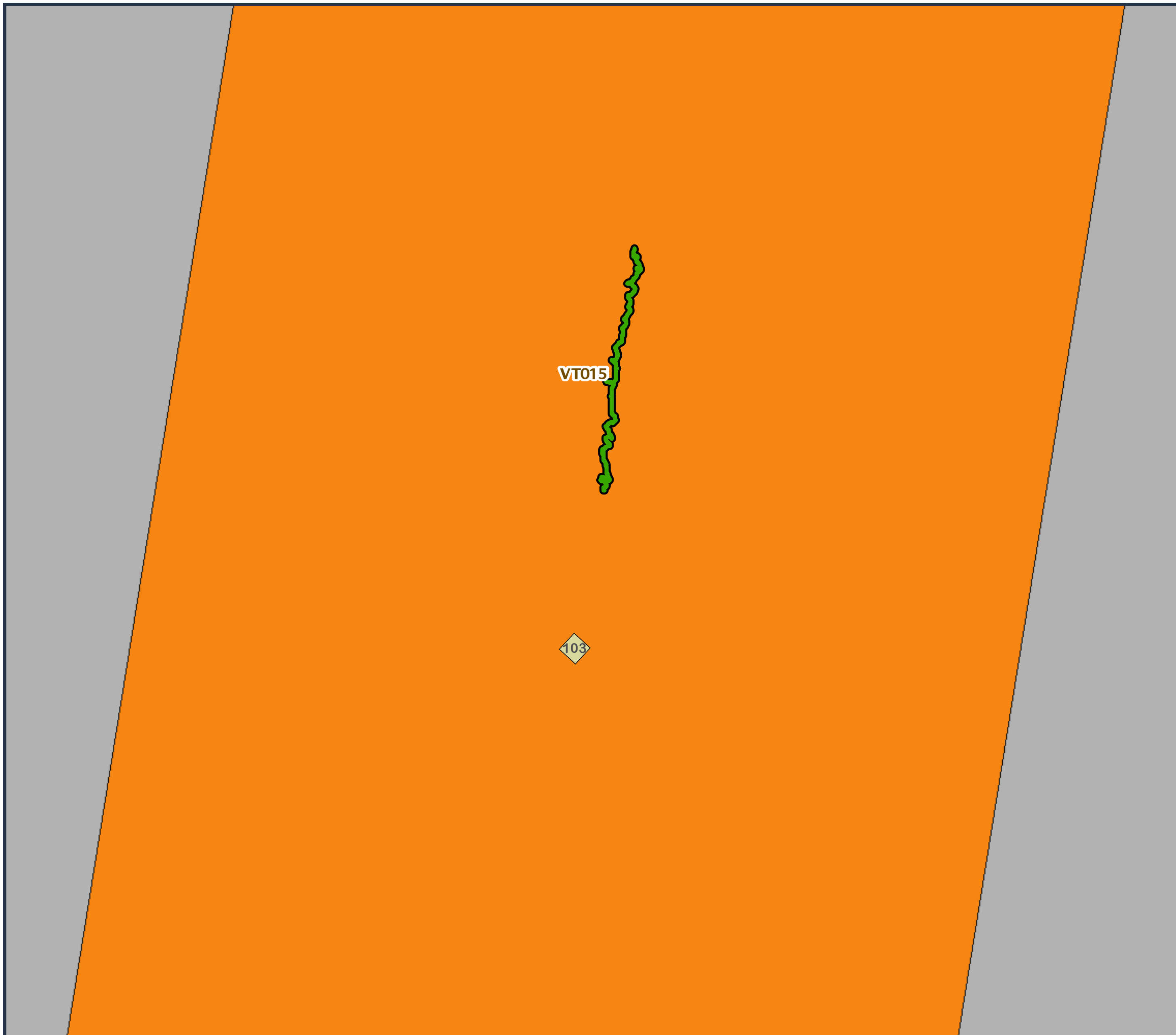
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

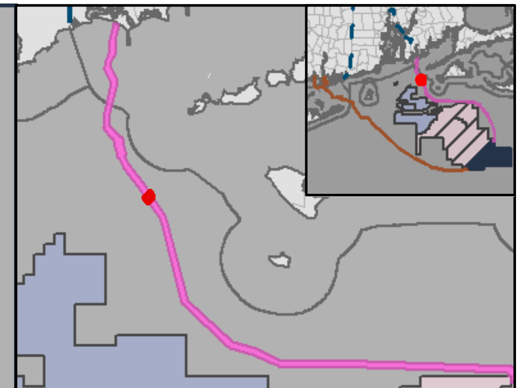
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Bottom Station - Video Transect

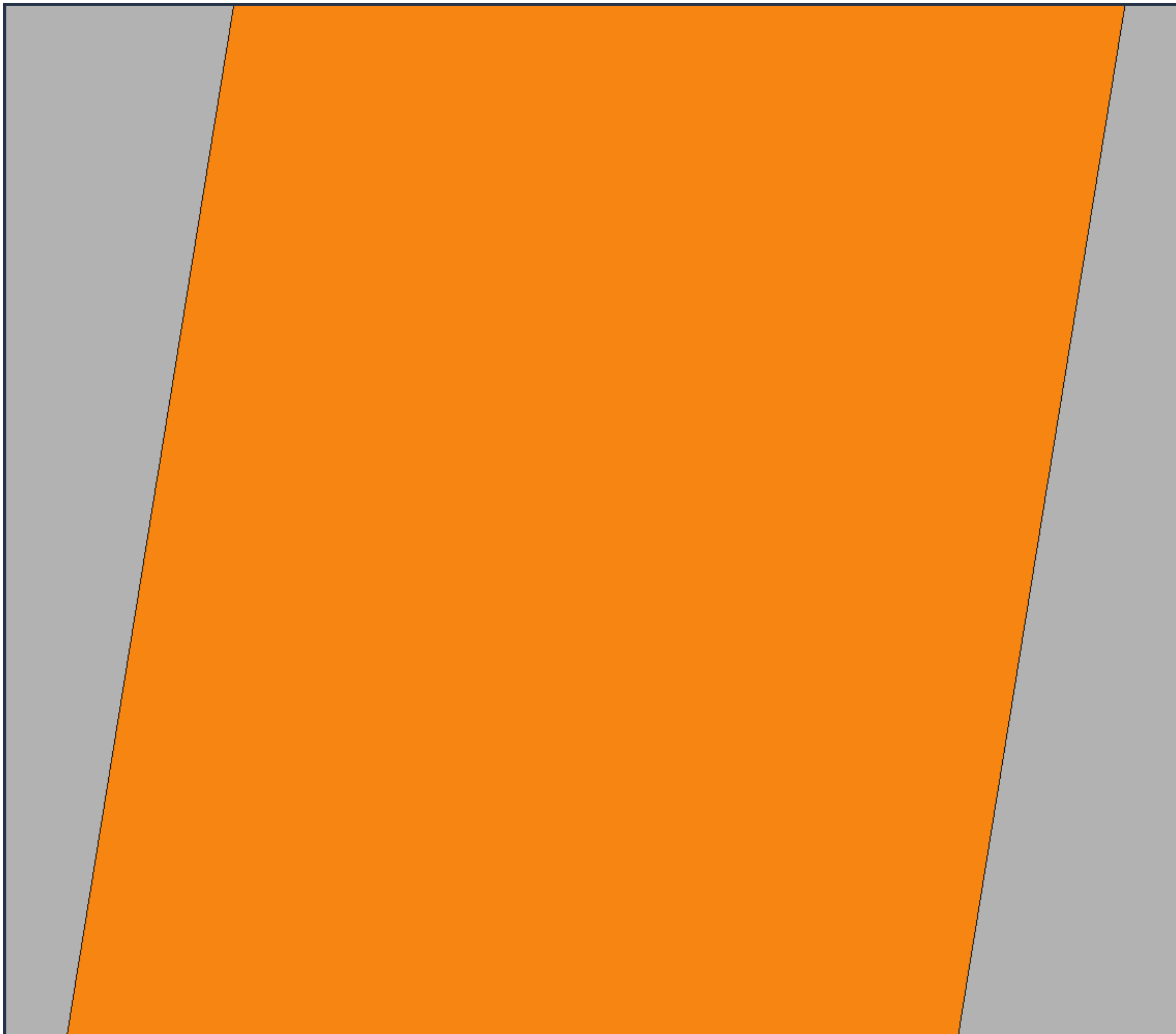
Scale 1:5,000
1 inch = 0 km

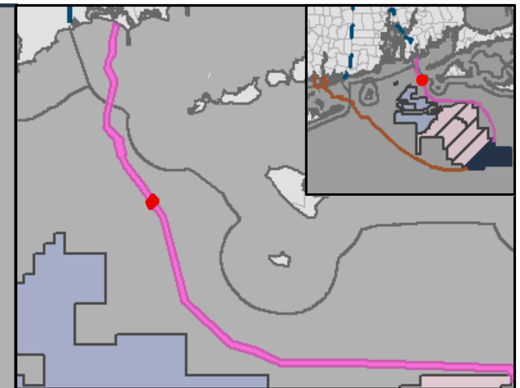
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat

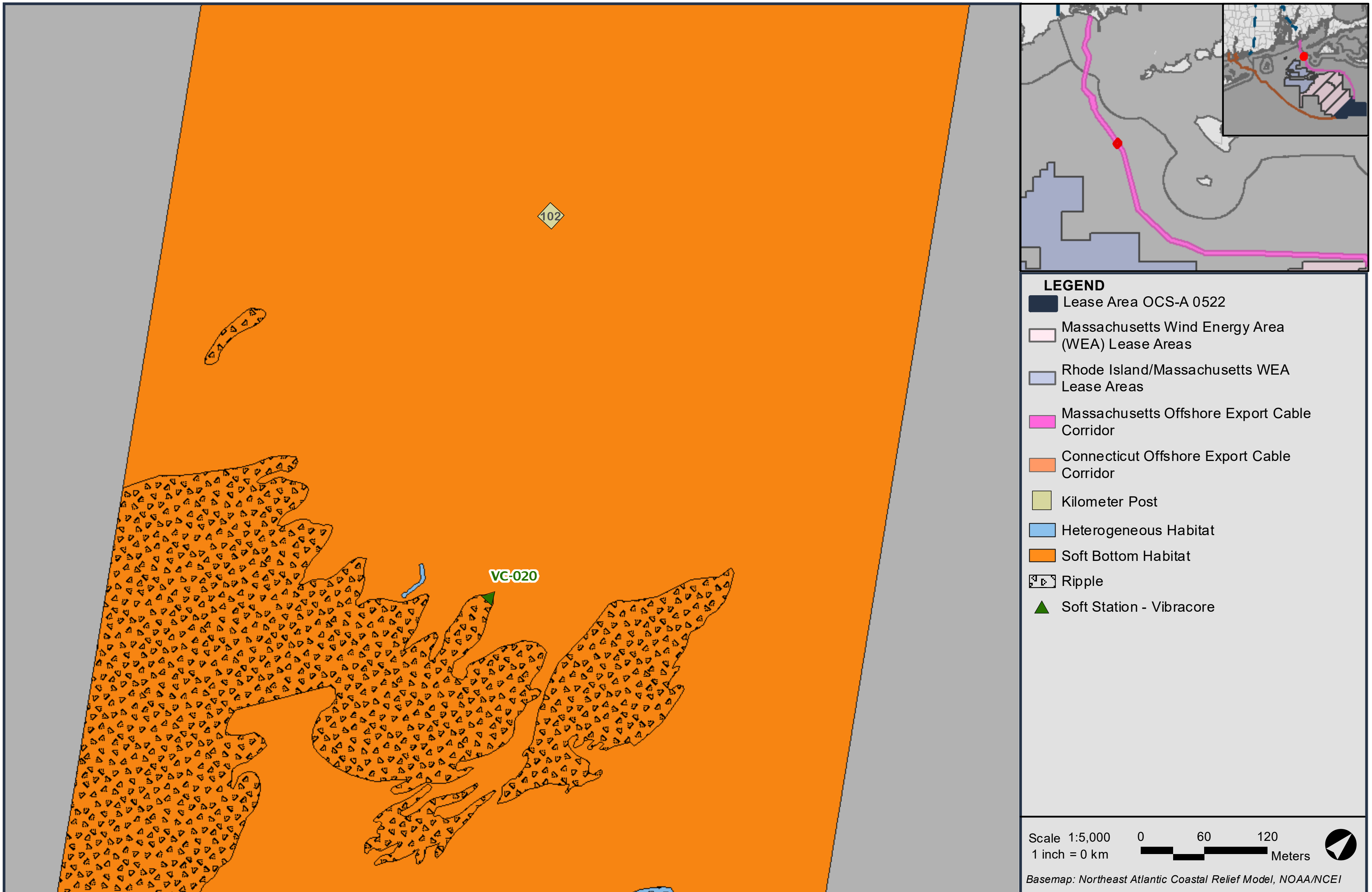
Scale 1:5,000
1 inch = 0 km

0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

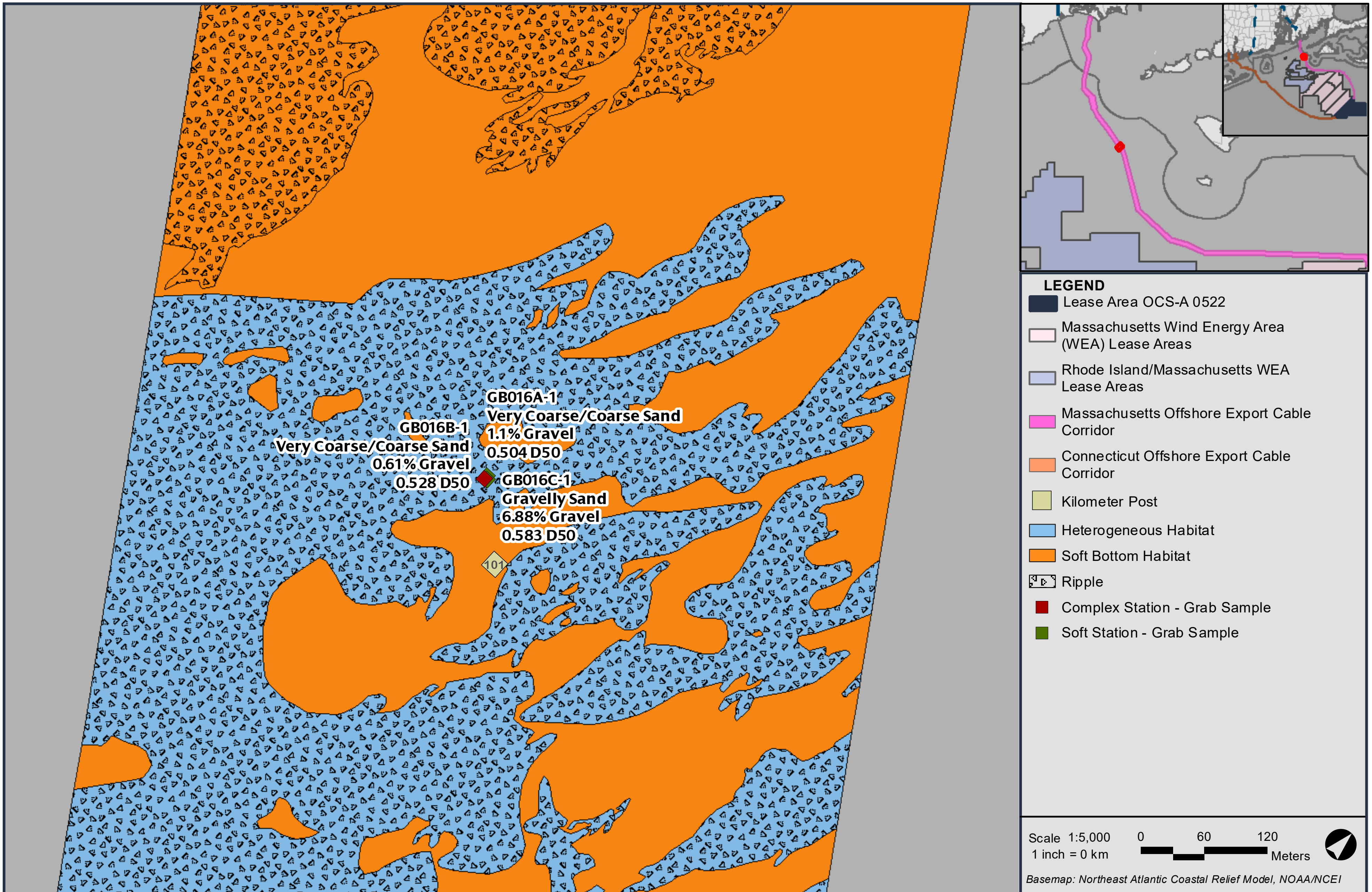
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST

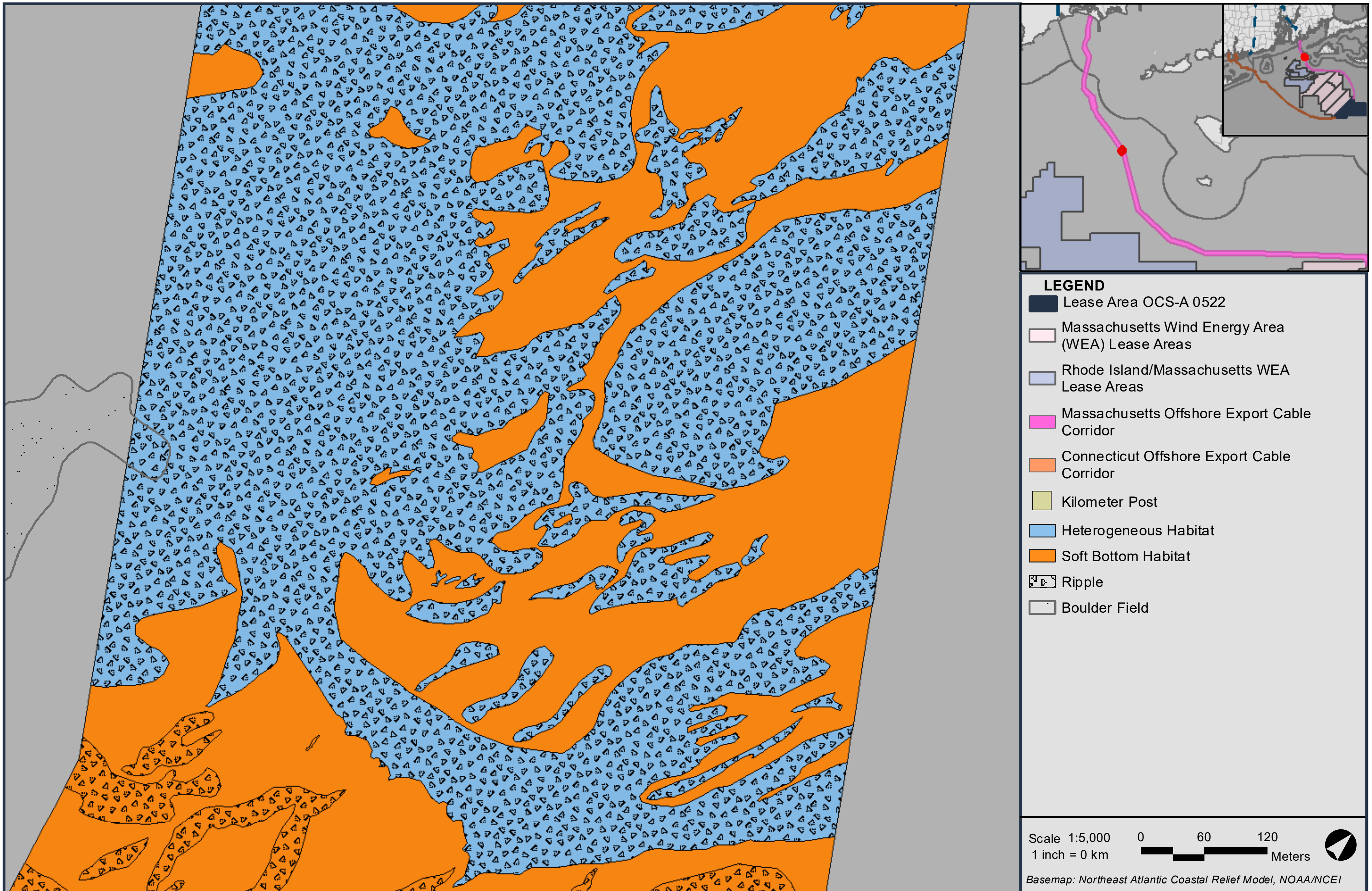
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST

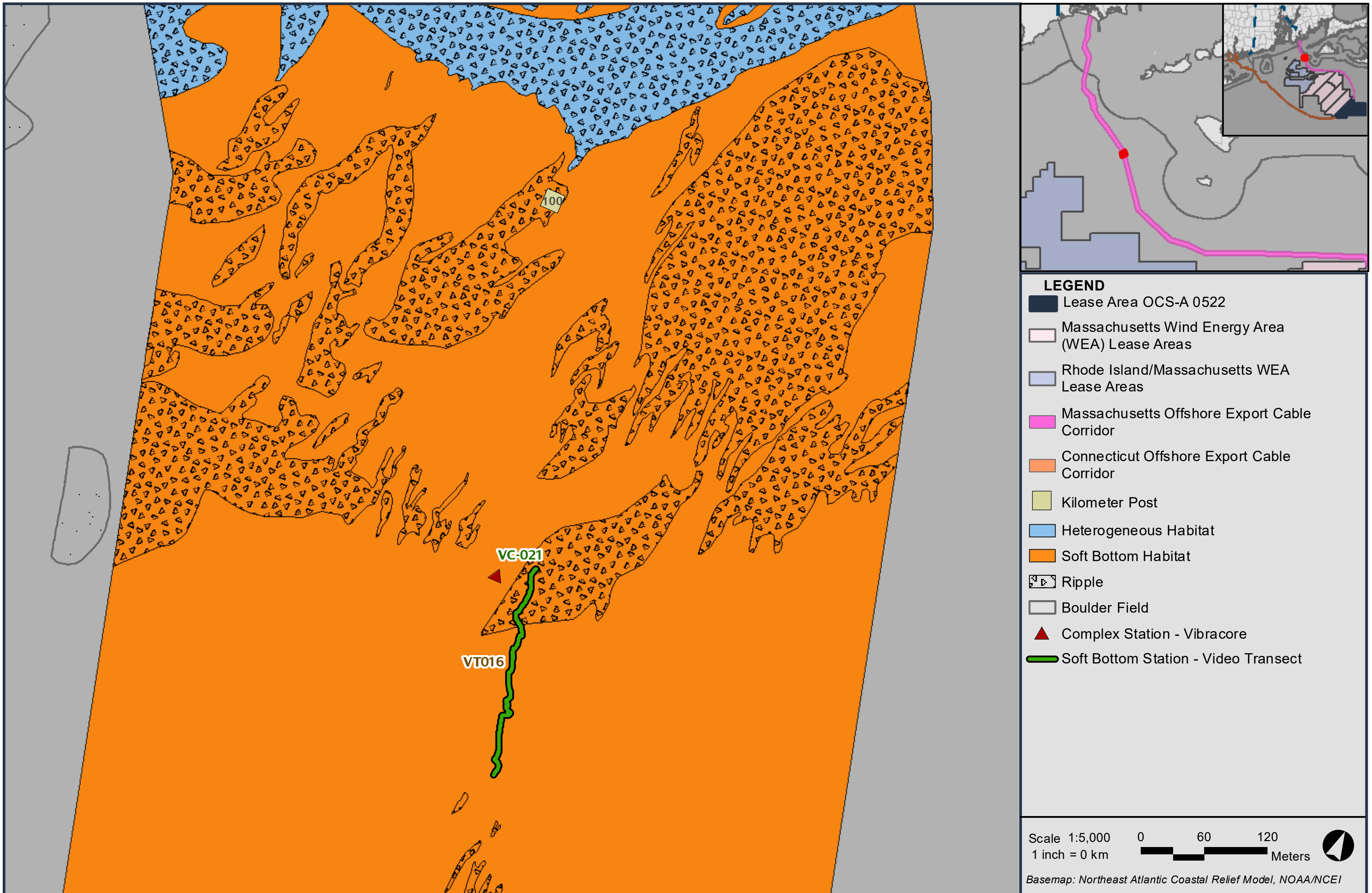
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST

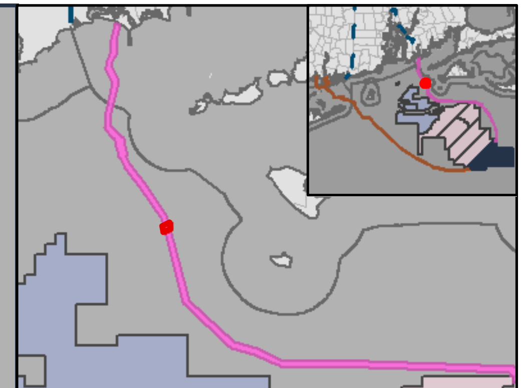
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE



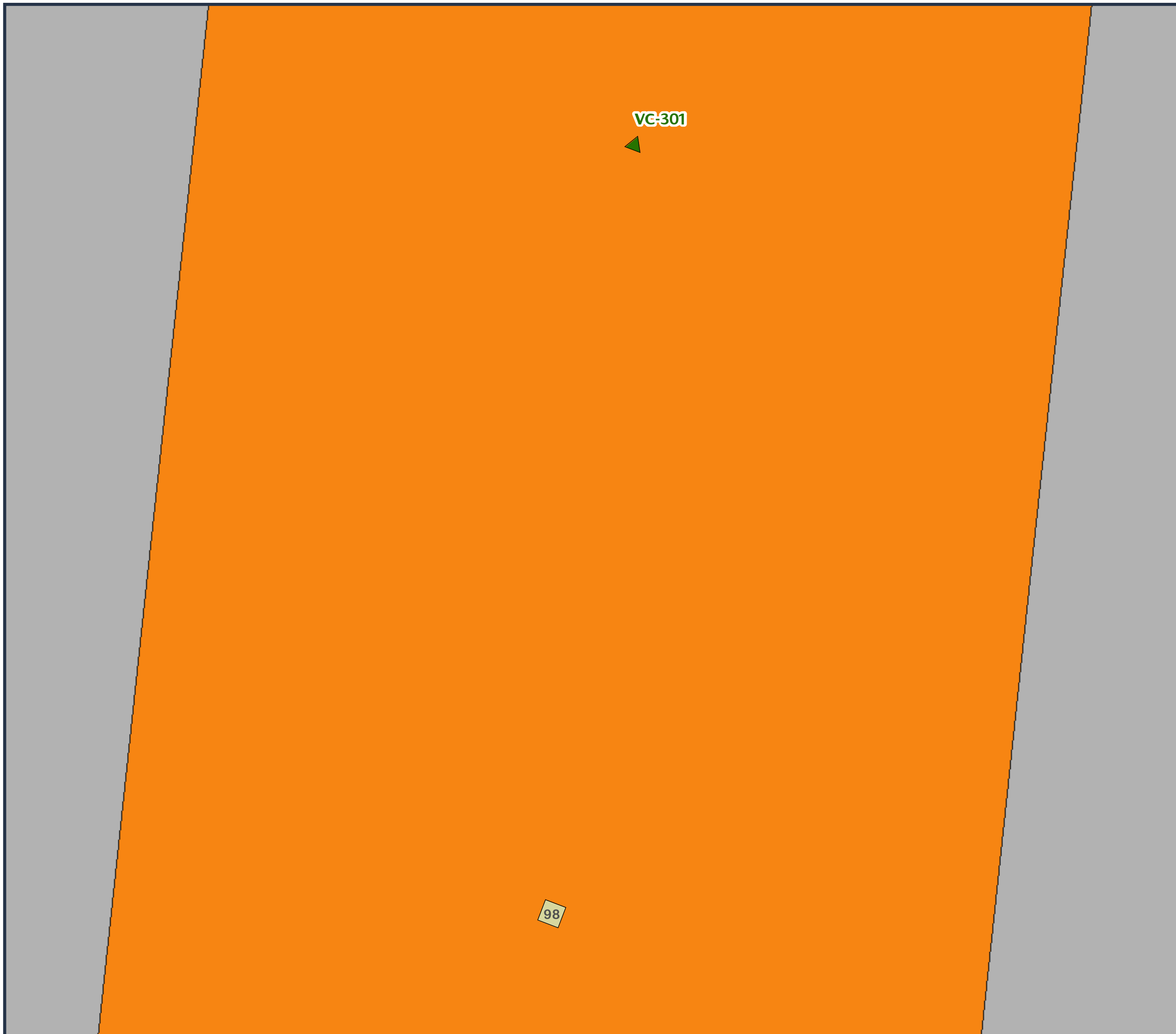
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Ripple
Soft Station - Vibracore
Soft Bottom Station - Video Transect

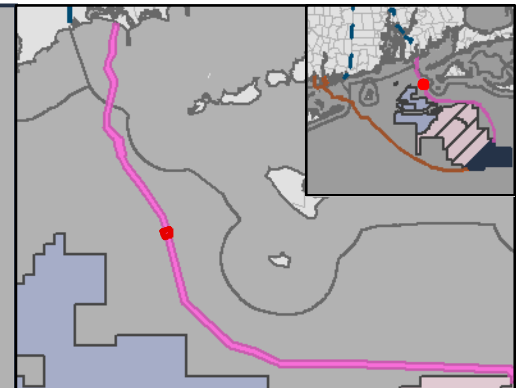
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

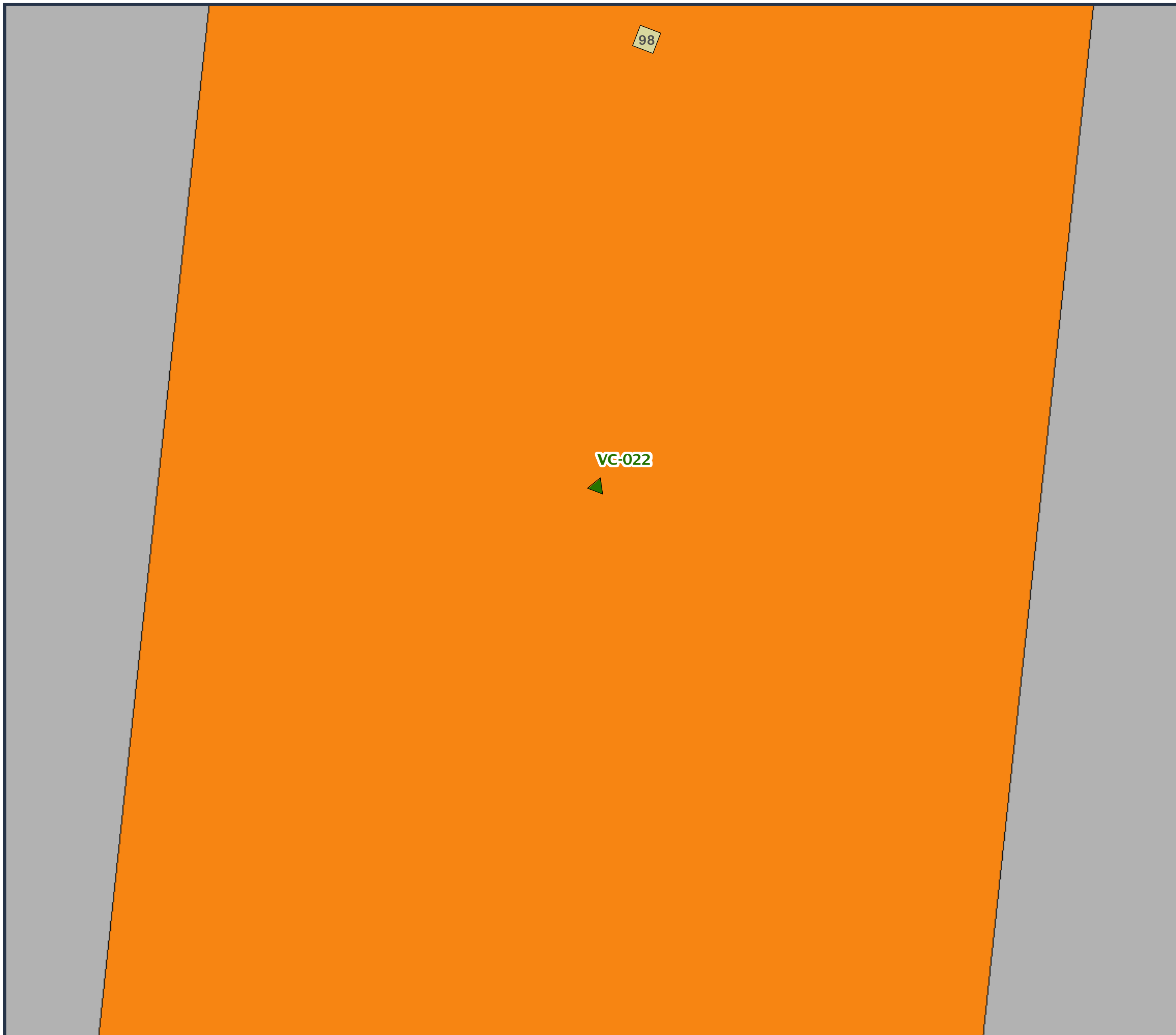
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

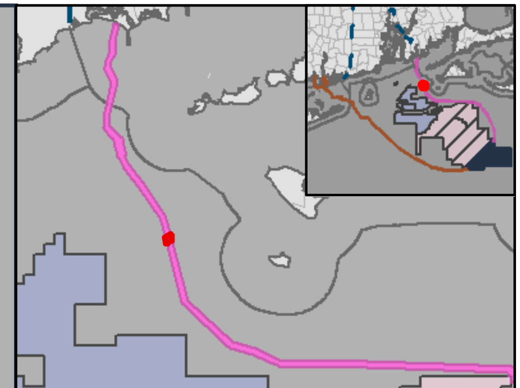
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

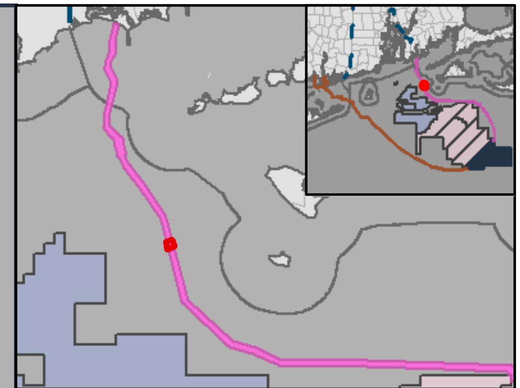
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample

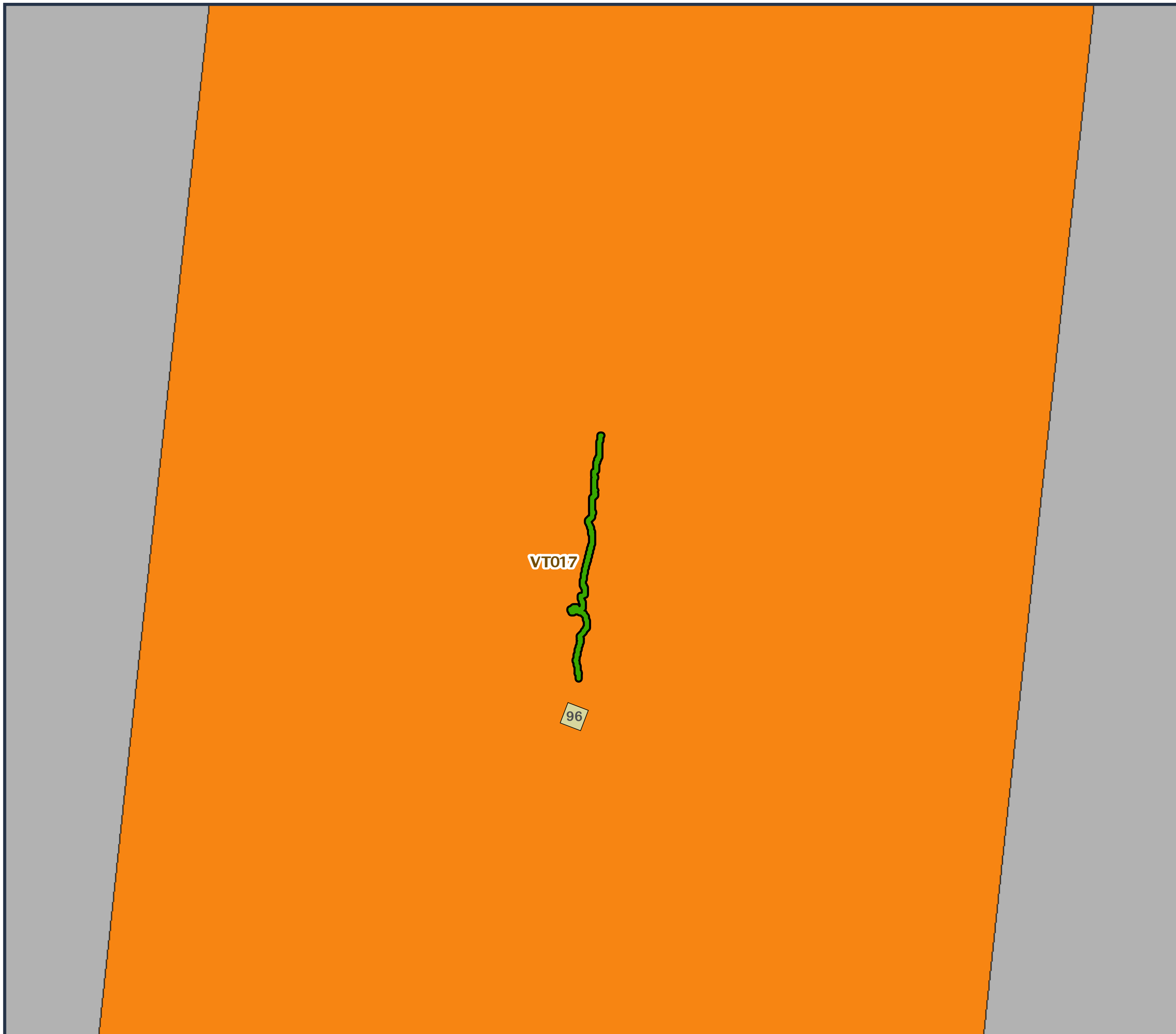
Scale 1:5,000
1 inch = 0 km

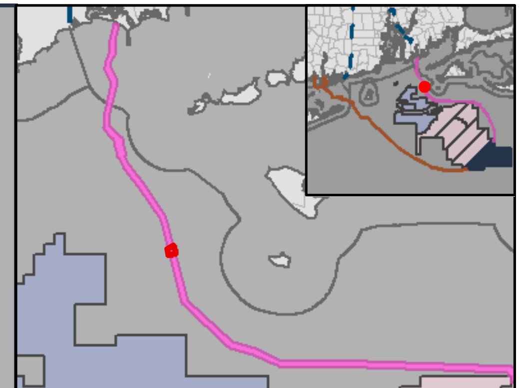
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

Lease Area OCS-A 0522

Massachusetts Wind Energy Area (WEA) Lease Areas

Rhode Island/Massachusetts WEA Lease Areas

Massachusetts Offshore Export Cable Corridor

Connecticut Offshore Export Cable Corridor

Kilometer Post

Soft Bottom Habitat

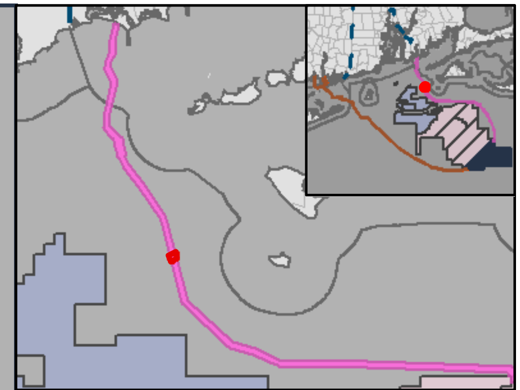
Soft Bottom Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Station - Grab Sample

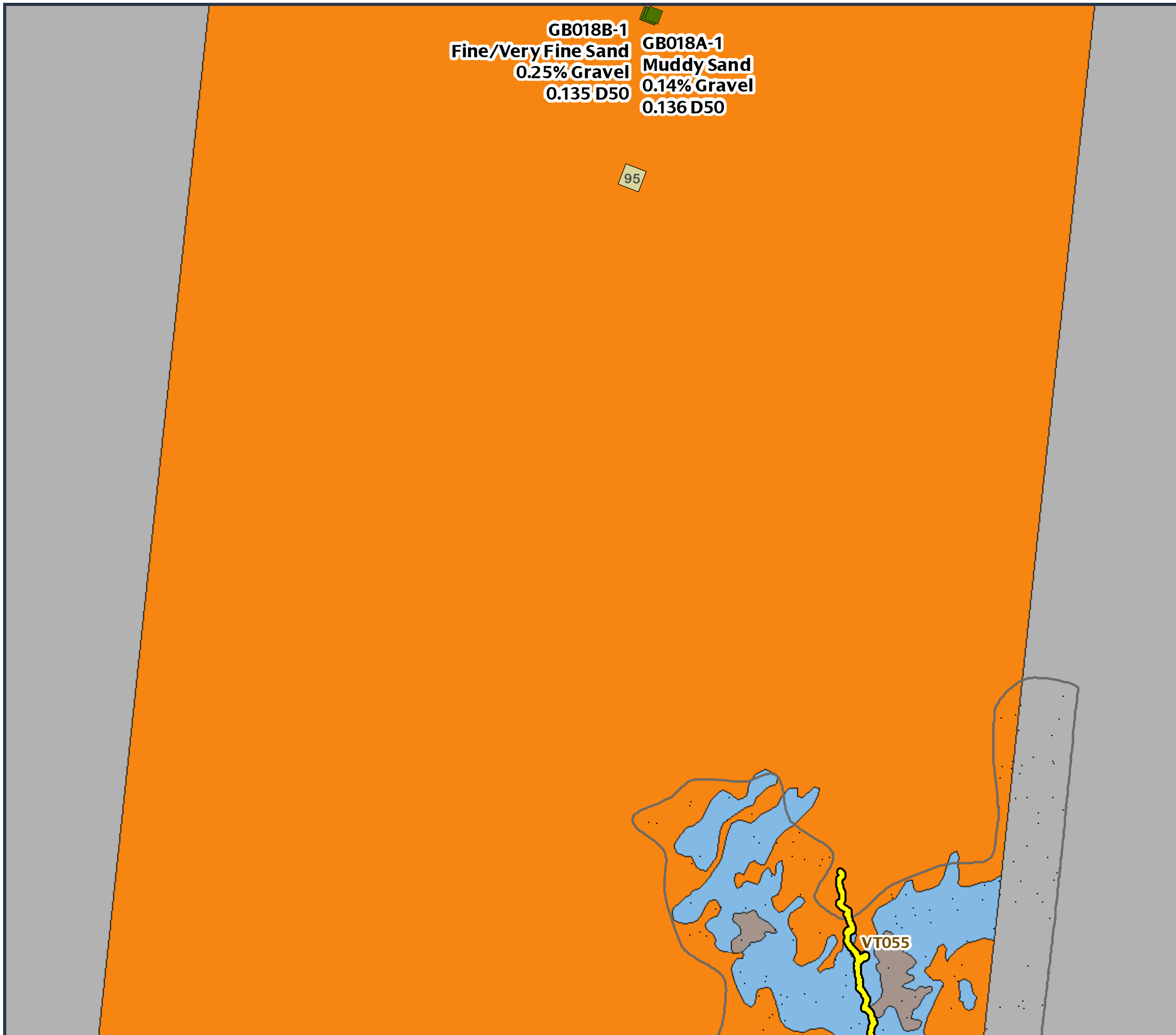
Scale 1:5,000
1 inch = 0 km

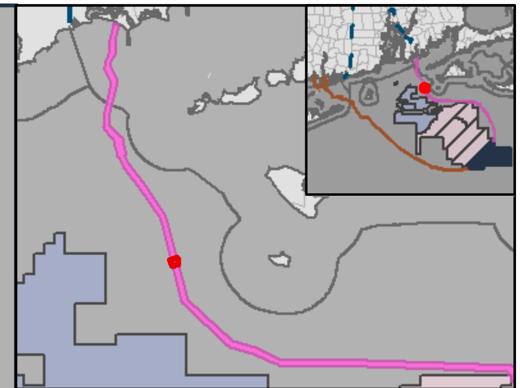
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

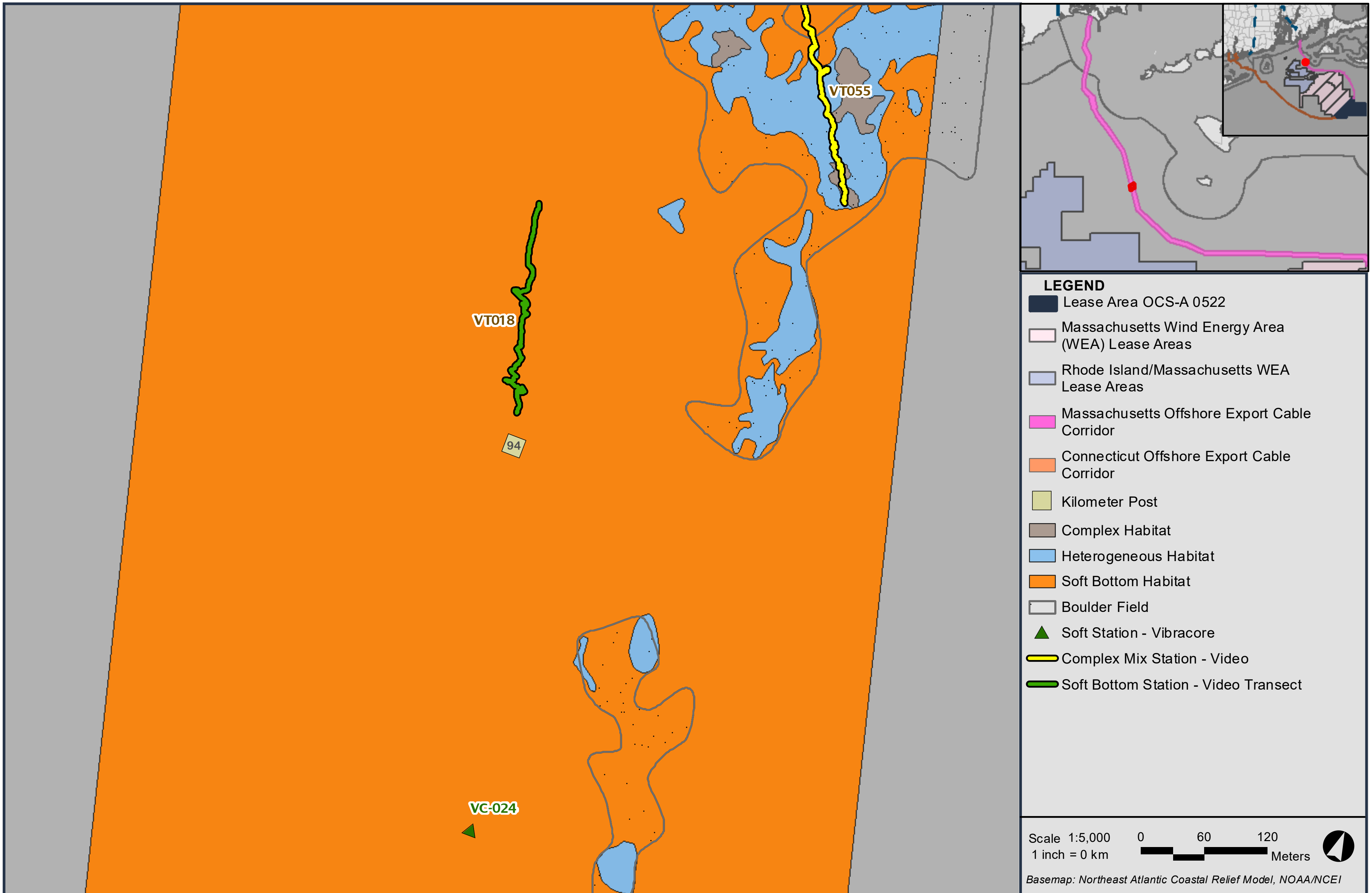
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Soft Bottom Habitat
- Boulder Field
- Soft Station - Grab Sample
- Complex Mix Station - Video

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

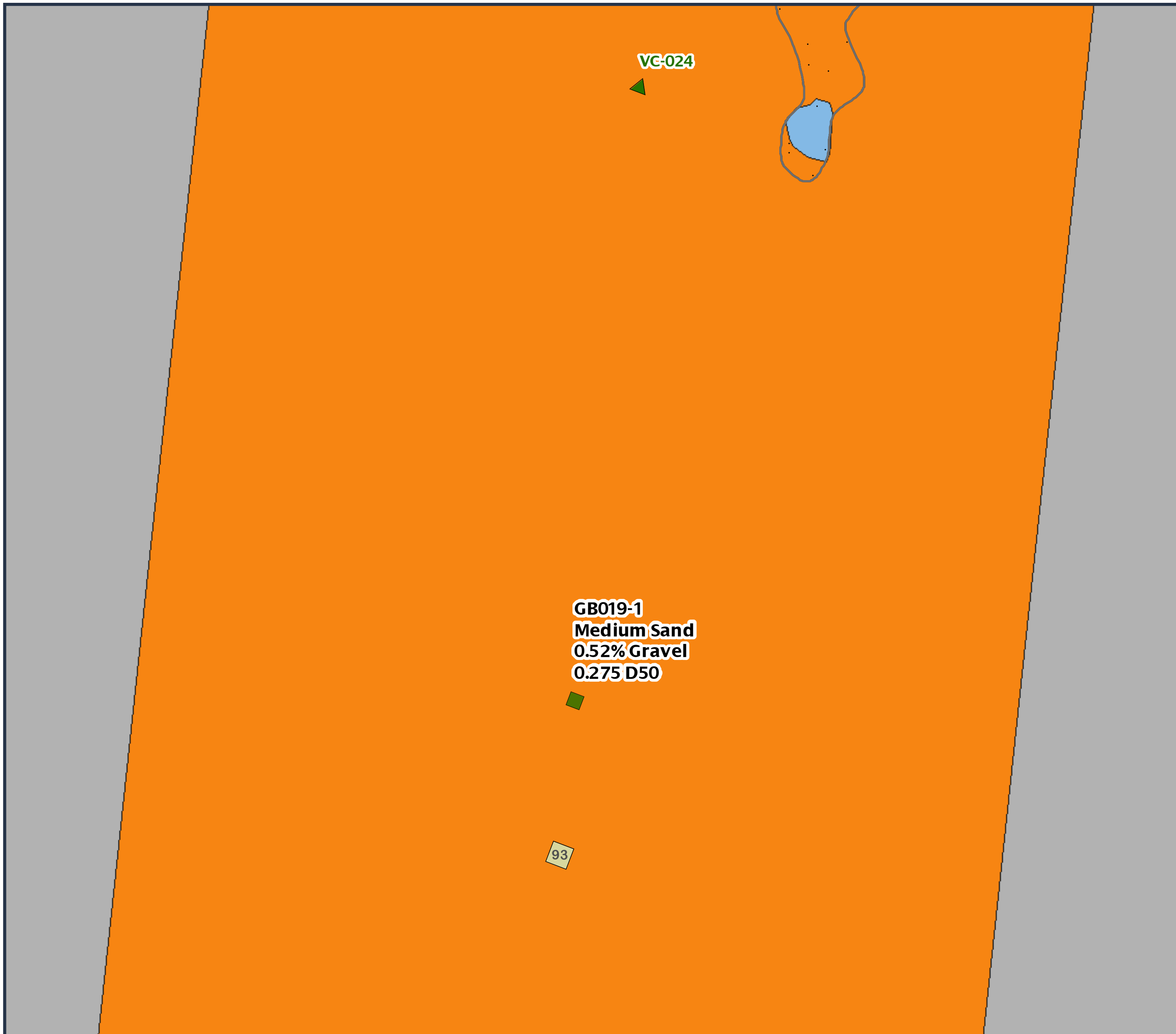
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

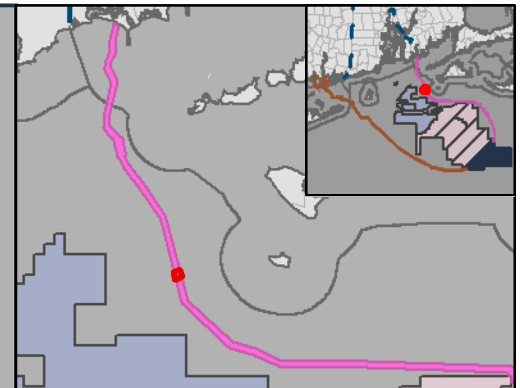
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

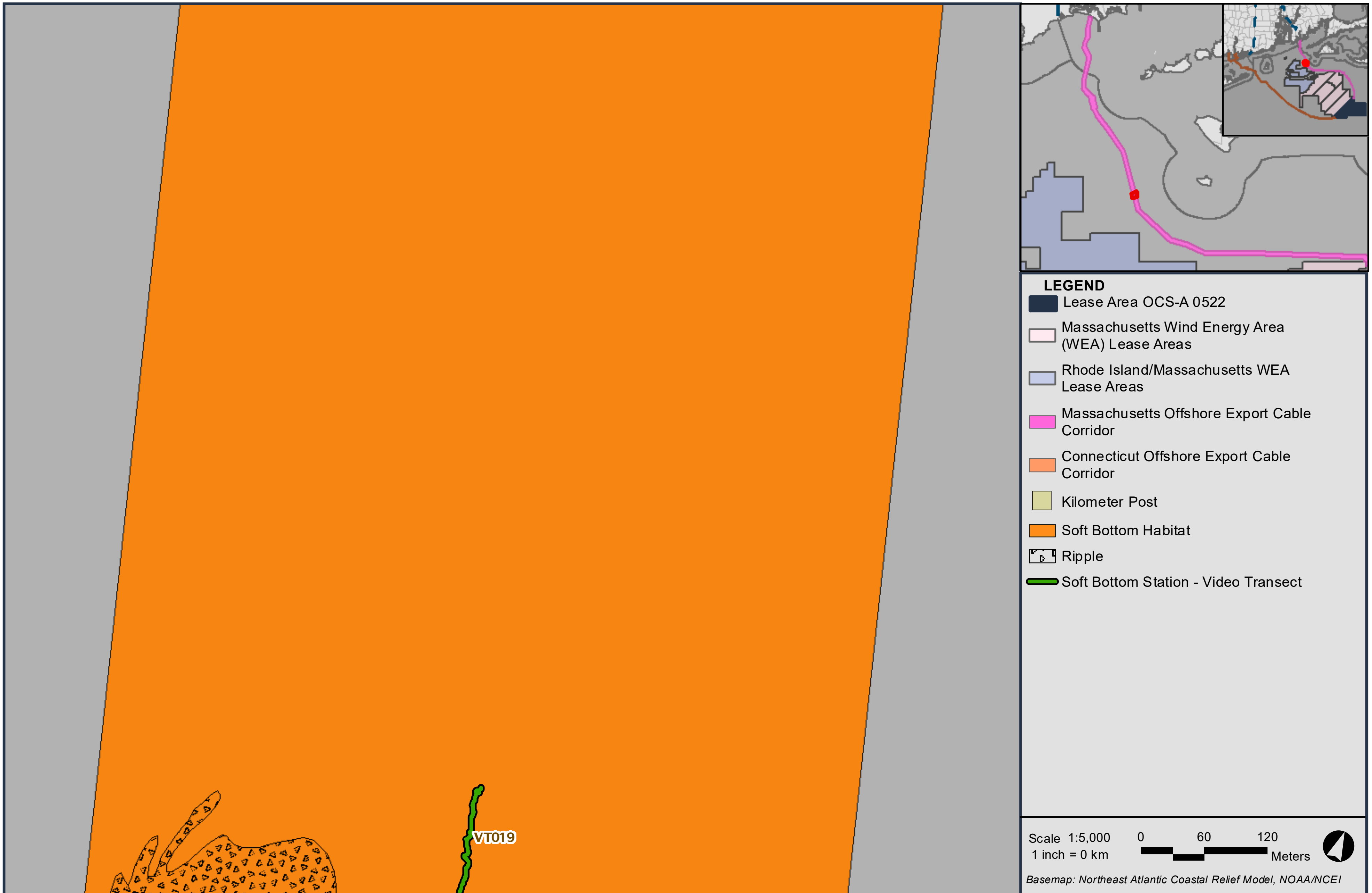
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Soft Bottom Habitat
- Boulder Field
- Soft Station - Vibracore
- Soft Station - Grab Sample

Scale 1:5,000
1 inch = 0 km

0 60 120
Meters

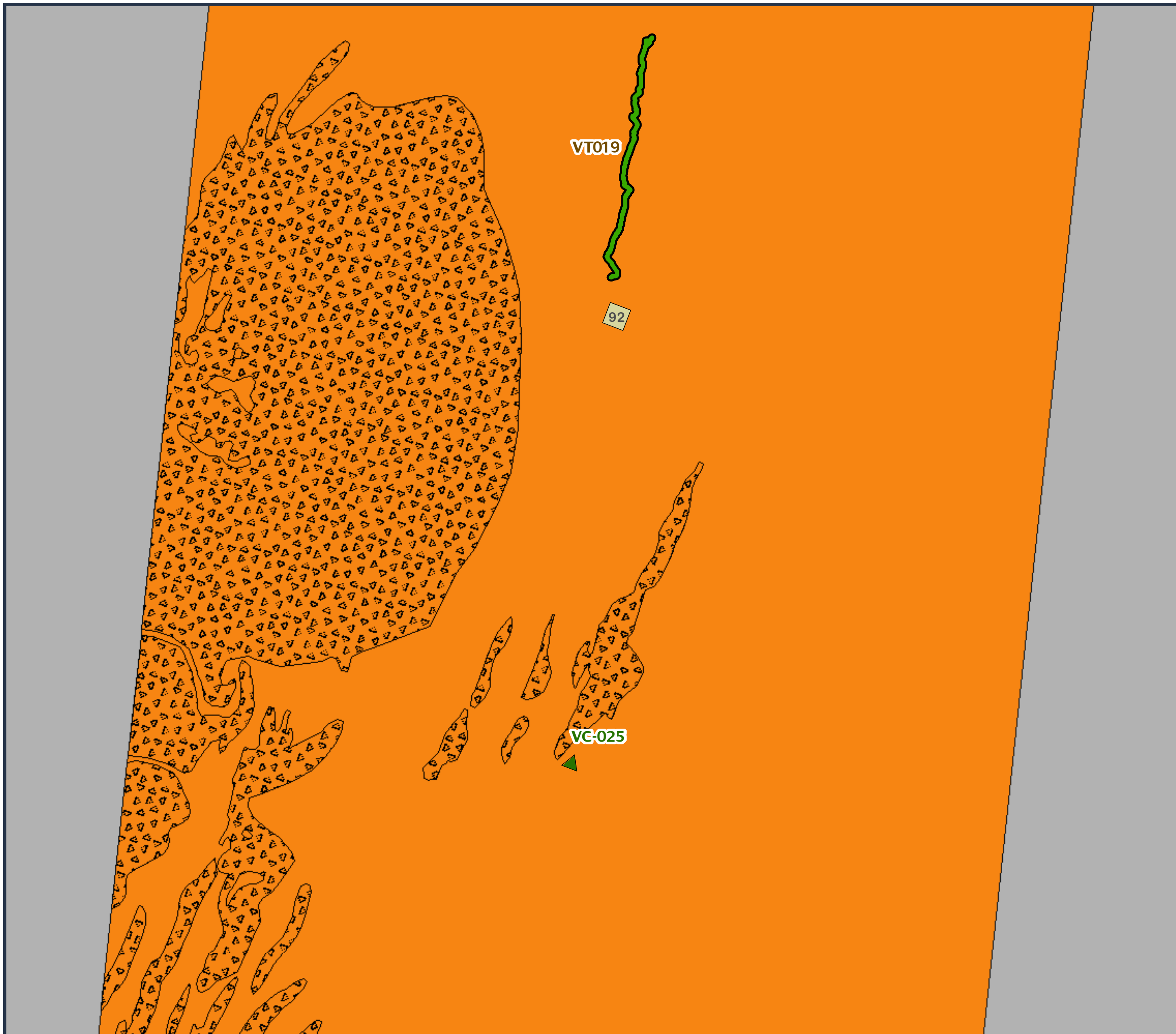
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

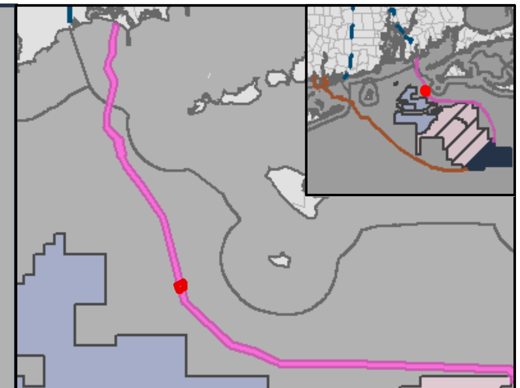
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

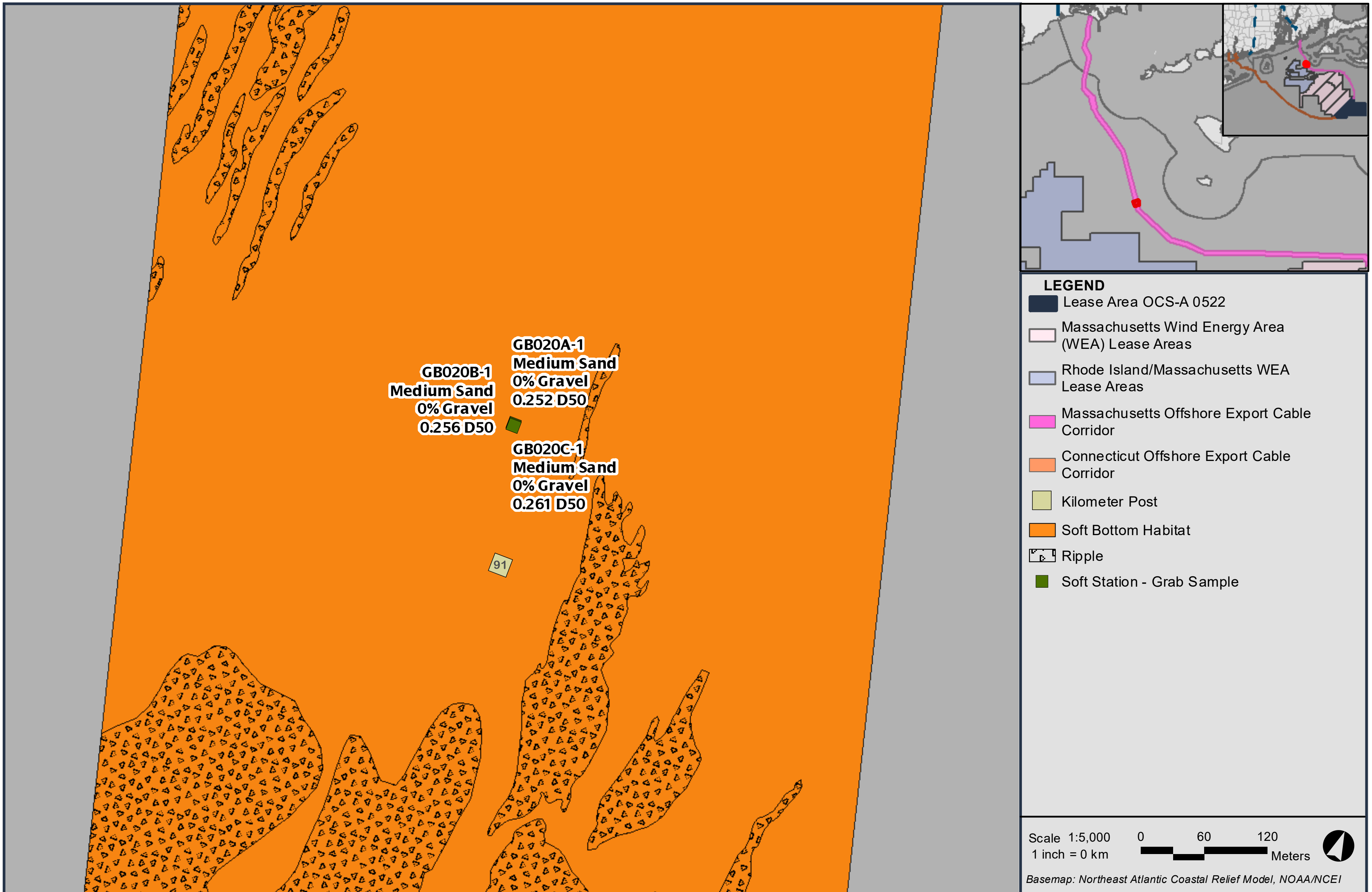
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

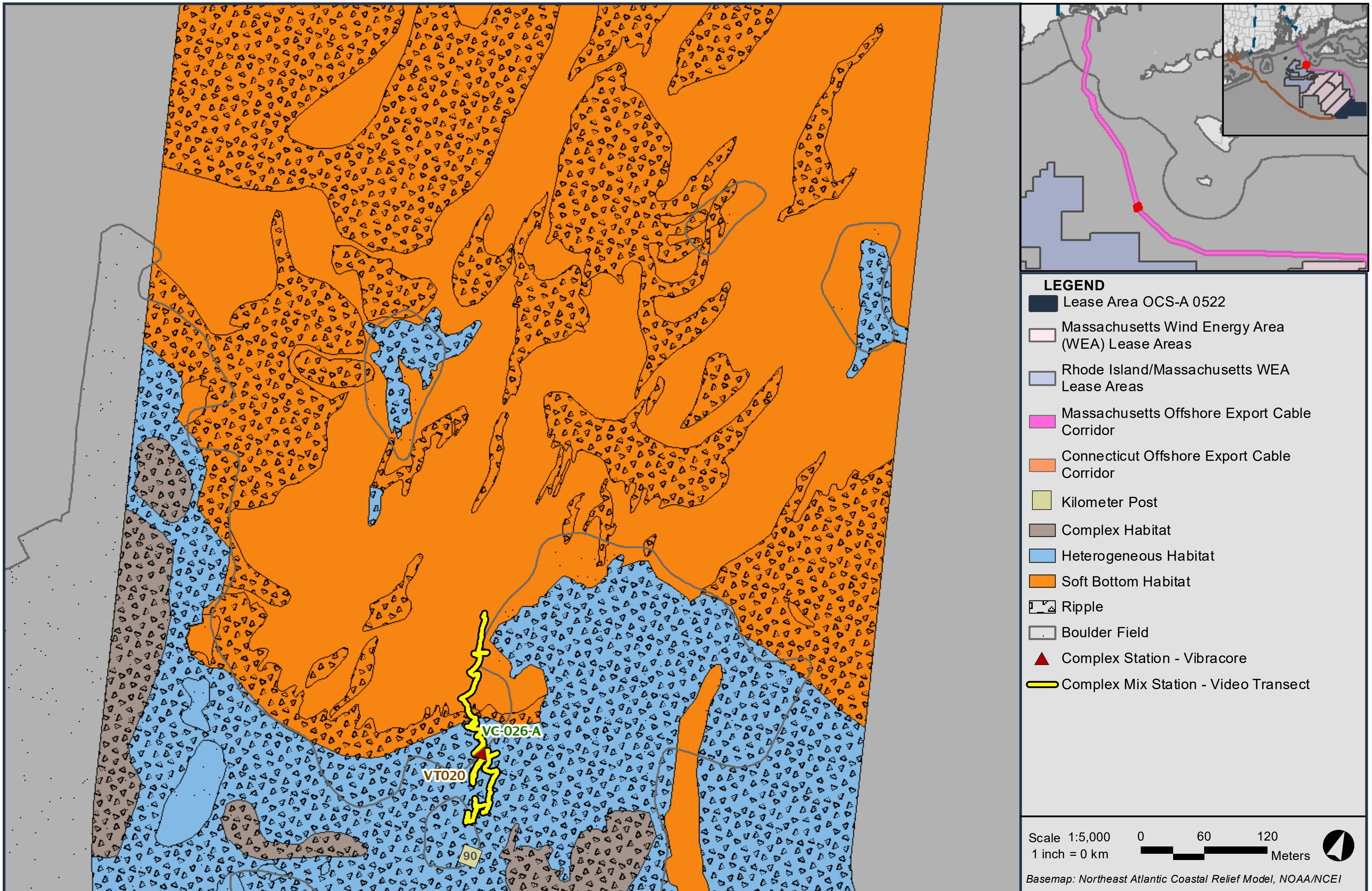
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



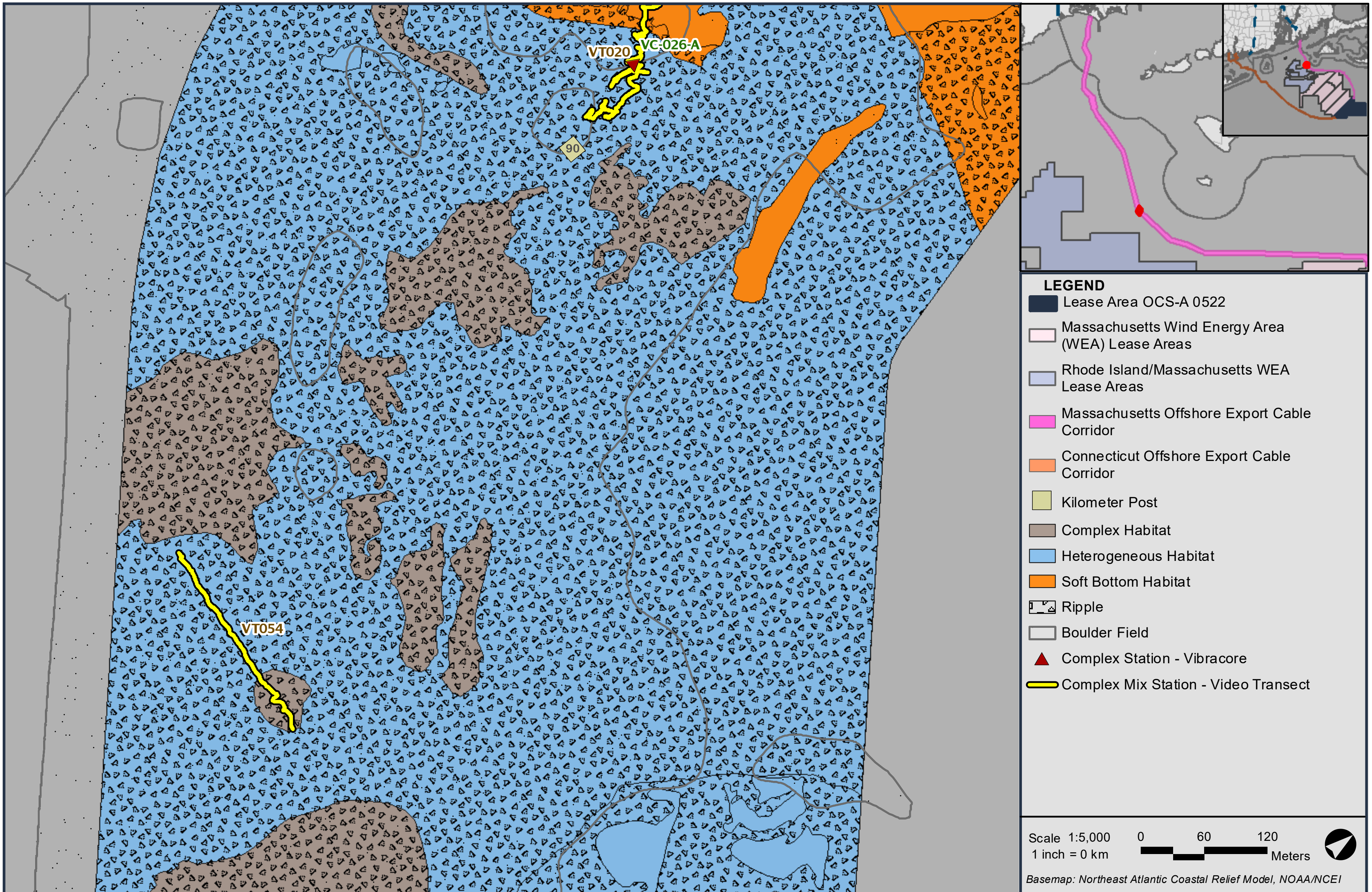
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



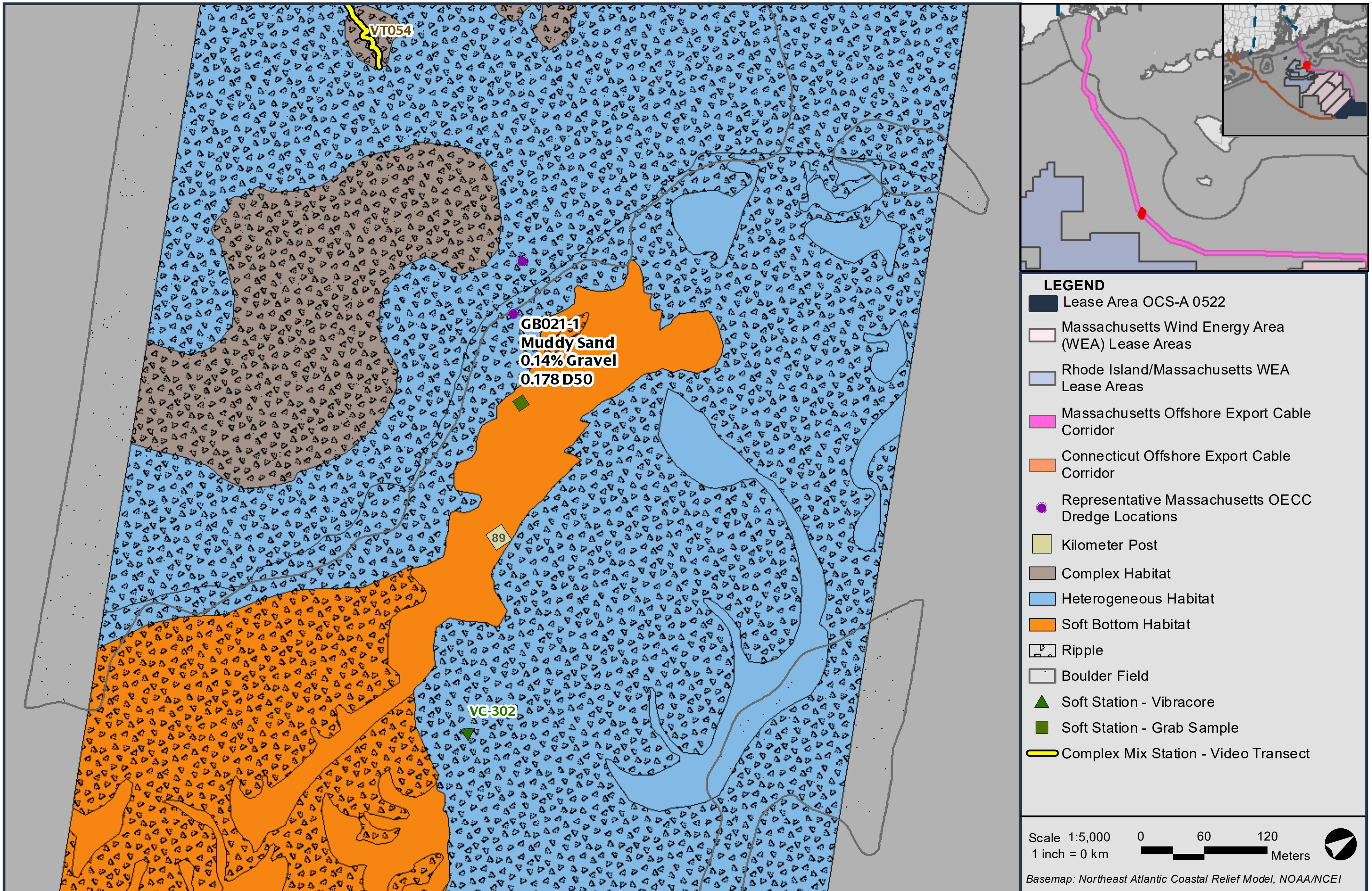
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

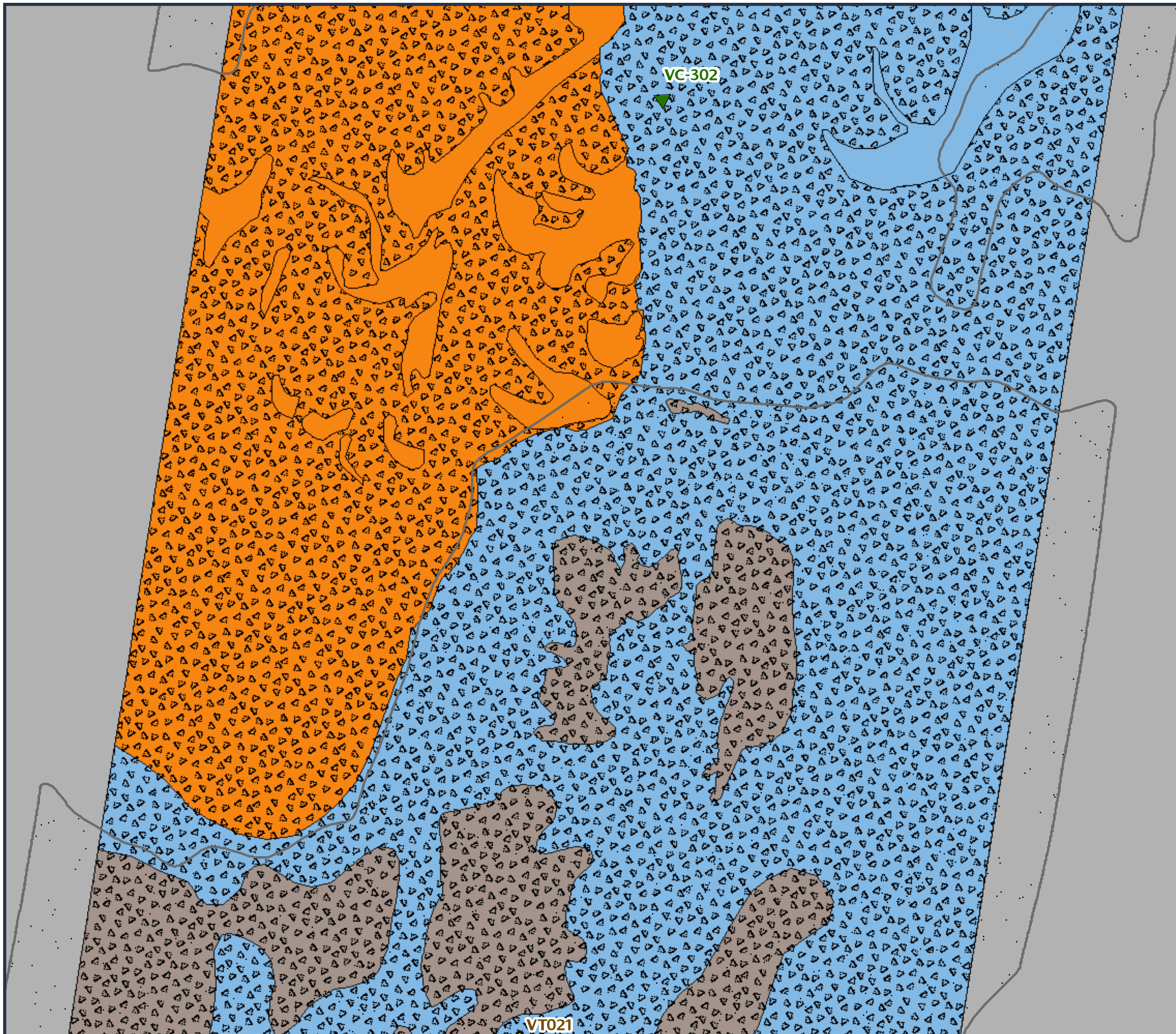
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Representative Massachusetts OECC Dredge Locations
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Boulder Field
- Soft Station - Vibracore
- Soft Station - Grab Sample
- Complex Mix Station - Video Transect

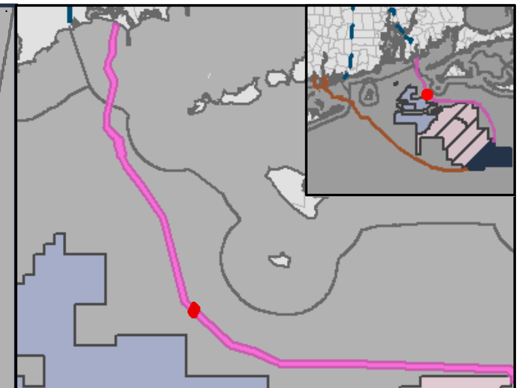
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





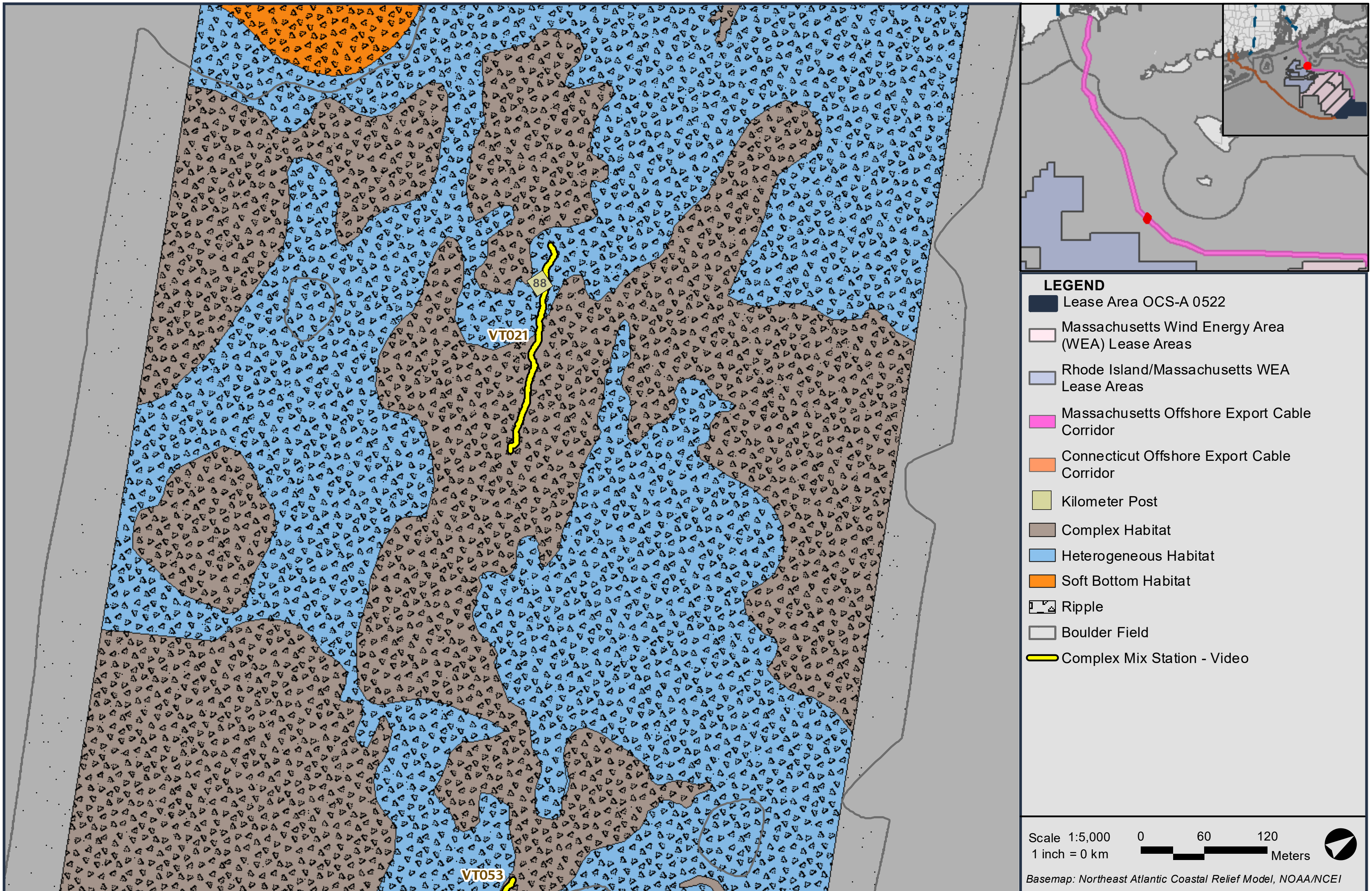
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Boulder Field
- Soft Station - Vibracore
- Complex Mix Station - Video

Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

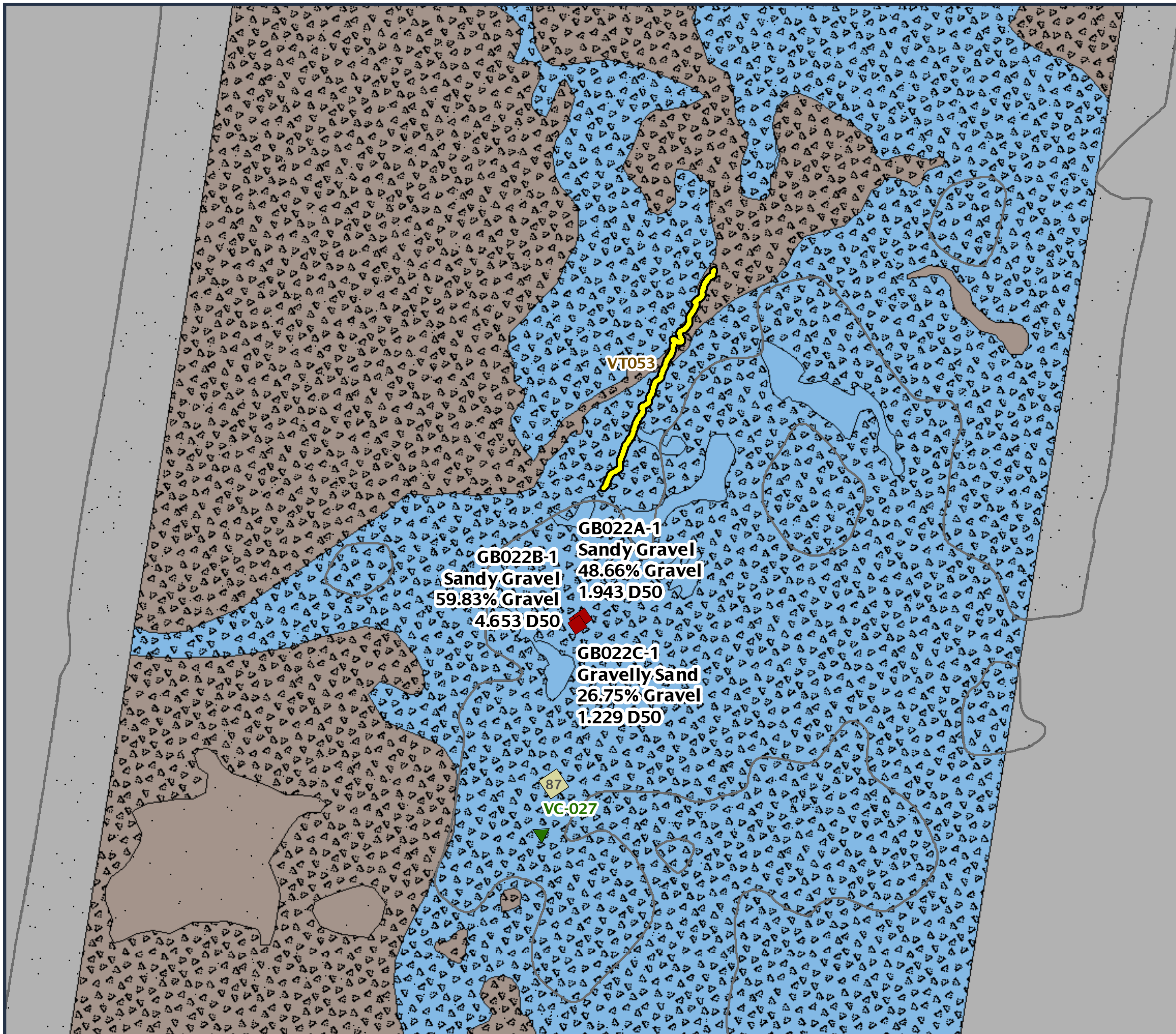
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

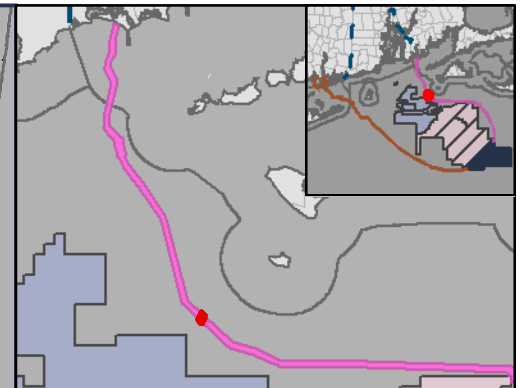
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Ripple
- Boulder Field
- Soft Station - Vibracore
- Complex Station - Grab Sample
- Complex Mix Station - Video Transect

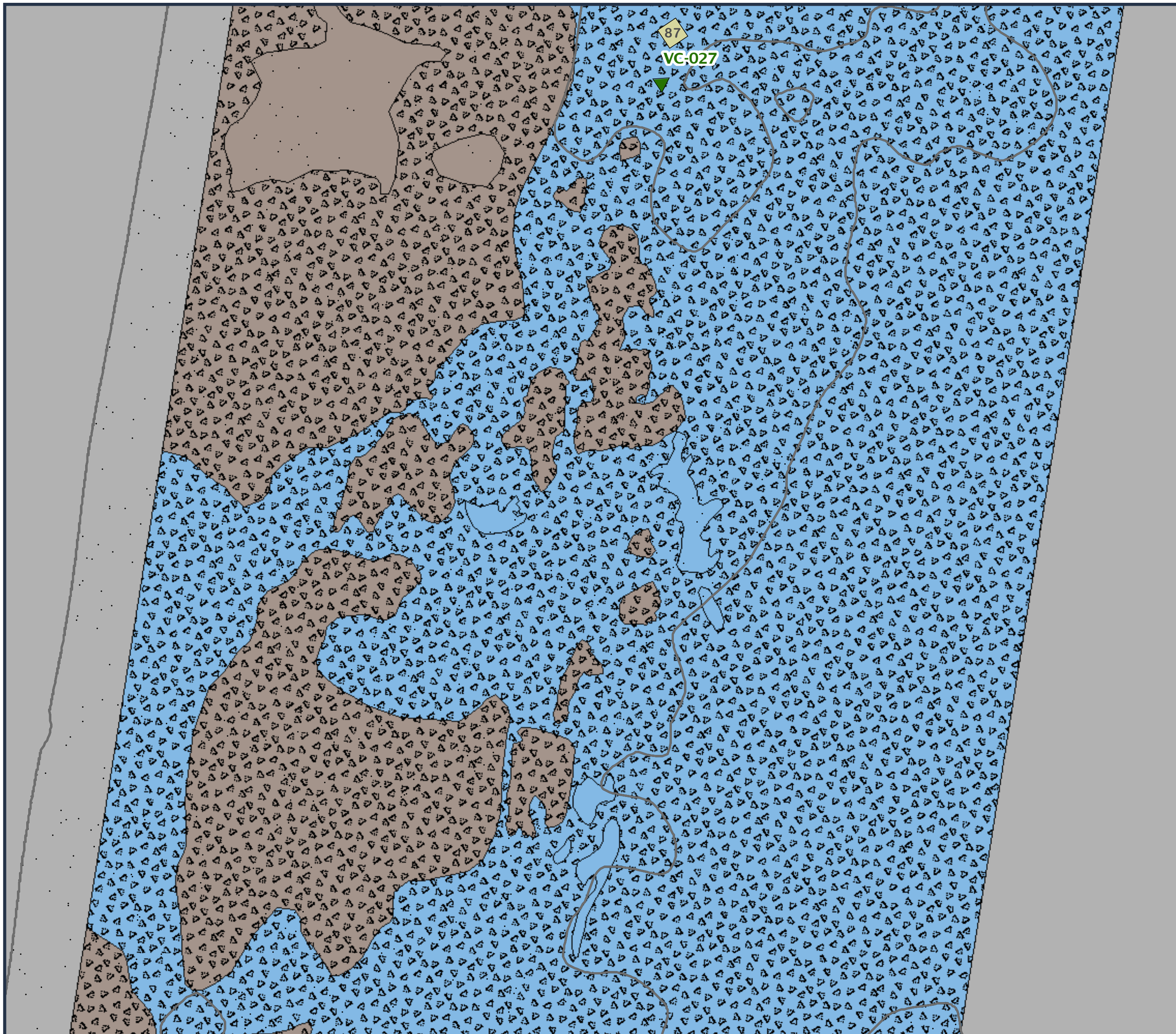
Scale 1:5,000
1 inch = 0 km

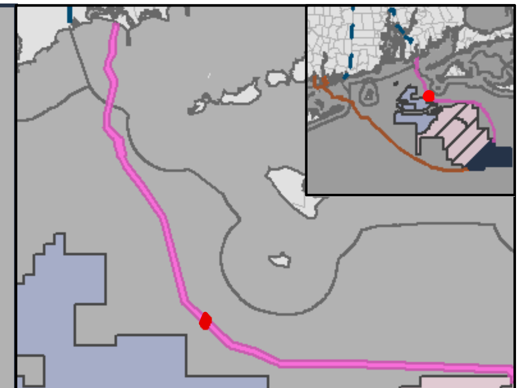
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Ripple
- Boulder Field
- Soft Station - Vibracore

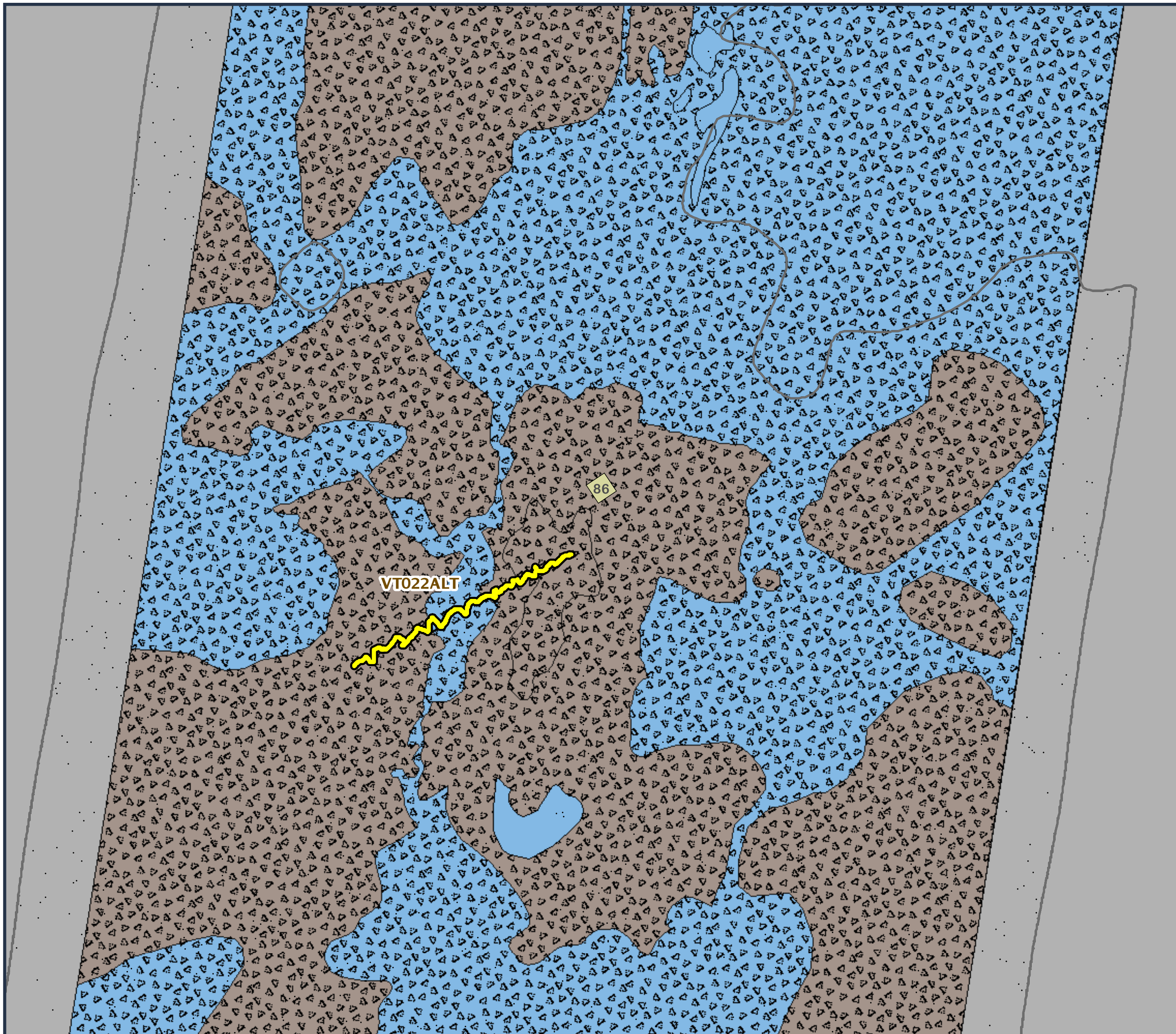
Scale 1:5,000
1 inch = 0 km

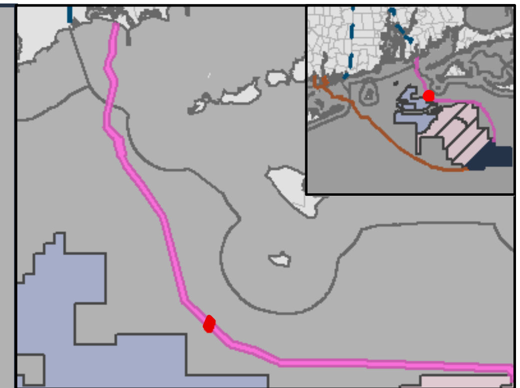
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Ripple
- Boulder Field
- Complex Mix Station - Video Transect

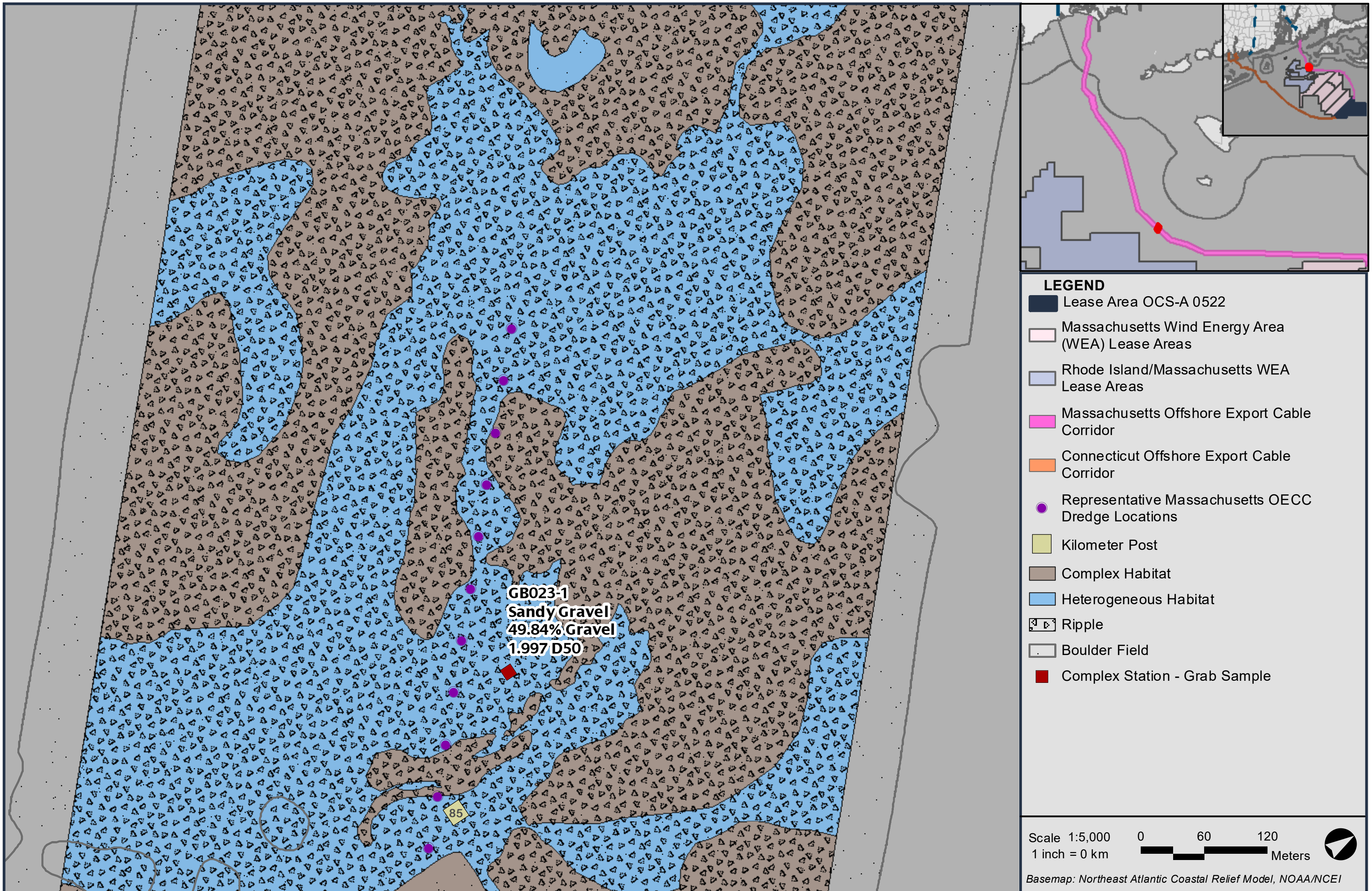
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

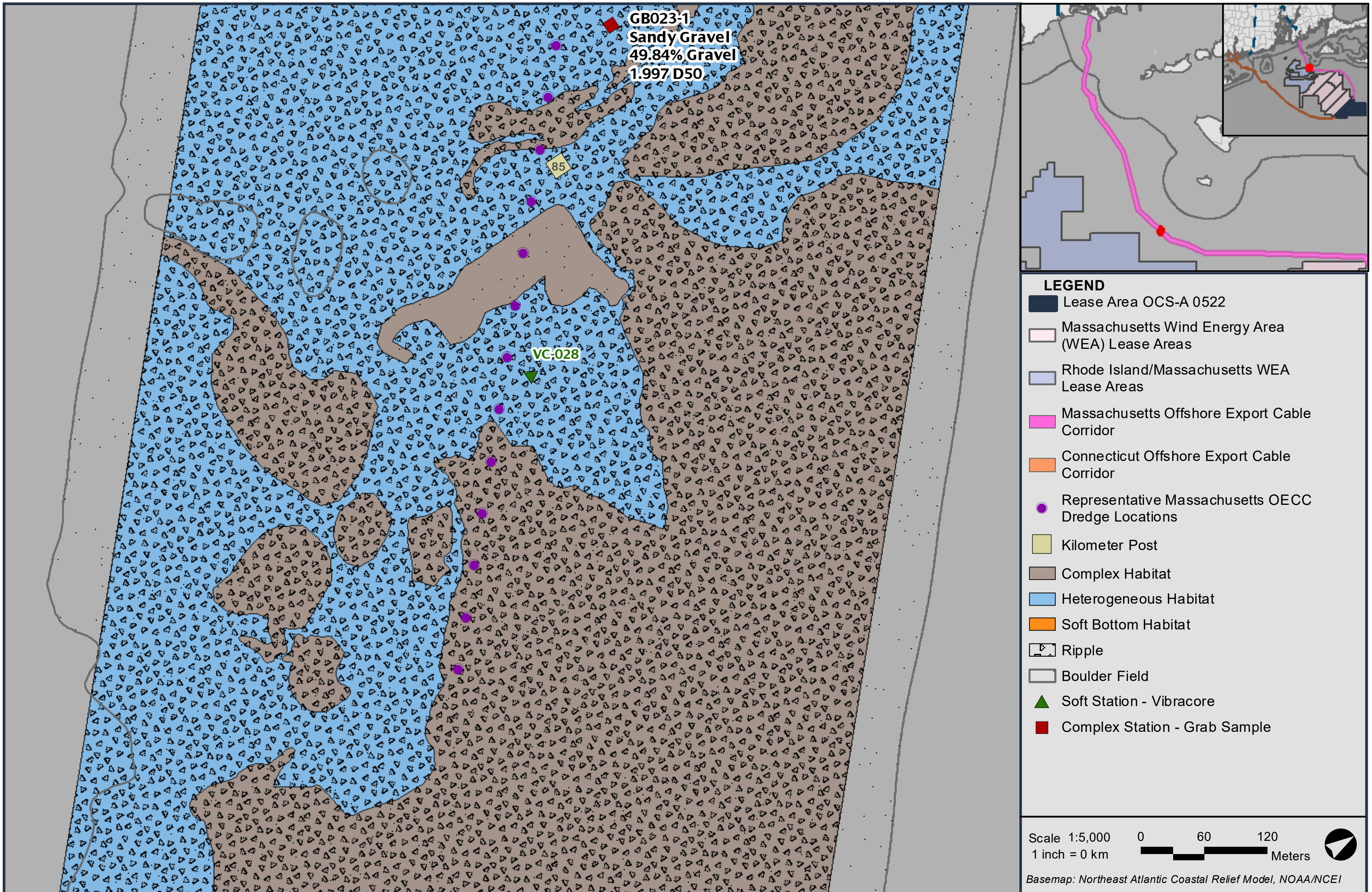
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

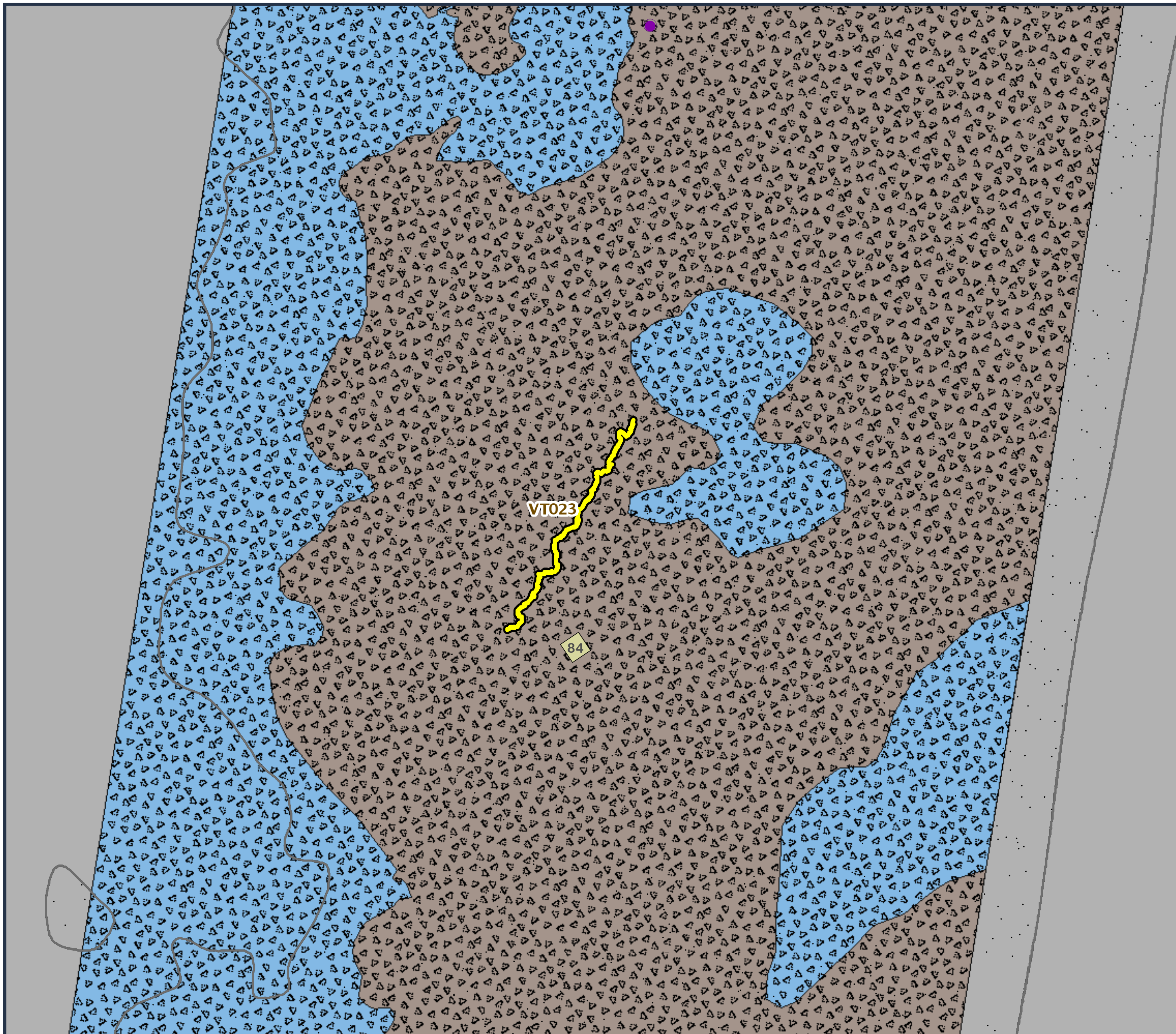
VINEYARD NORTHEAST
VINEYARD OFFSHORE

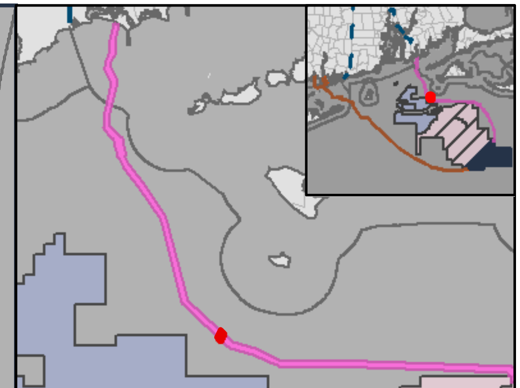


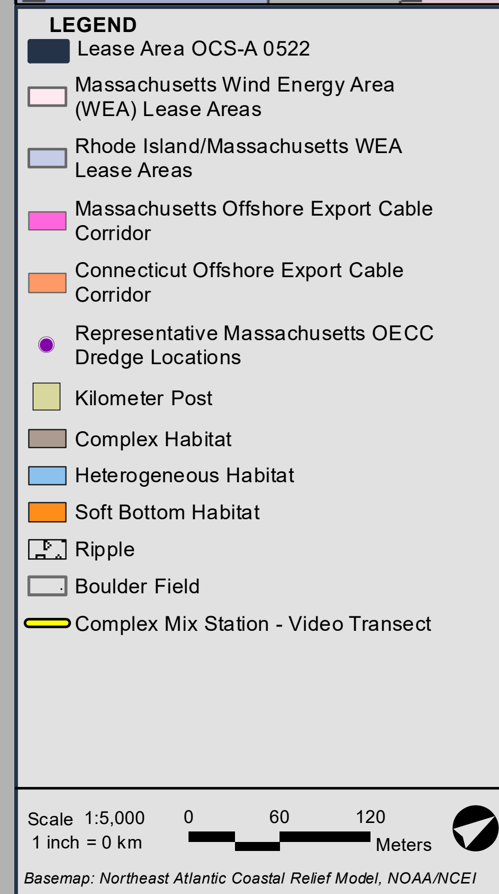
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE

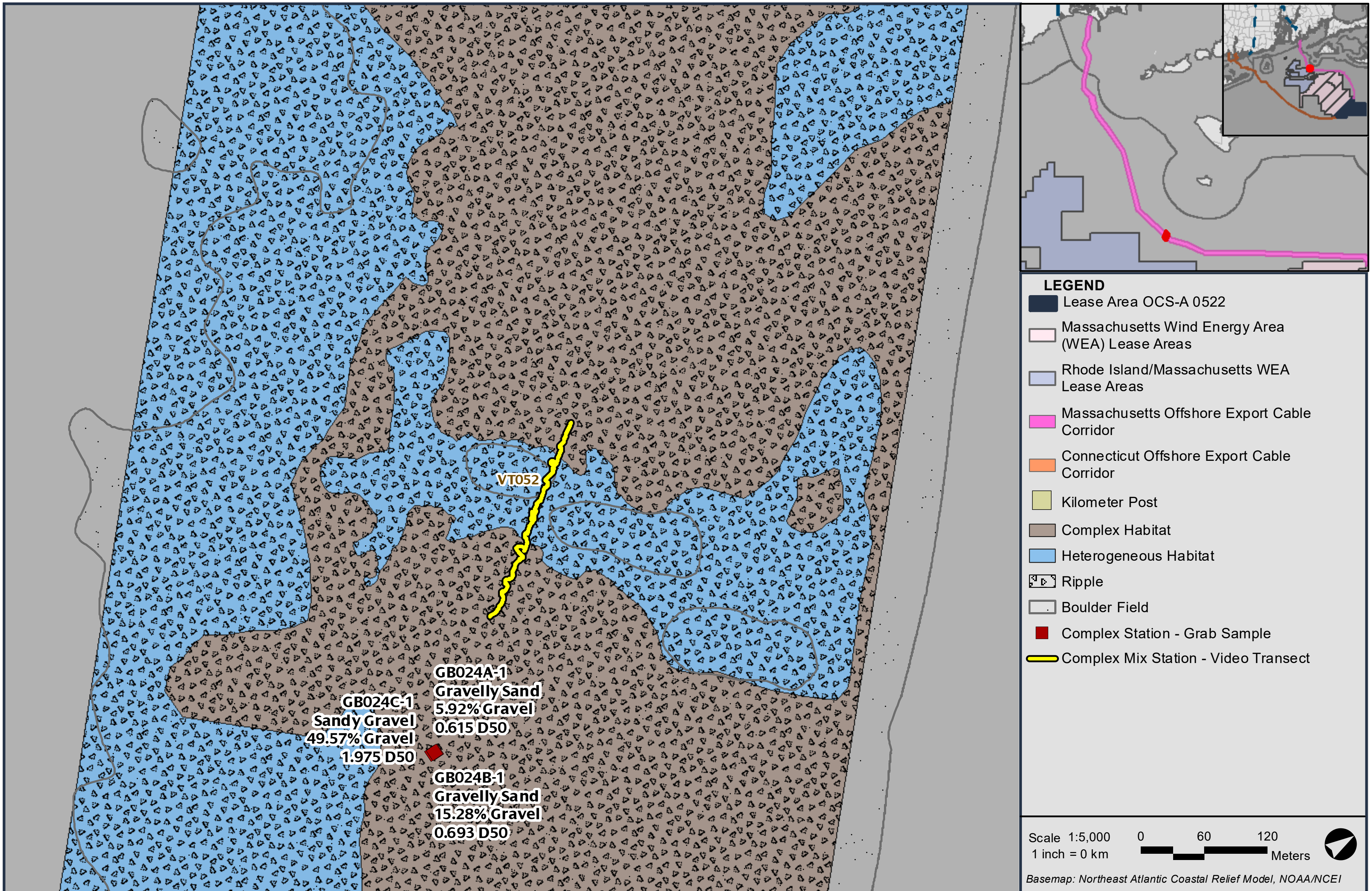






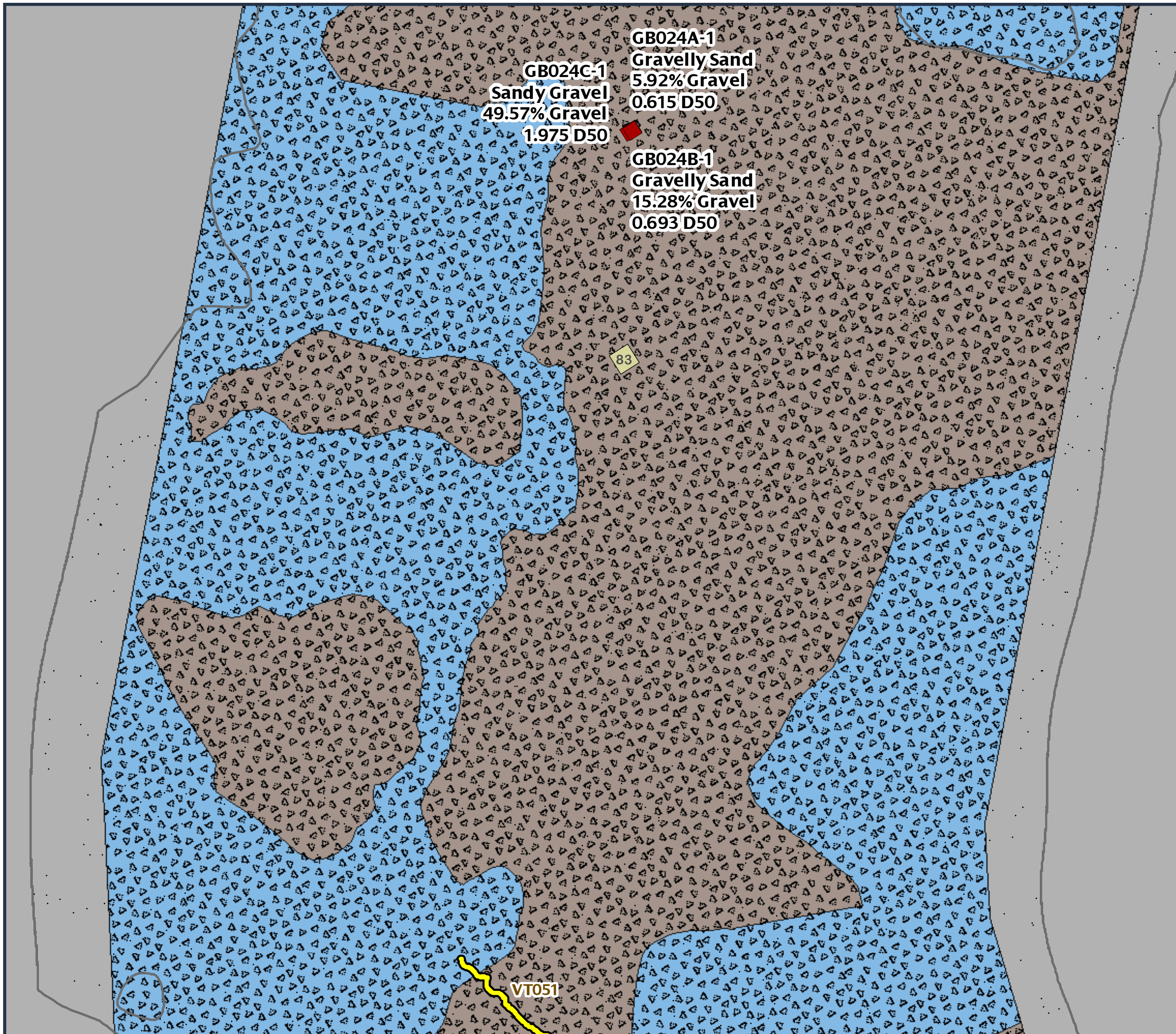
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

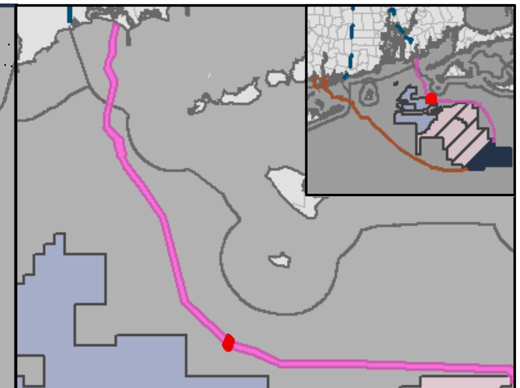
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



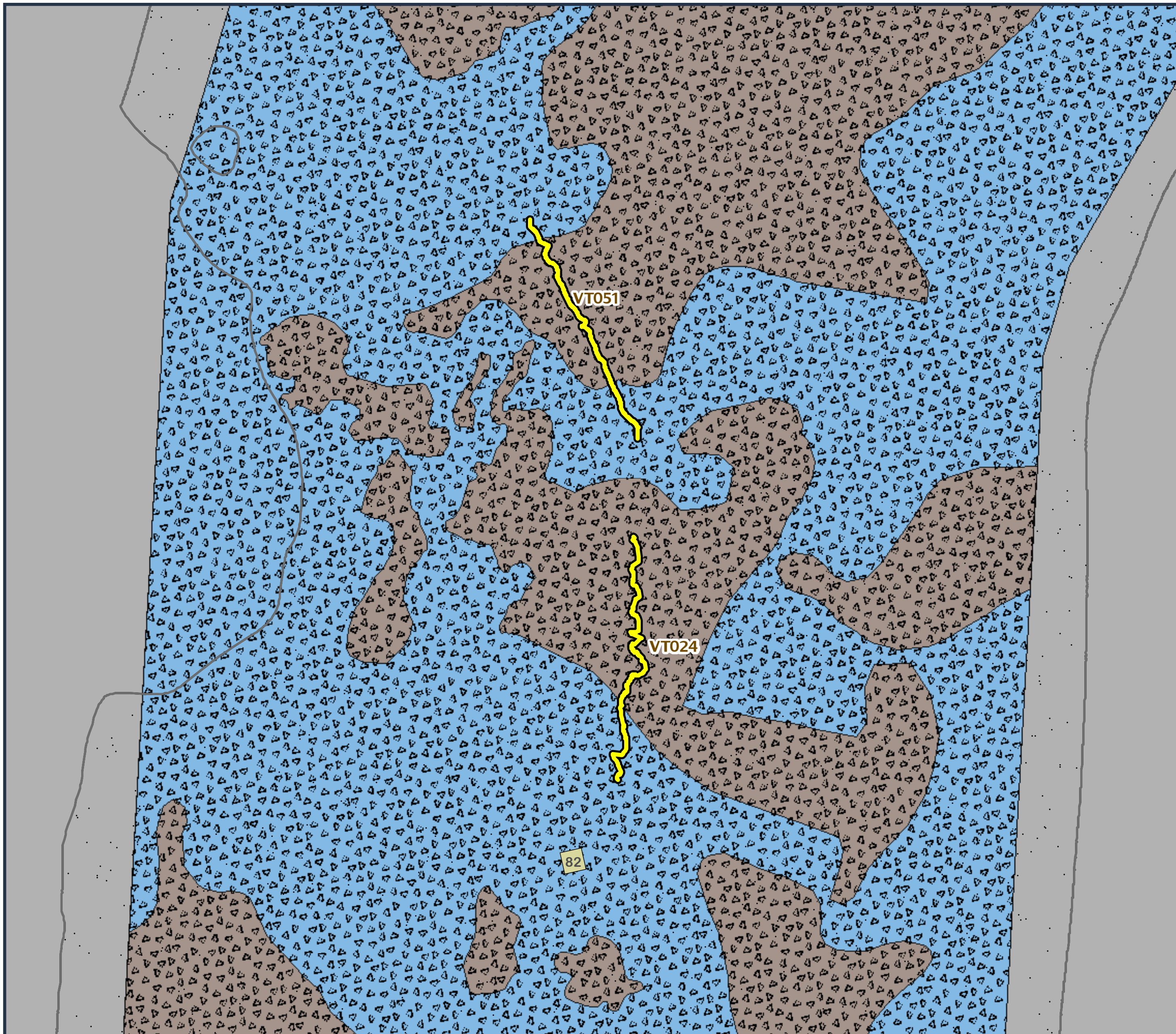


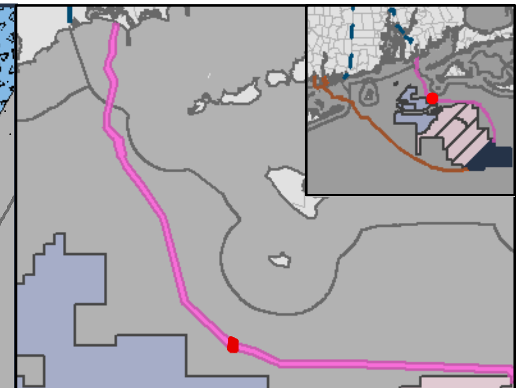
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Ripple
- Boulder Field
- Complex Station - Grab Sample
- Complex Mix Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Ripple
- Boulder Field
- Soft Station - Vibracore
- Complex Mix Station - Video Transect

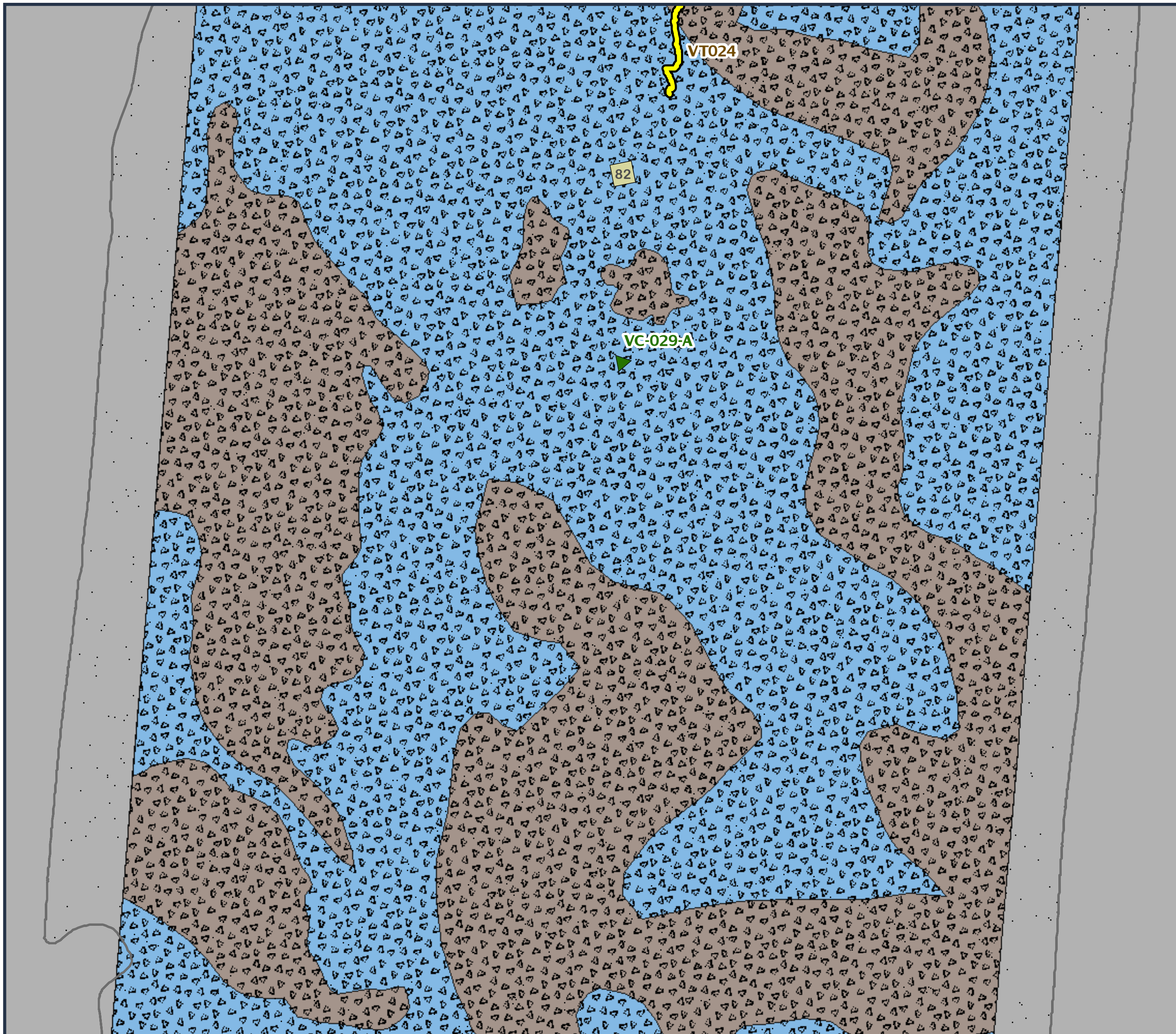
Scale 1:5,000
1 inch = 0 km

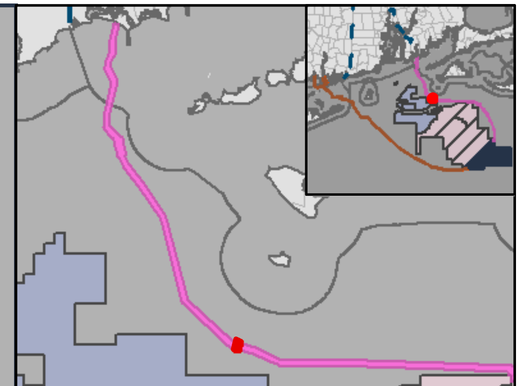
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





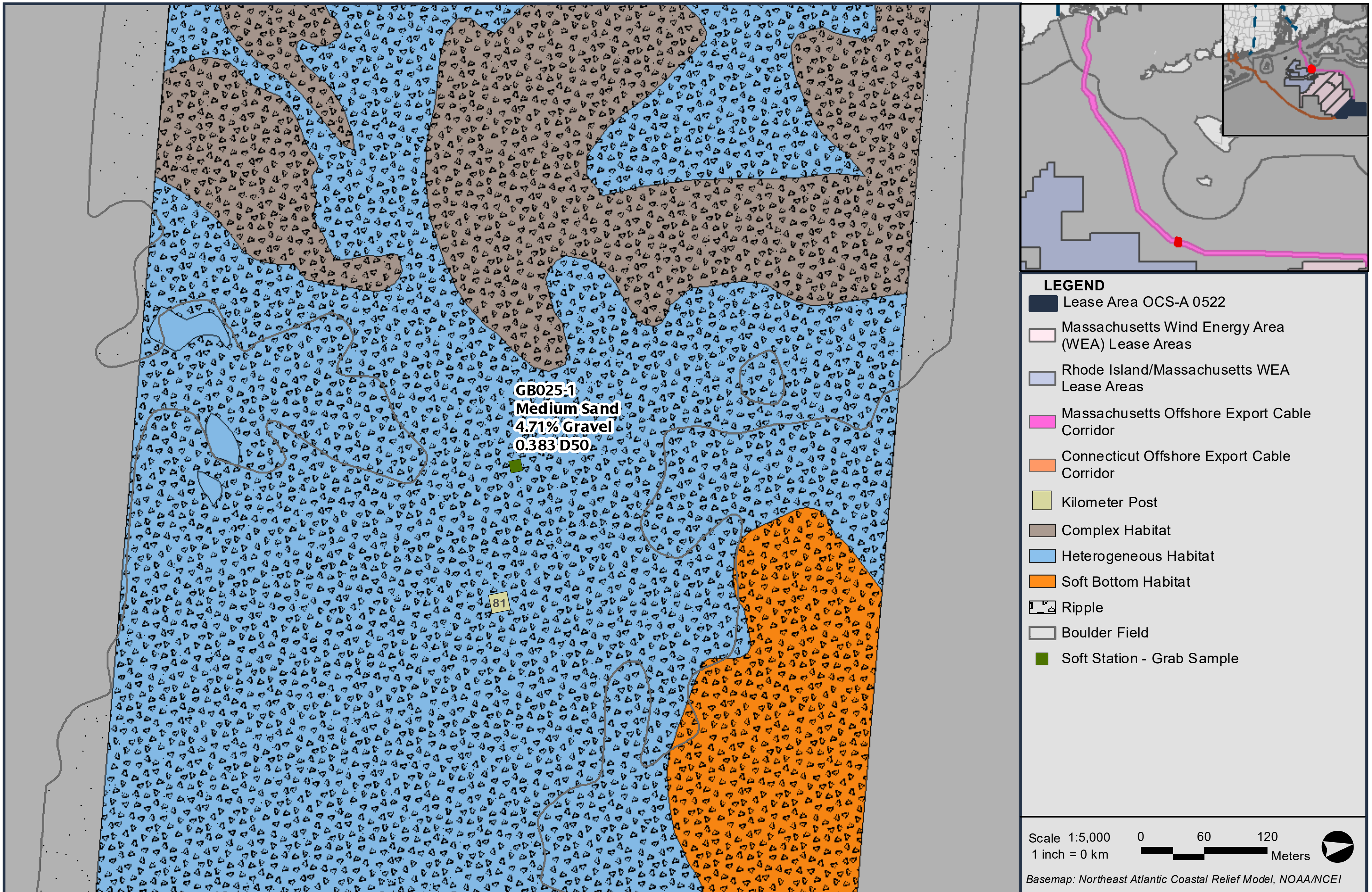
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Ripple
- Boulder Field
- Soft Station - Vibracore
- Complex Mix Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

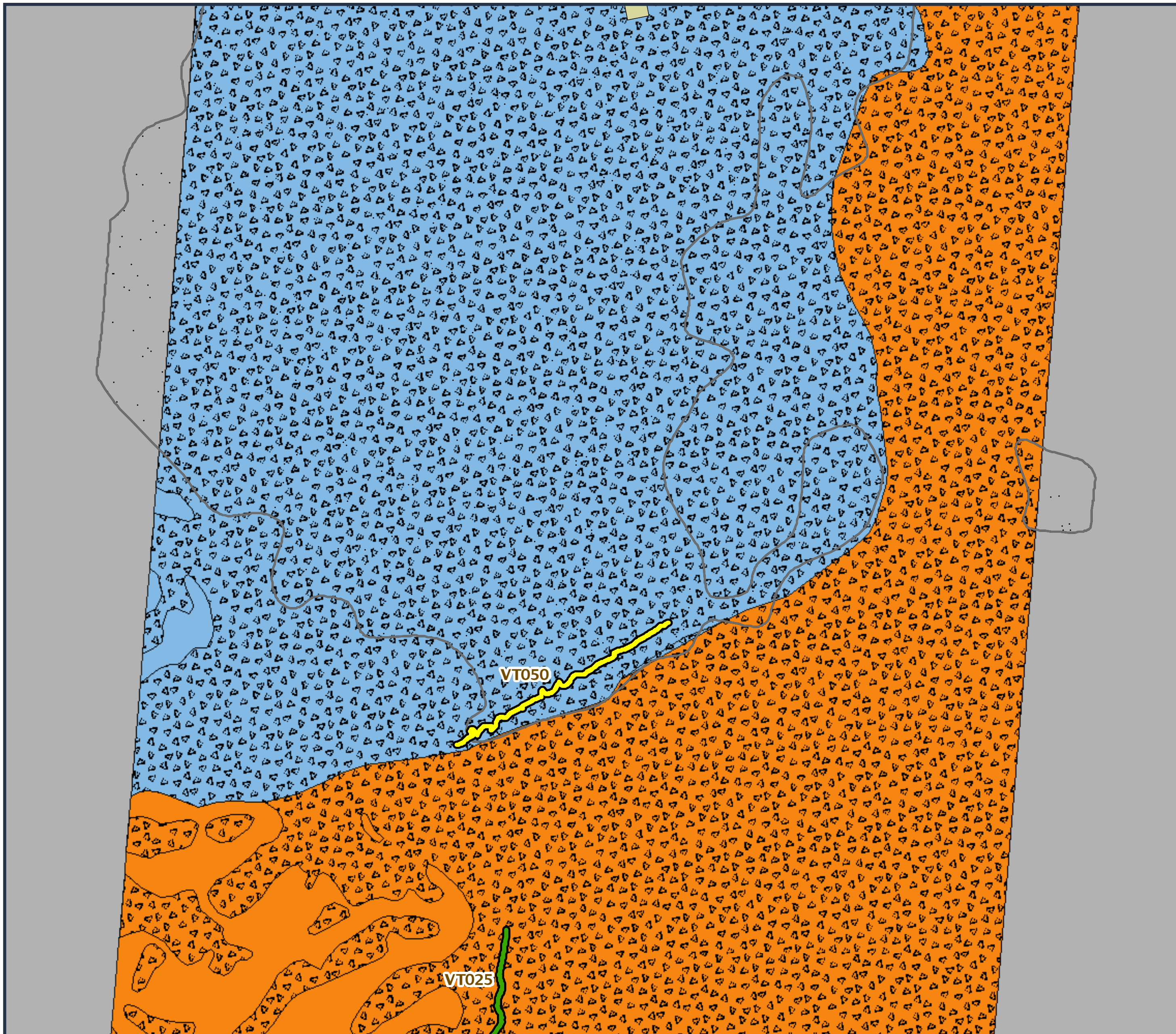
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

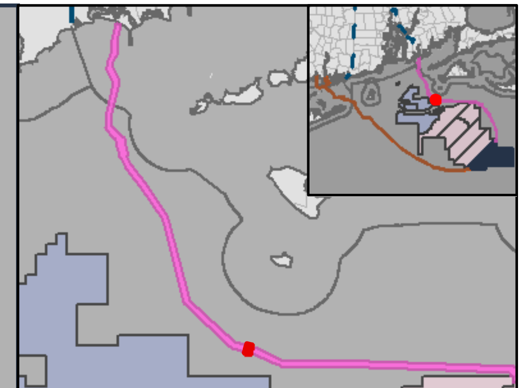
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Boulder Field
- Complex Mix Station - Video Transect
- Soft Bottom Station - Video Transect

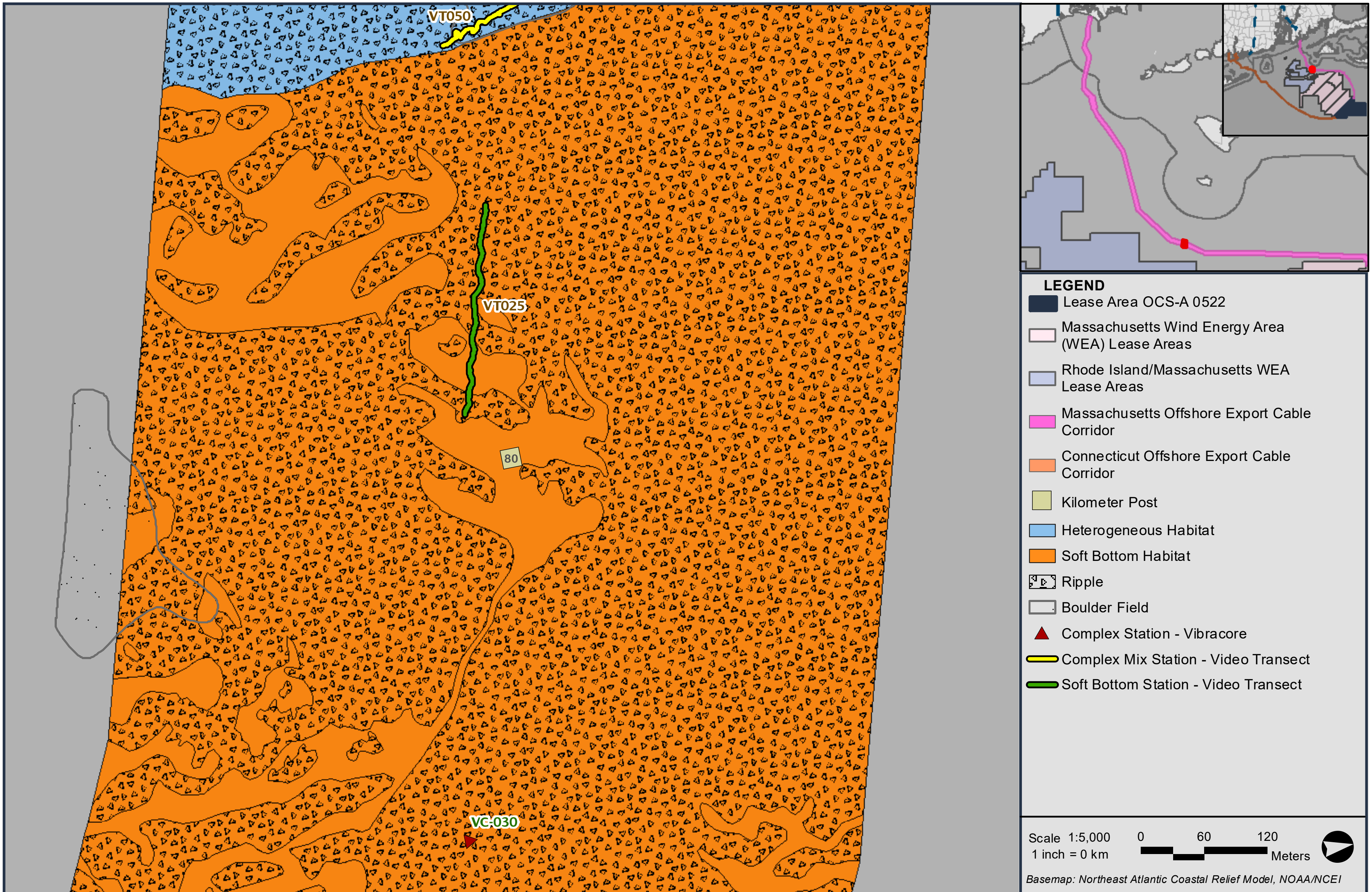
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

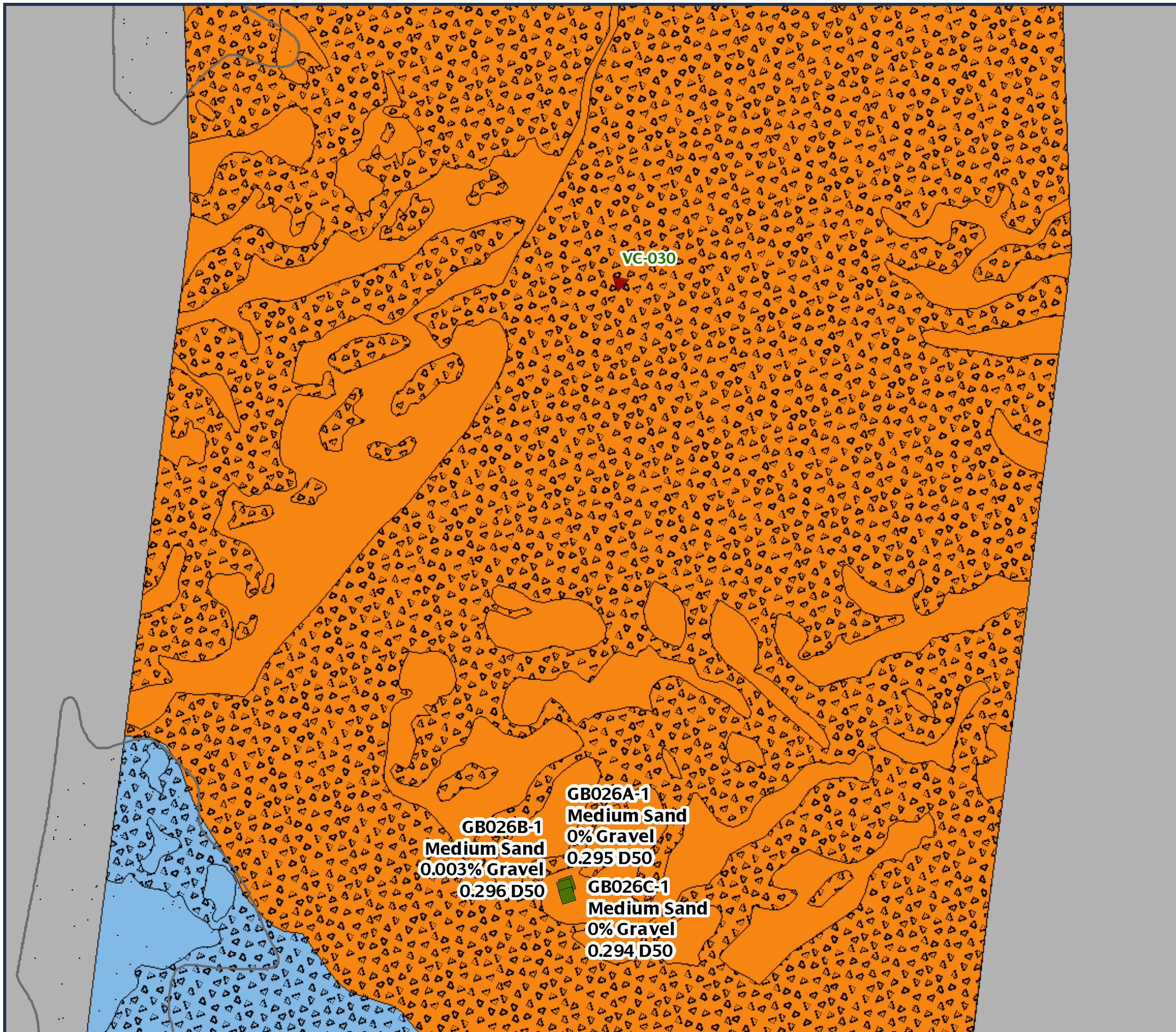
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

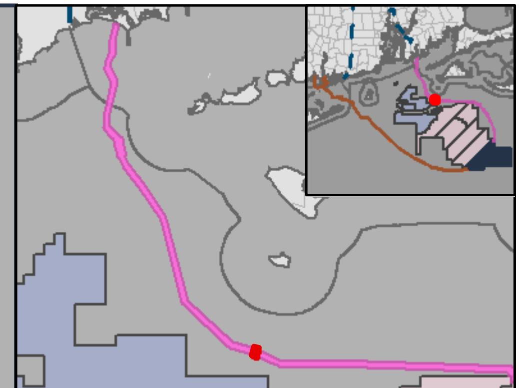
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Boulder Field
- Complex Station - Vibracore
- Soft Station - Grab Sample

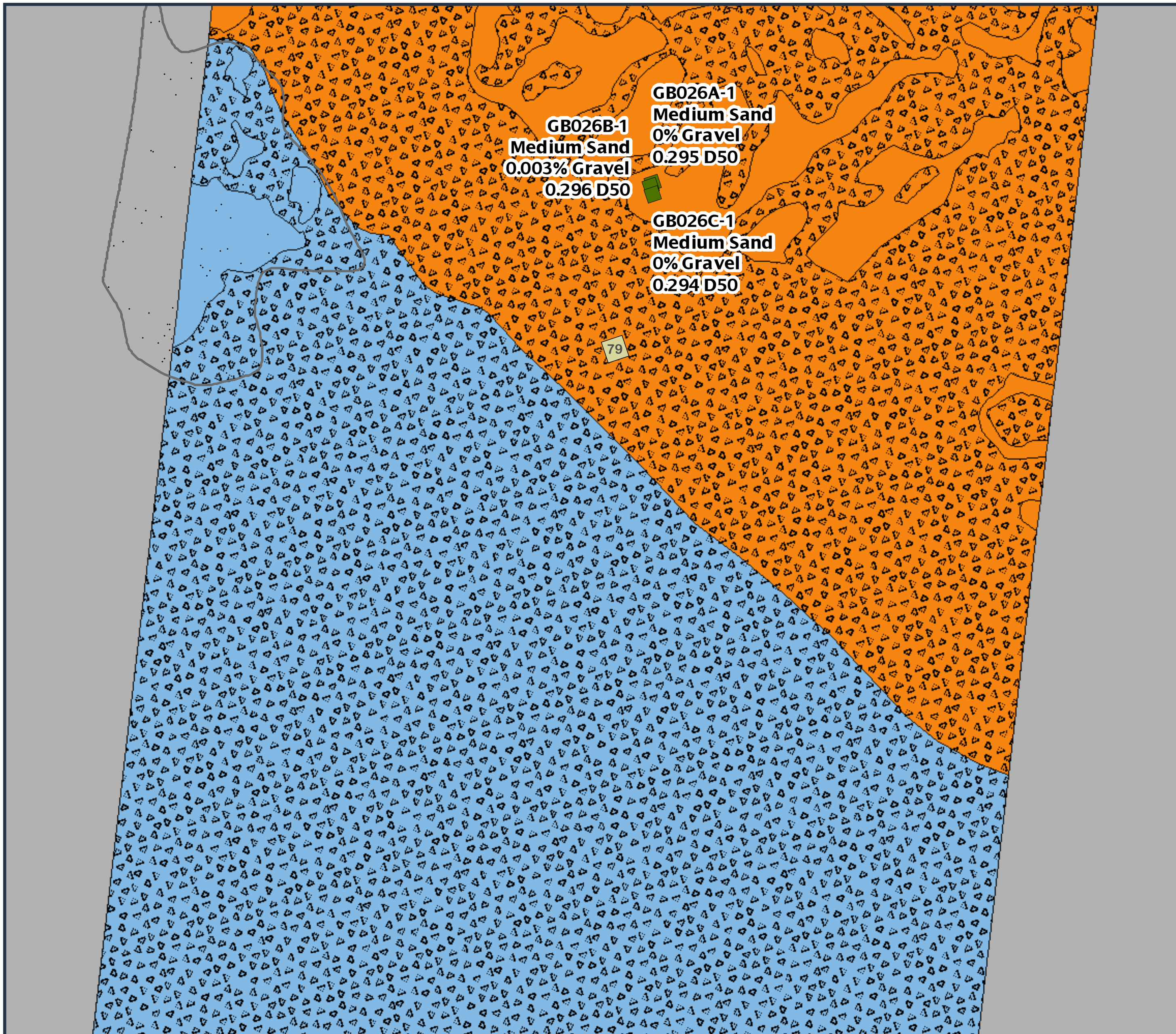
Scale 1:5,000
1 inch = 0 km

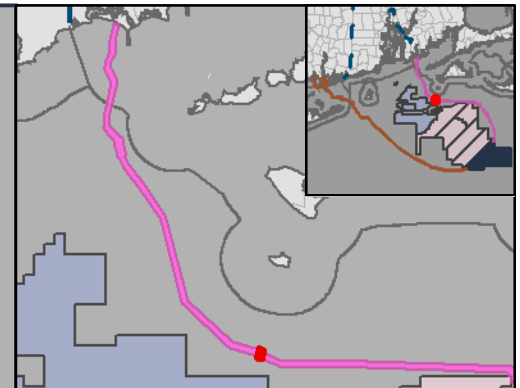
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Boulder Field
- Soft Station - Grab Sample

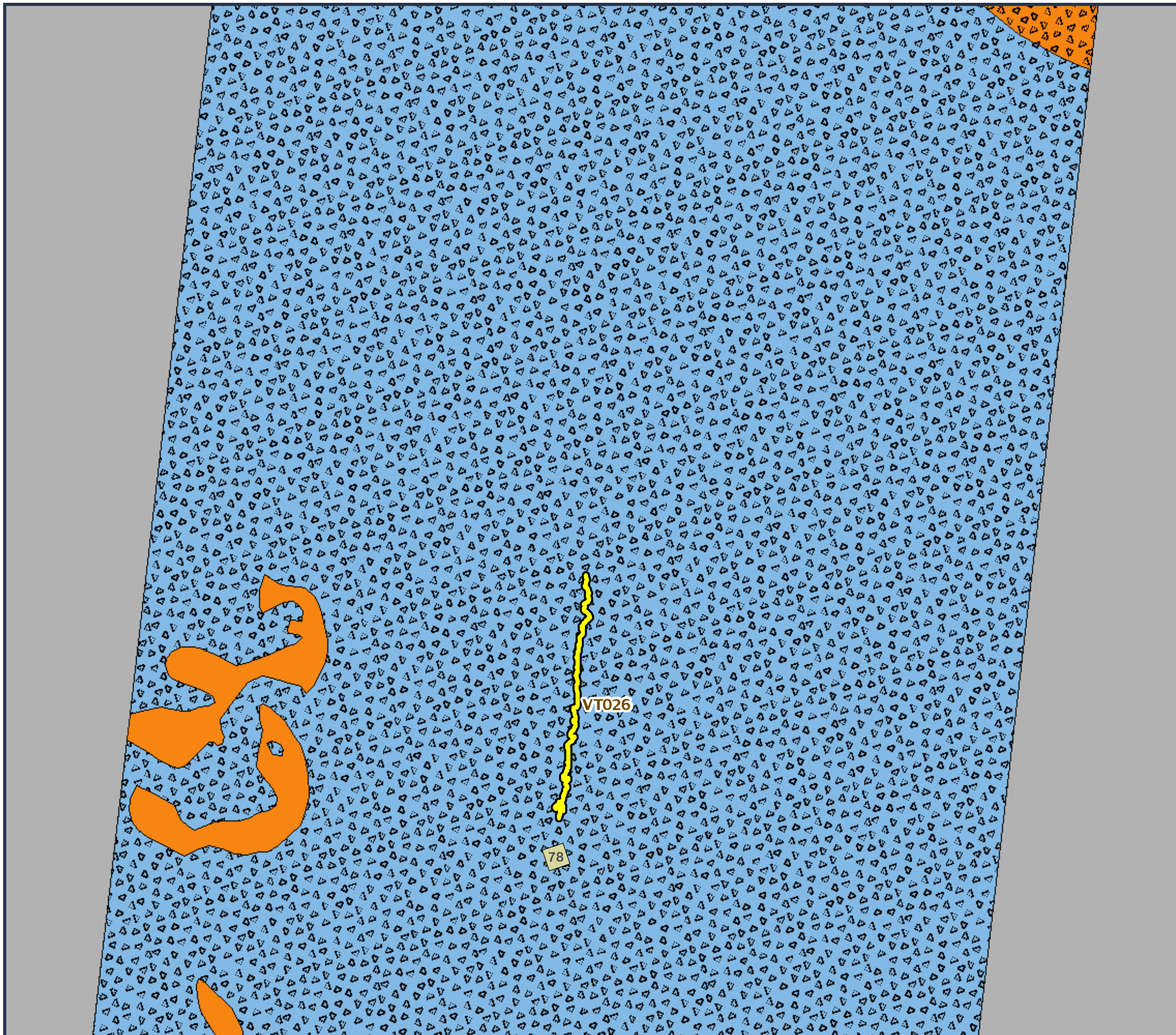
Scale 1:5,000
1 inch = 0 km

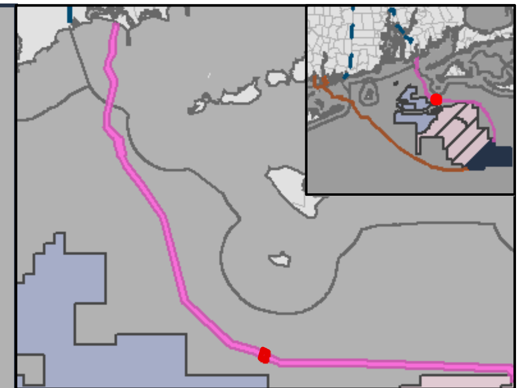
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

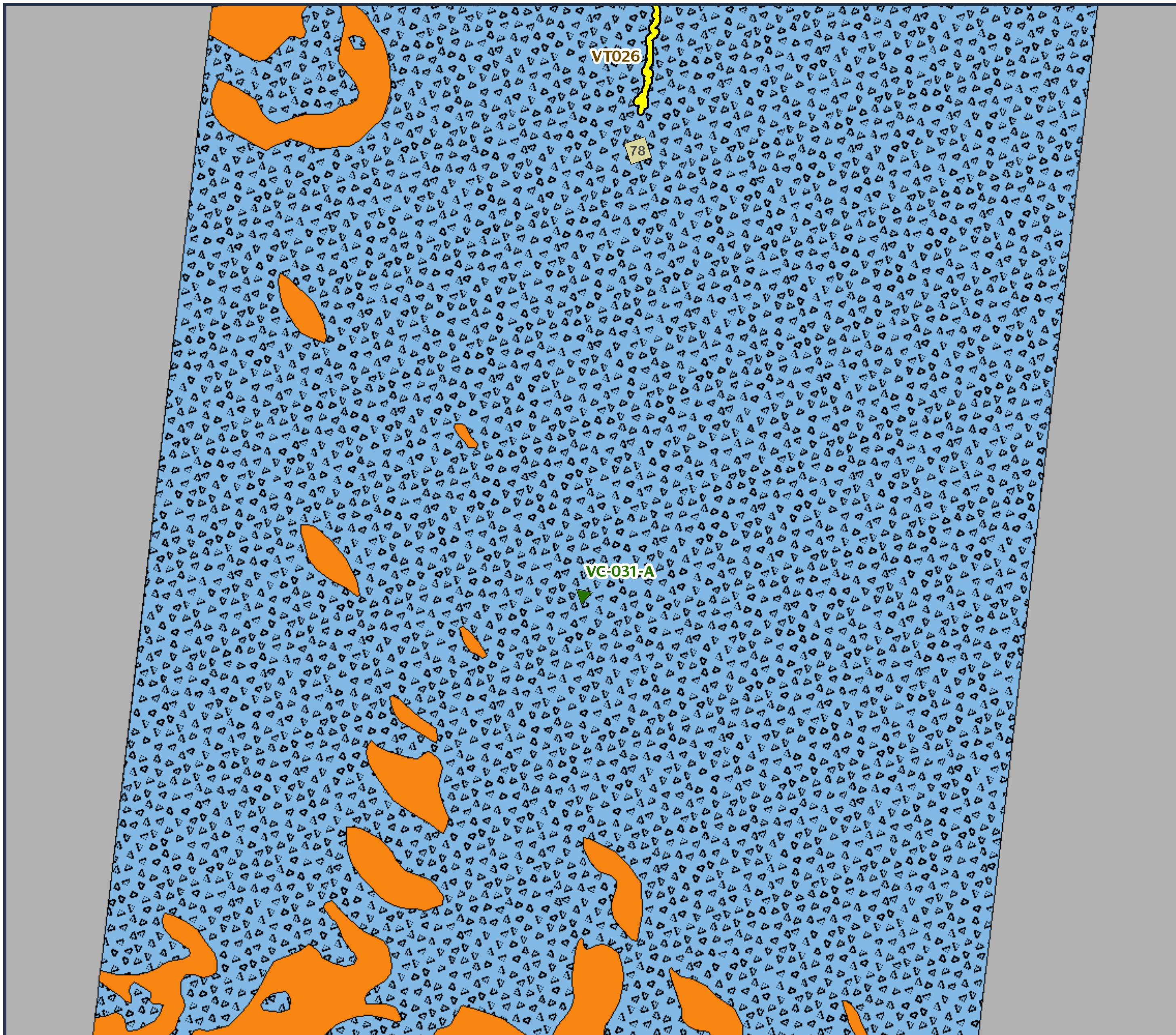
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Complex Mix Station - Video Transect

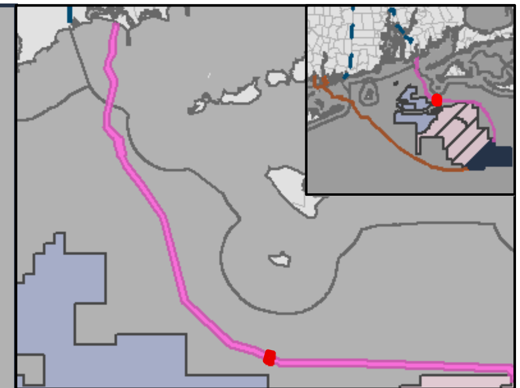
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore
- Complex Mix Station - Video Transect

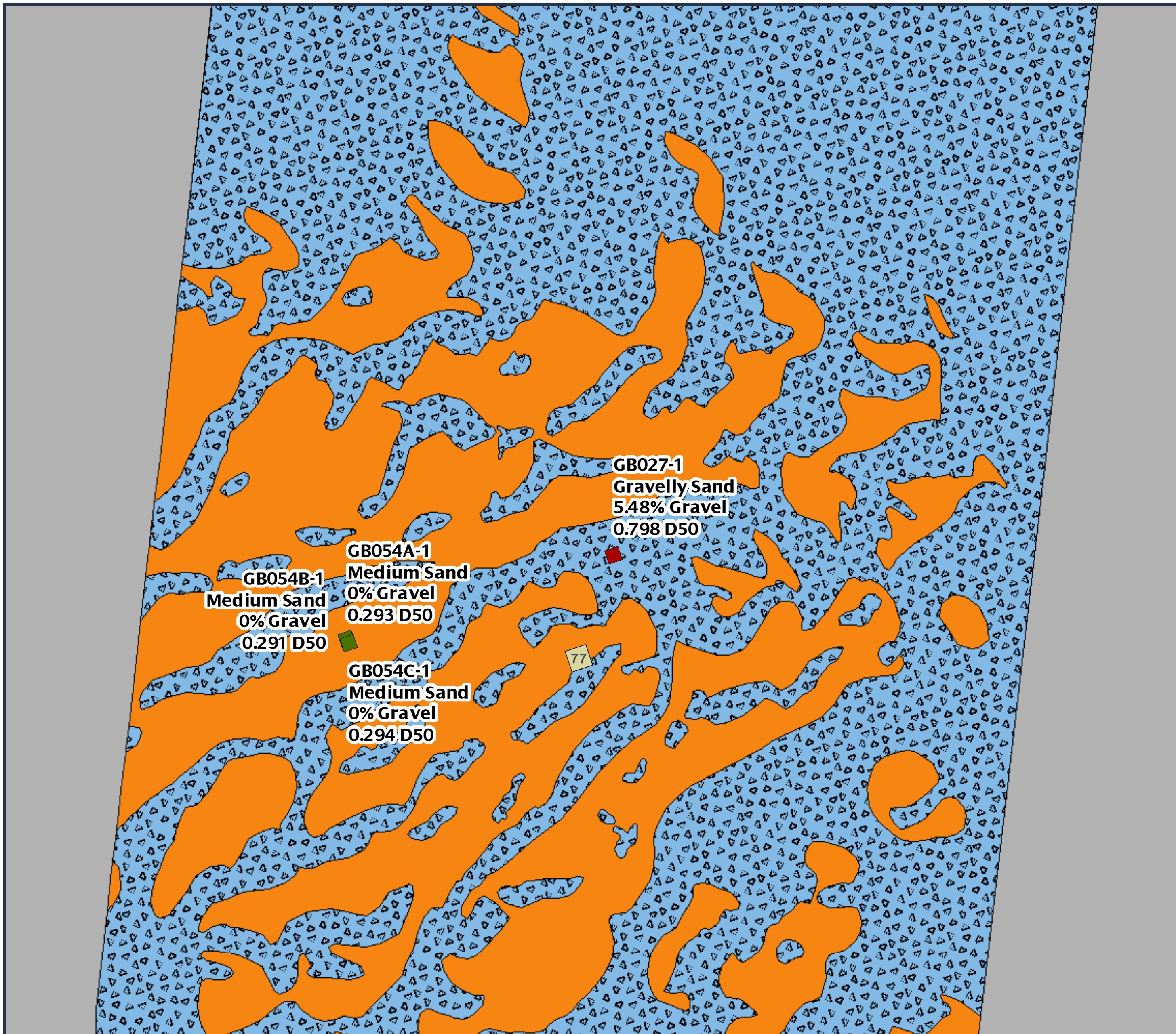
Scale 1:5,000
1 inch = 0 km

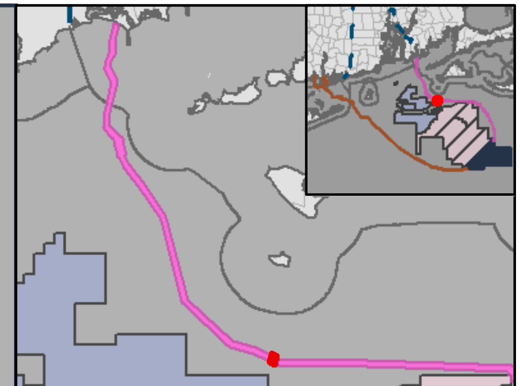
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

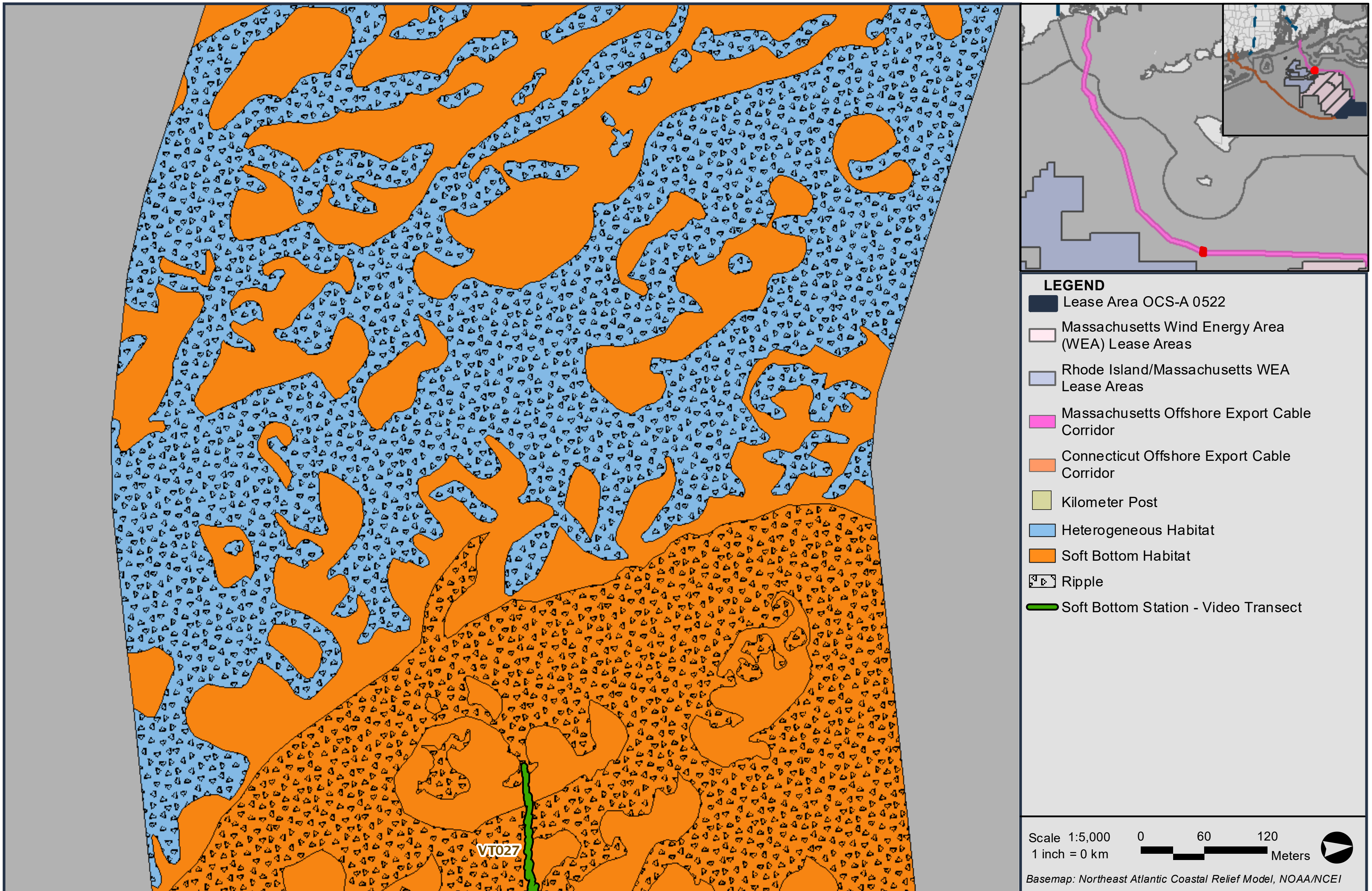
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Complex Station - Grab Sample
- Soft Station - Grab Sample

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

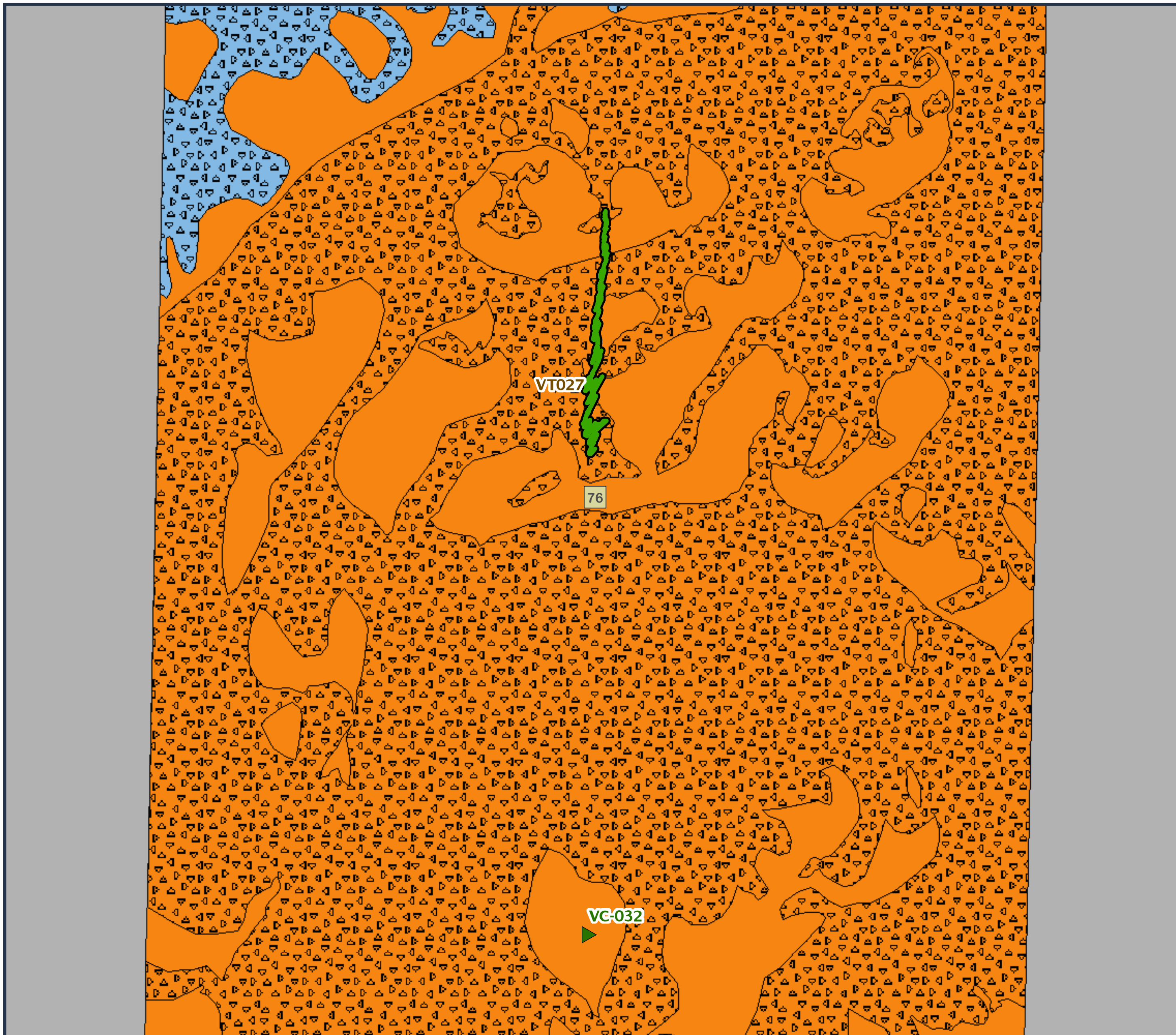
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

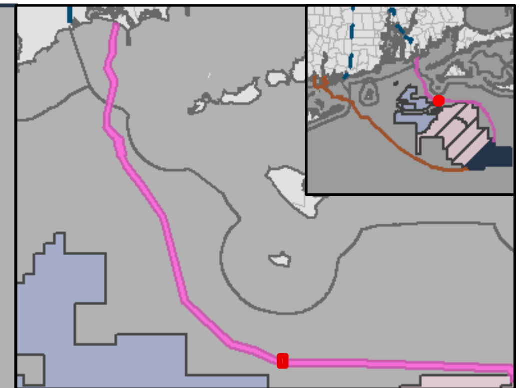
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

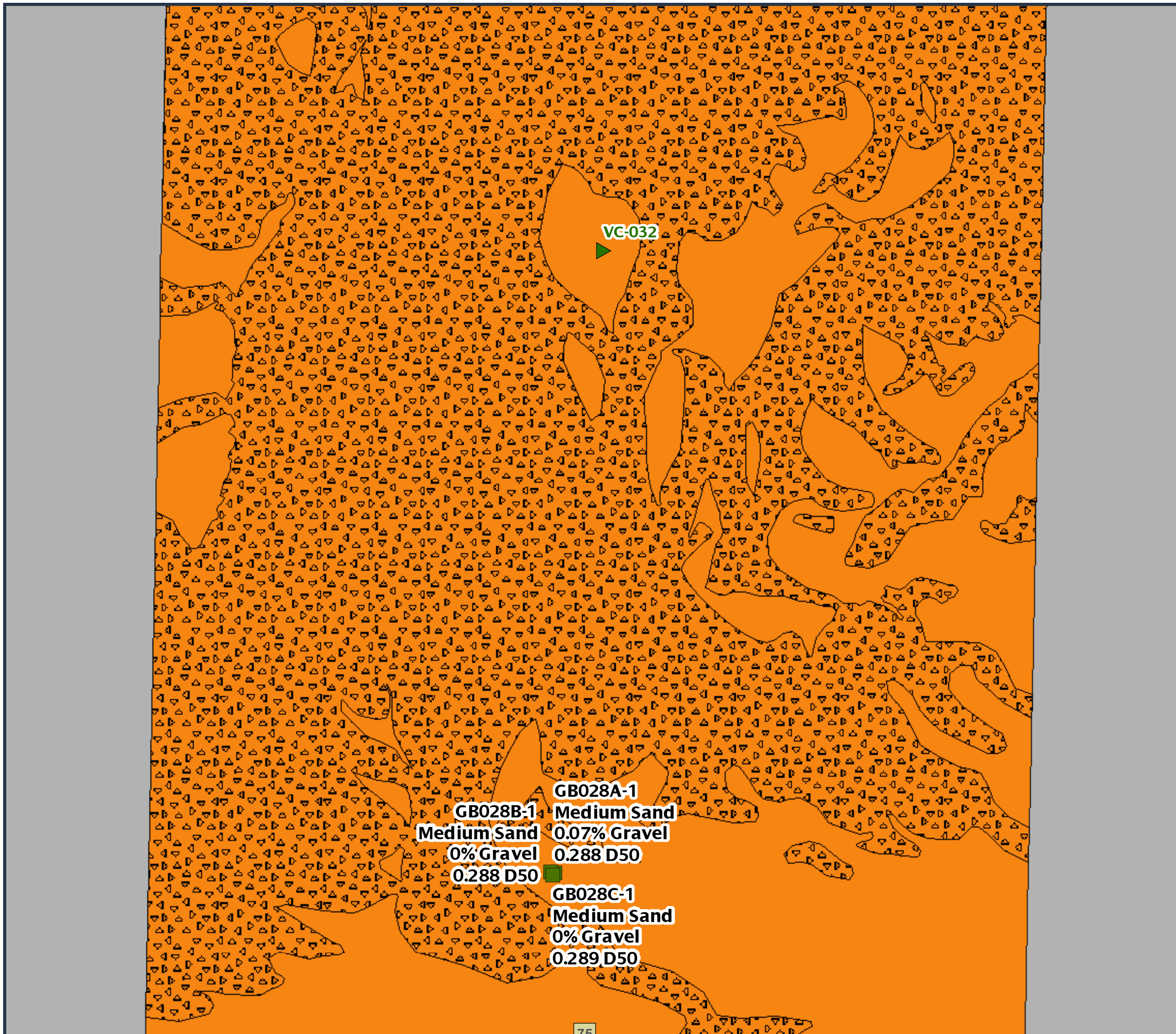
Scale 1:5,000
1 inch = 0 km

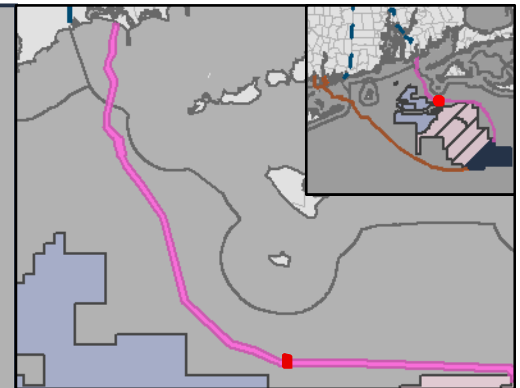
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

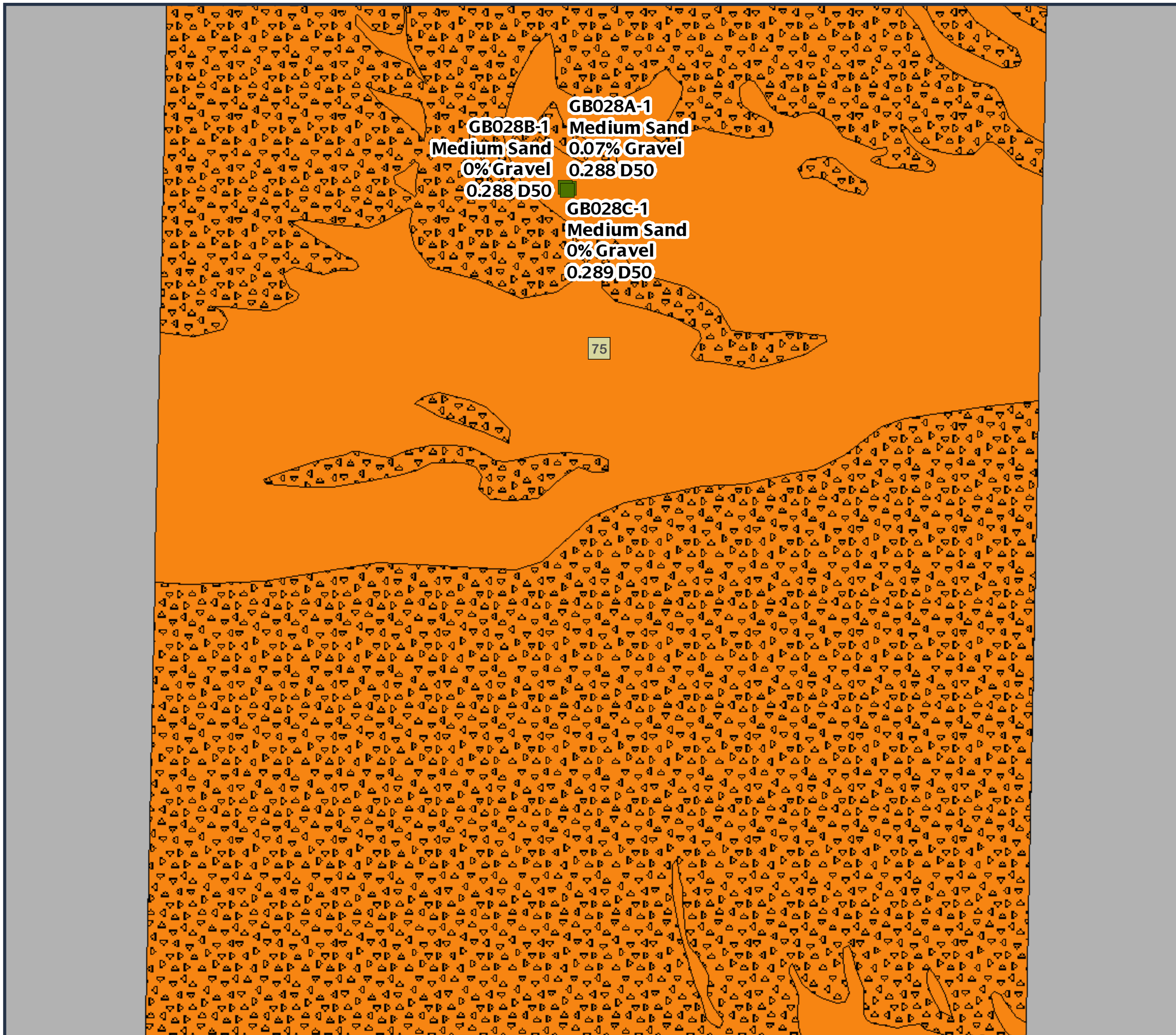
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore
- Soft Station - Grab Sample

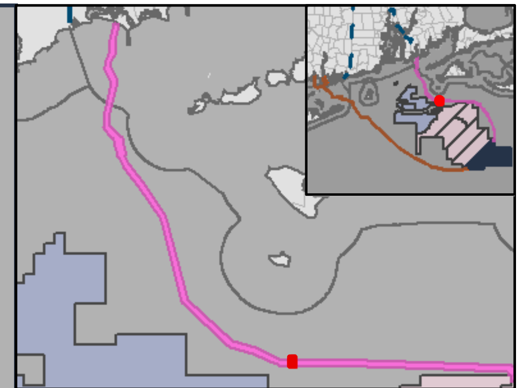
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





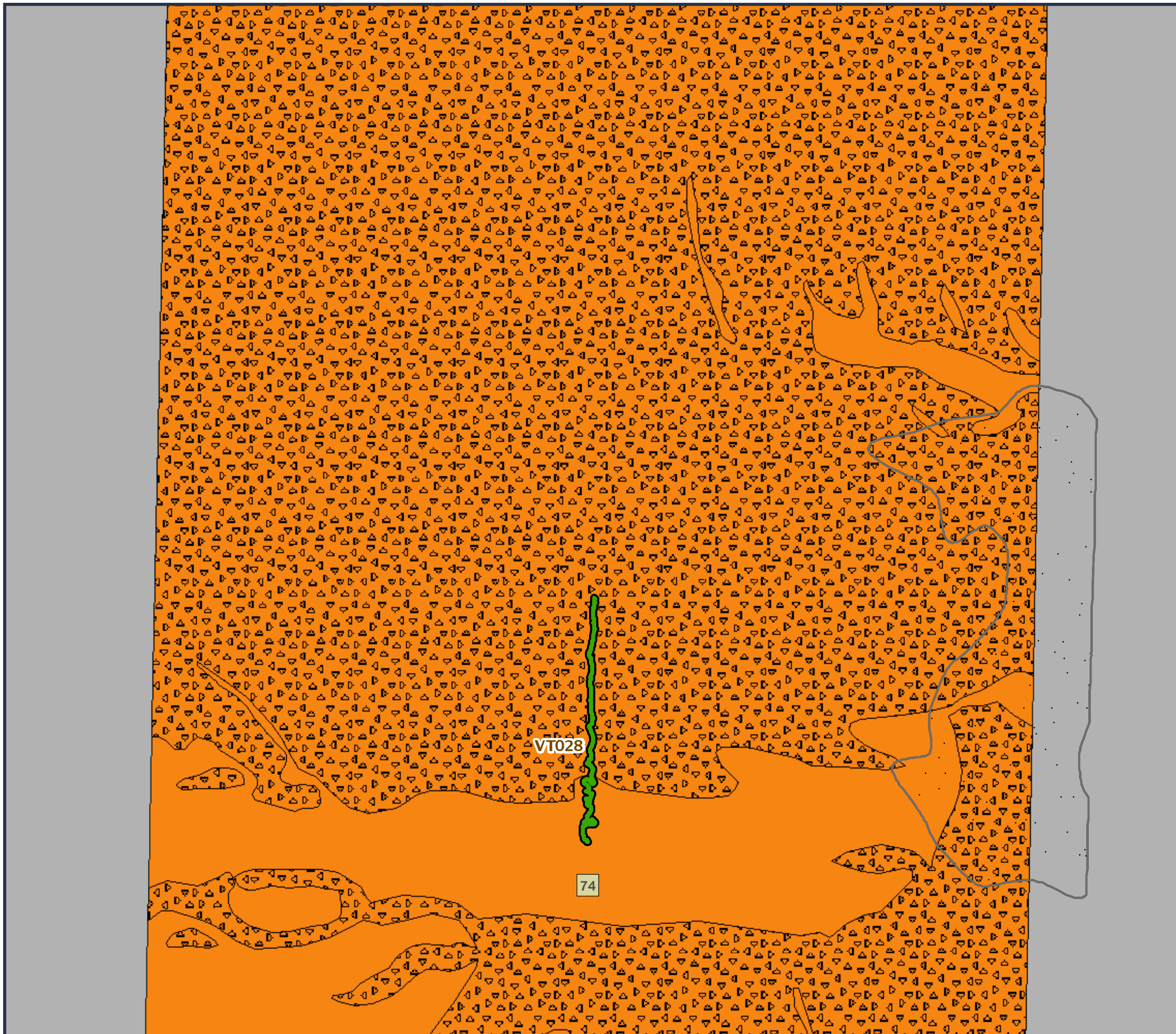
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Grab Sample

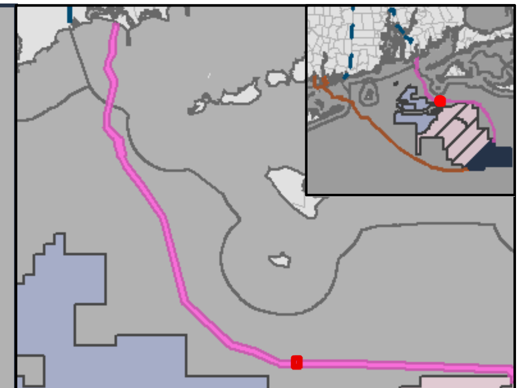
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

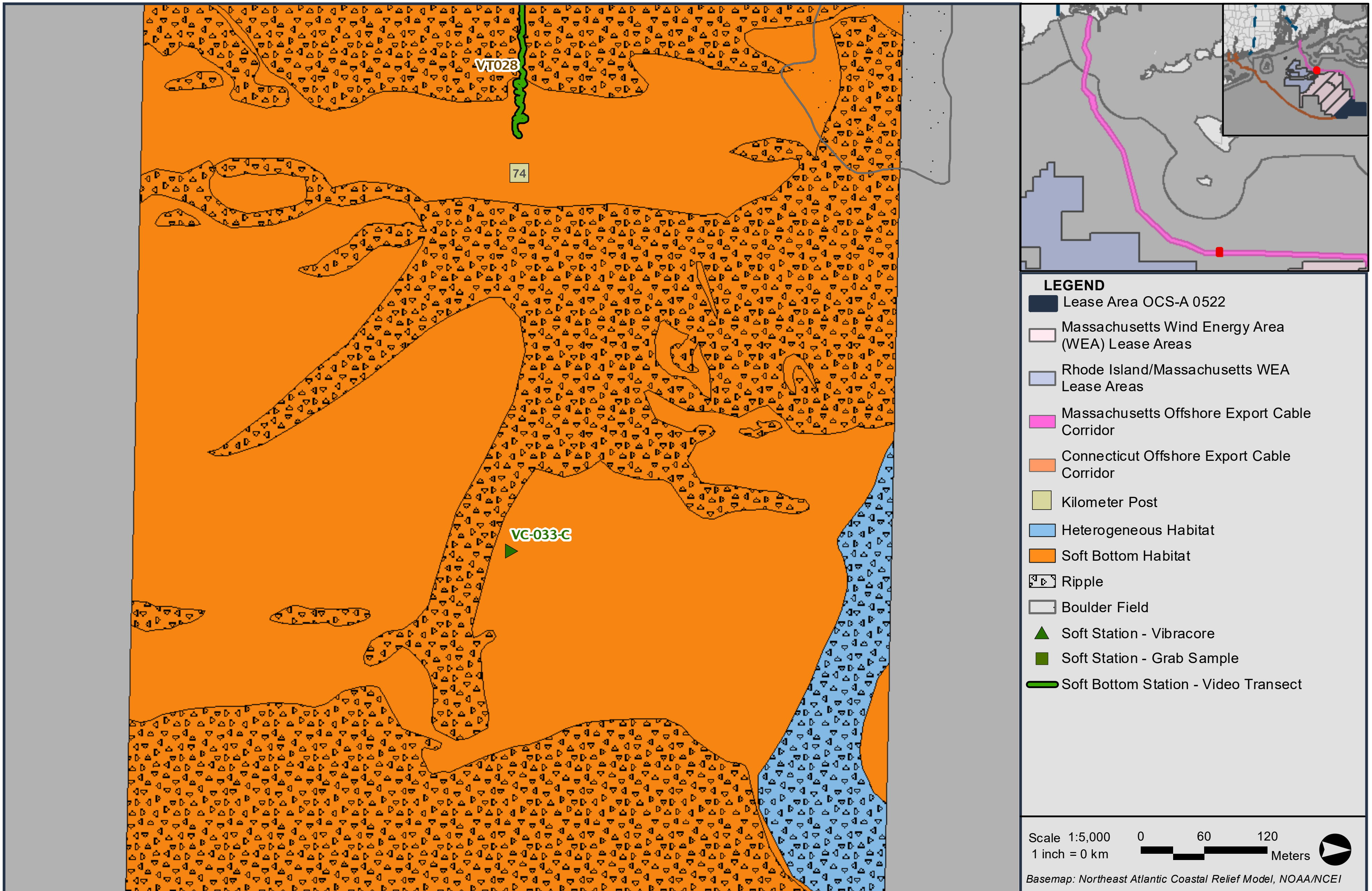
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Boulder Field
- Soft Bottom Station - Video

Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

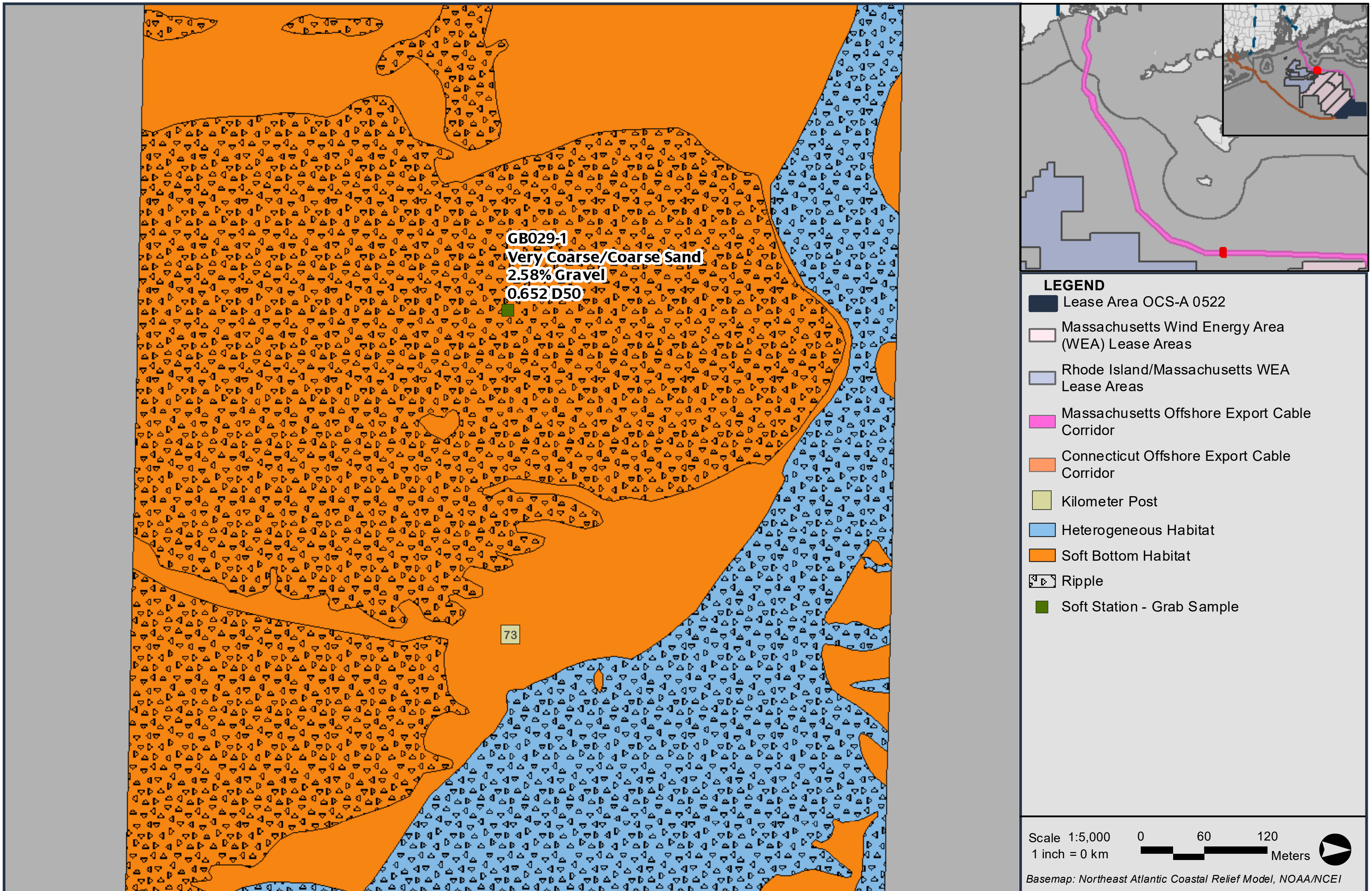
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC



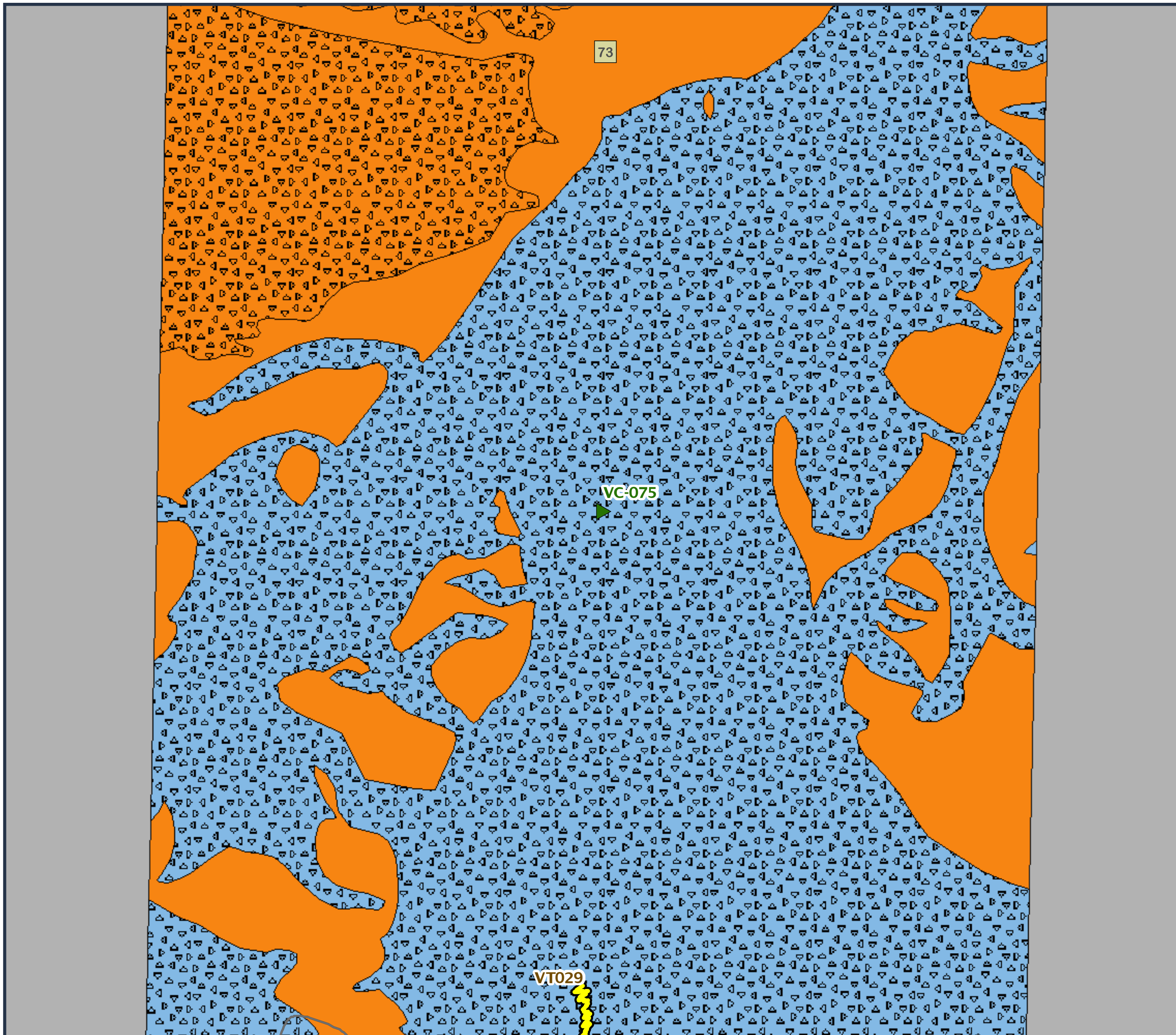
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

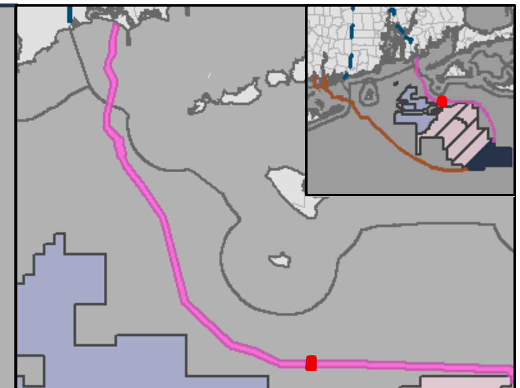
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





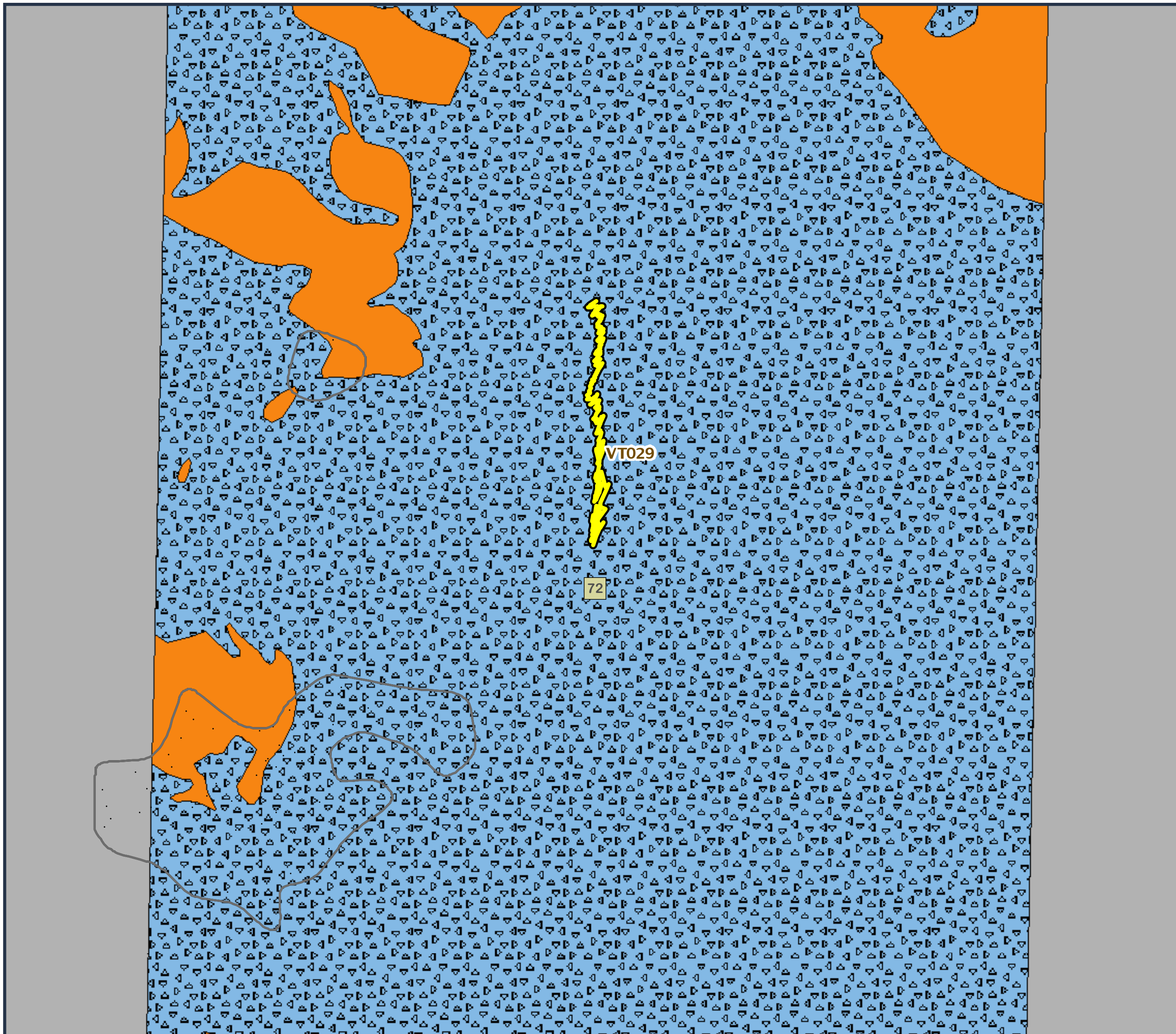
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Heterogeneous Habitat
Soft Bottom Habitat
Ripple
Boulder Field
Soft Station - Vibracore
Complex Mix Station - Video Transect

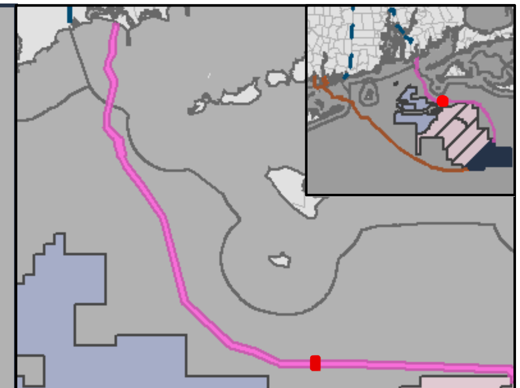
Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





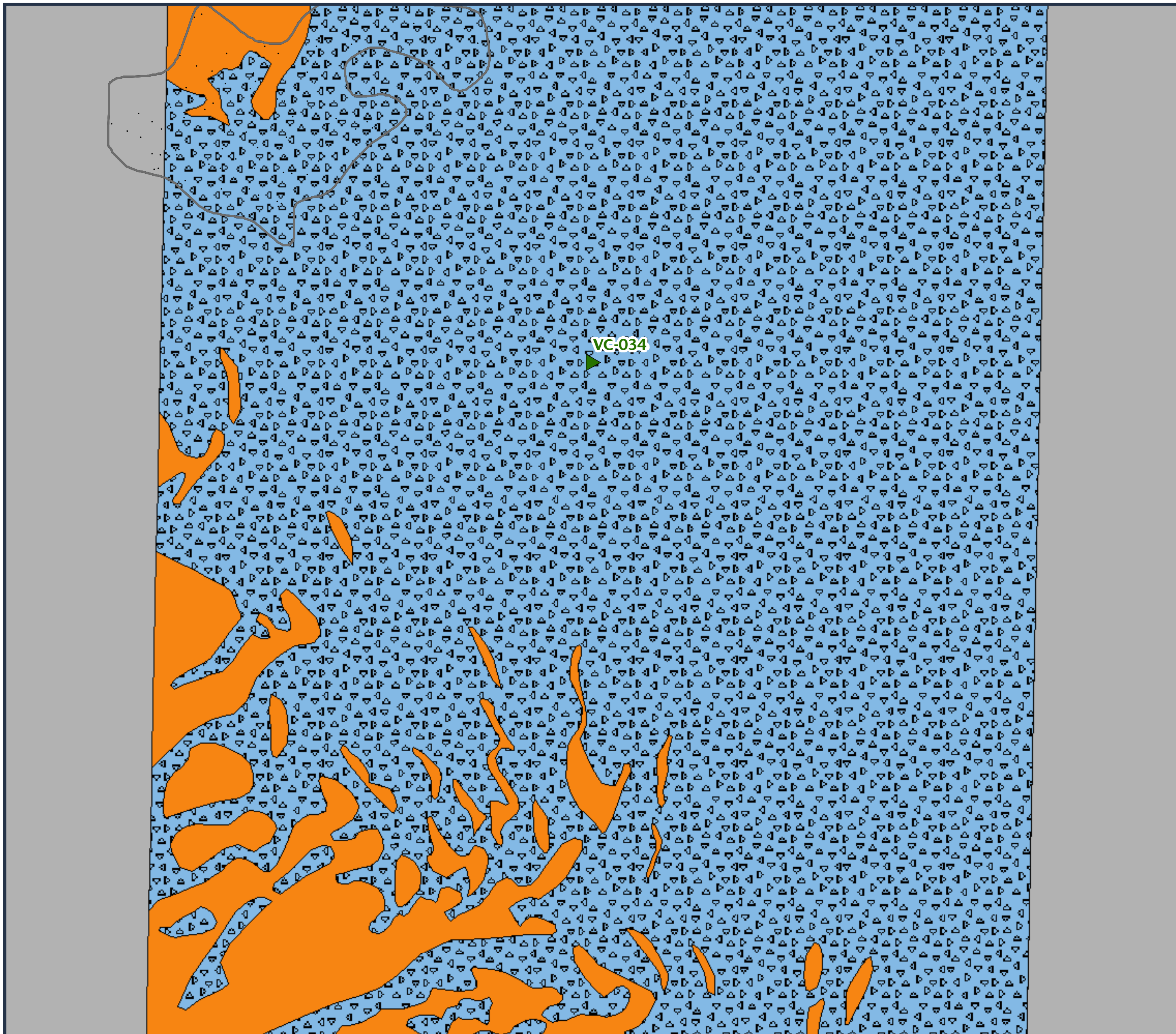
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Heterogeneous Habitat
Soft Bottom Habitat
Ripple
Boulder Field
Soft Station - Vibracore
Complex Mix Station - Video Transect

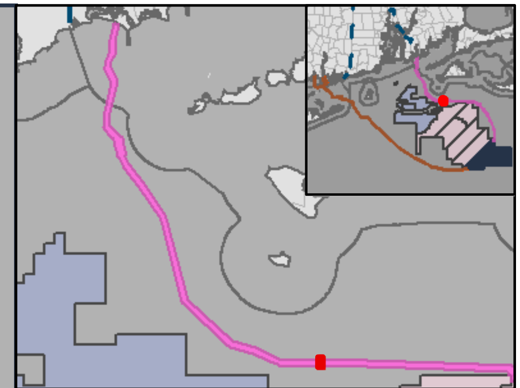
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Boulder Field
- Soft Station - Vibracore

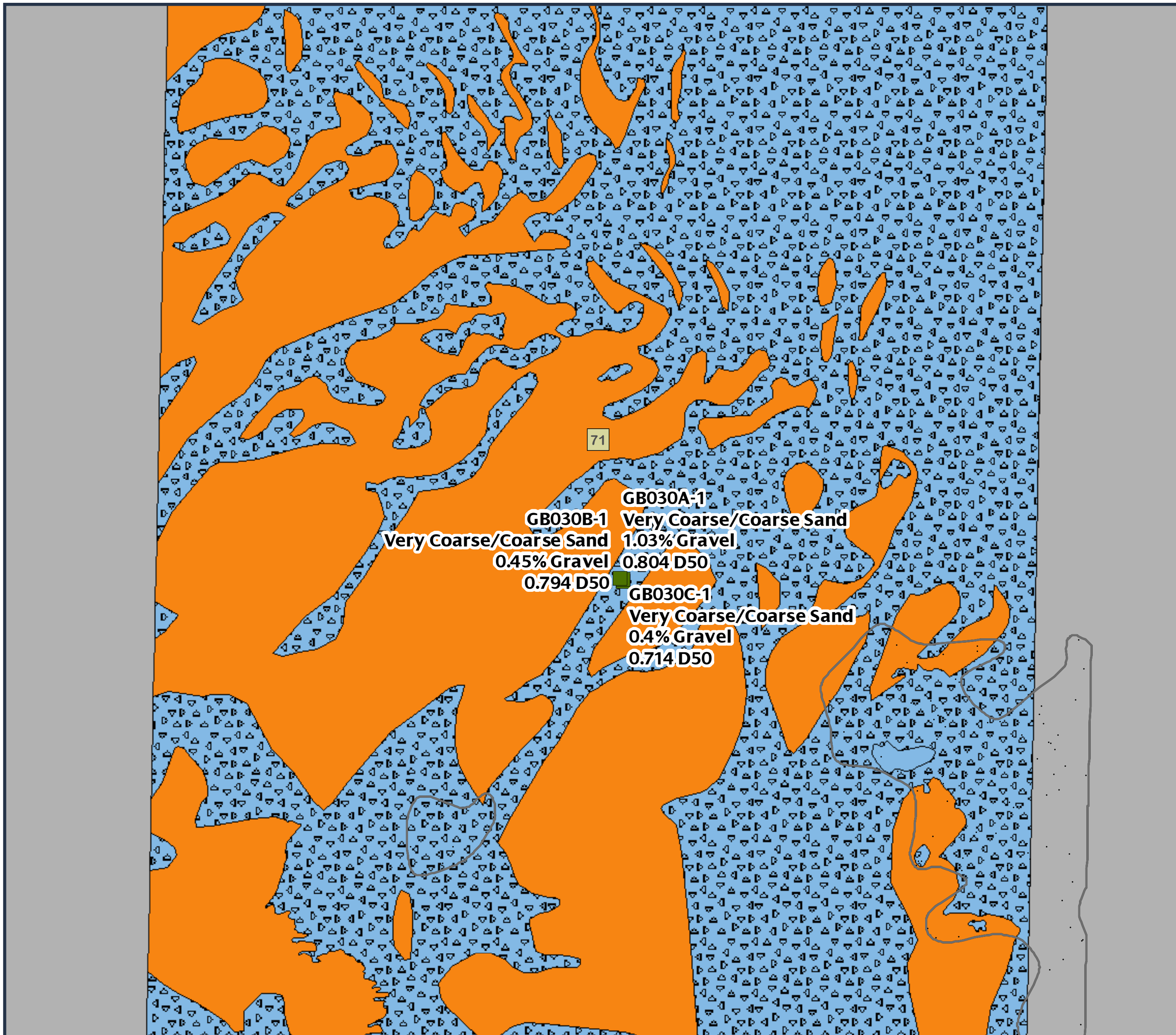
Scale 1:5,000
1 inch = 0 km

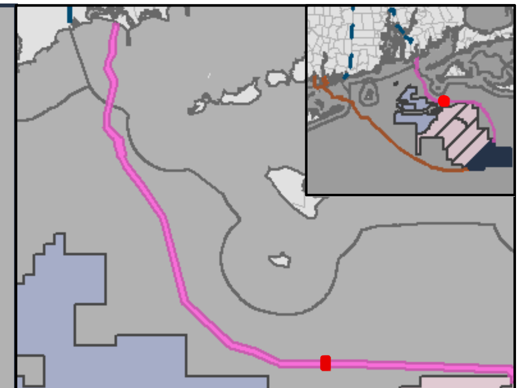
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

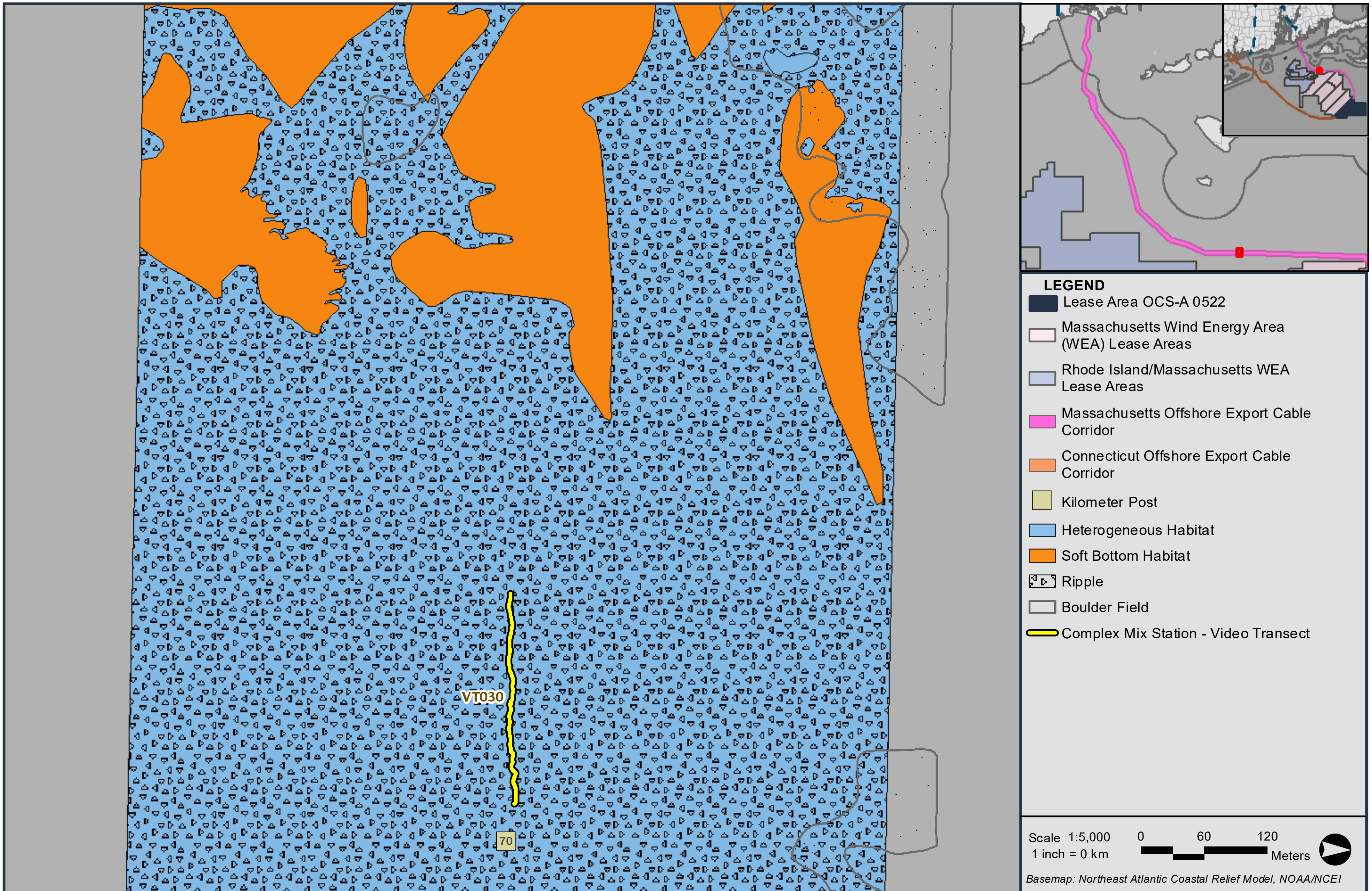
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Boulder Field
- Soft Station - Grab Sample

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

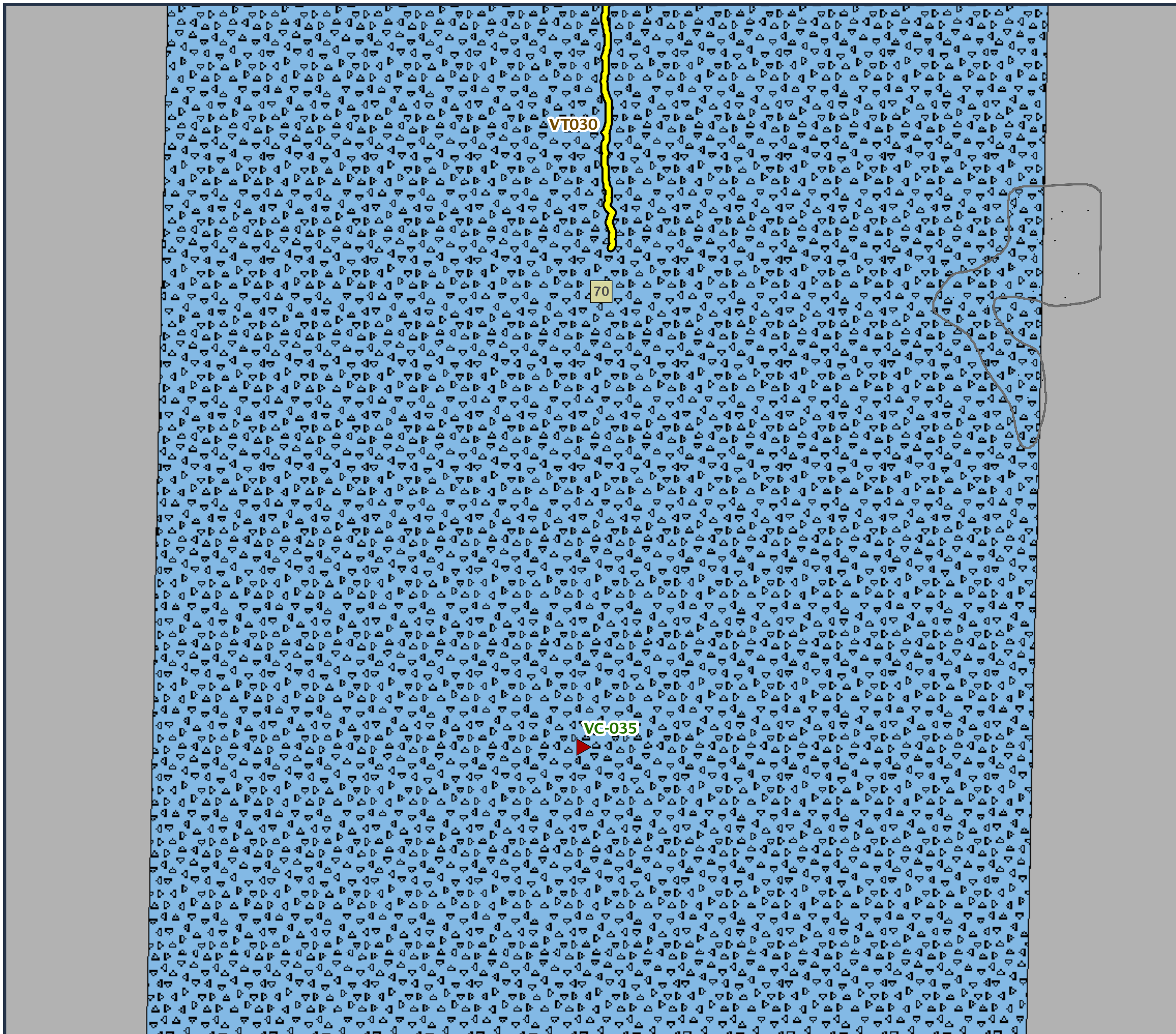
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

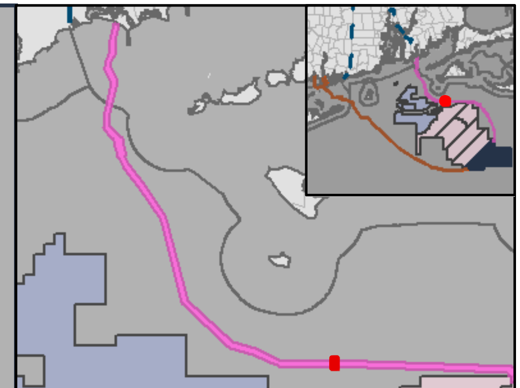
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST





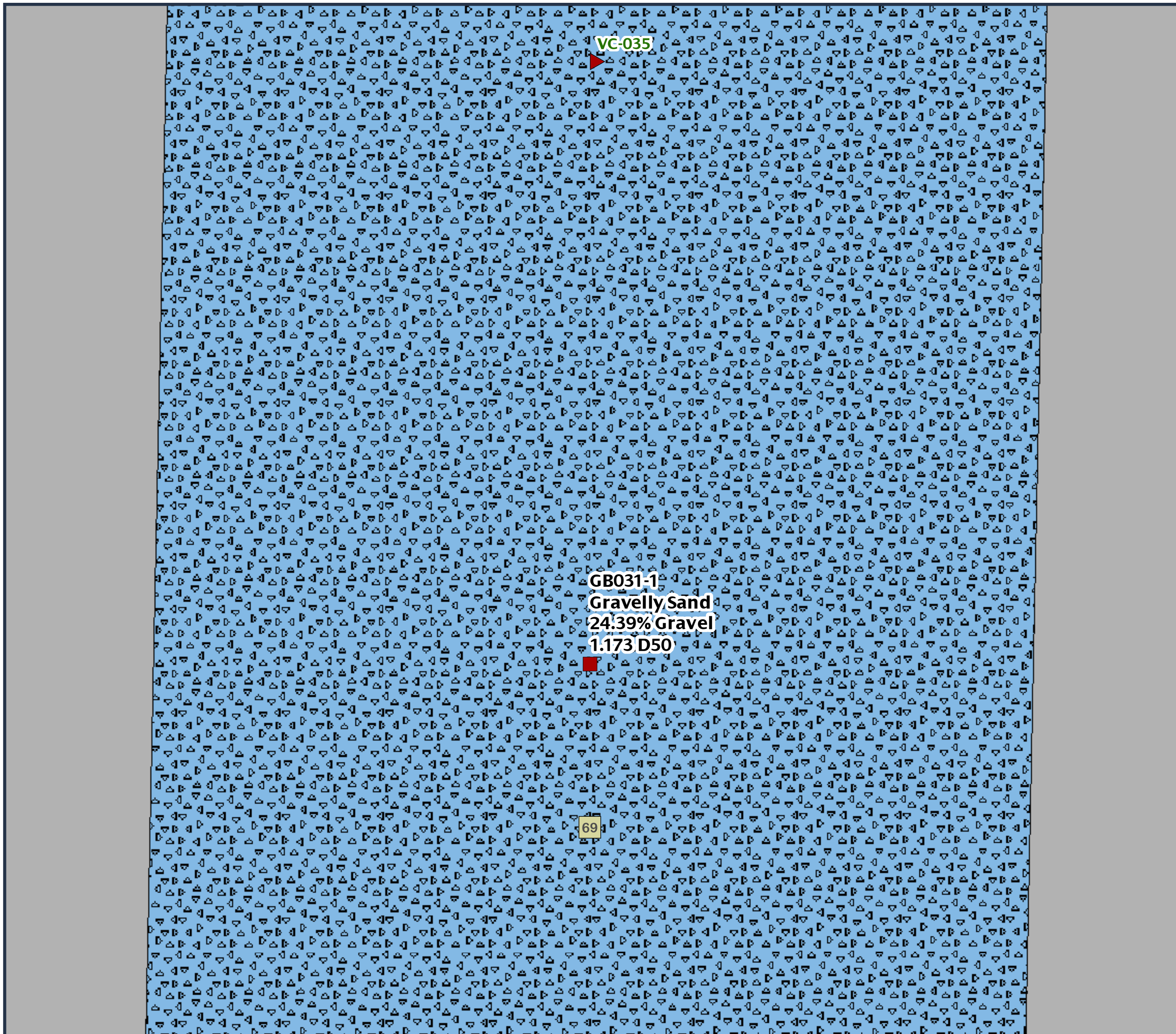
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Ripple
- Boulder Field
- Complex Station - Vibracore
- Complex Mix Station - Video Transect

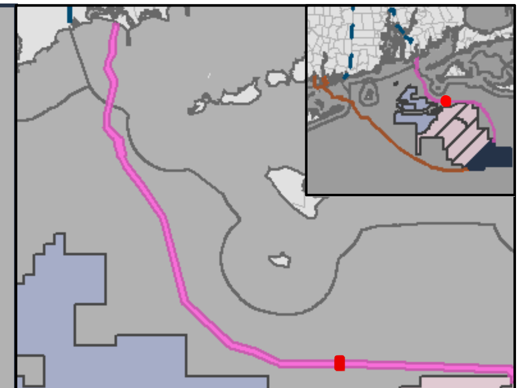
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Ripple
- Complex Station - Vibracore
- Complex Station - Grab Sample

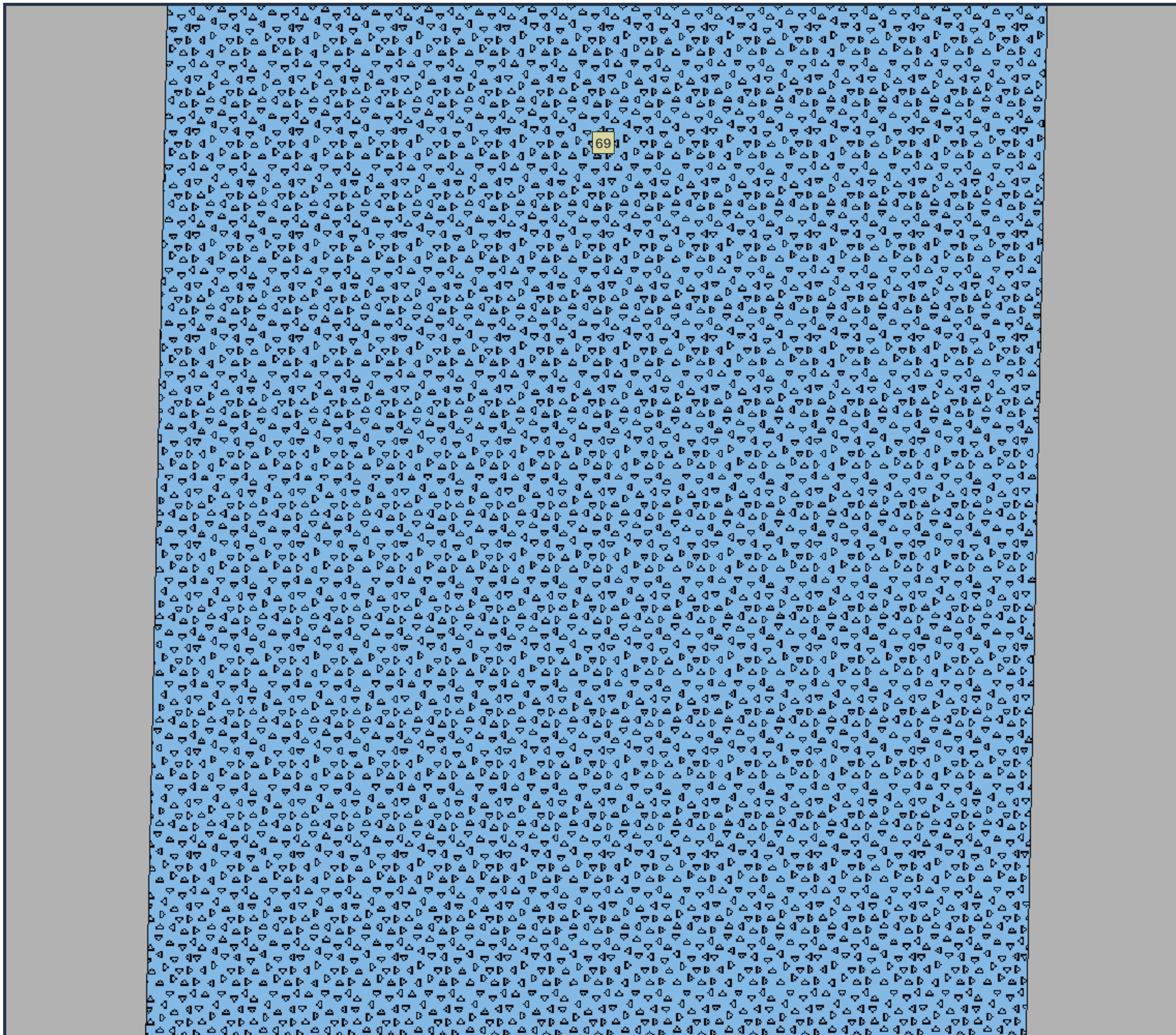
Scale 1:5,000
1 inch = 0 km

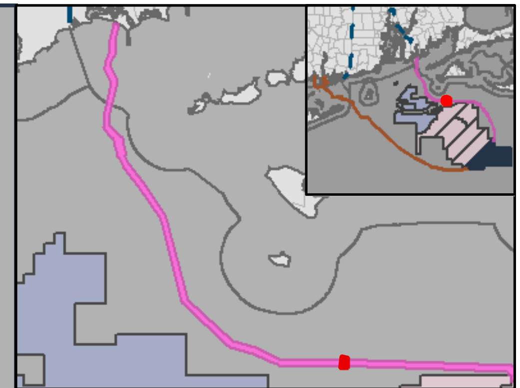
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Ripple

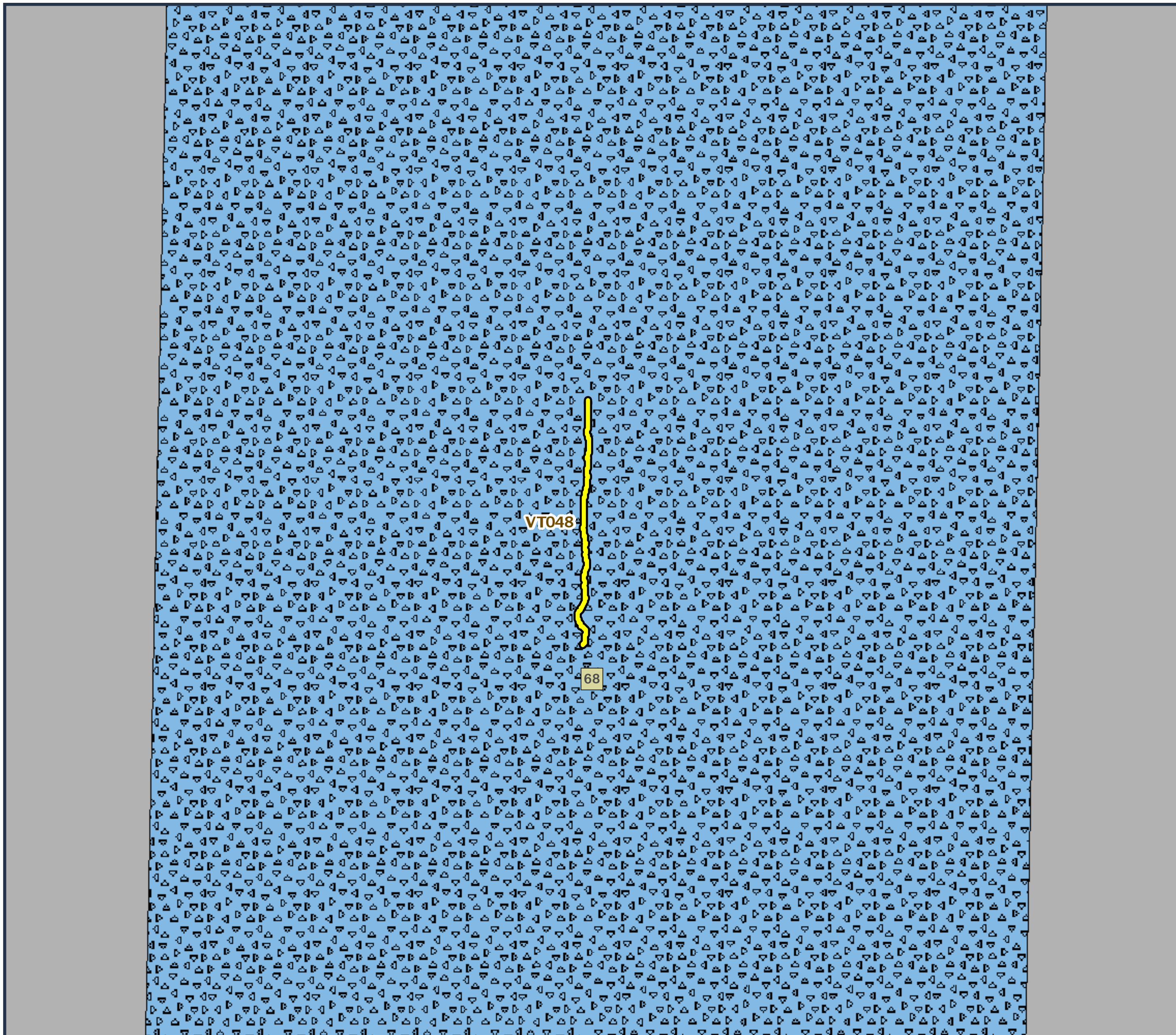
Scale 1:5,000
1 inch = 0 km

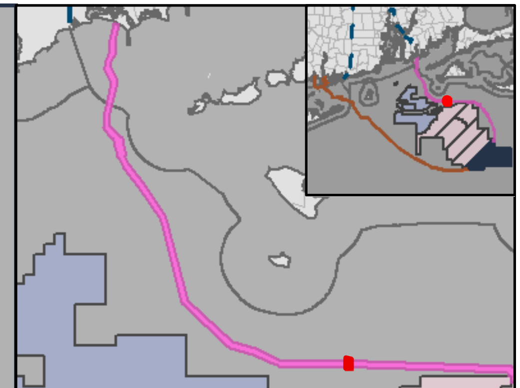
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Ripple
- Complex Mix Station - Video Transect

Scale 1:5,000
1 inch = 0 km

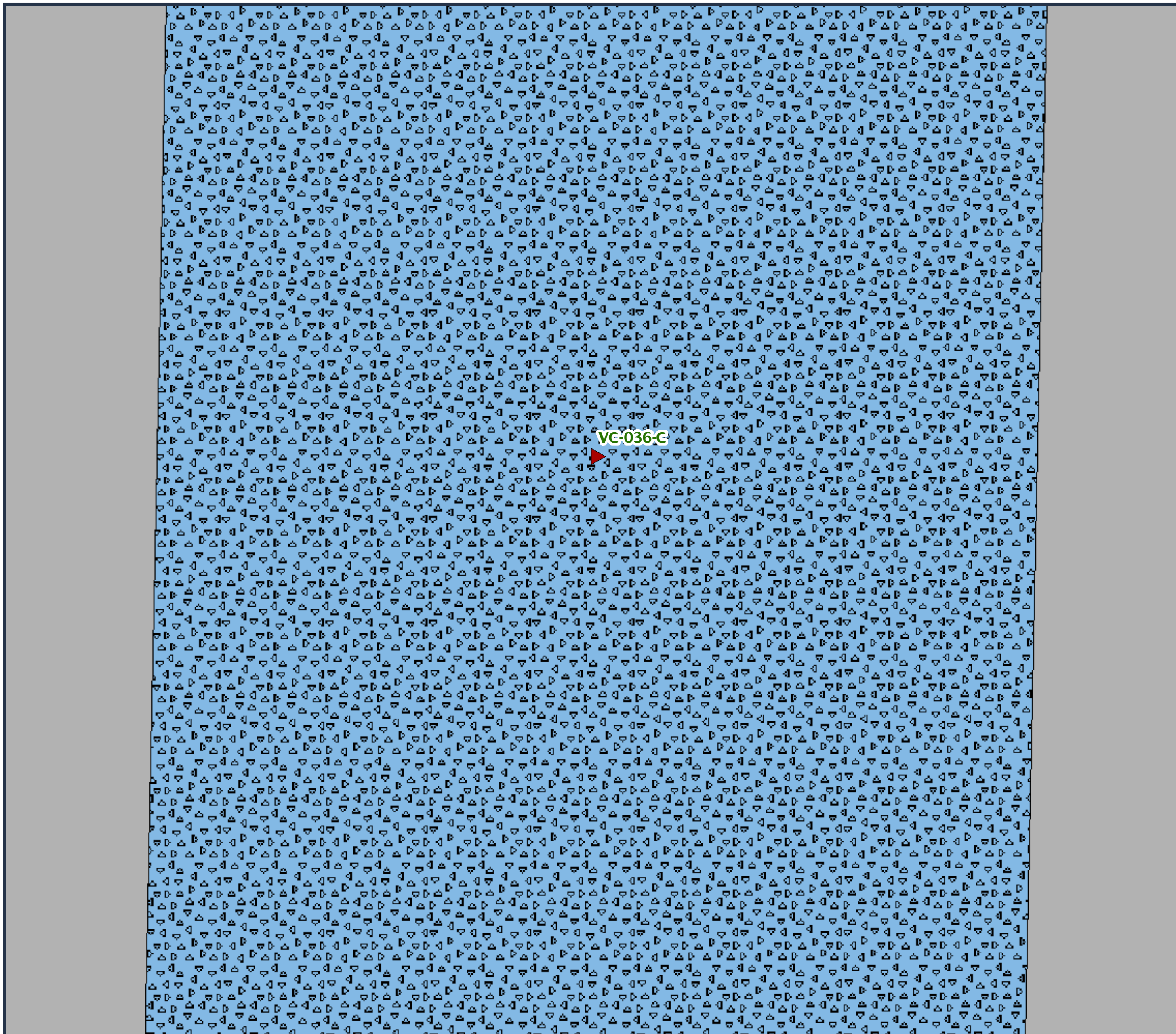
0 60 120 Meters

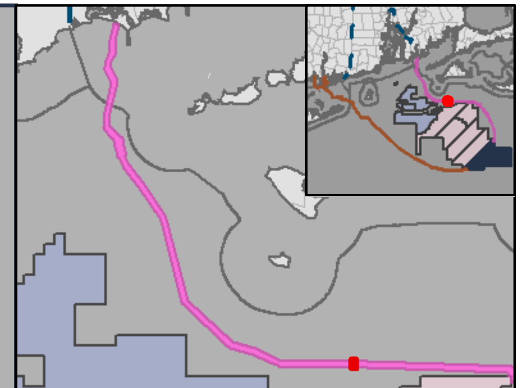
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Ripple
- Complex Station - Vibracore
- Complex Station - Grab Sample

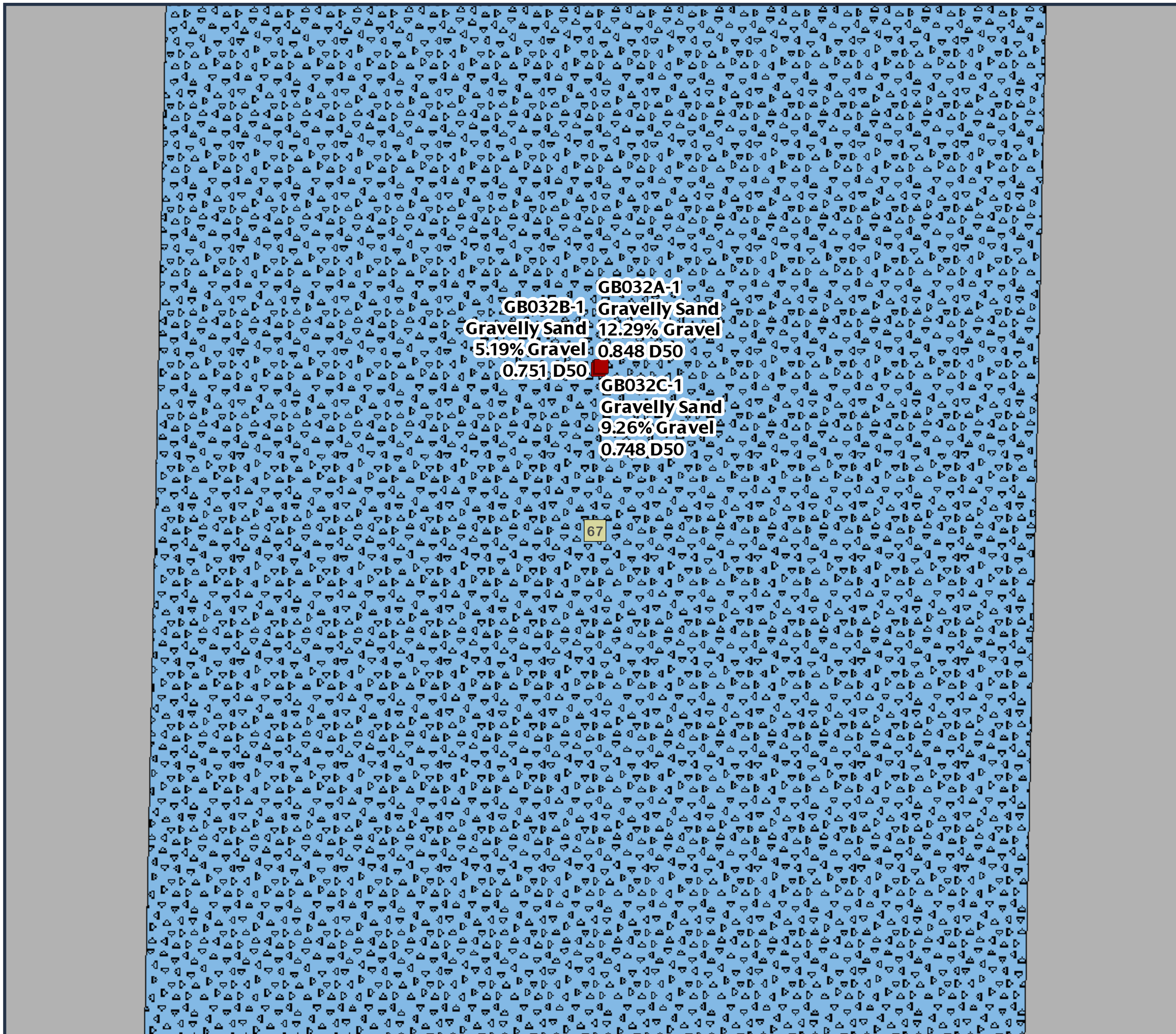
Scale 1:5,000
1 inch = 0 km

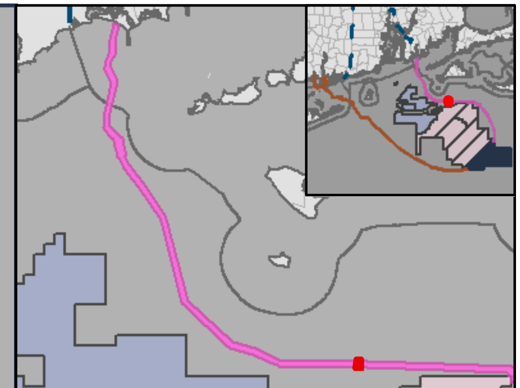
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

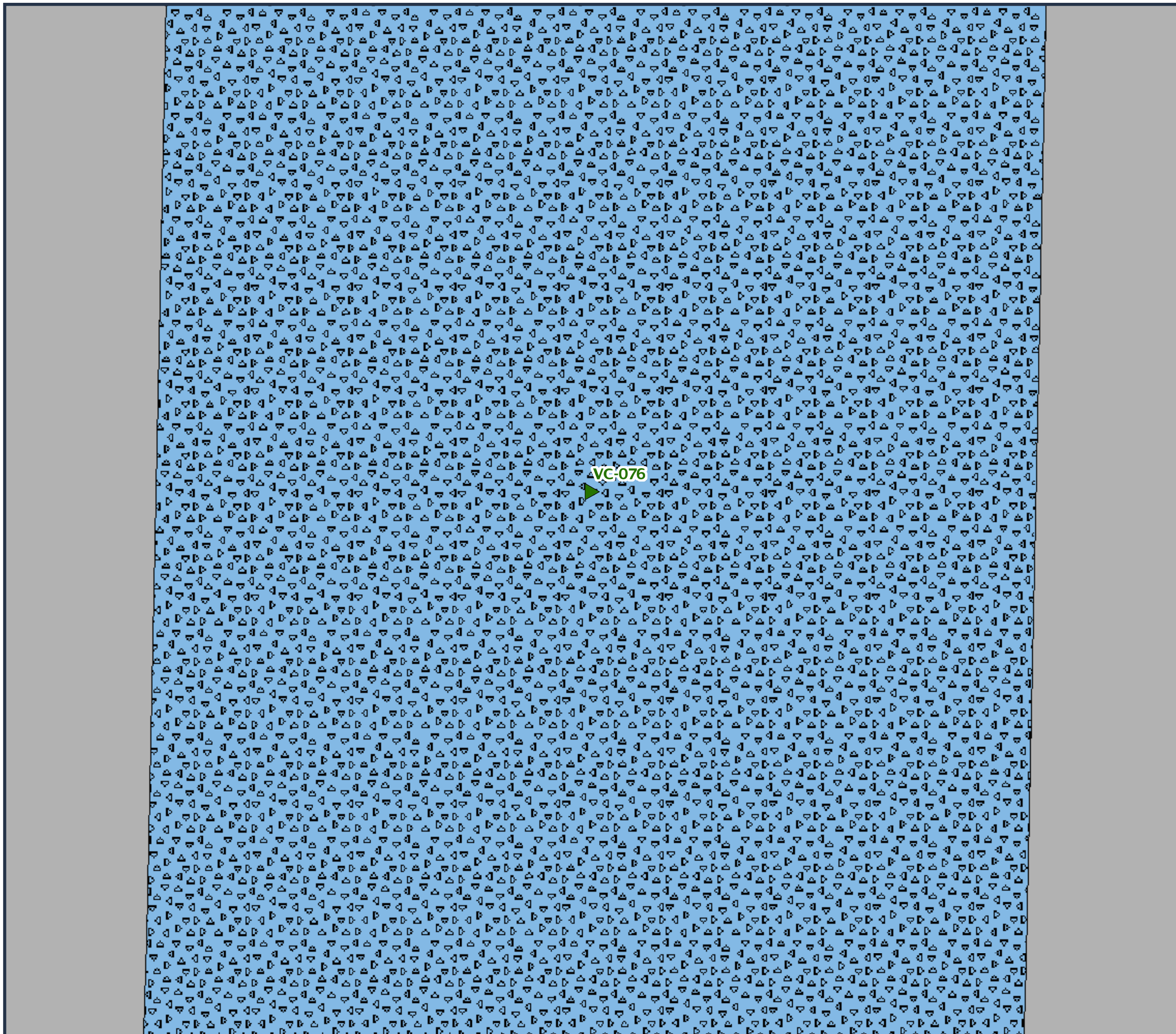
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Ripple
- Complex Station - Grab Sample

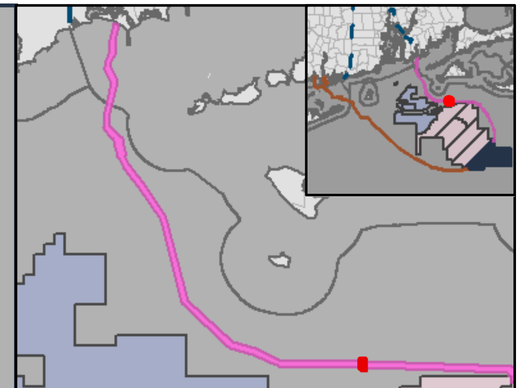
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





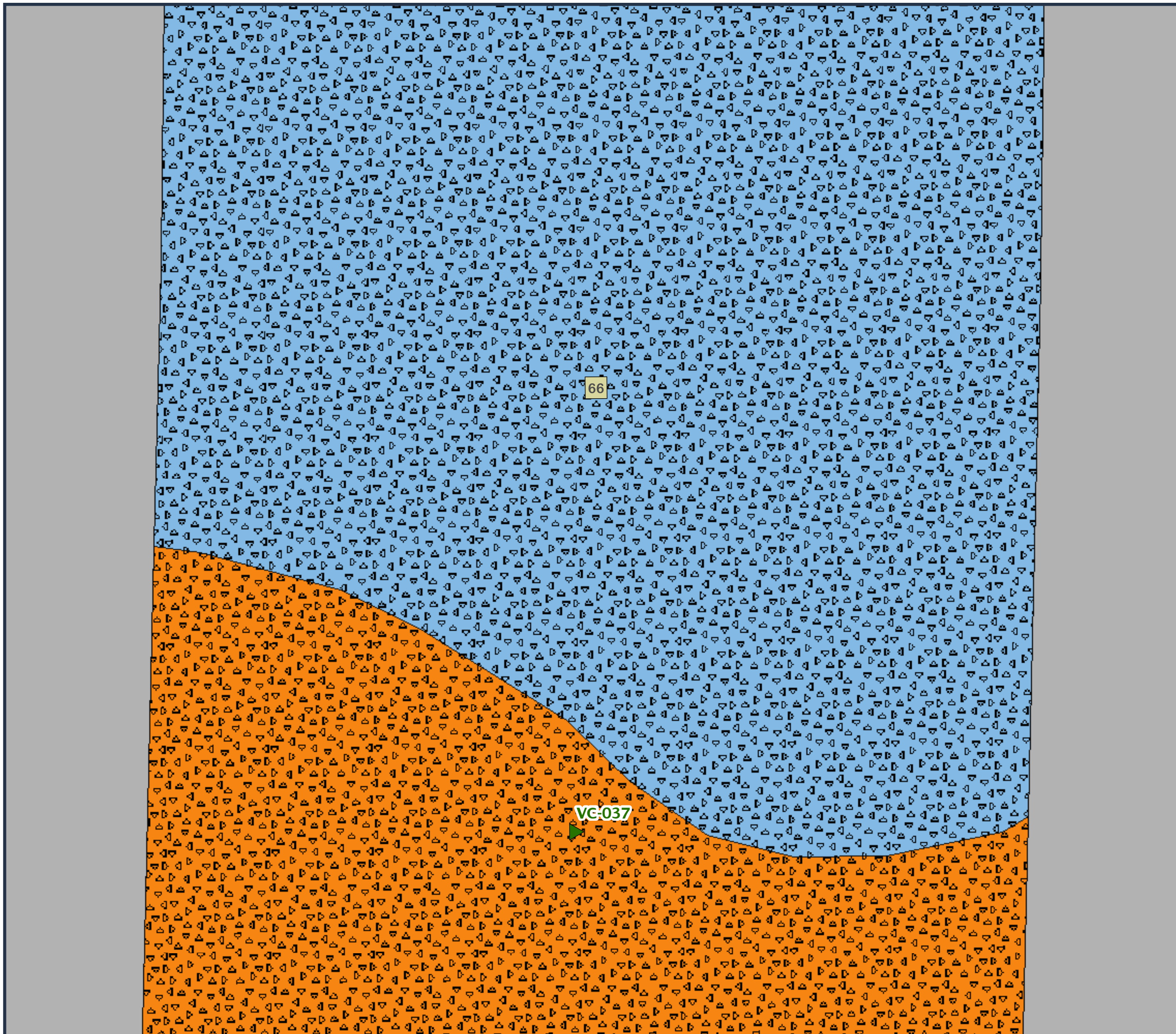
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Heterogeneous Habitat
Ripple
Soft Station - Vibracore

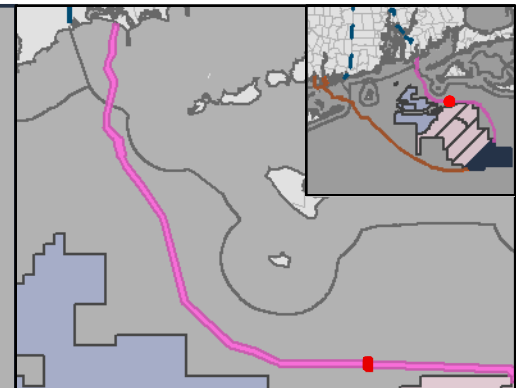
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore

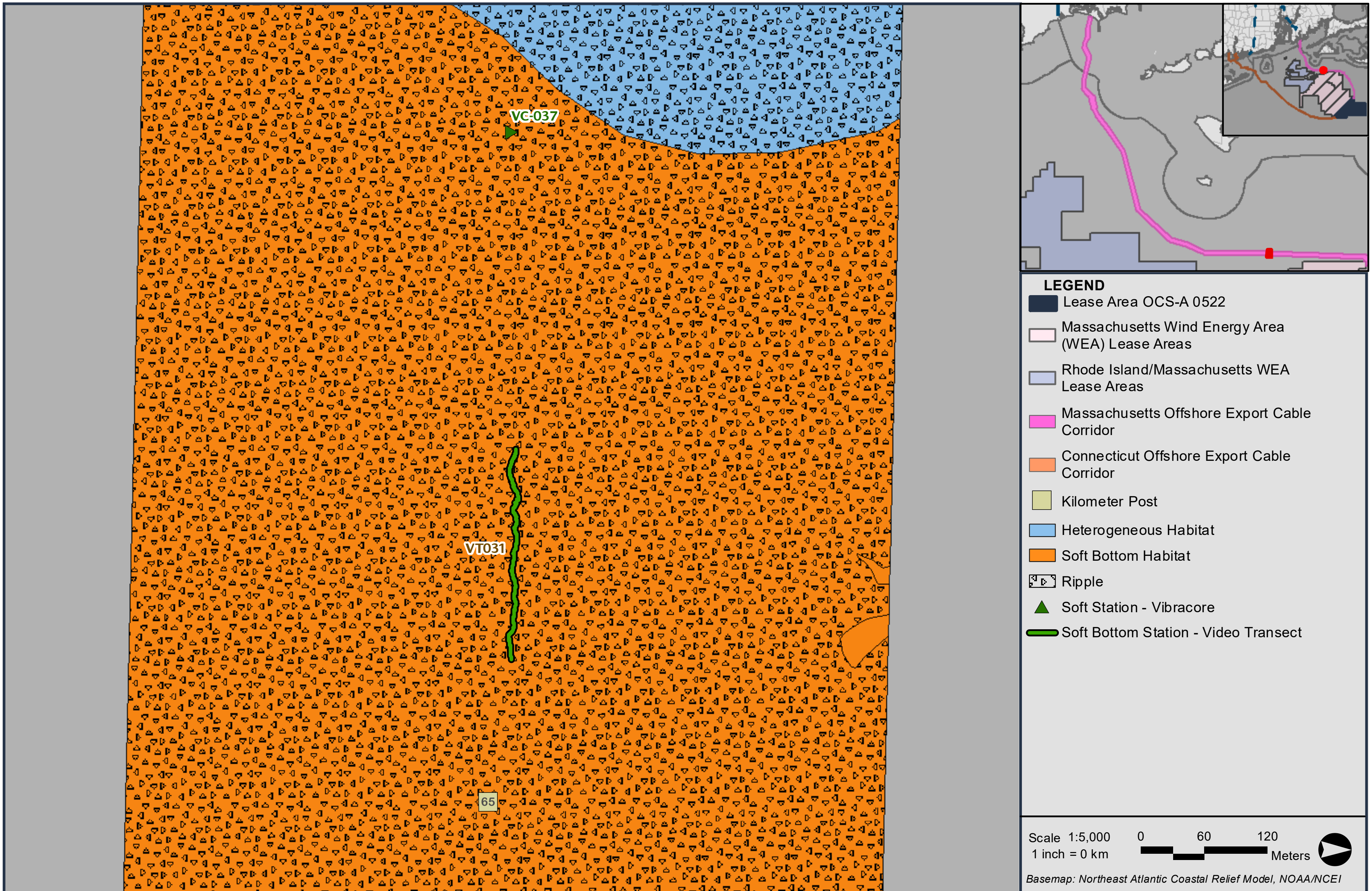
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

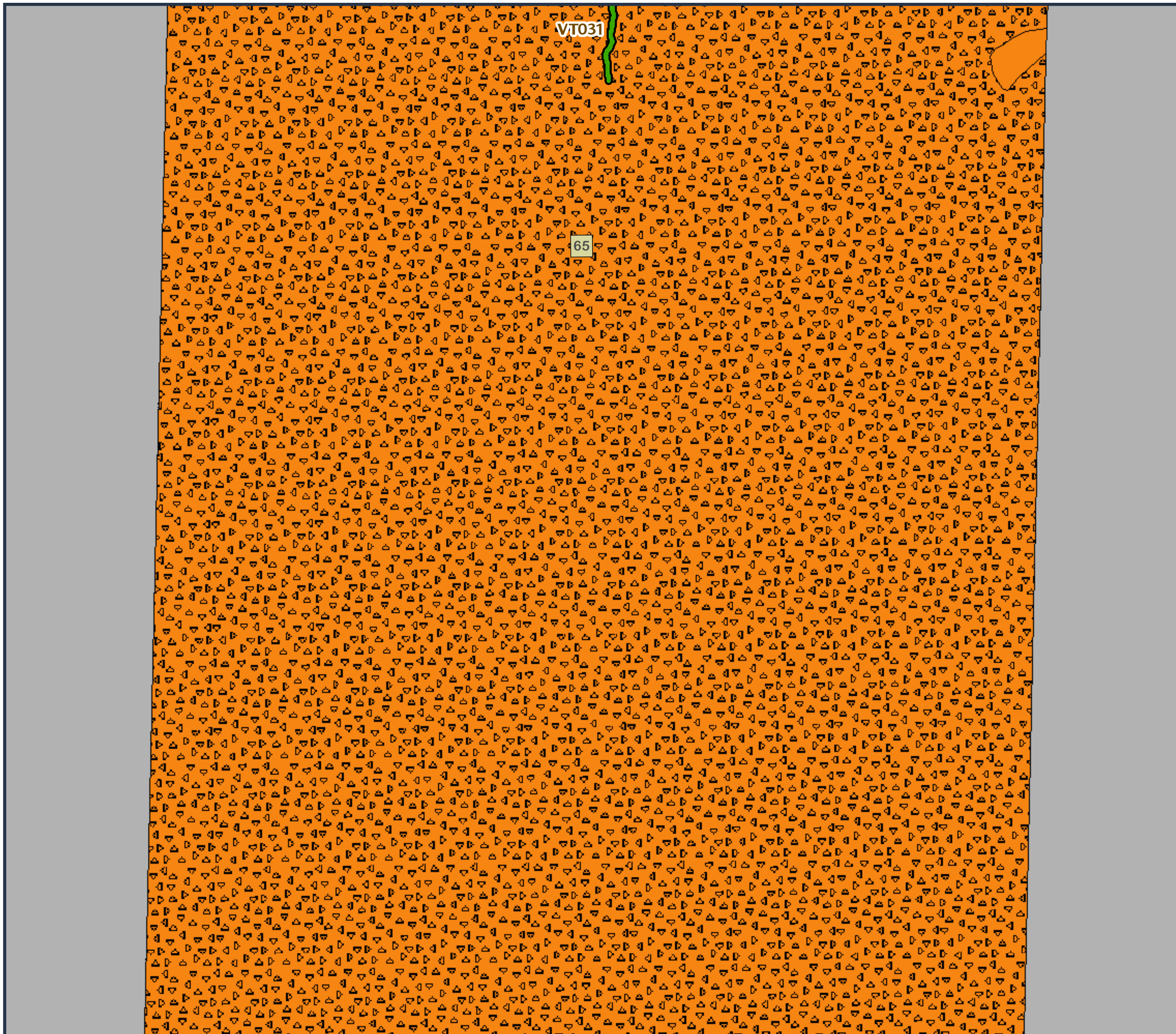
VINEYARD NORTHEAST
VINEYARD OFFSHORE

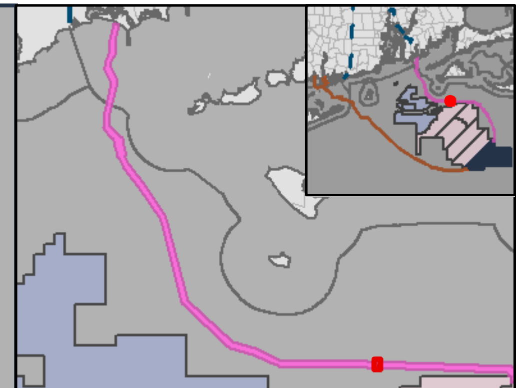


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Bottom Station - Video Transect

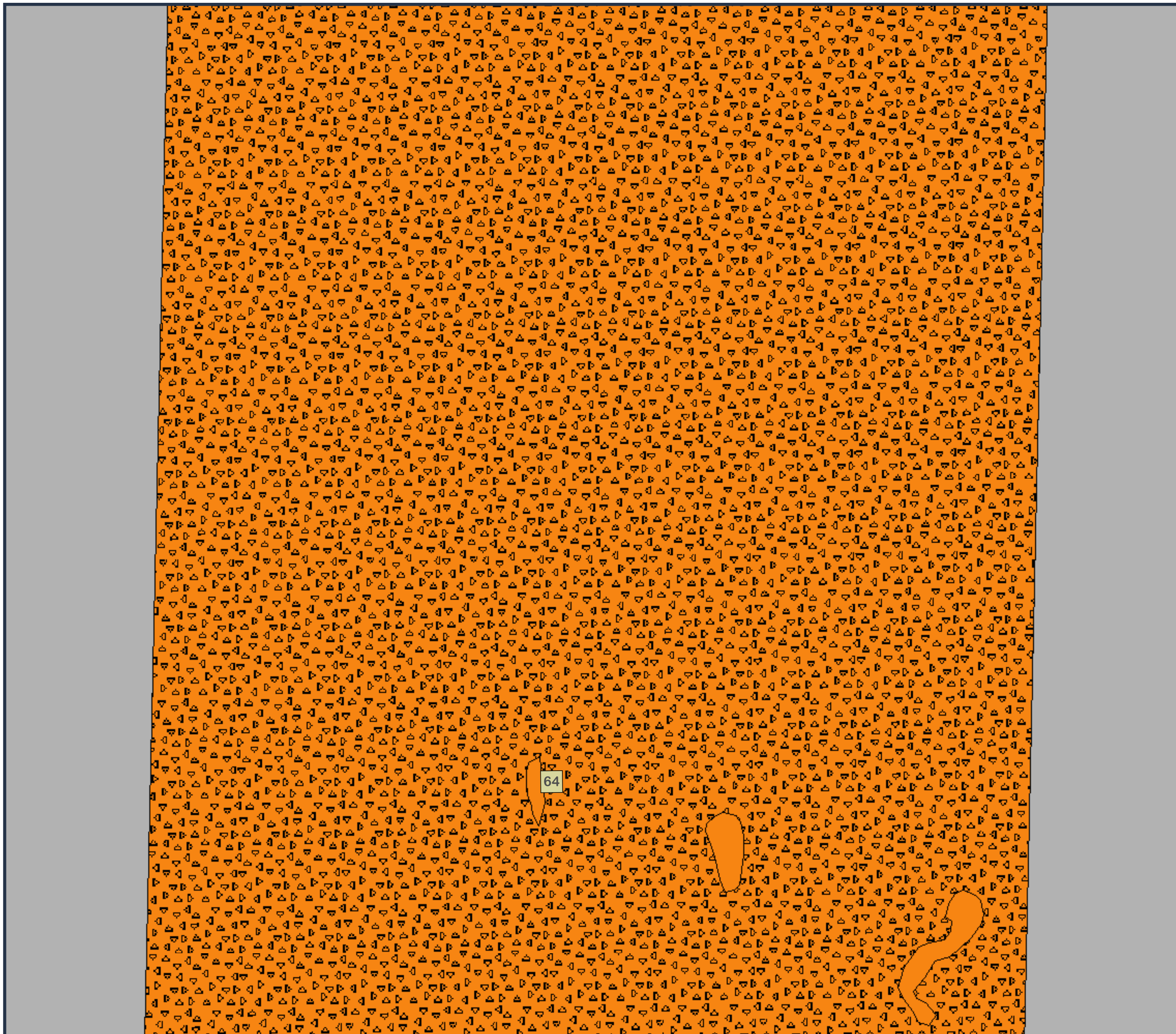
Scale 1:5,000
1 inch = 0 km

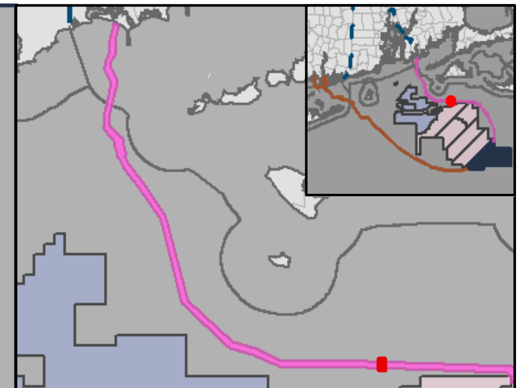
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple

Scale 1:5,000
1 inch = 0 km

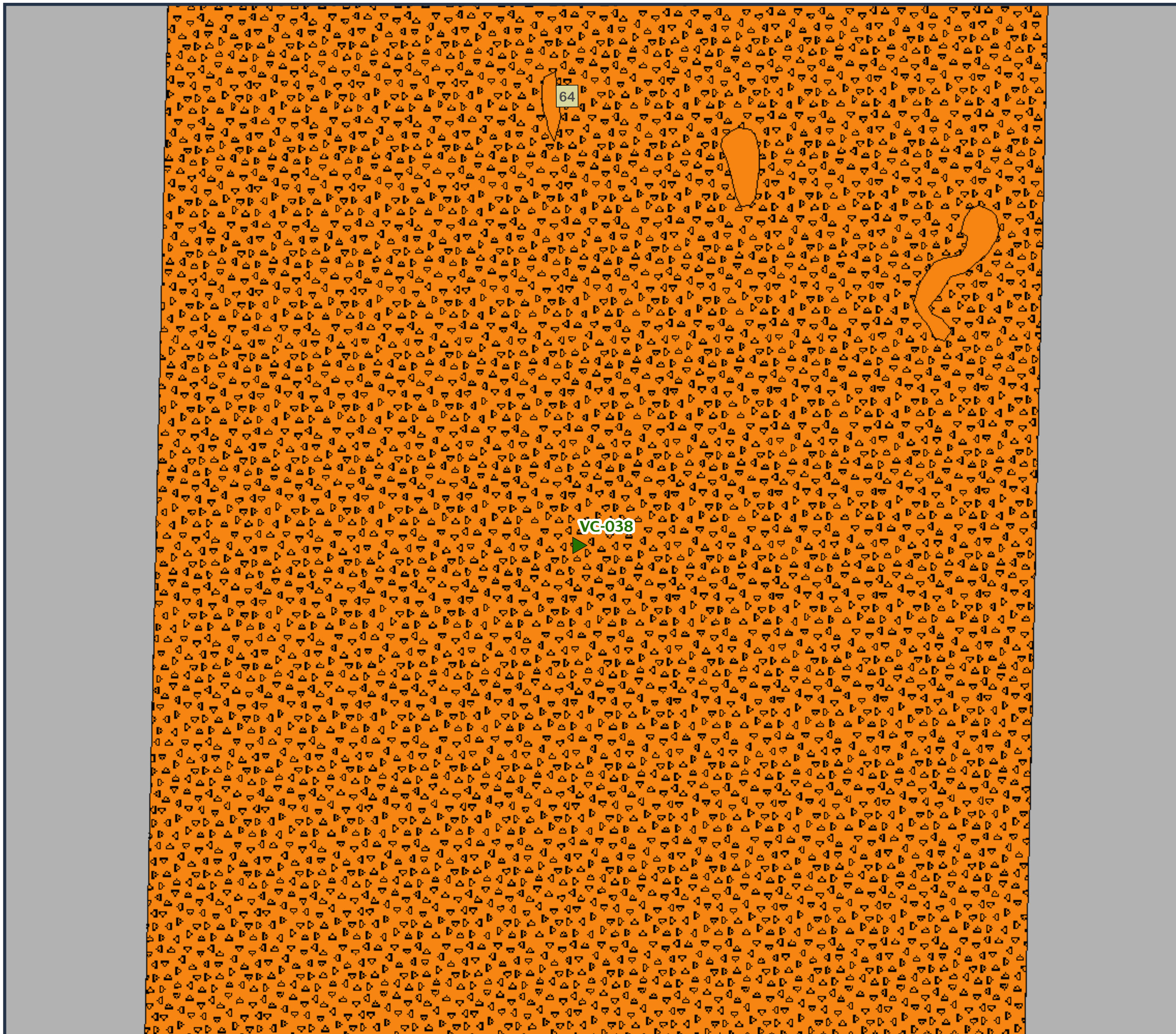
0 60 120 Meters

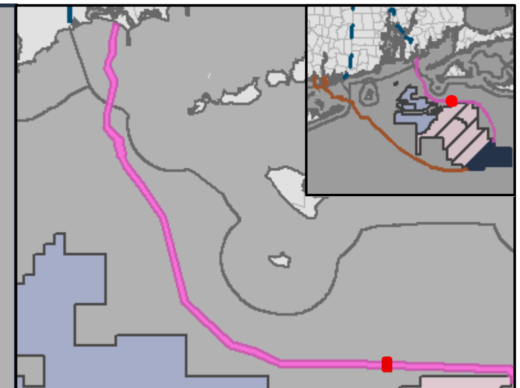
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore

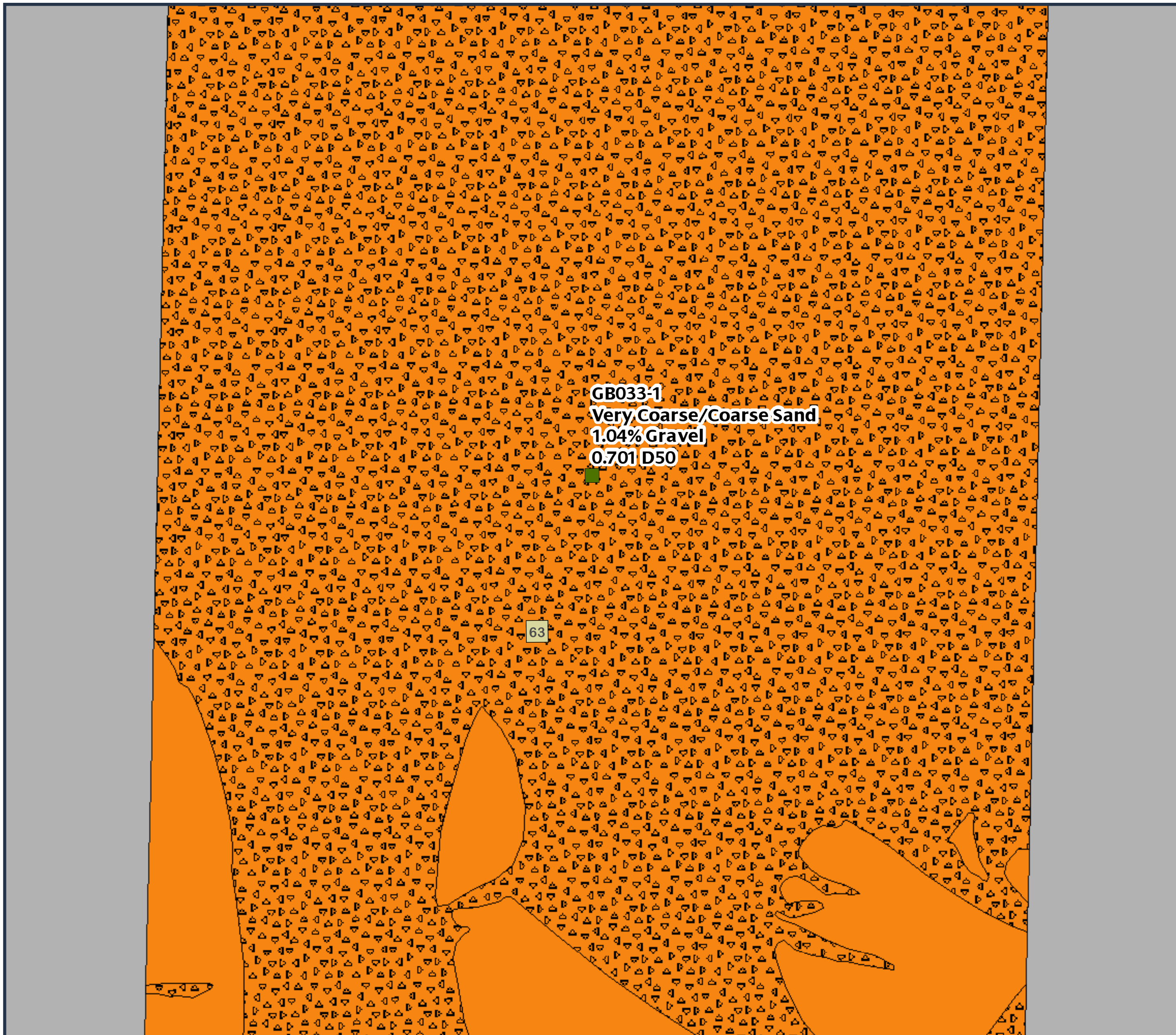
Scale 1:5,000
1 inch = 0 km

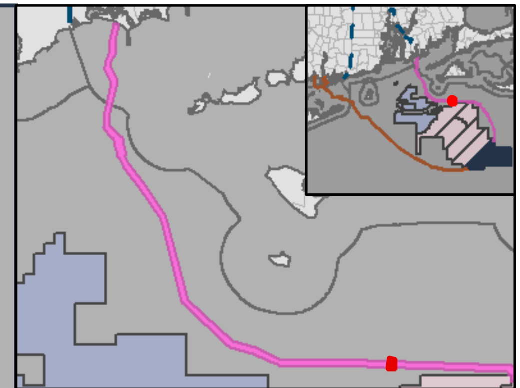
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





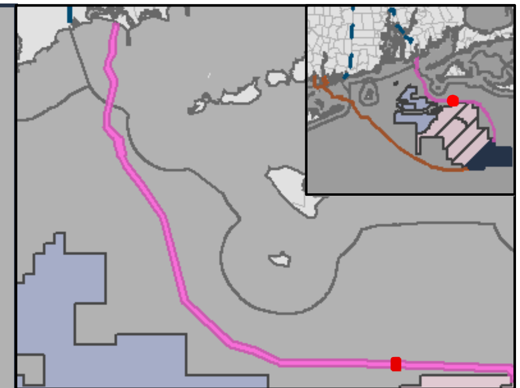
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Grab Sample

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple

Scale 1:5,000
1 inch = 0 km

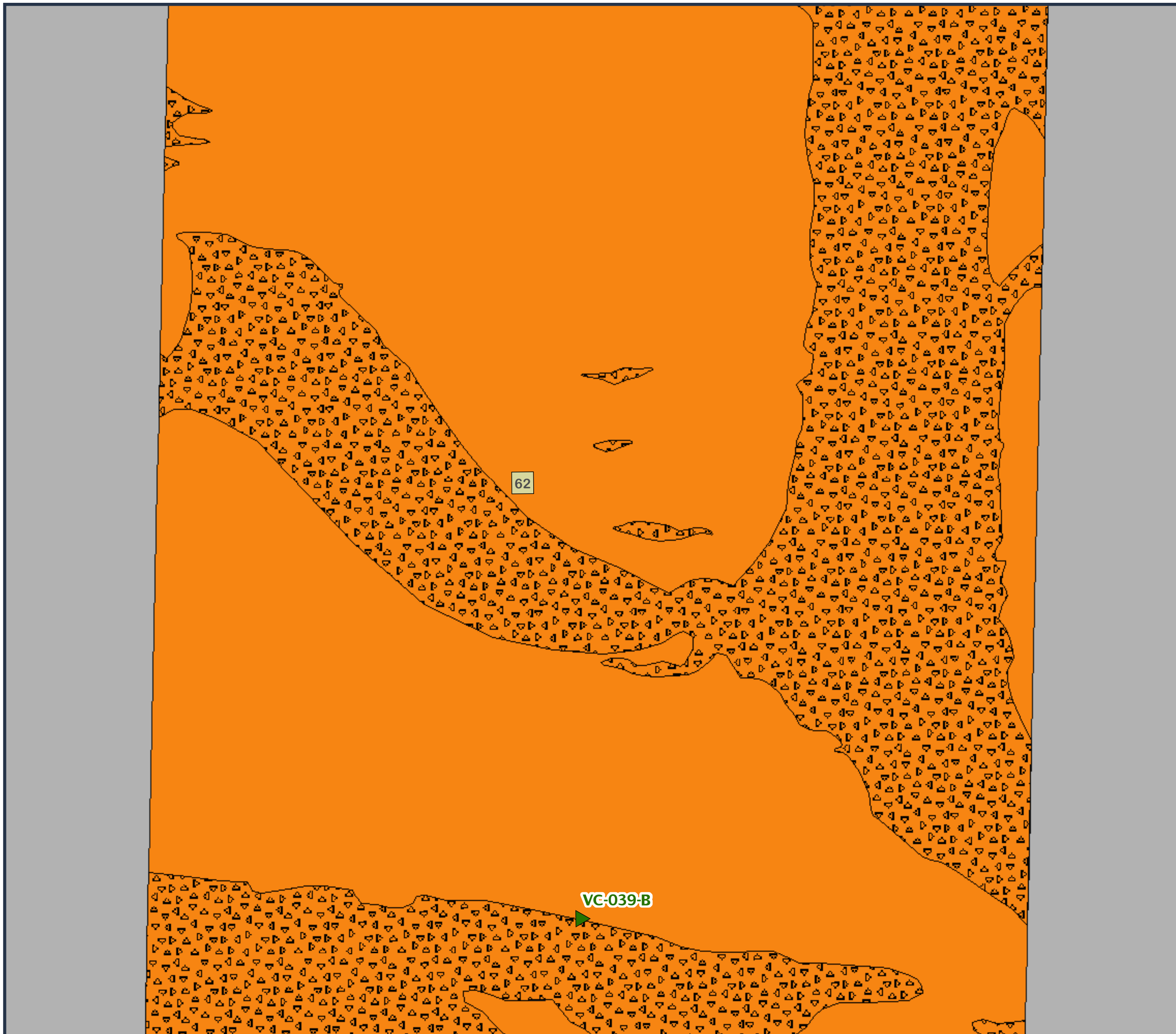
0 60 120 Meters

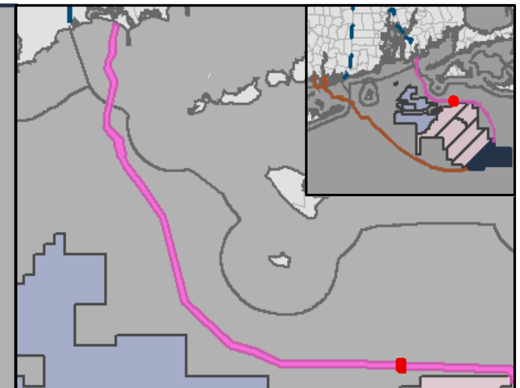
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

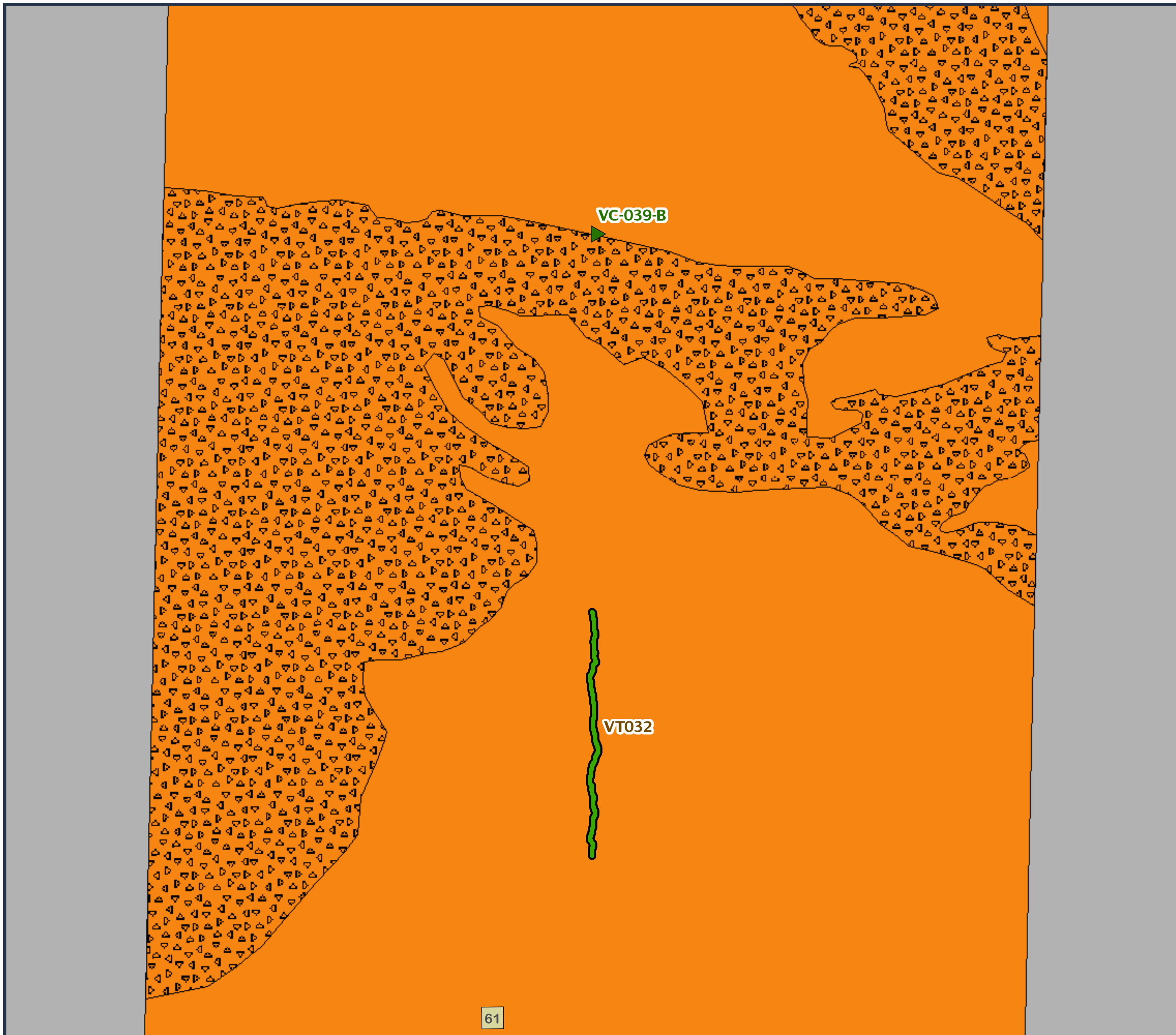
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore

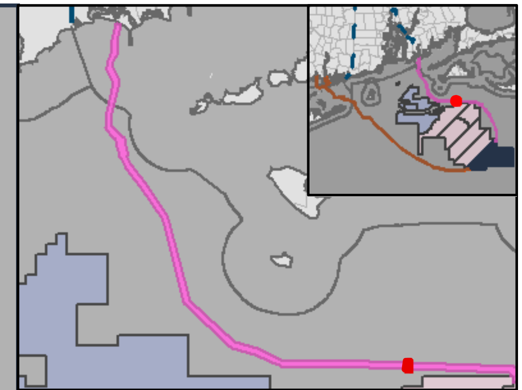
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore
- Soft Bottom Station - Video

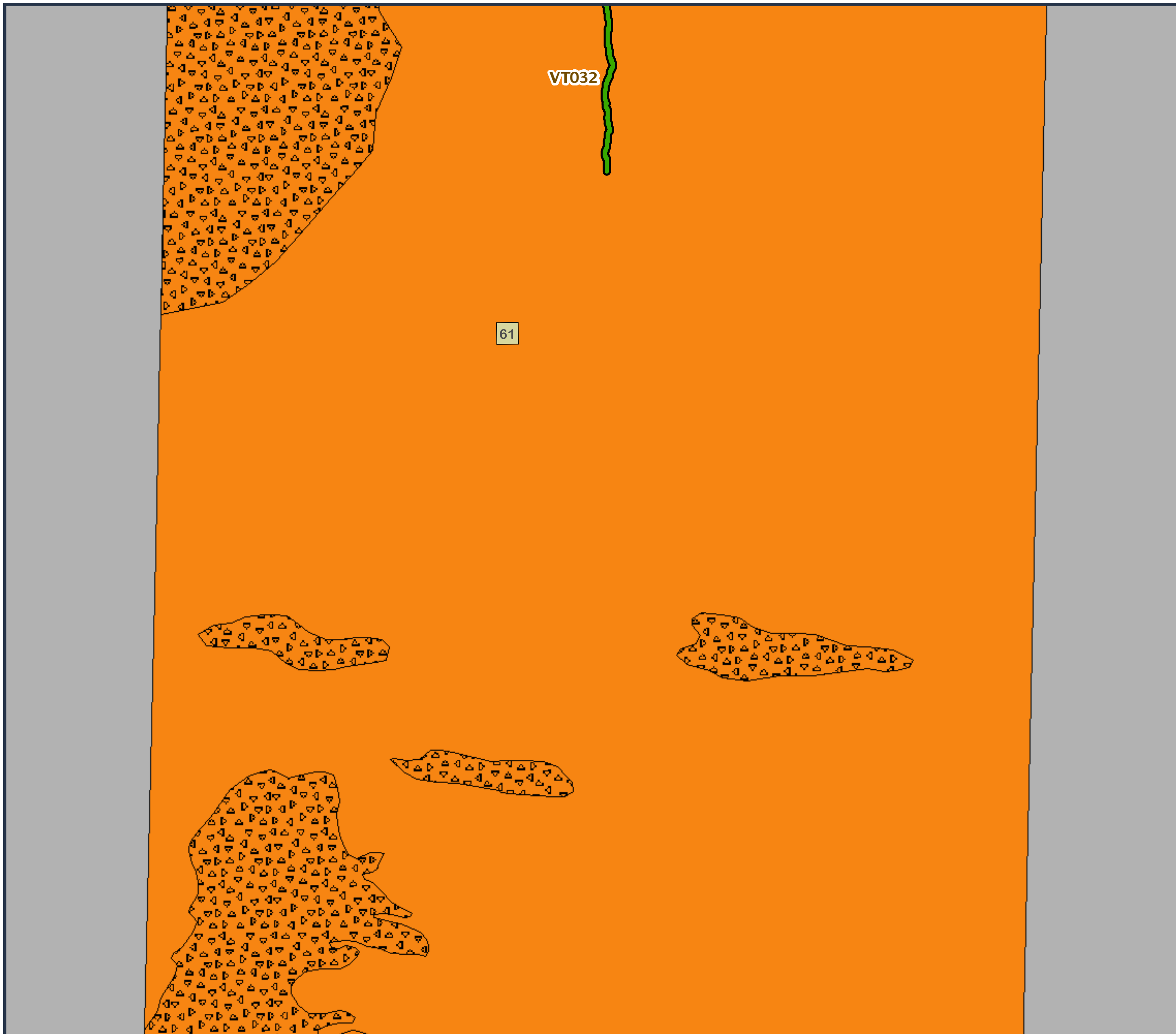
Scale 1:5,000
1 inch = 0 km

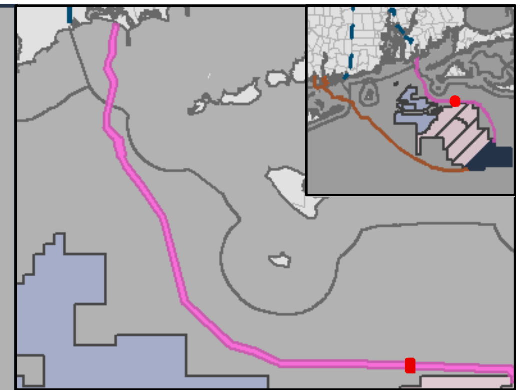
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Bottom Station - Video Transect

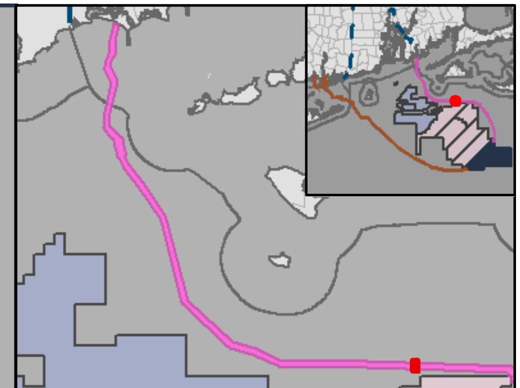
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

Lease Area OCS-A 0522

Massachusetts Wind Energy Area (WEA) Lease Areas

Rhode Island/Massachusetts WEA Lease Areas

Massachusetts Offshore Export Cable Corridor

Connecticut Offshore Export Cable Corridor

Kilometer Post

Soft Bottom Habitat

Ripple

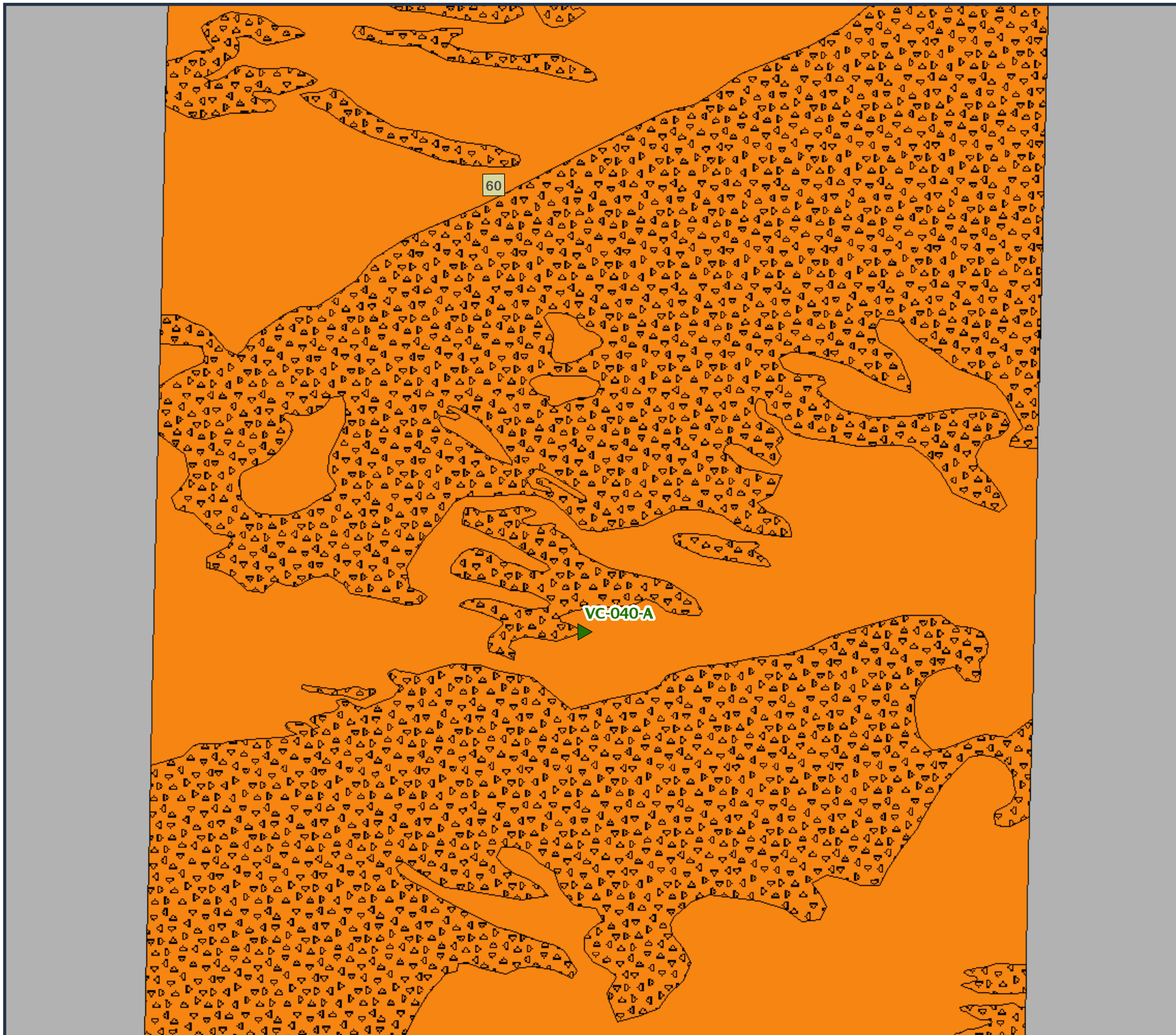
Scale 1:5,000
1 inch = 0 km

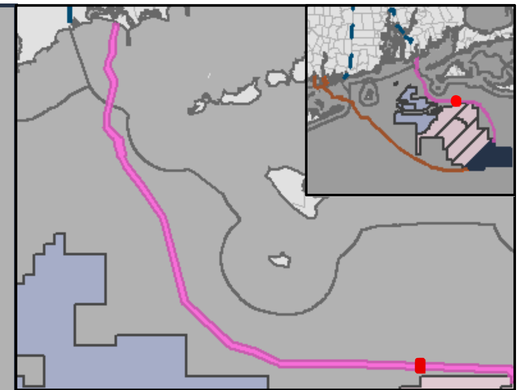
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





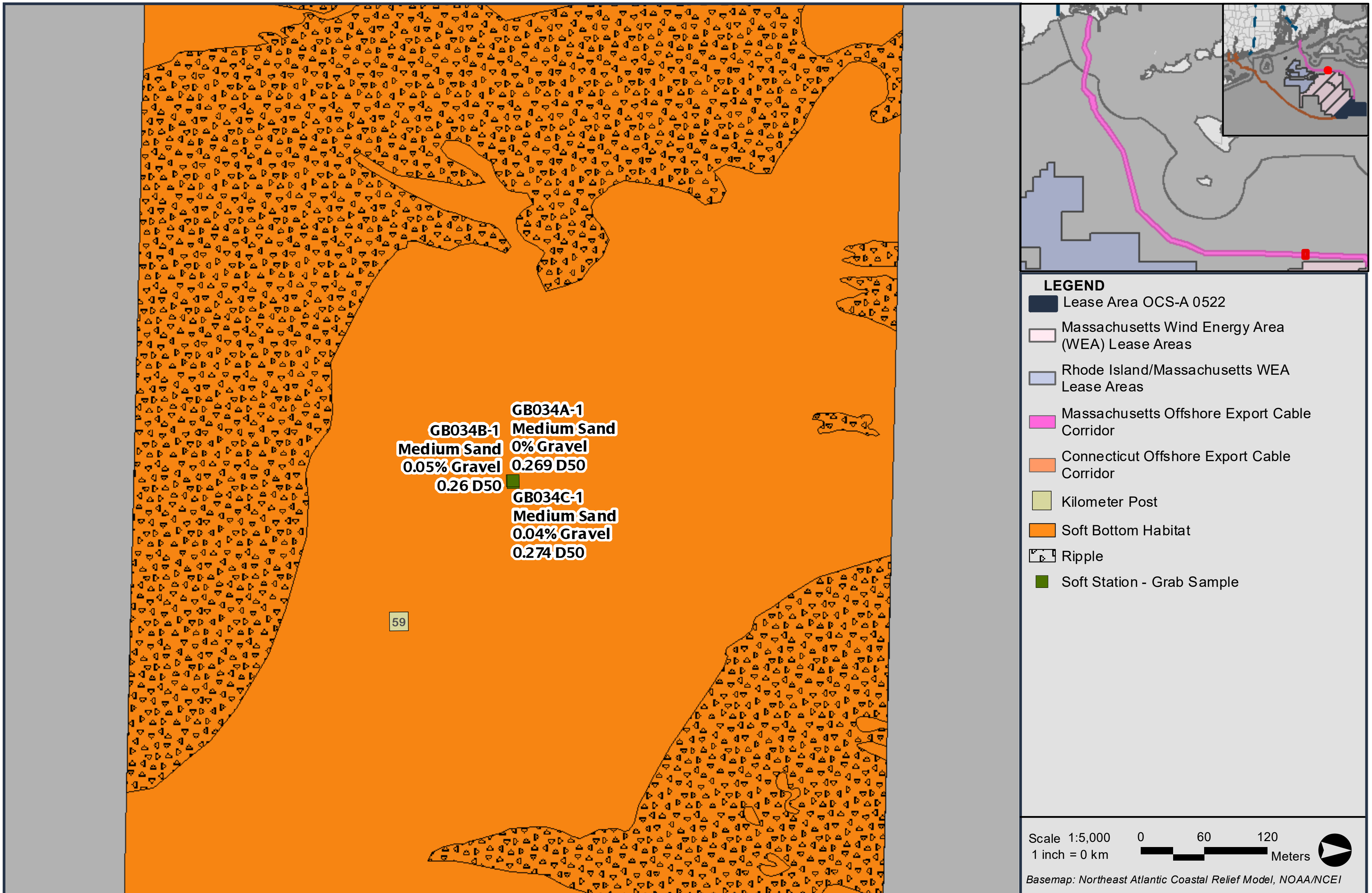
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Ripple
Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

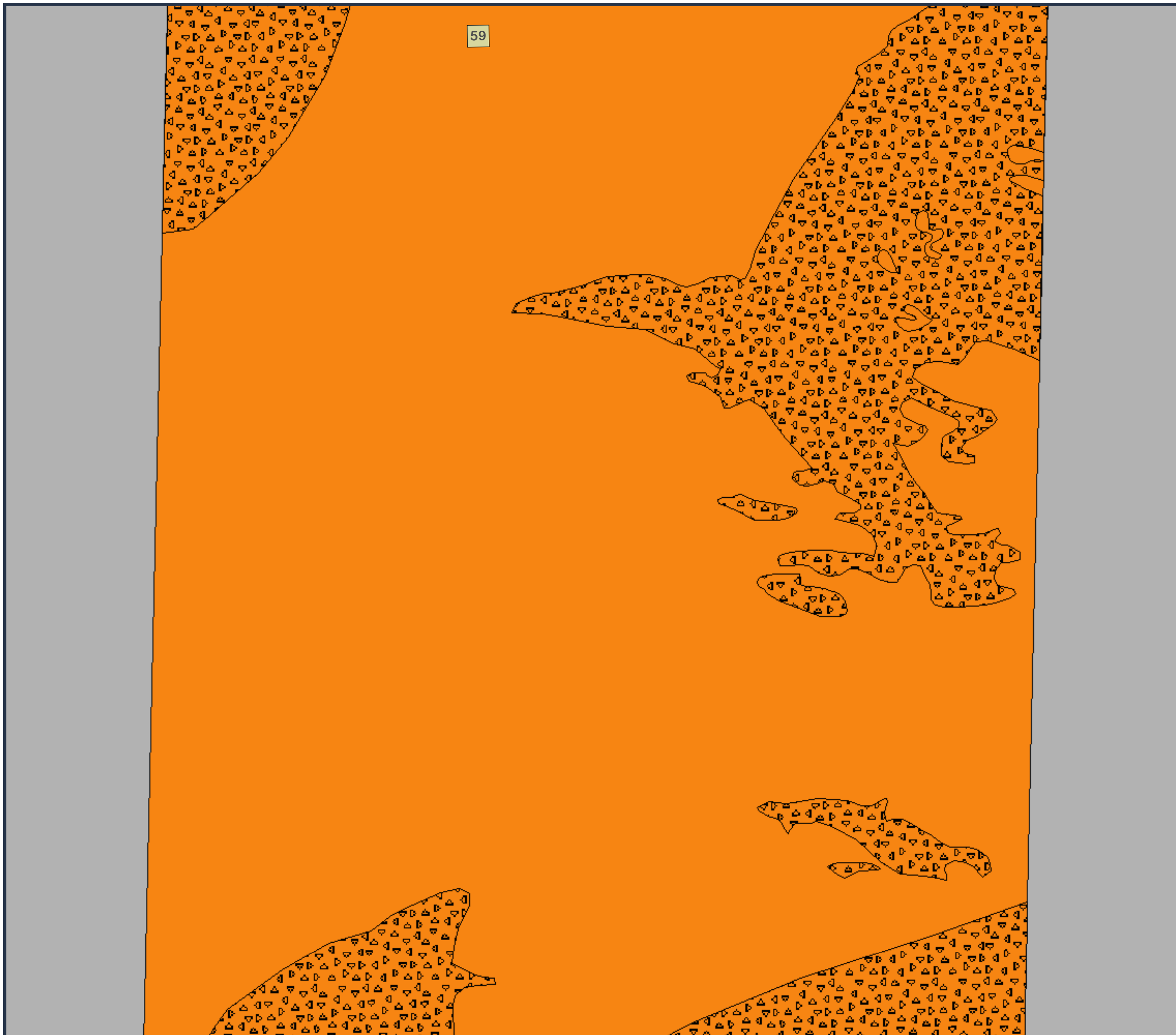
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Grab Sample

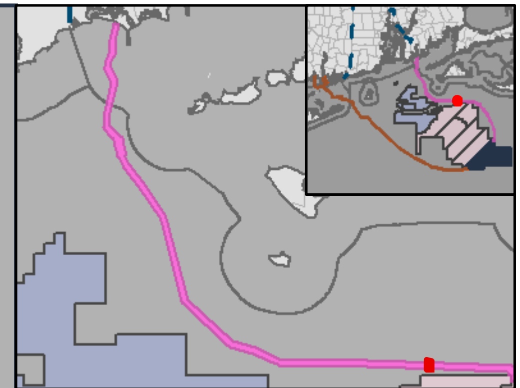
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

Lease Area OCS-A 0522

Massachusetts Wind Energy Area (WEA) Lease Areas

Rhode Island/Massachusetts WEA Lease Areas

Massachusetts Offshore Export Cable Corridor

Connecticut Offshore Export Cable Corridor

Kilometer Post

Soft Bottom Habitat

Ripple

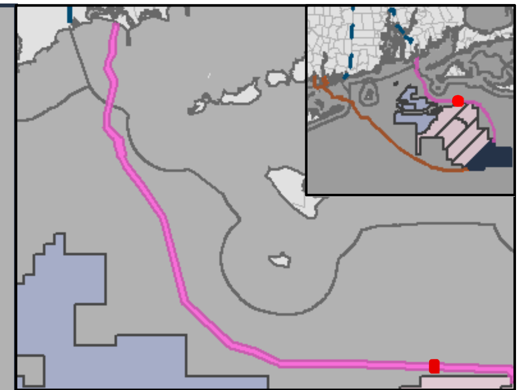
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore

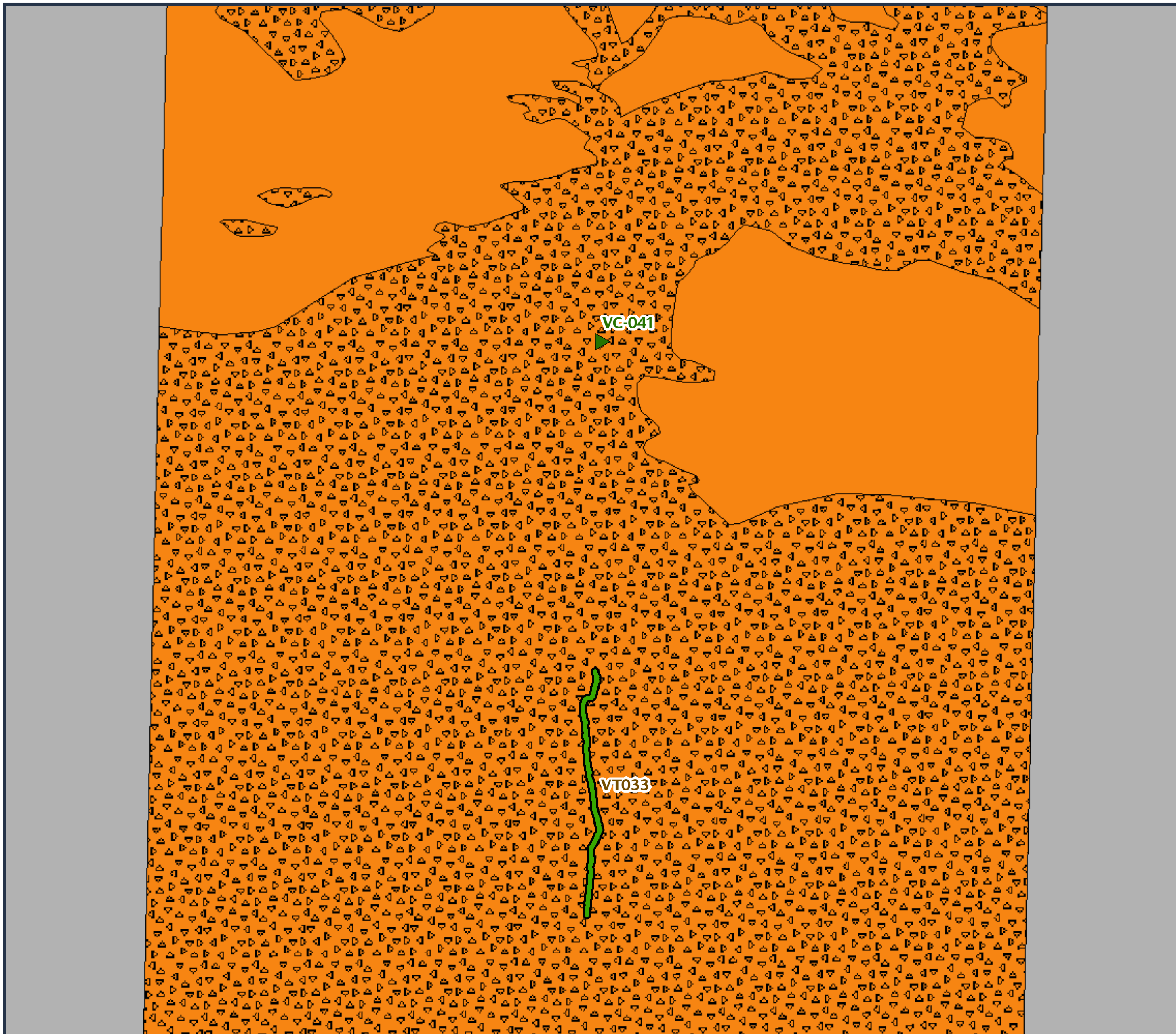
Scale 1:5,000
1 inch = 0 km

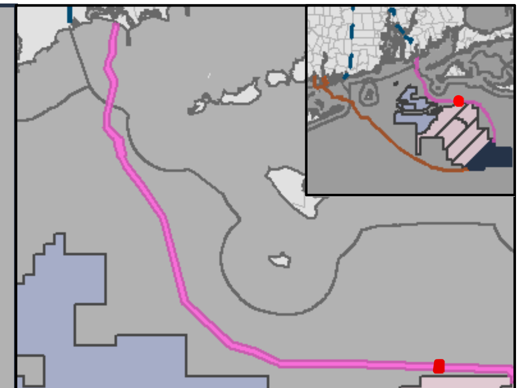
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





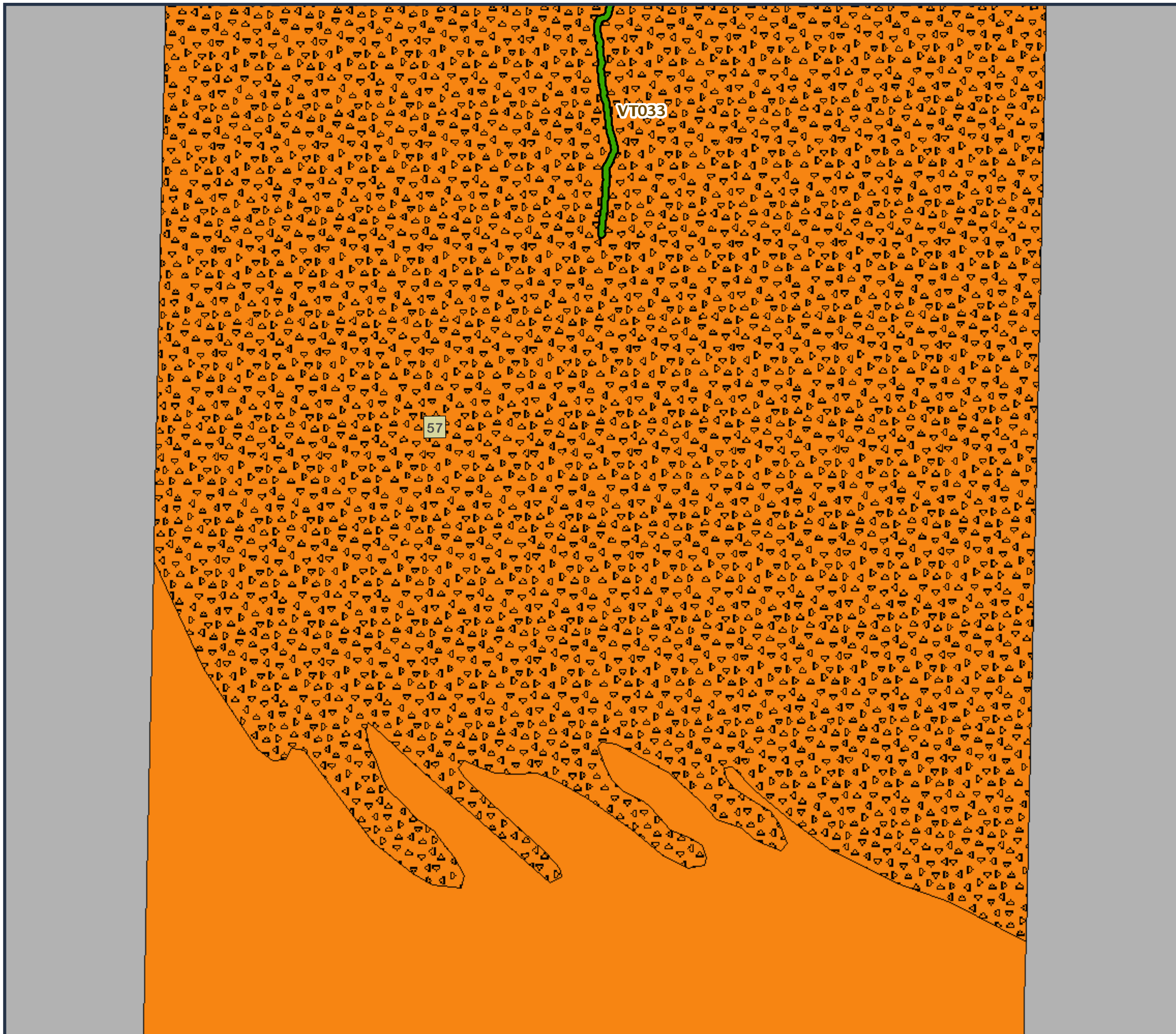
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Ripple
Soft Station - Vibracore
Soft Bottom Station - Video

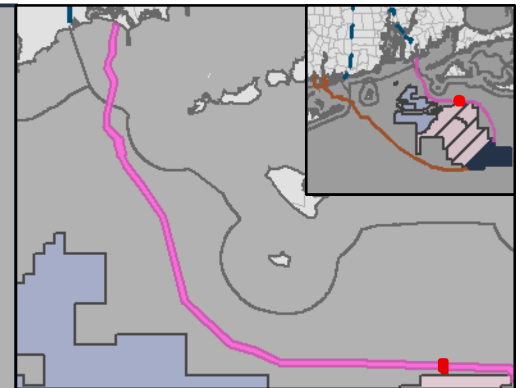
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Bottom Station - Video Transect

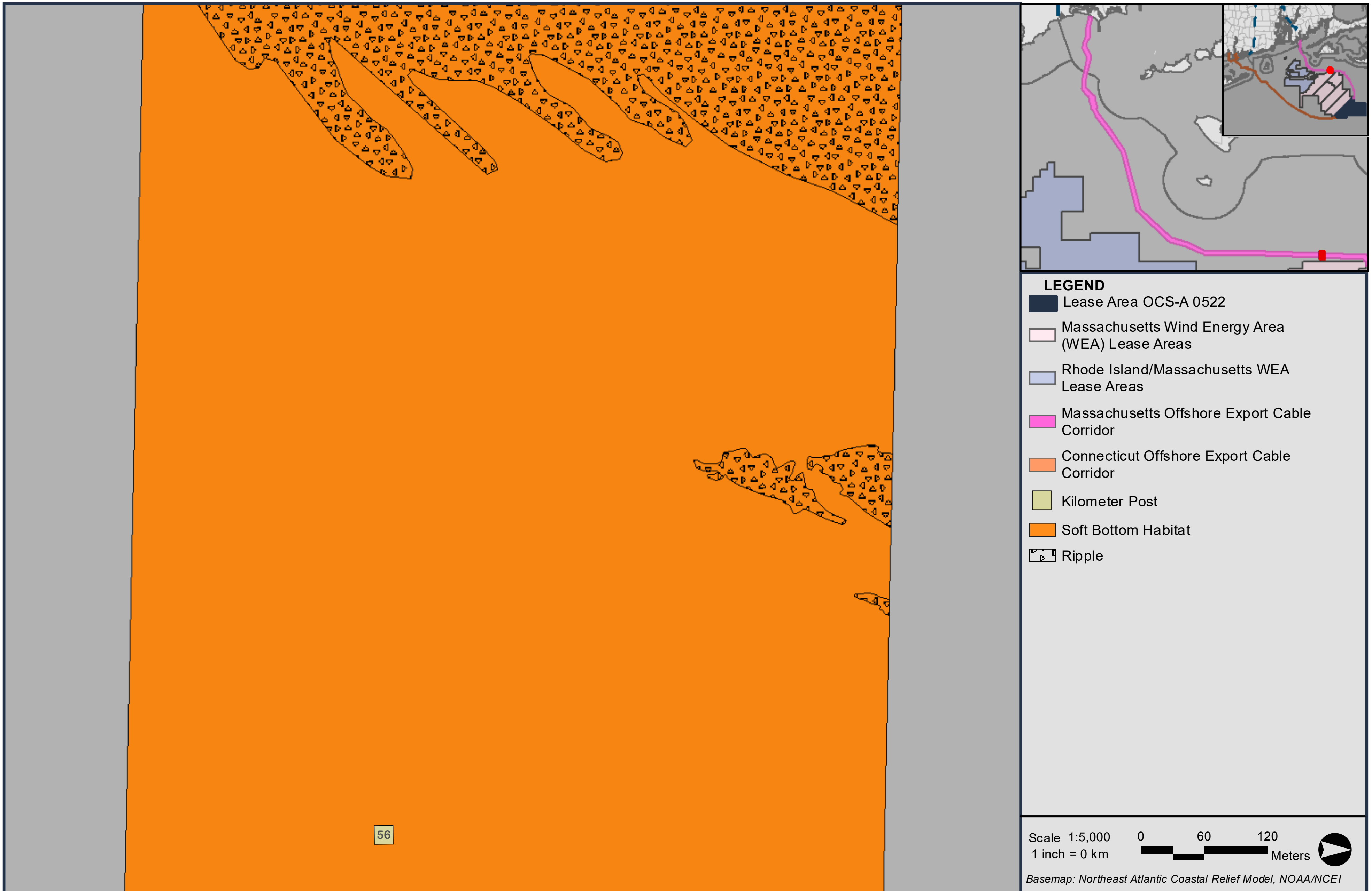
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

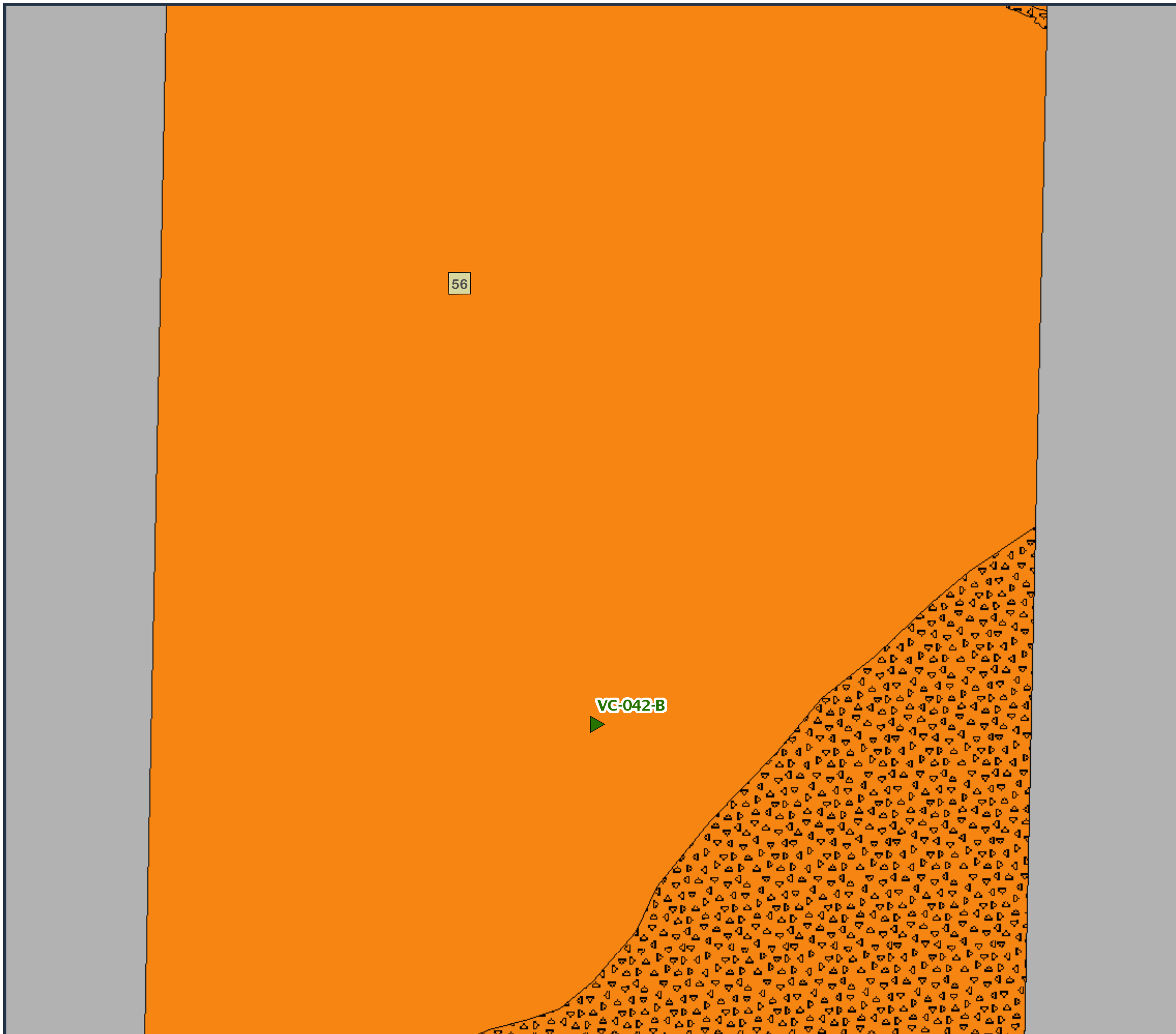
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

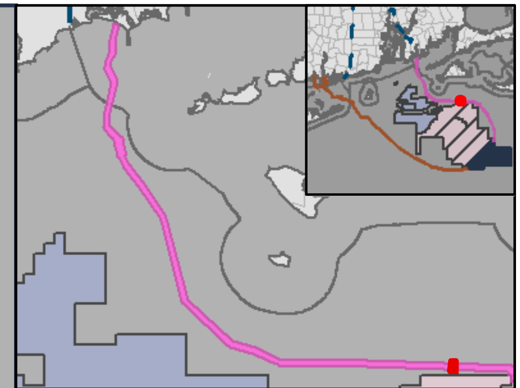
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore

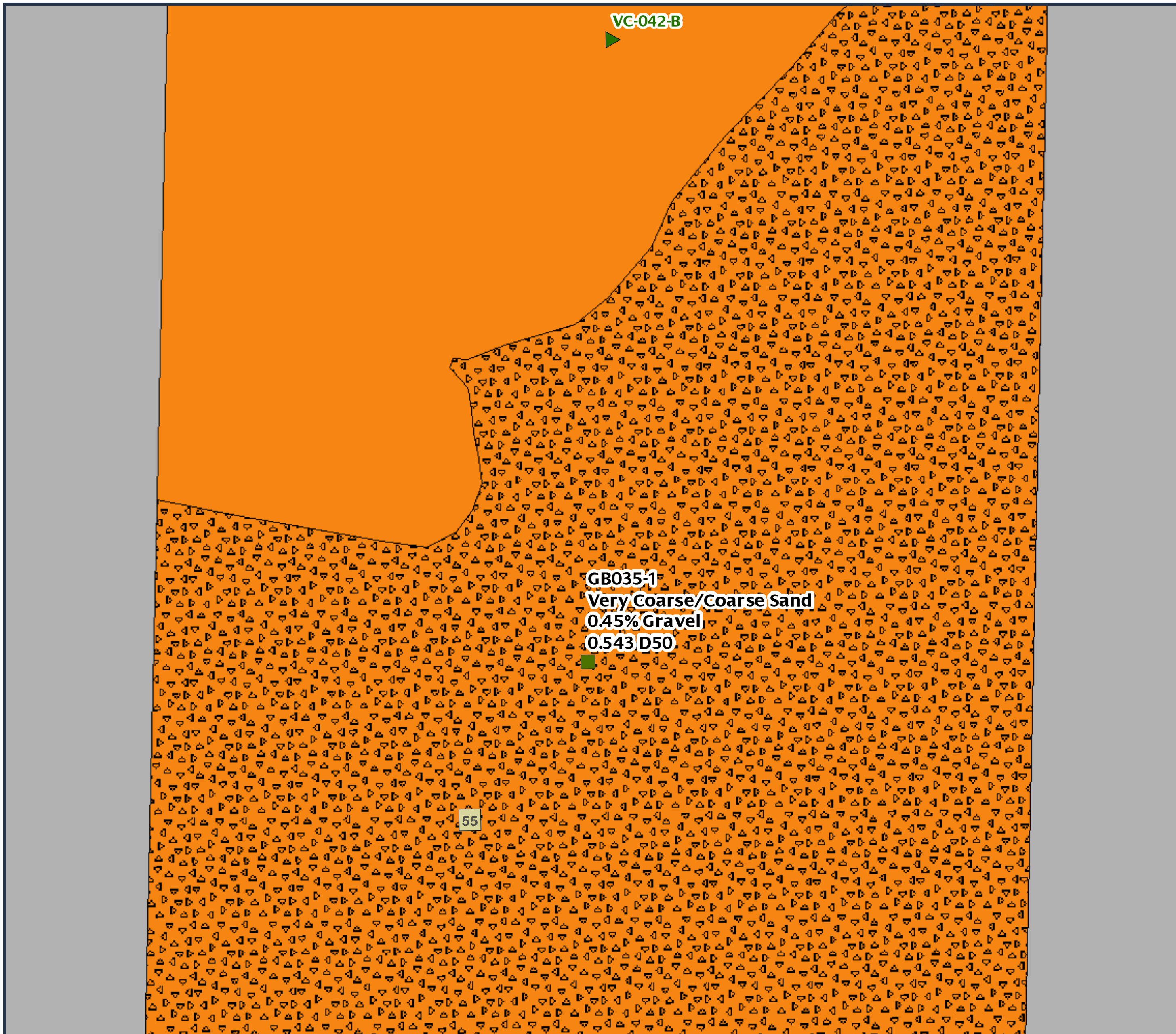
Scale 1:5,000
1 inch = 0 km

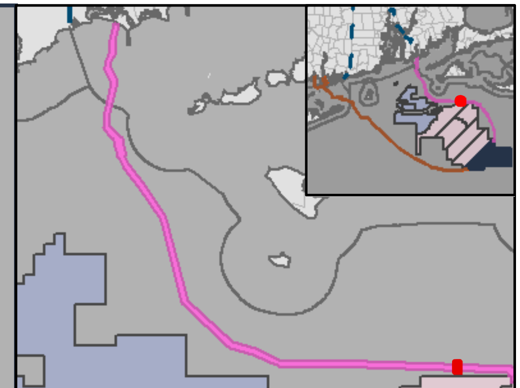
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



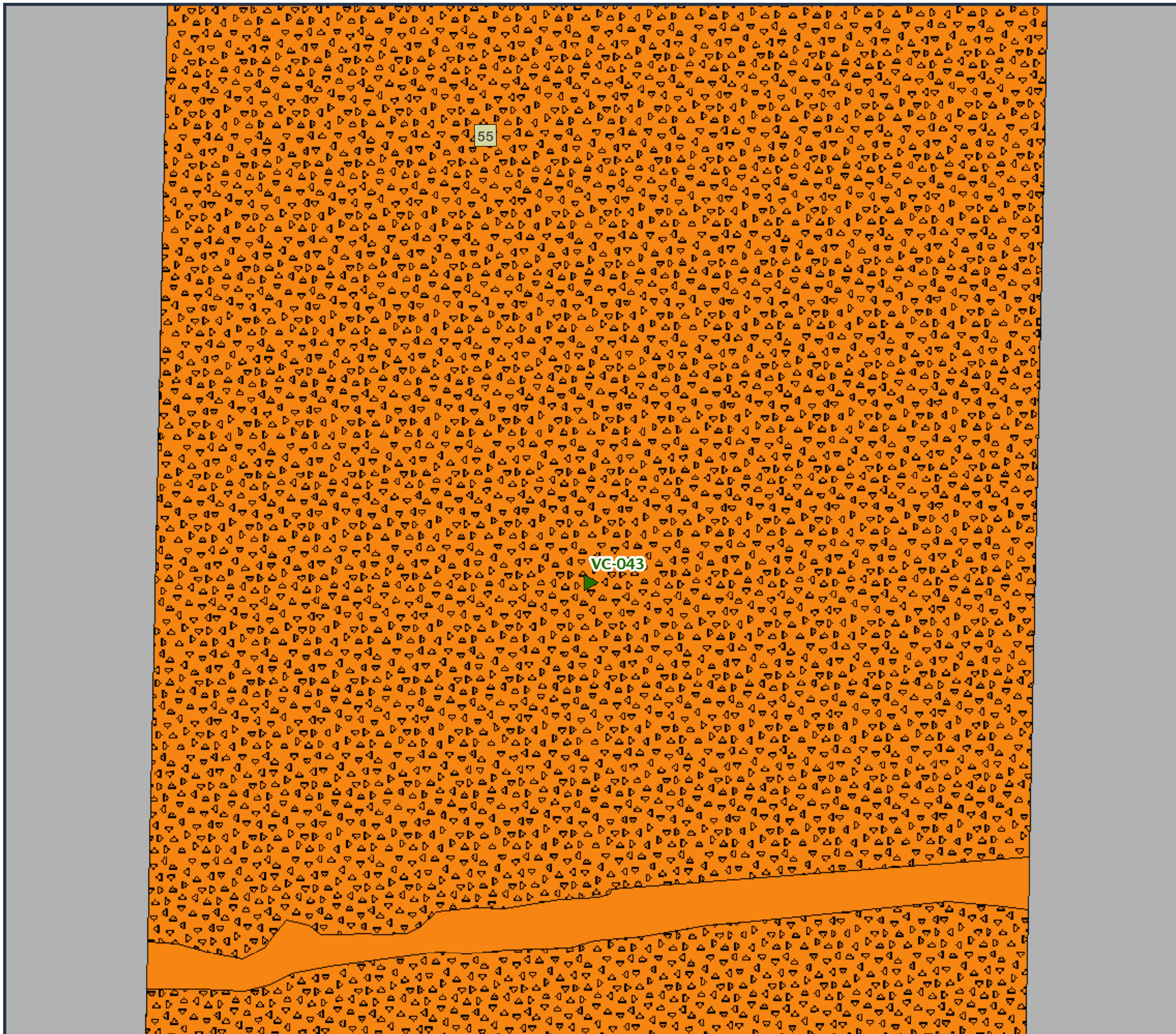


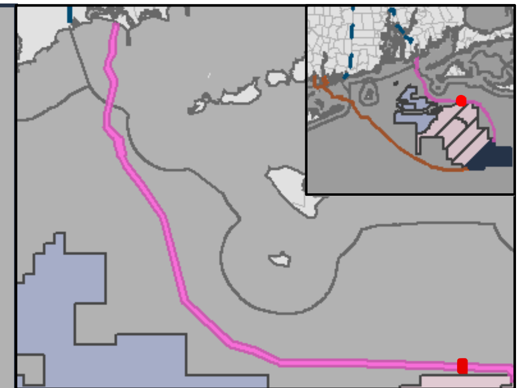
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Ripple
Soft Station - Vibracore
Soft Station - Grab Sample

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore

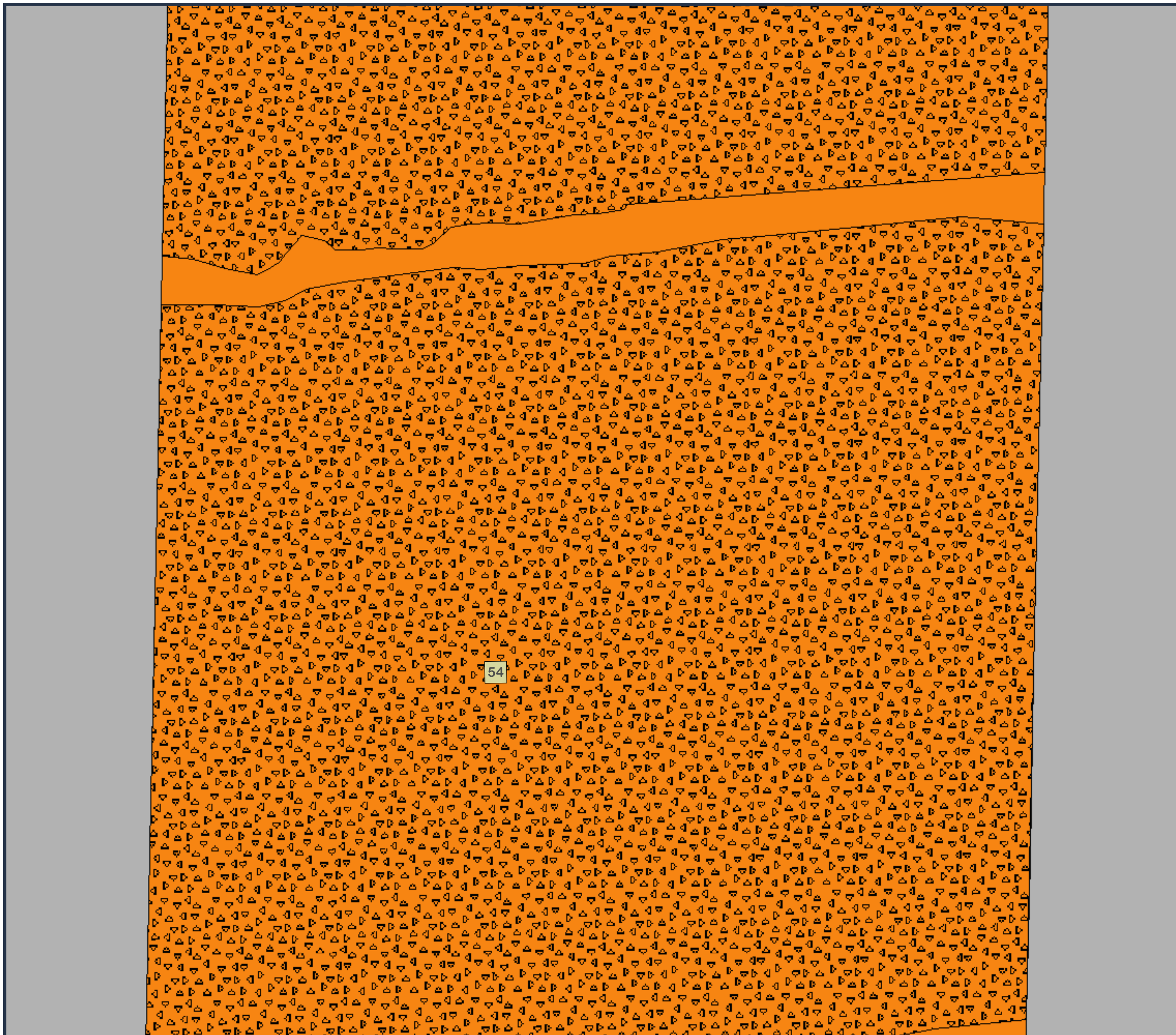
Scale 1:5,000
1 inch = 0 km

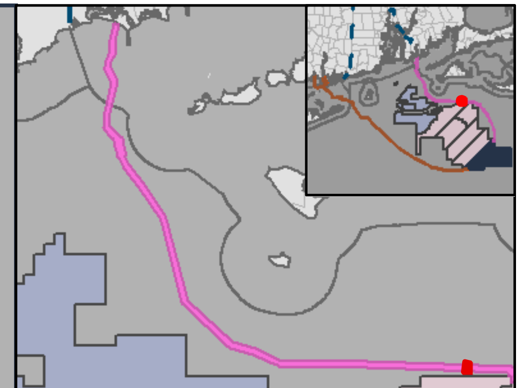
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





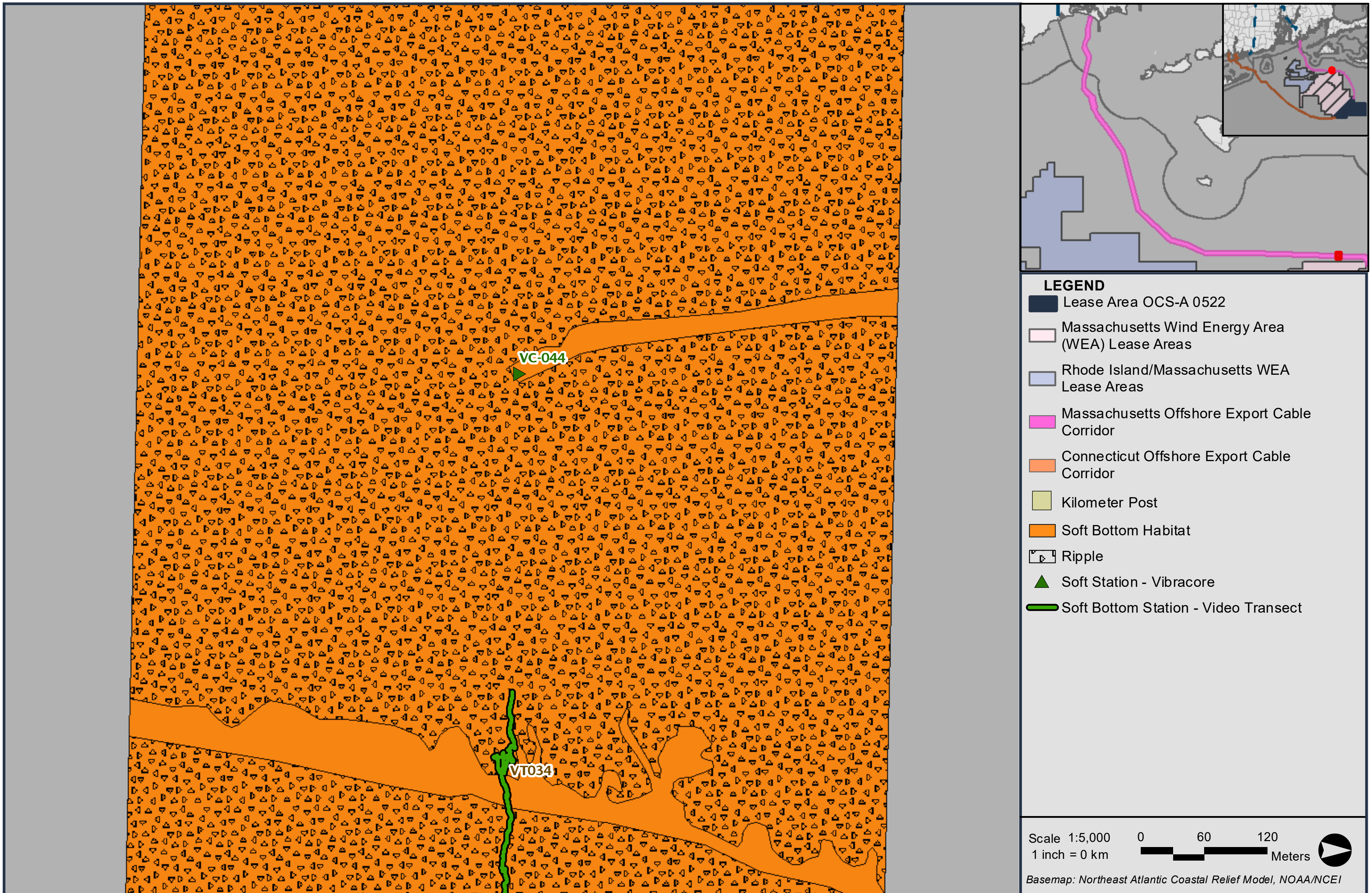
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Ripple

Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

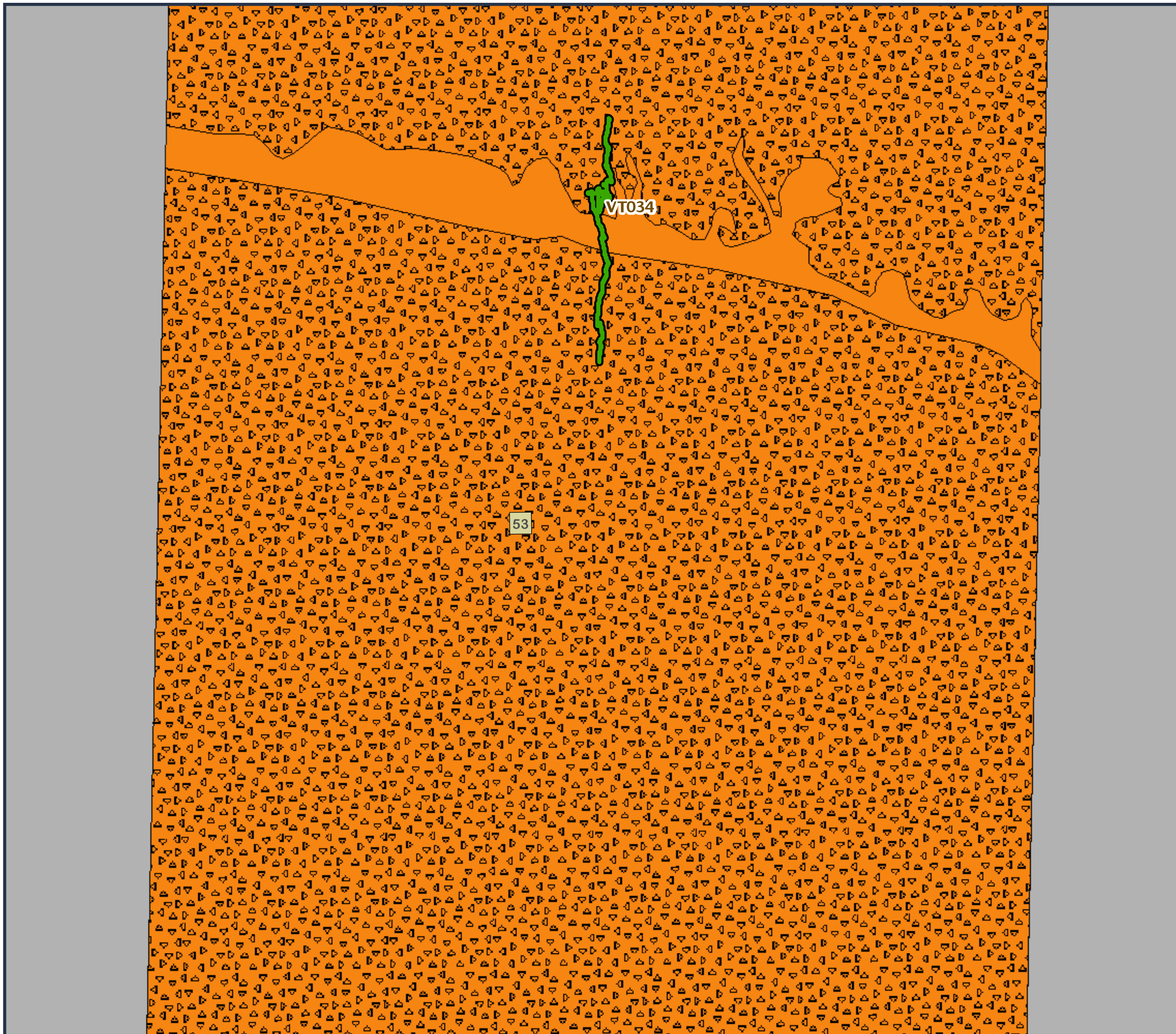
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

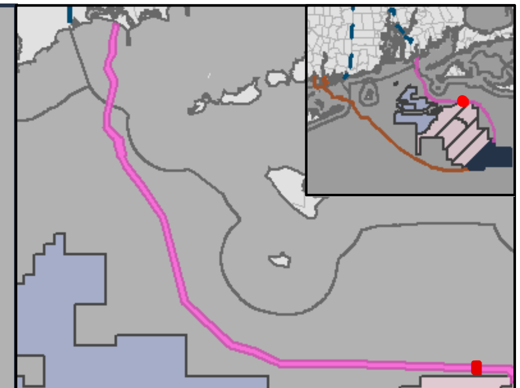
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Bottom Station - Video

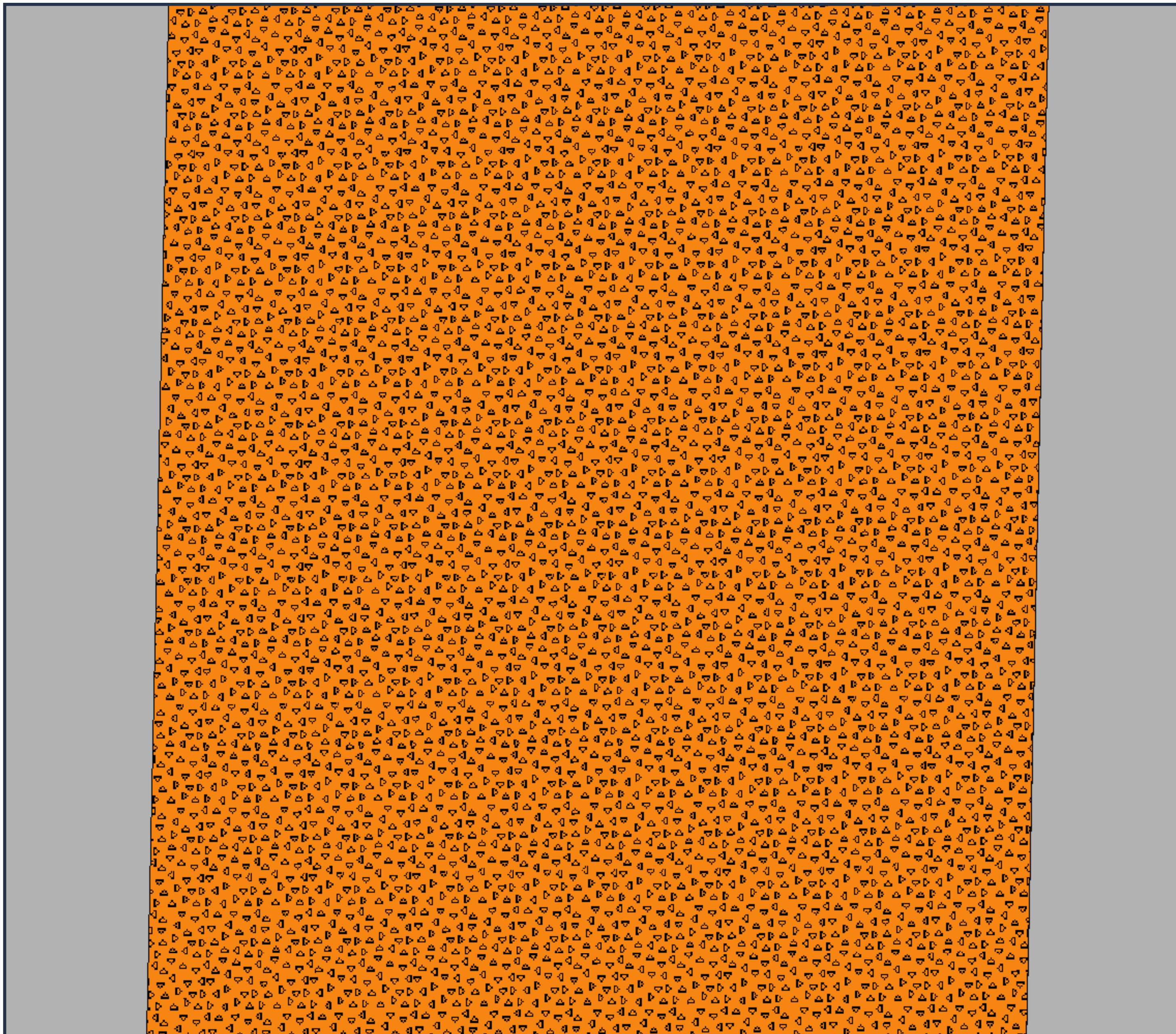
Scale 1:5,000
1 inch = 0 km

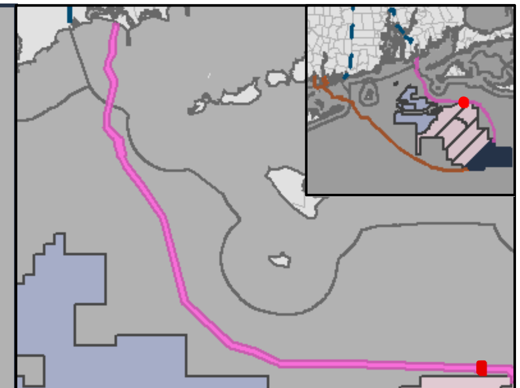
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple

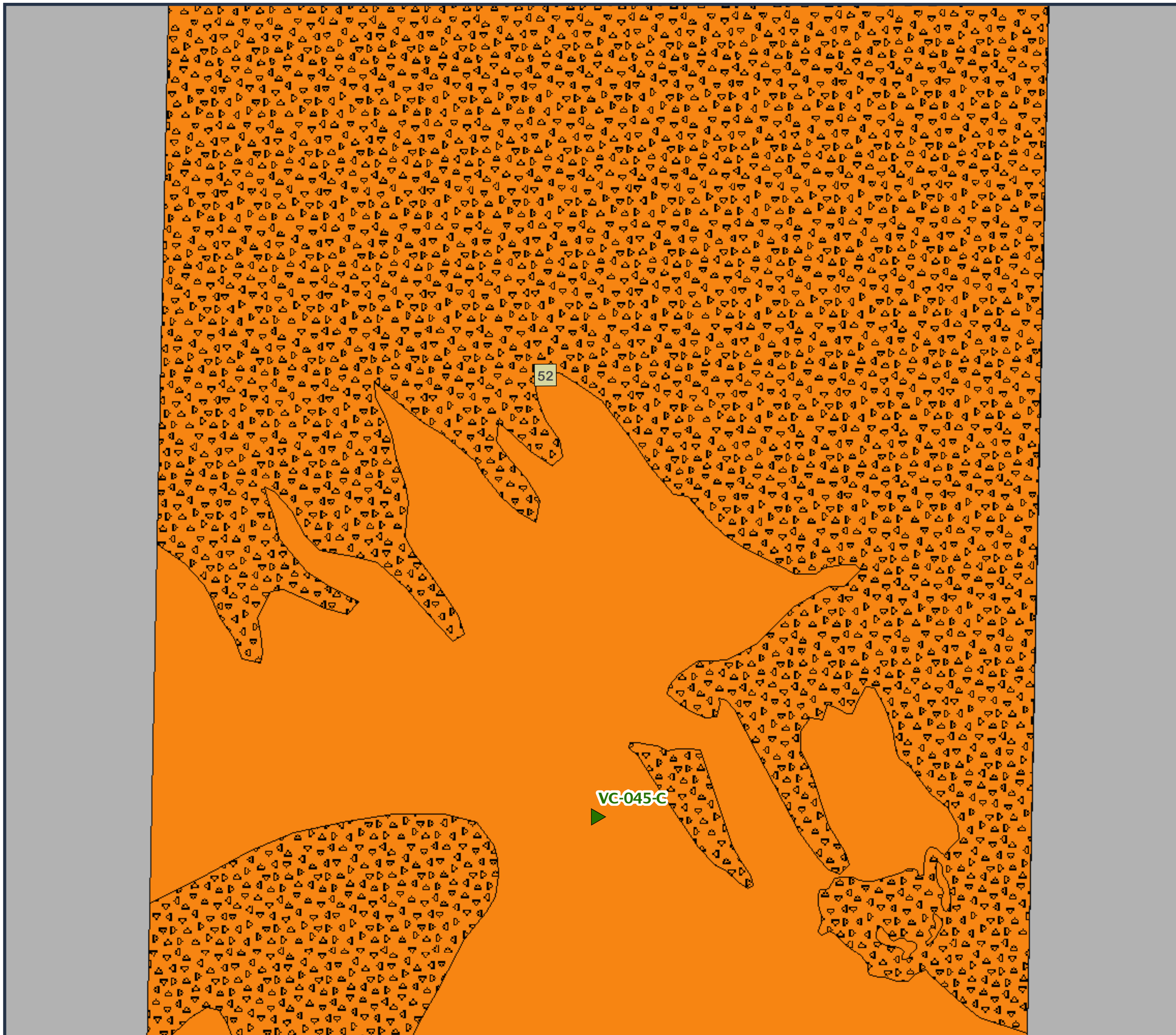
Scale 1:5,000
1 inch = 0 km

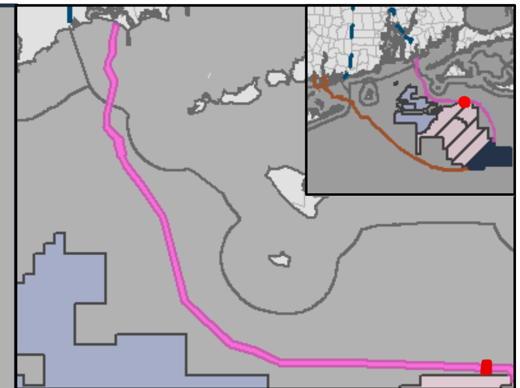
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



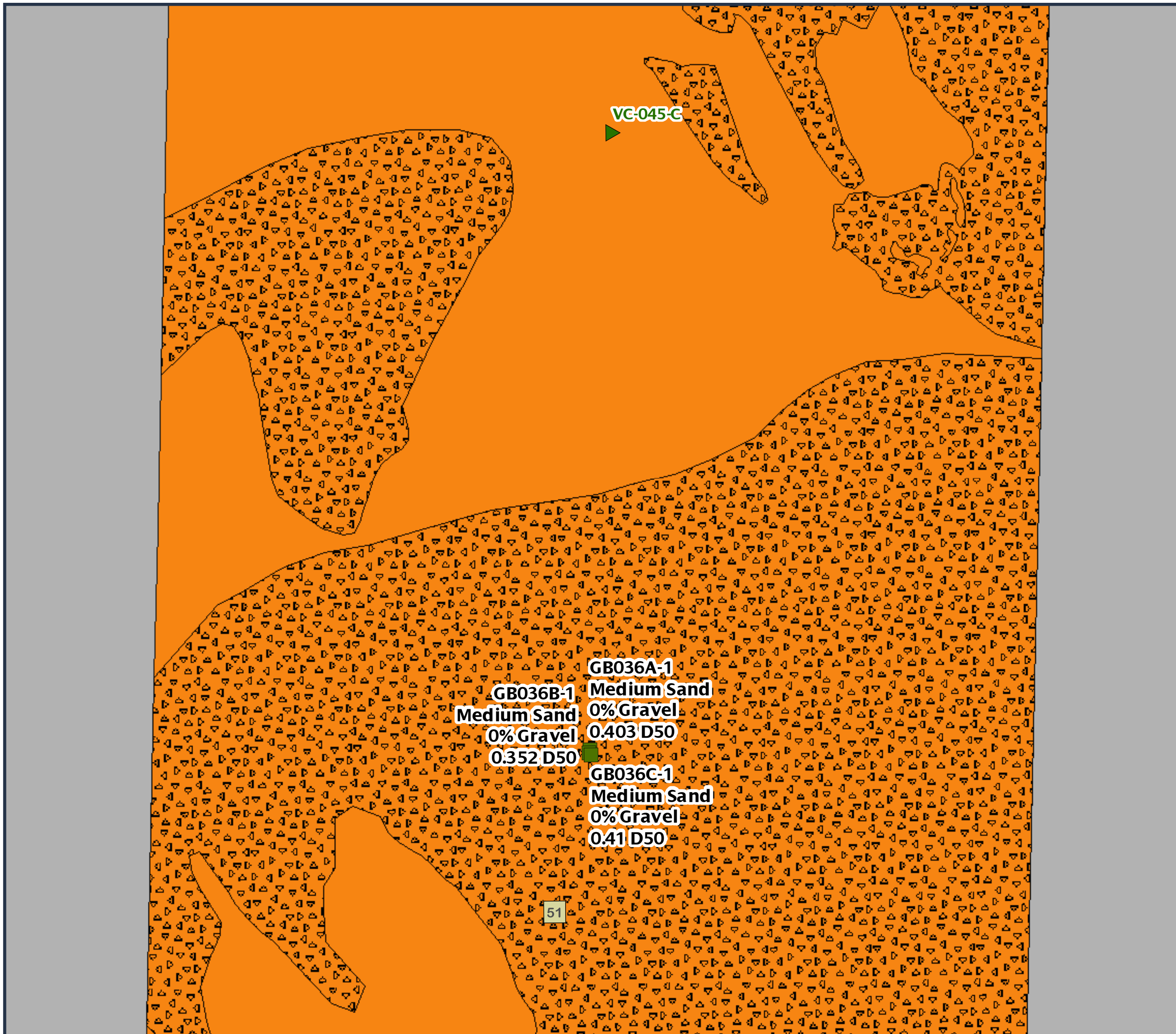


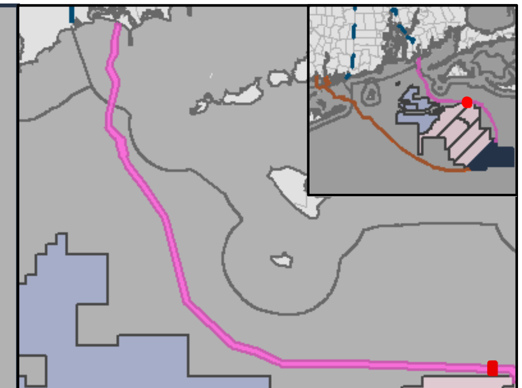
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Ripple
Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

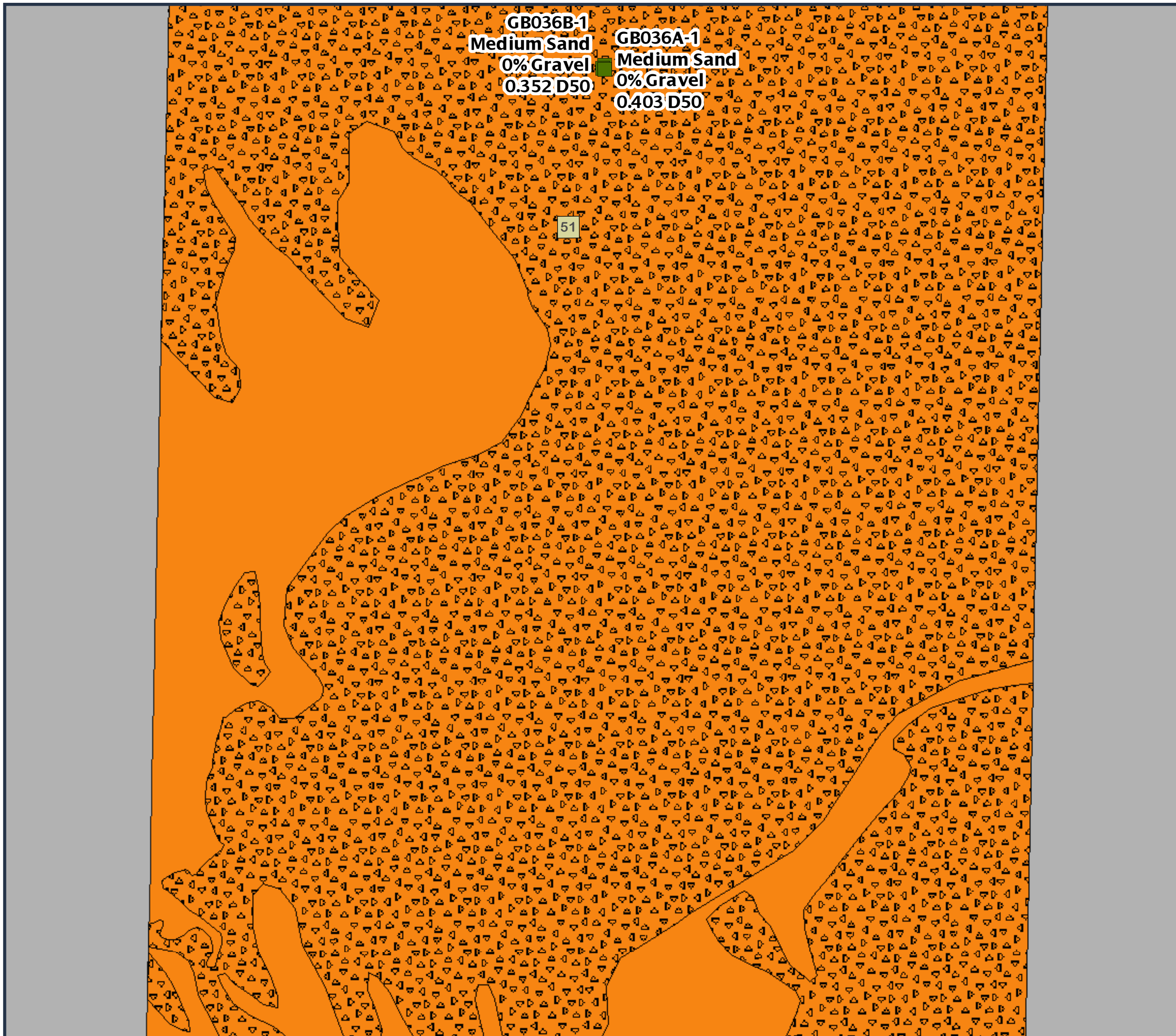
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

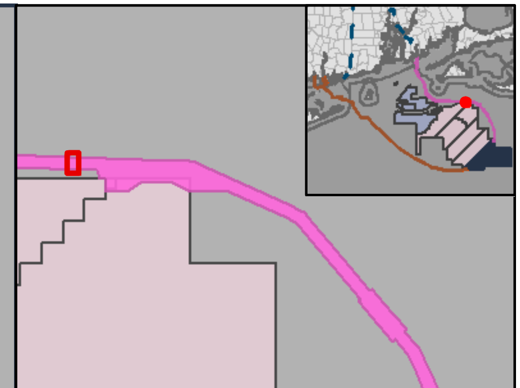




Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Grab Sample

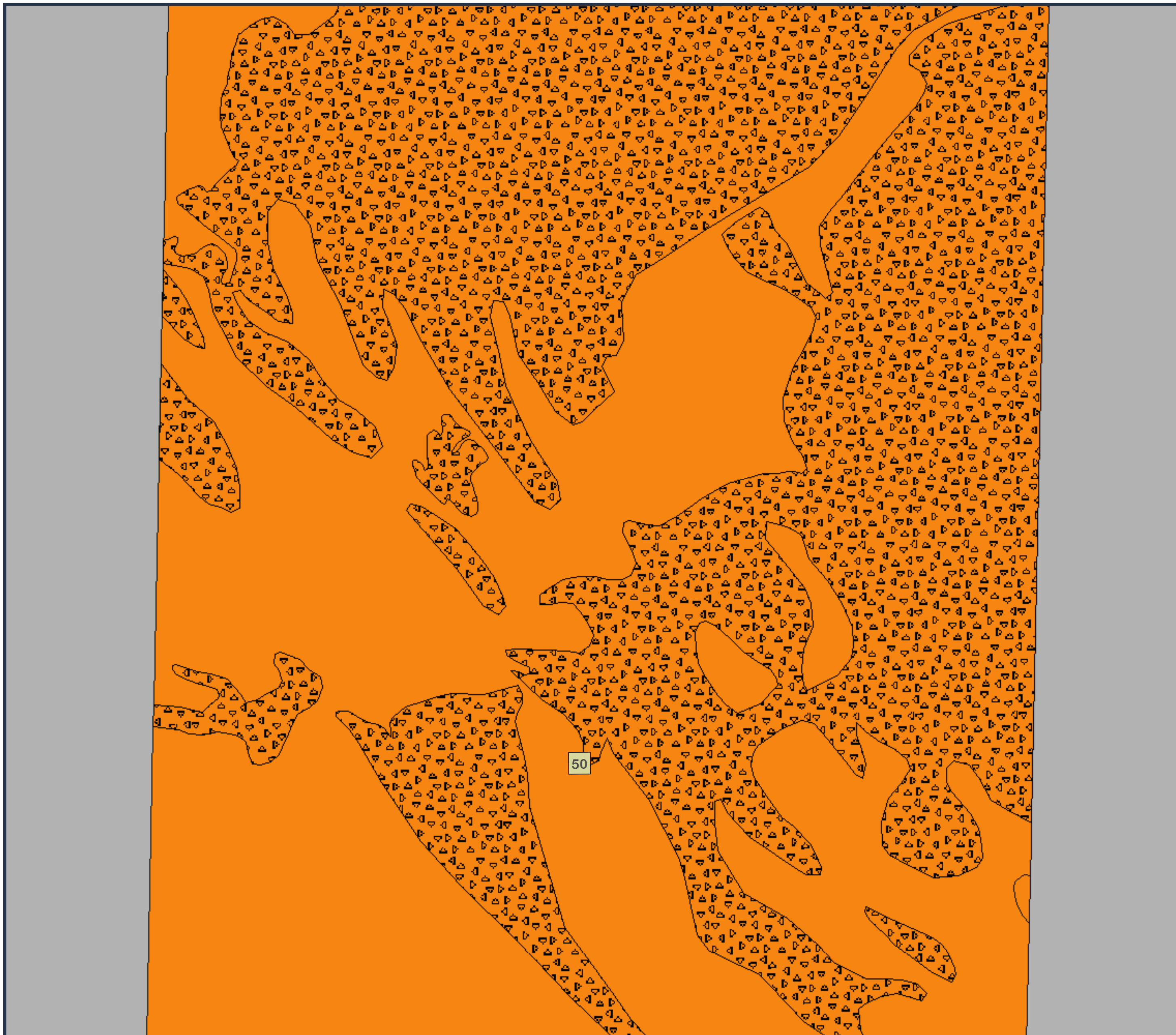
Scale 1:5,000
1 inch = 0 km

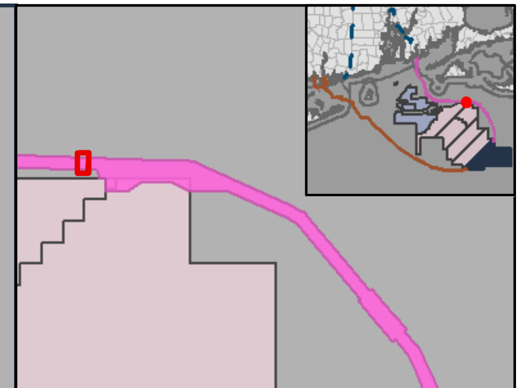
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

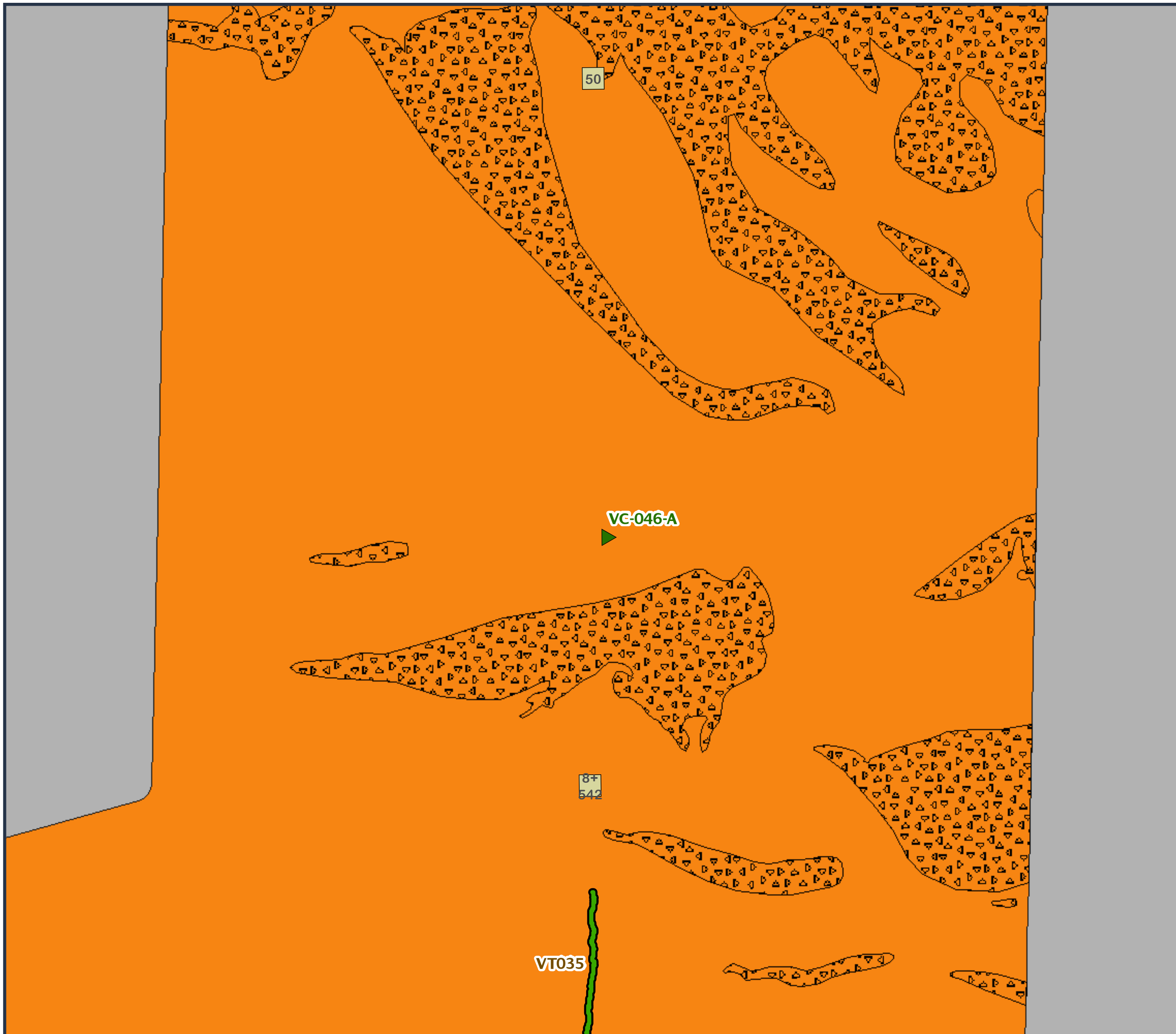
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple

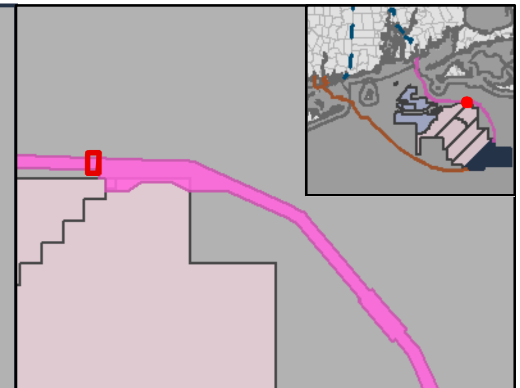
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

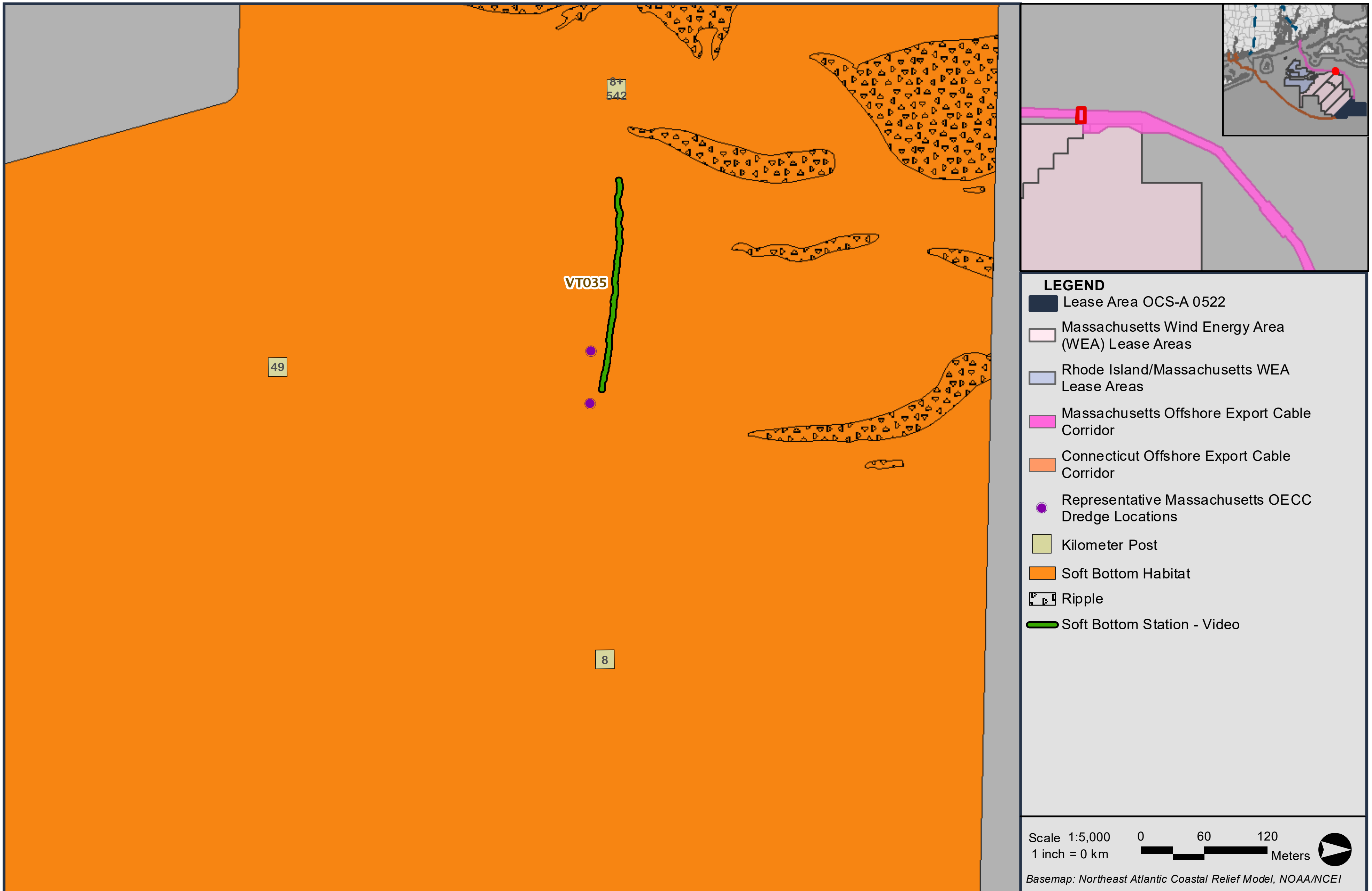
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

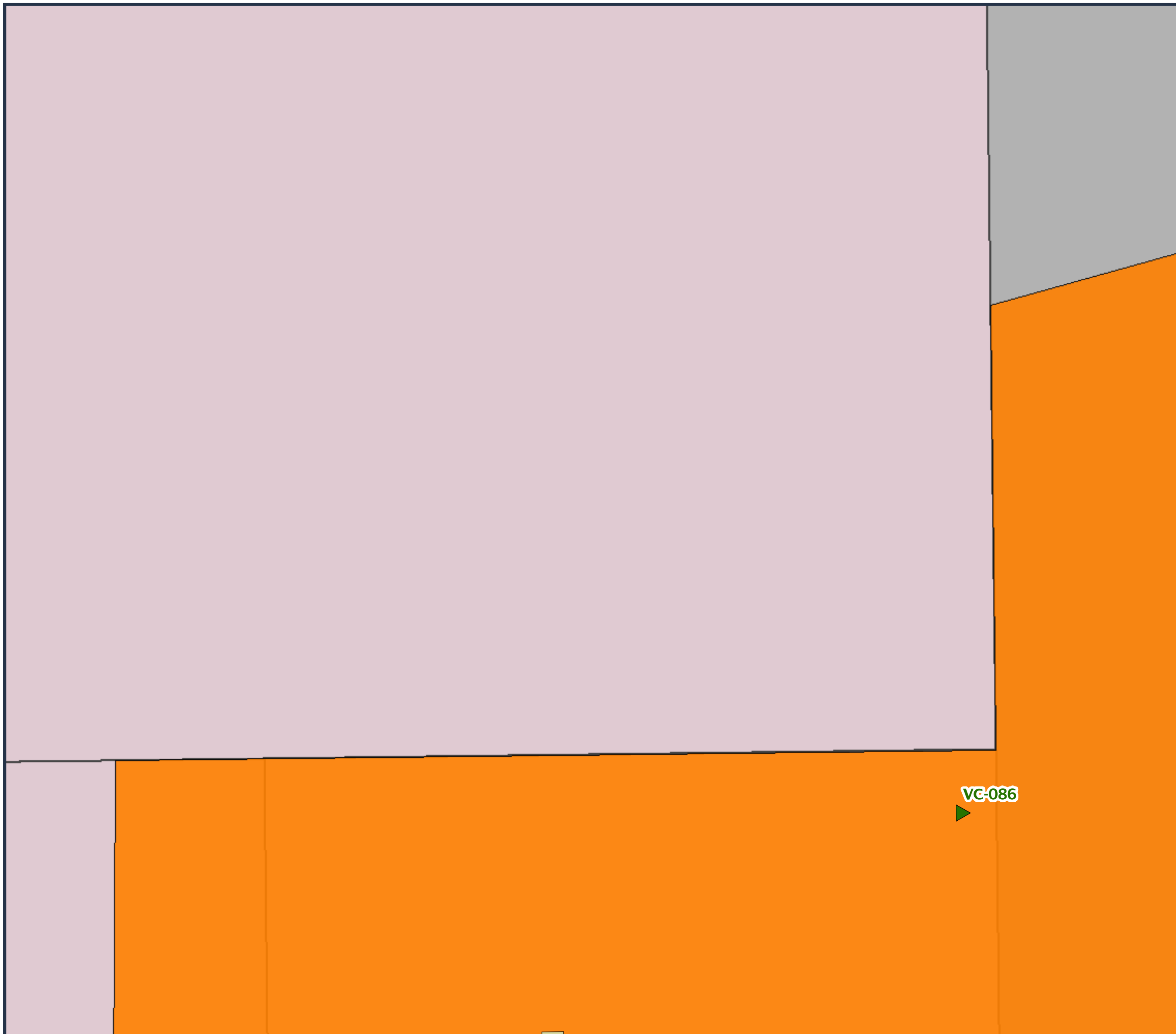
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

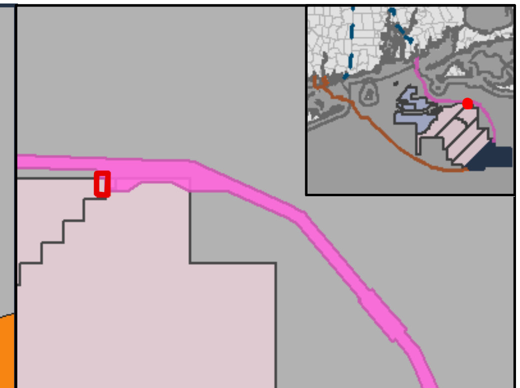
VINEYARD NORTHEAST
VINEYARD OFFSHORE



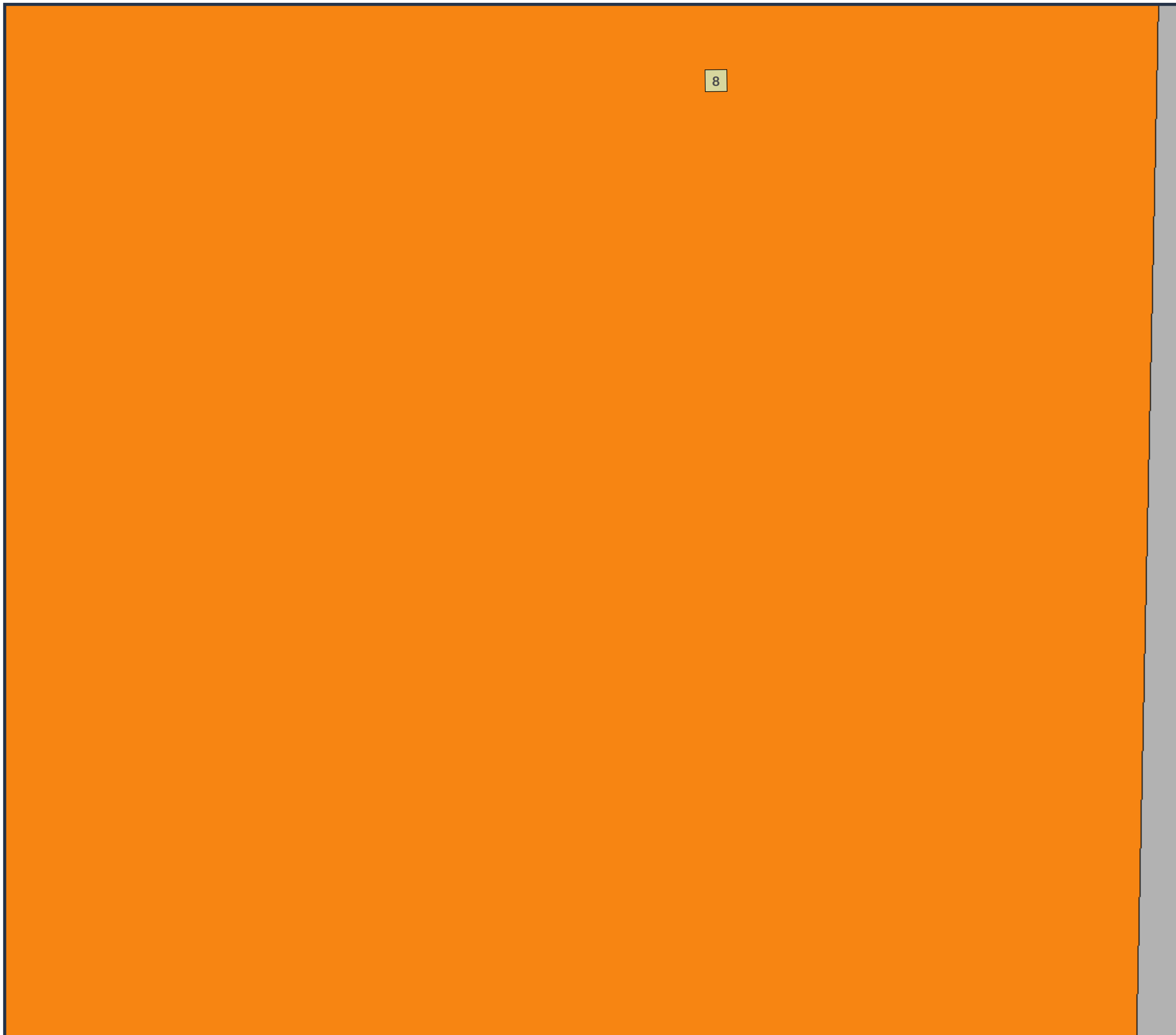
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

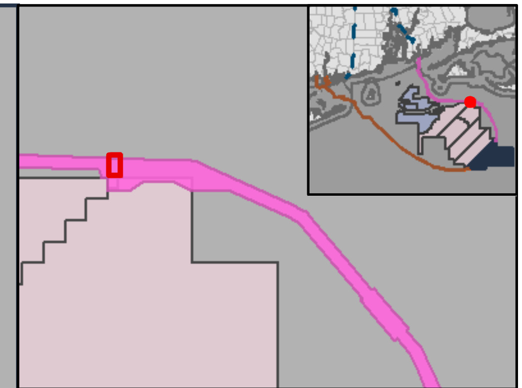
VINEYARD NORTHEAST
VINEYARD OFFSHORE





Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat

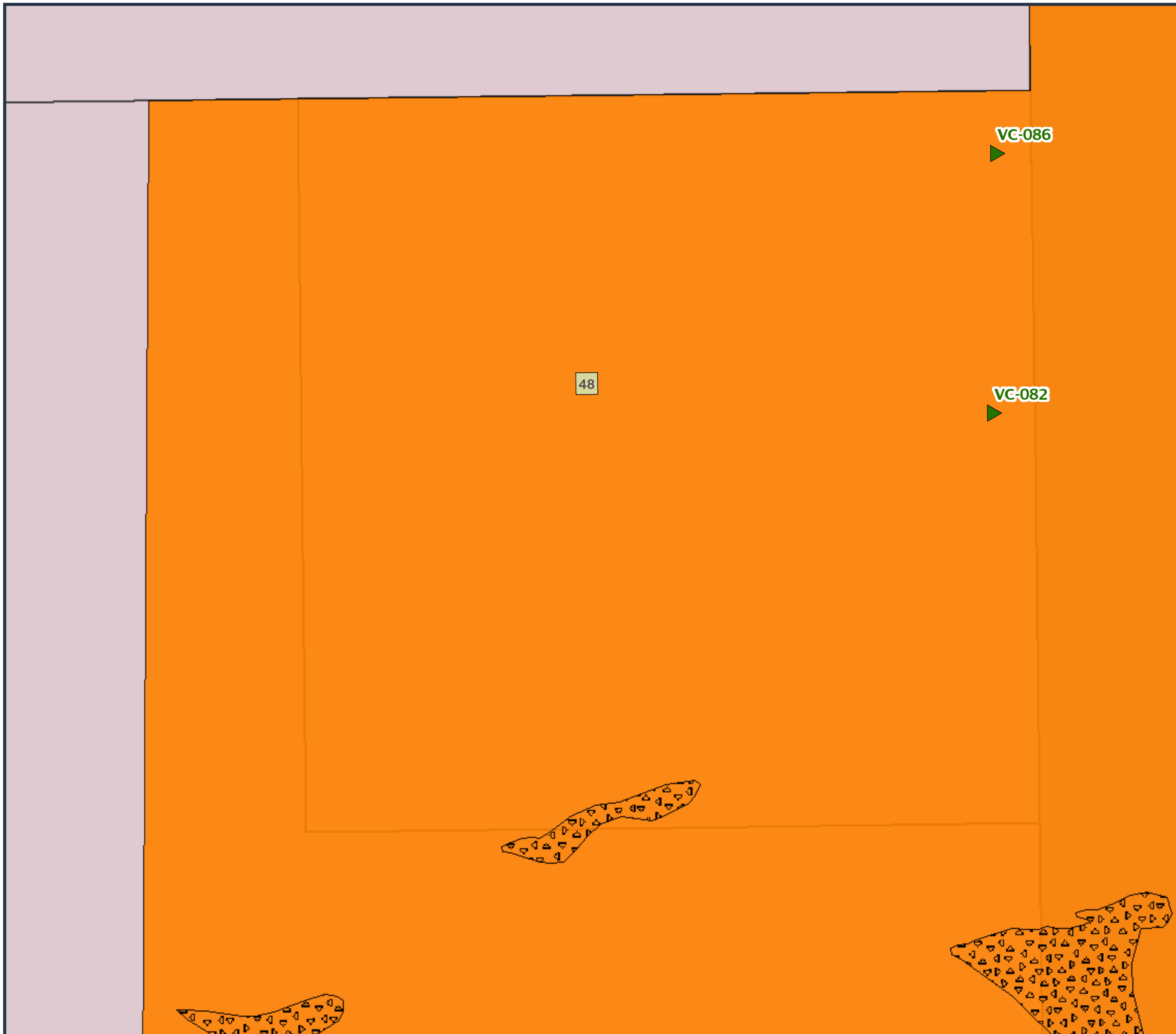
Scale 1:5,000
1 inch = 0 km

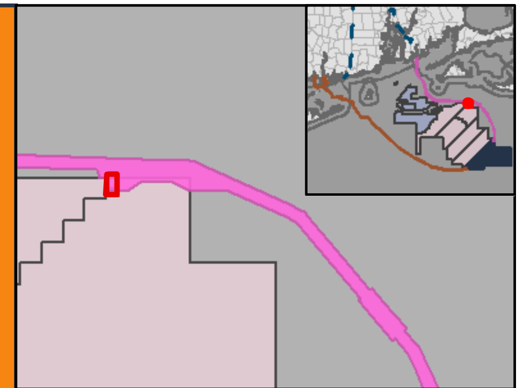
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore

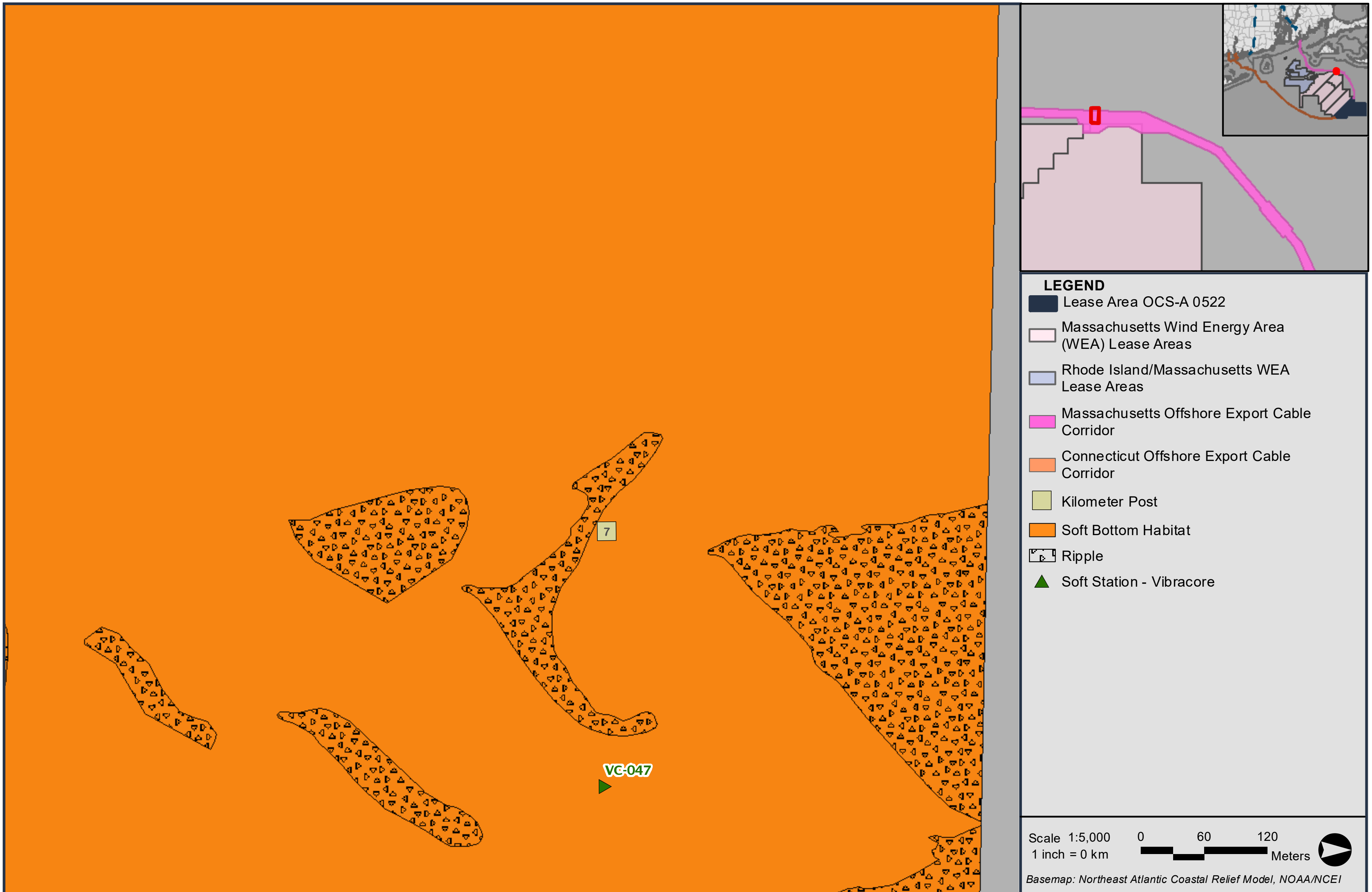
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

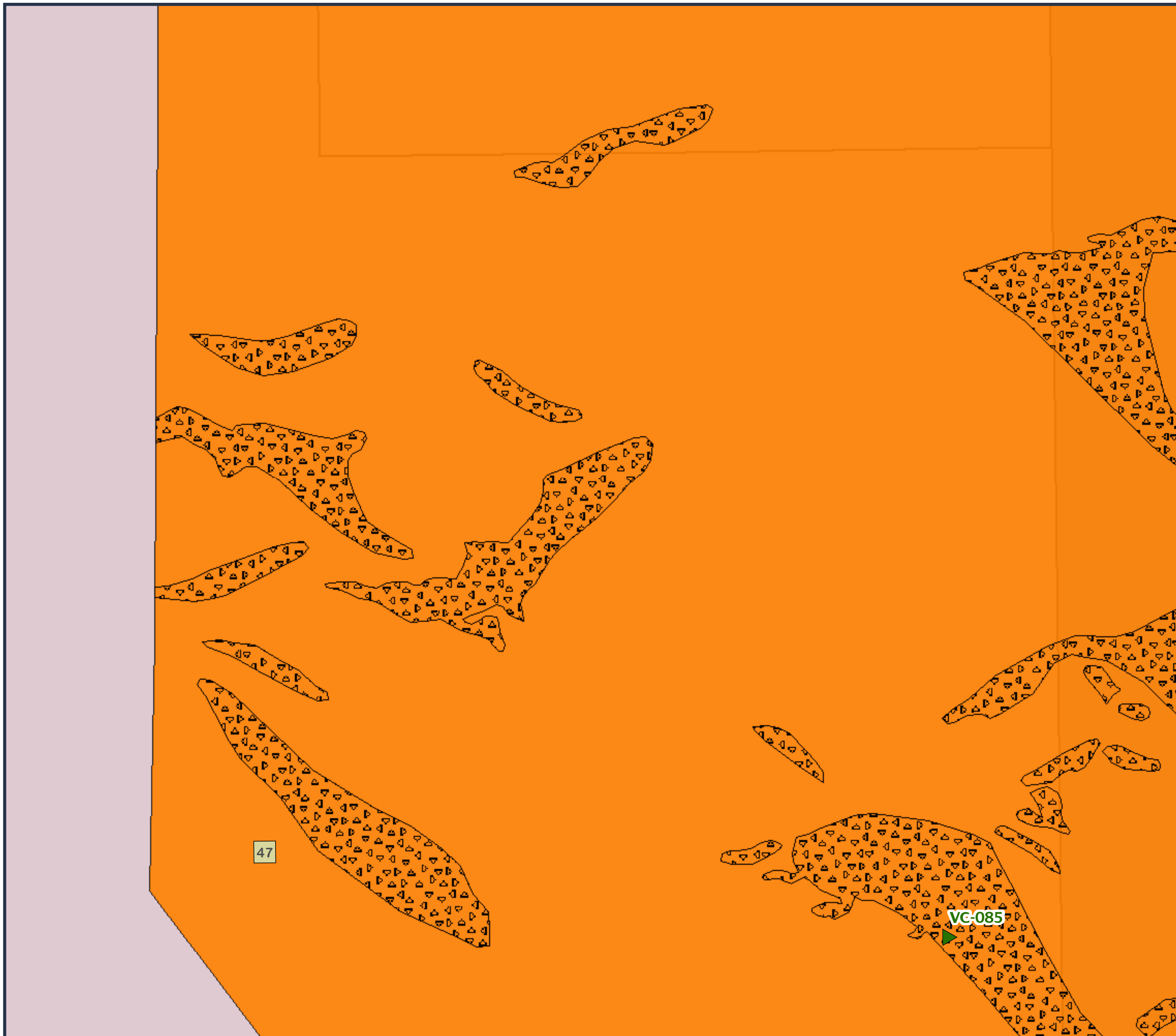
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

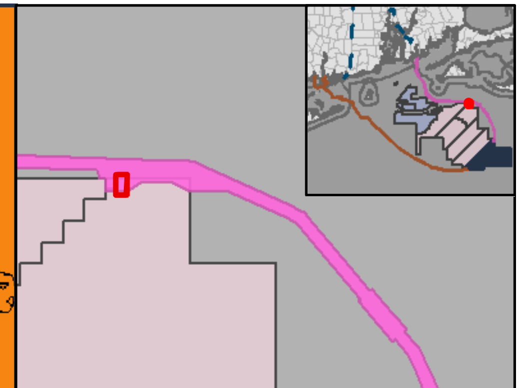
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





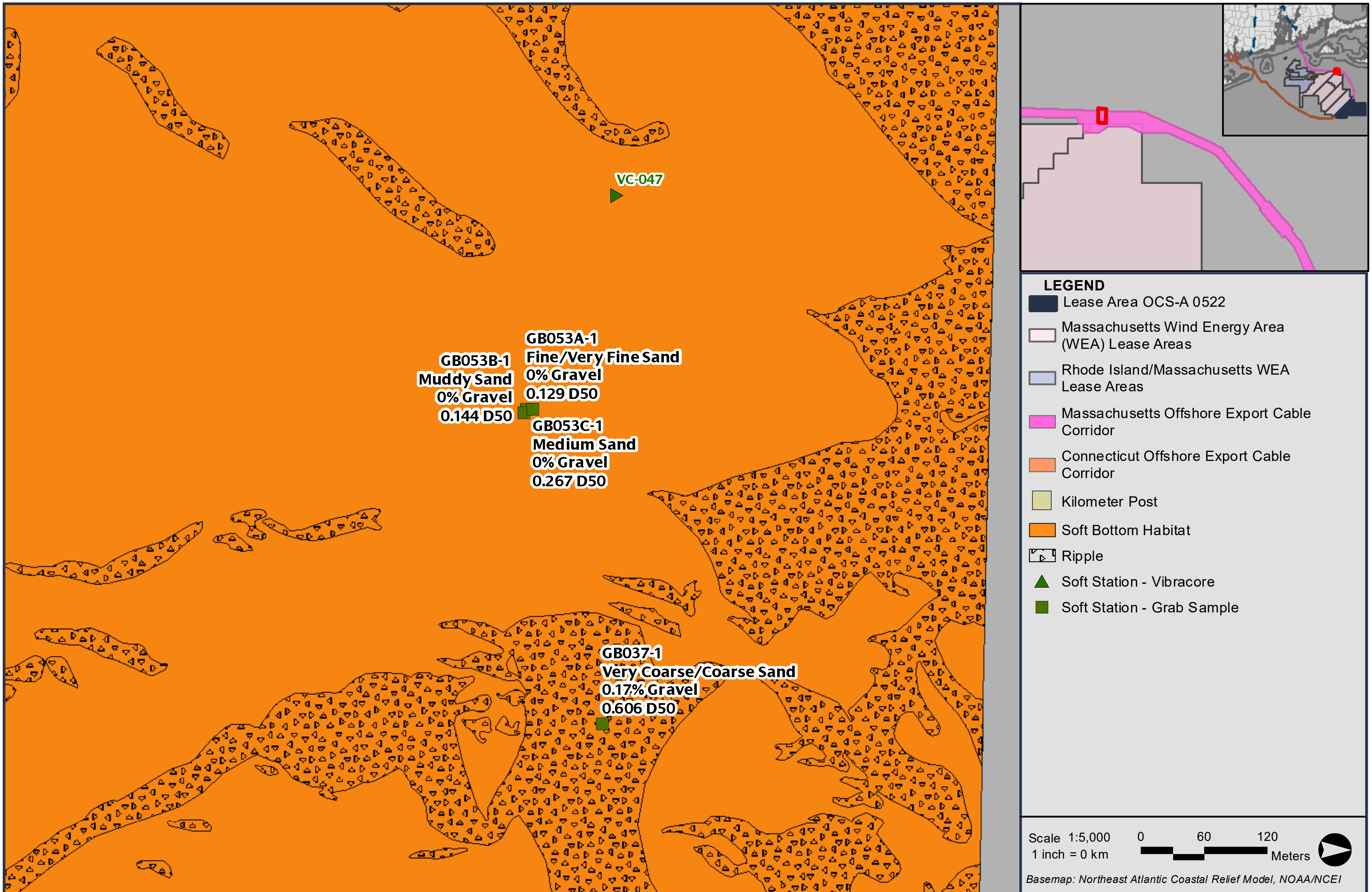
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

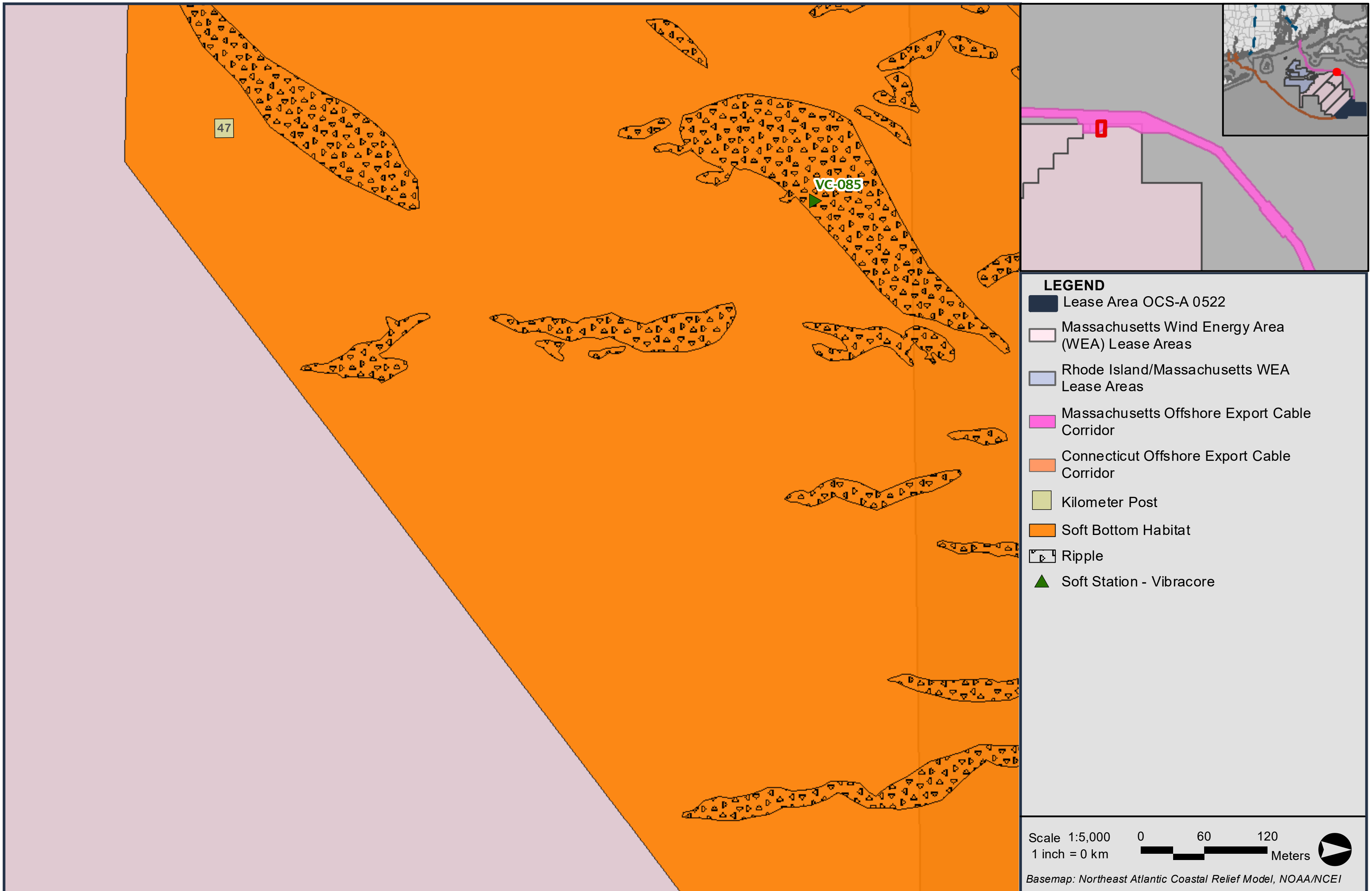
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

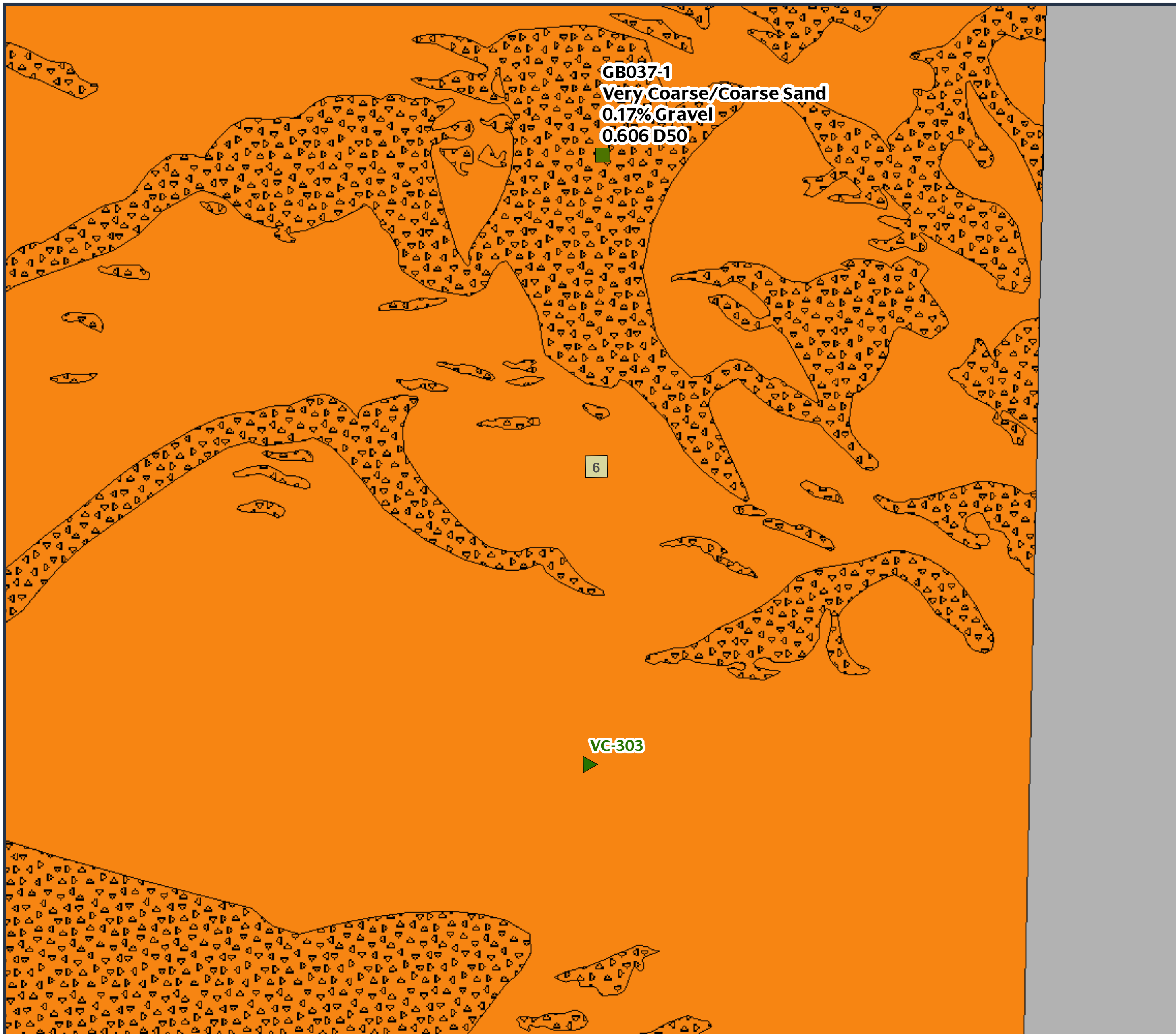
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore

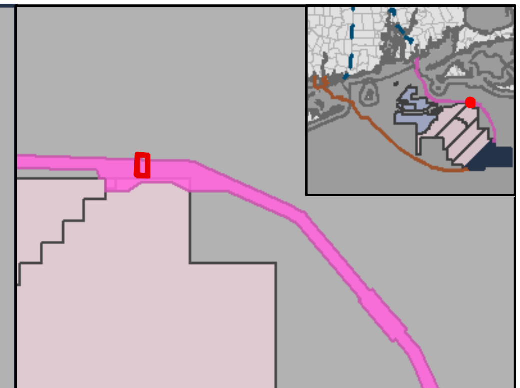
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





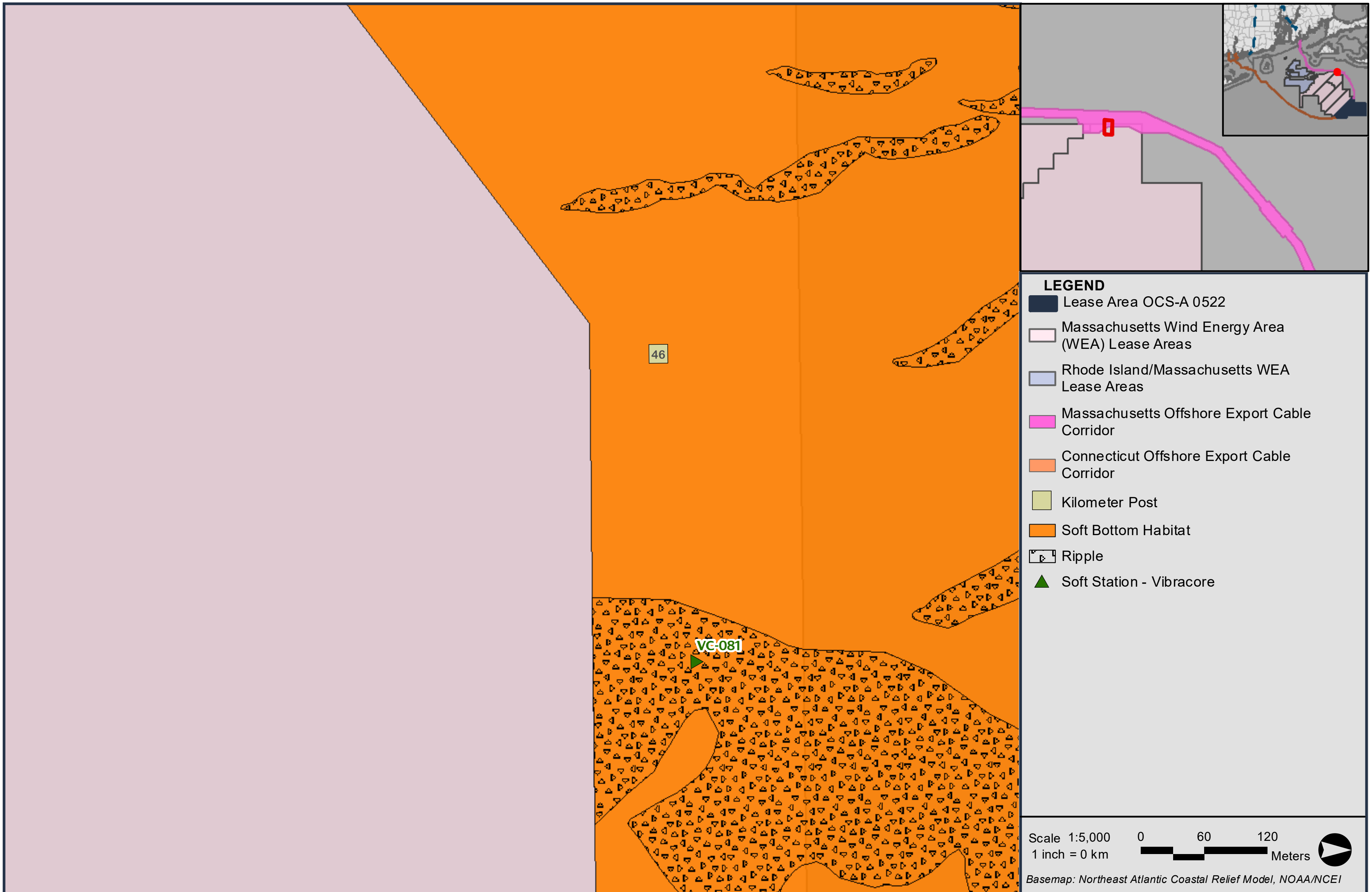
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore
- Soft Station - Grab Sample

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

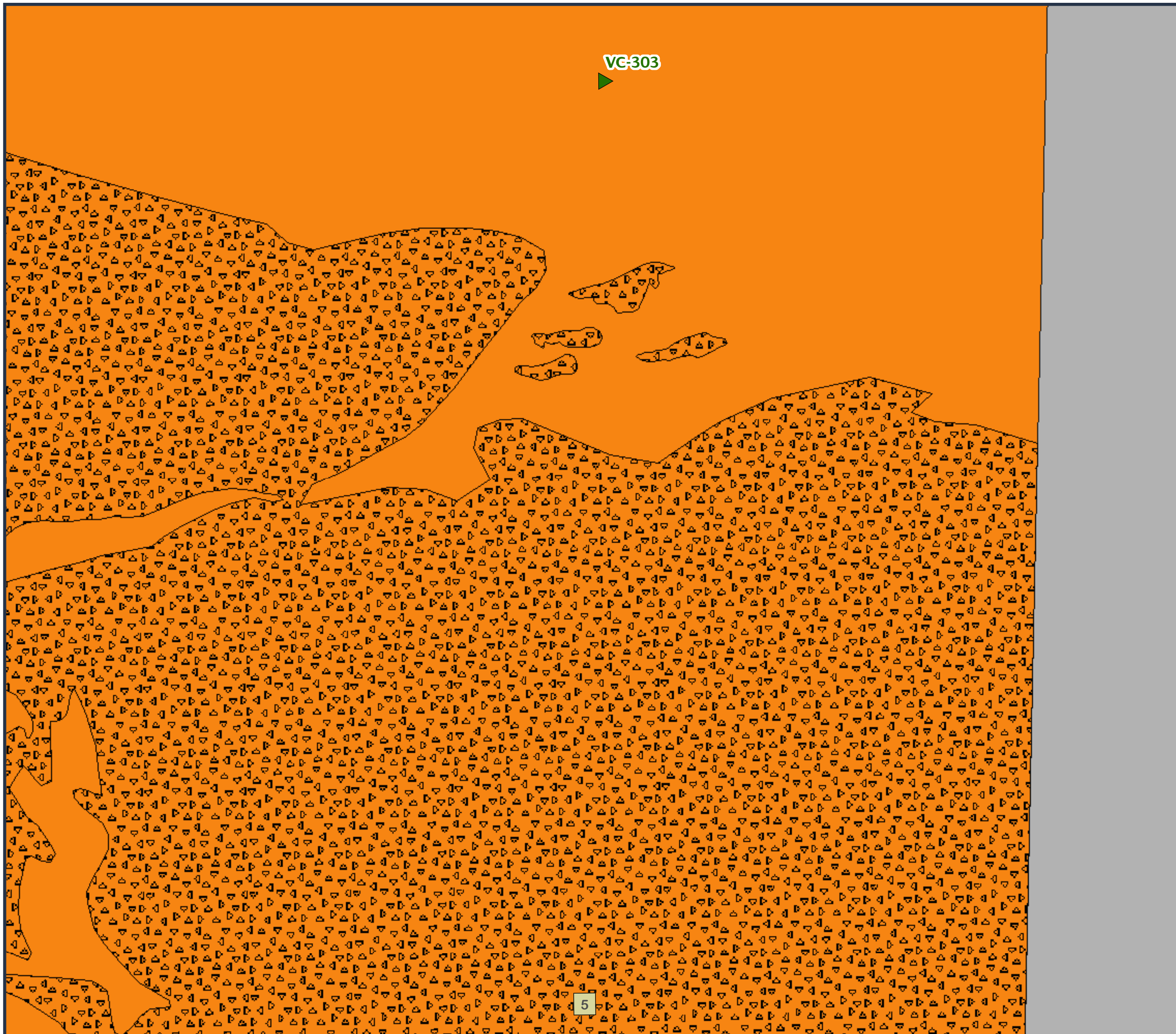
VINEYARD NORTHEAST
VINEYARD OFFSHORE

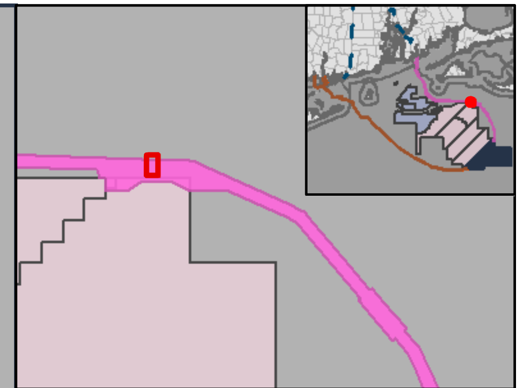


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore

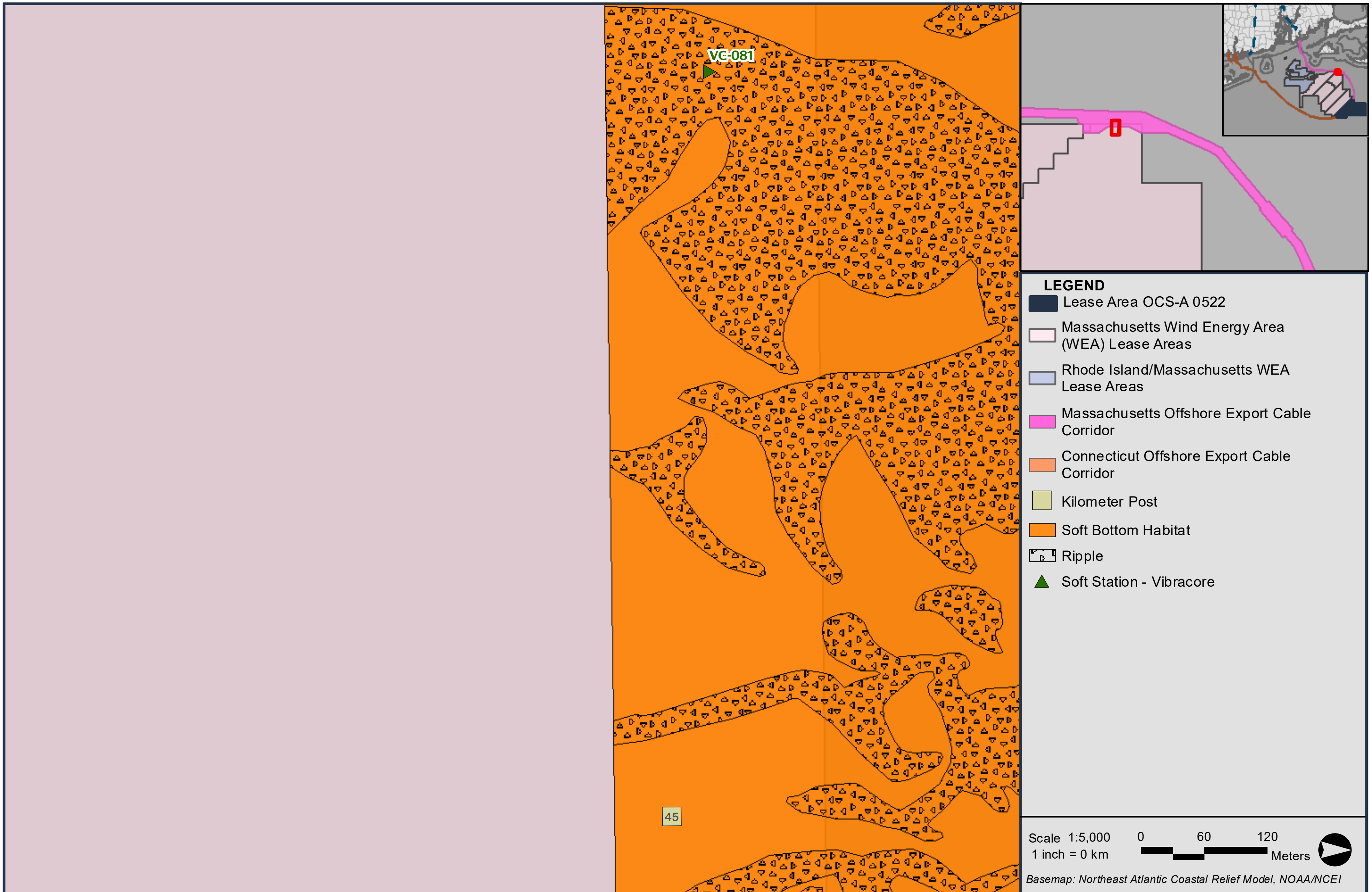
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

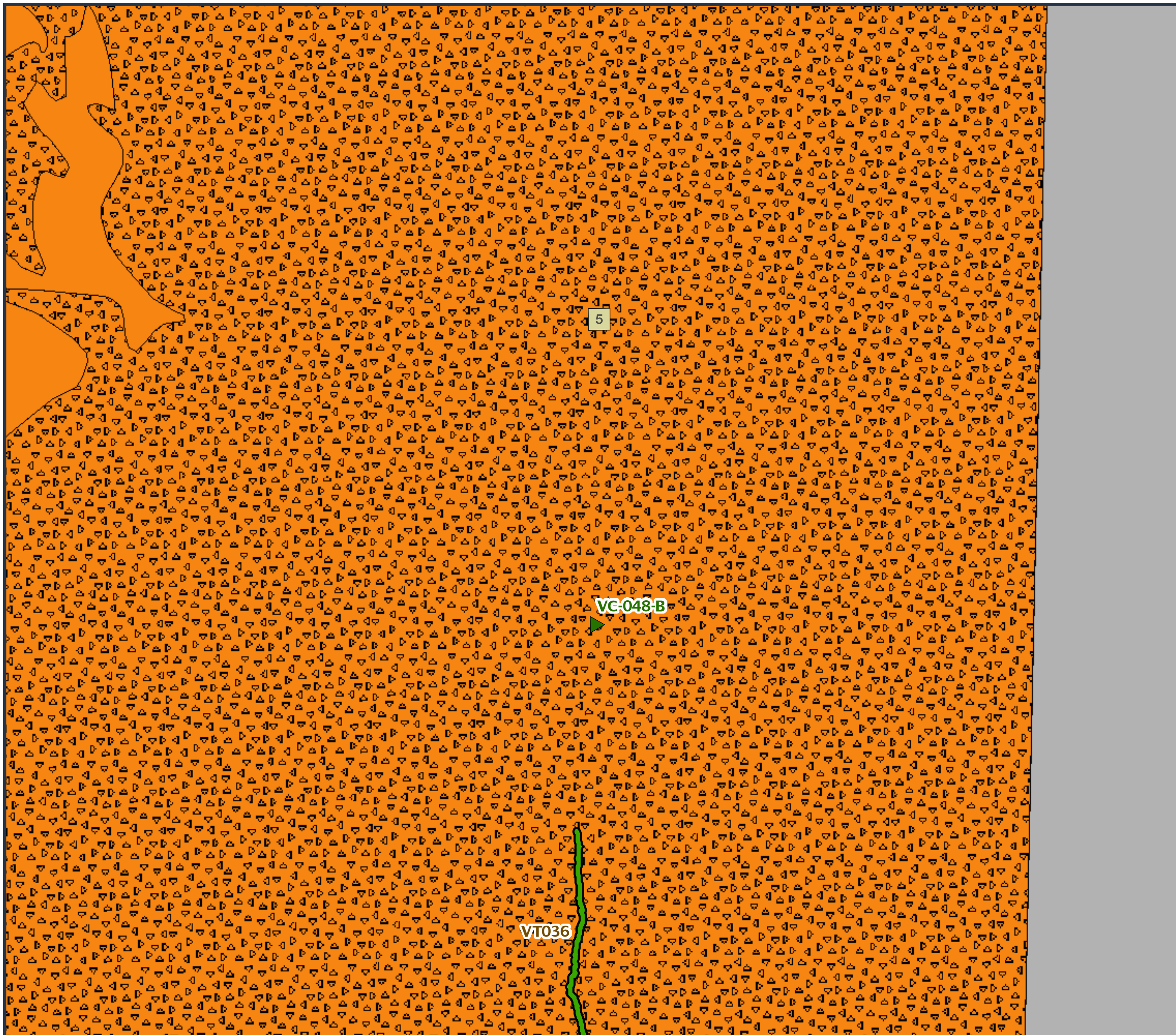
VINEYARD NORTHEAST
VINEYARD OFFSHORE

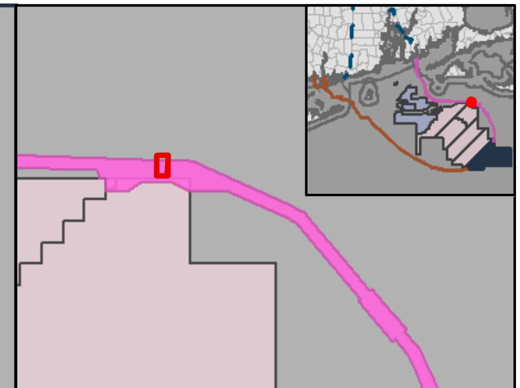


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





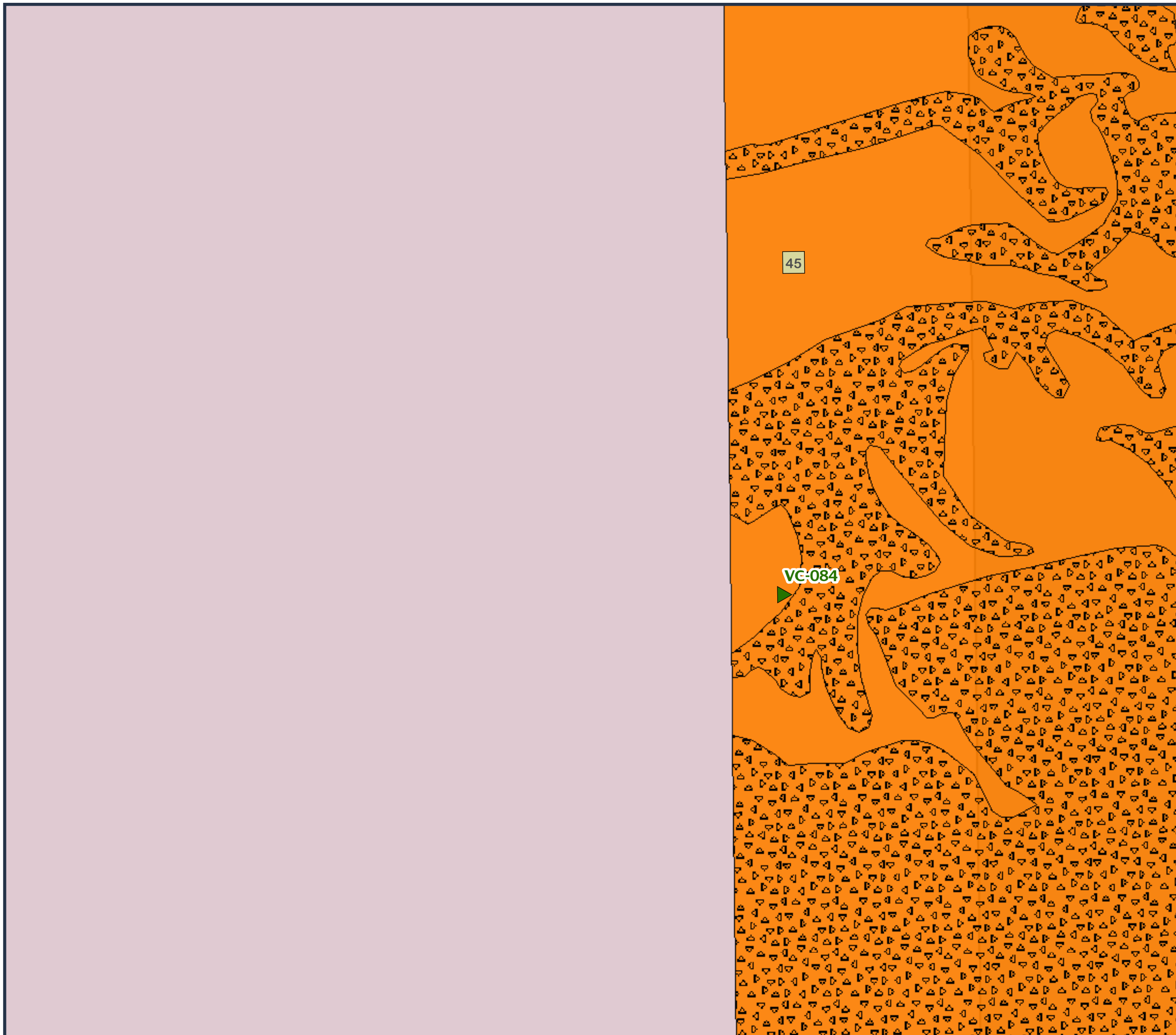
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Ripple
Soft Station - Vibracore
Soft Bottom Station - Video

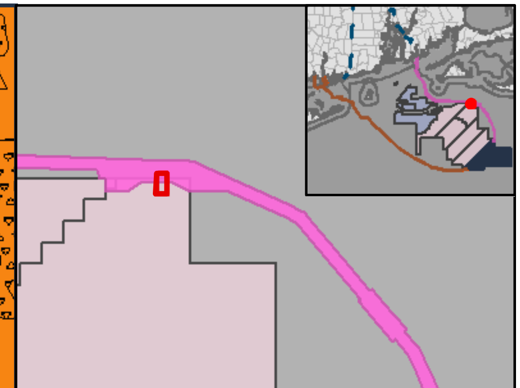
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





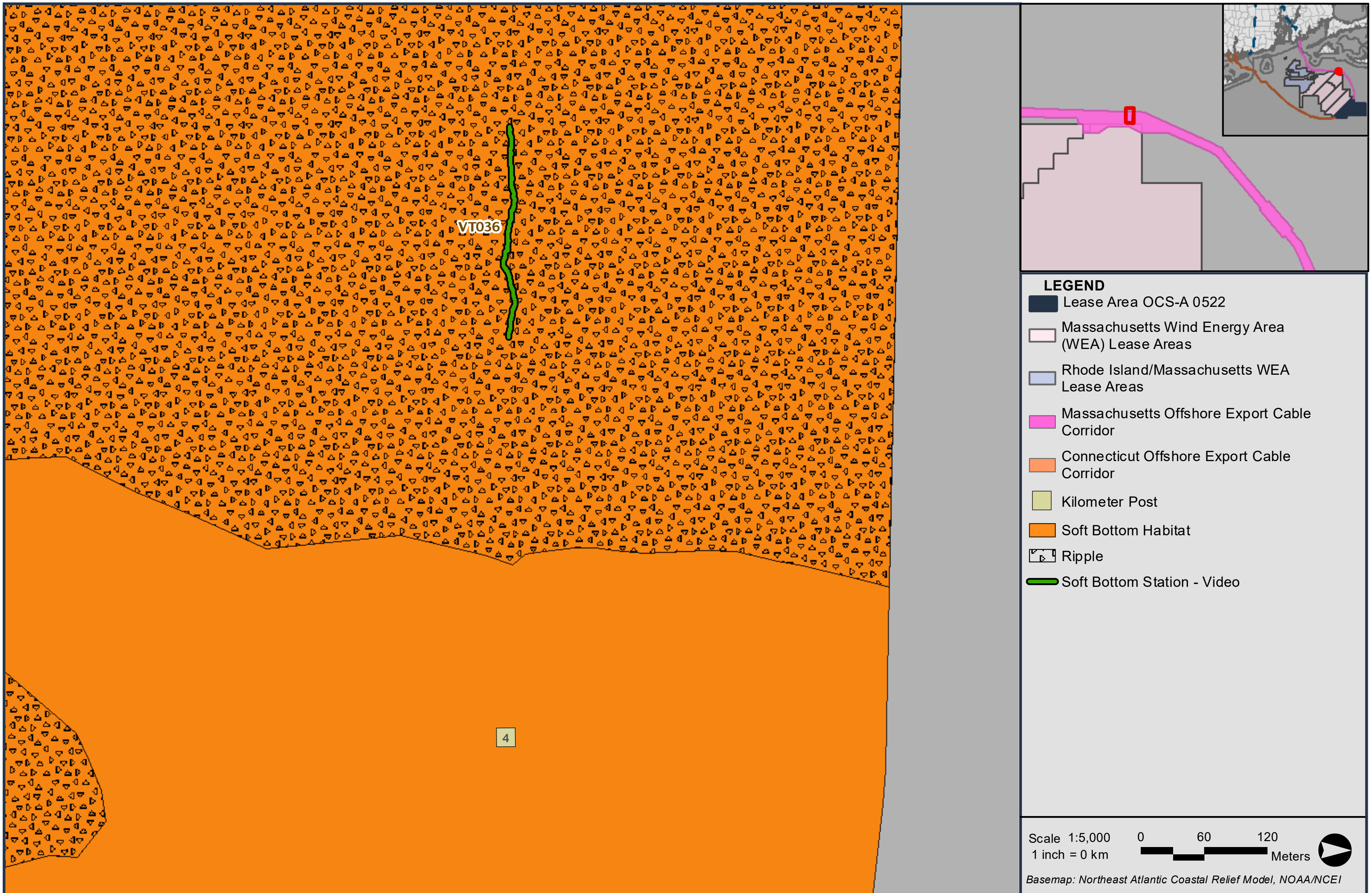
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Ripple
Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

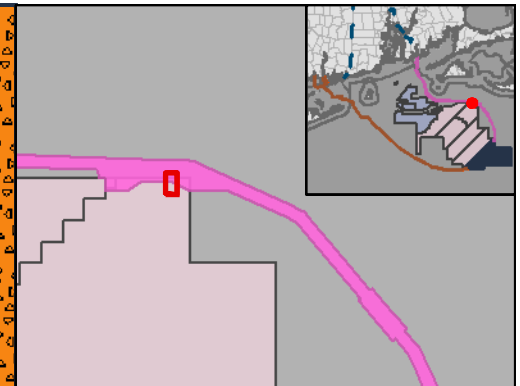
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE

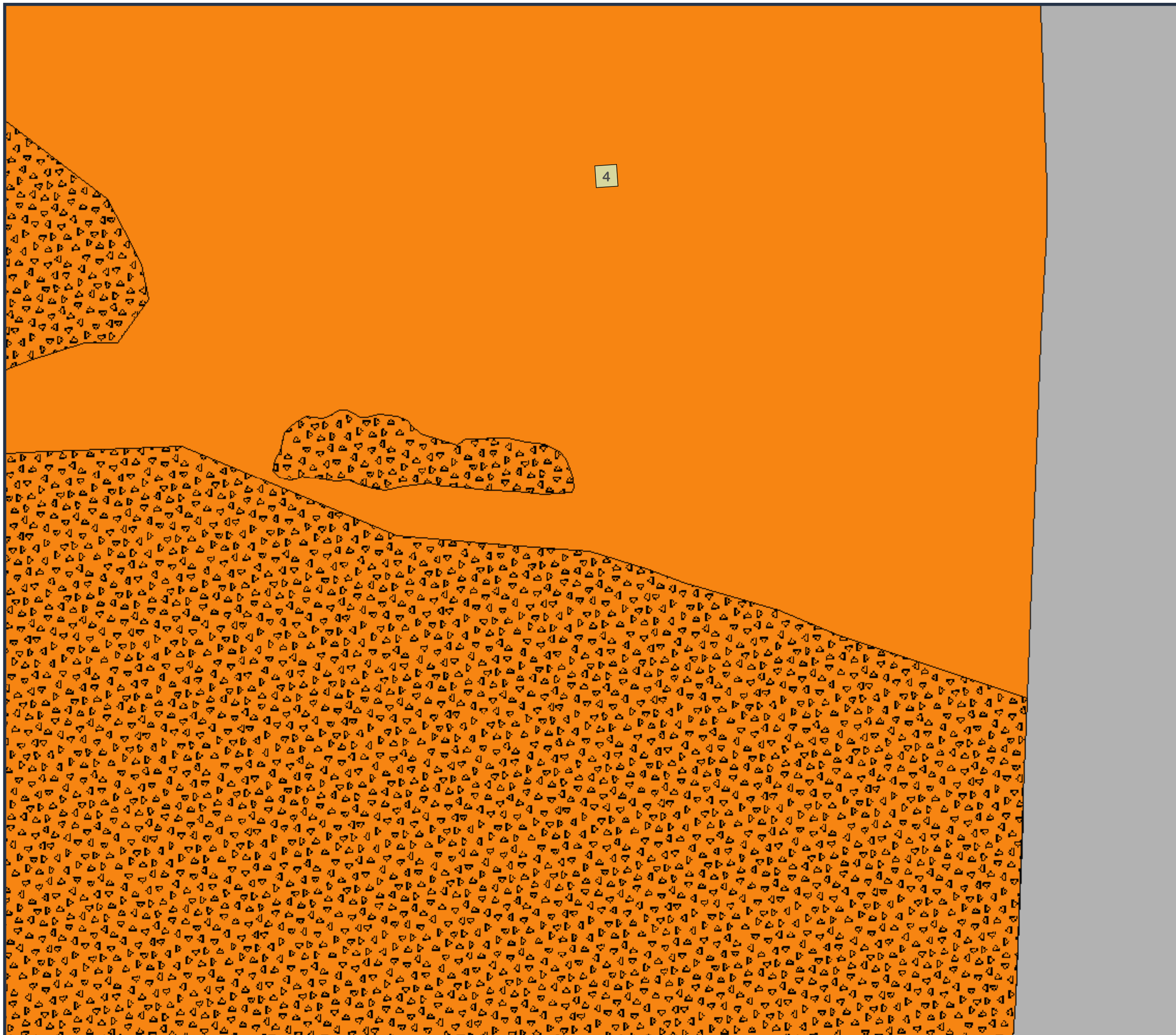


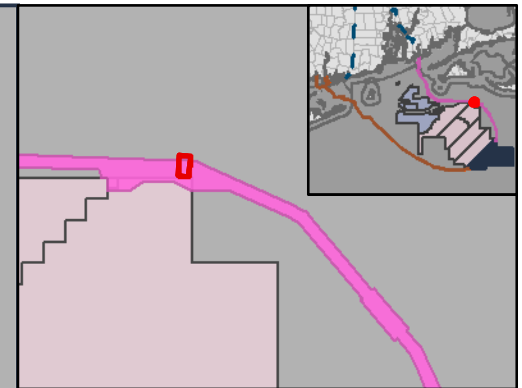
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Ripple

Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple

Scale 1:5,000
1 inch = 0 km

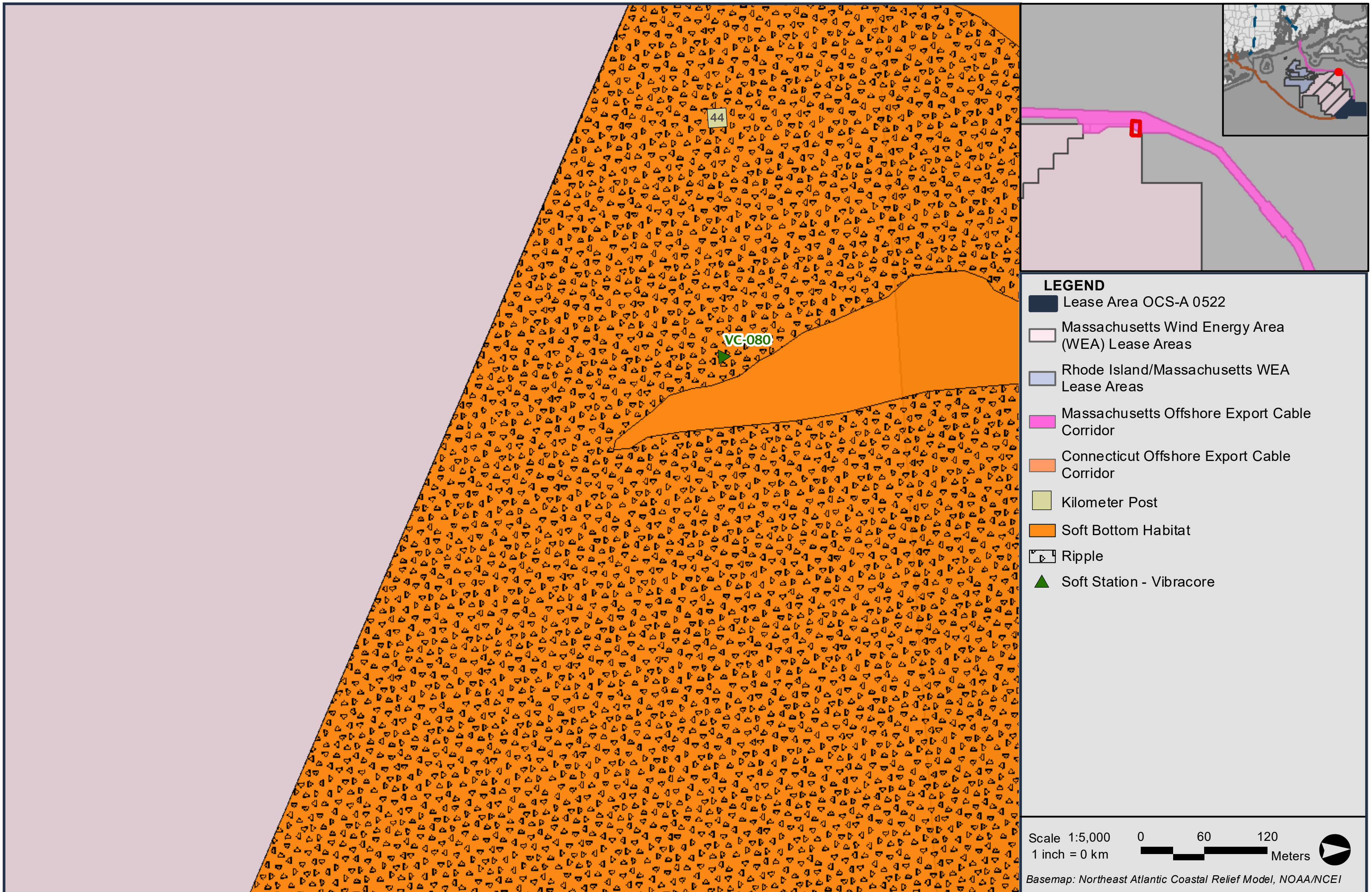
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

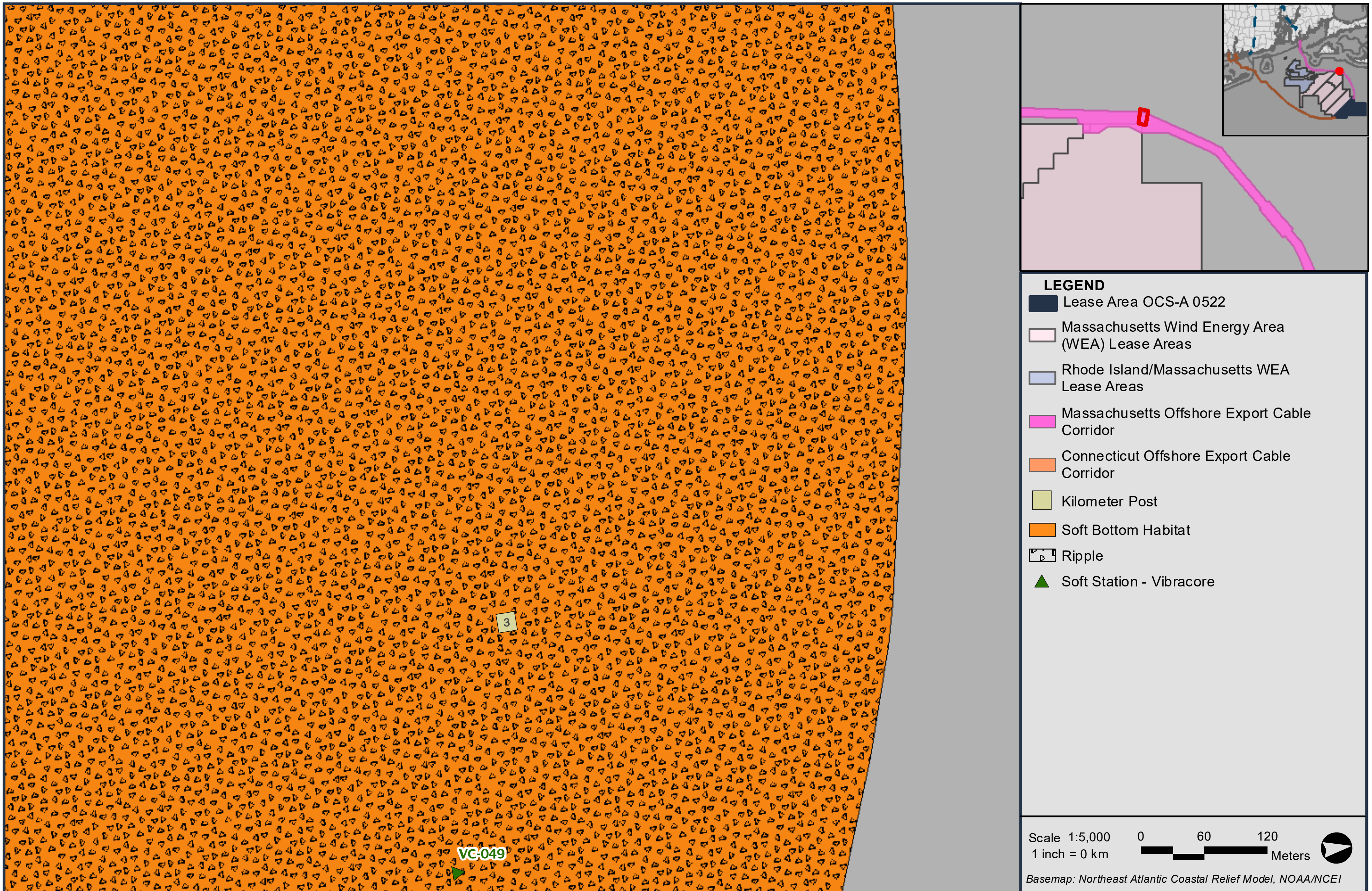
VINEYARD NORTHEAST

VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

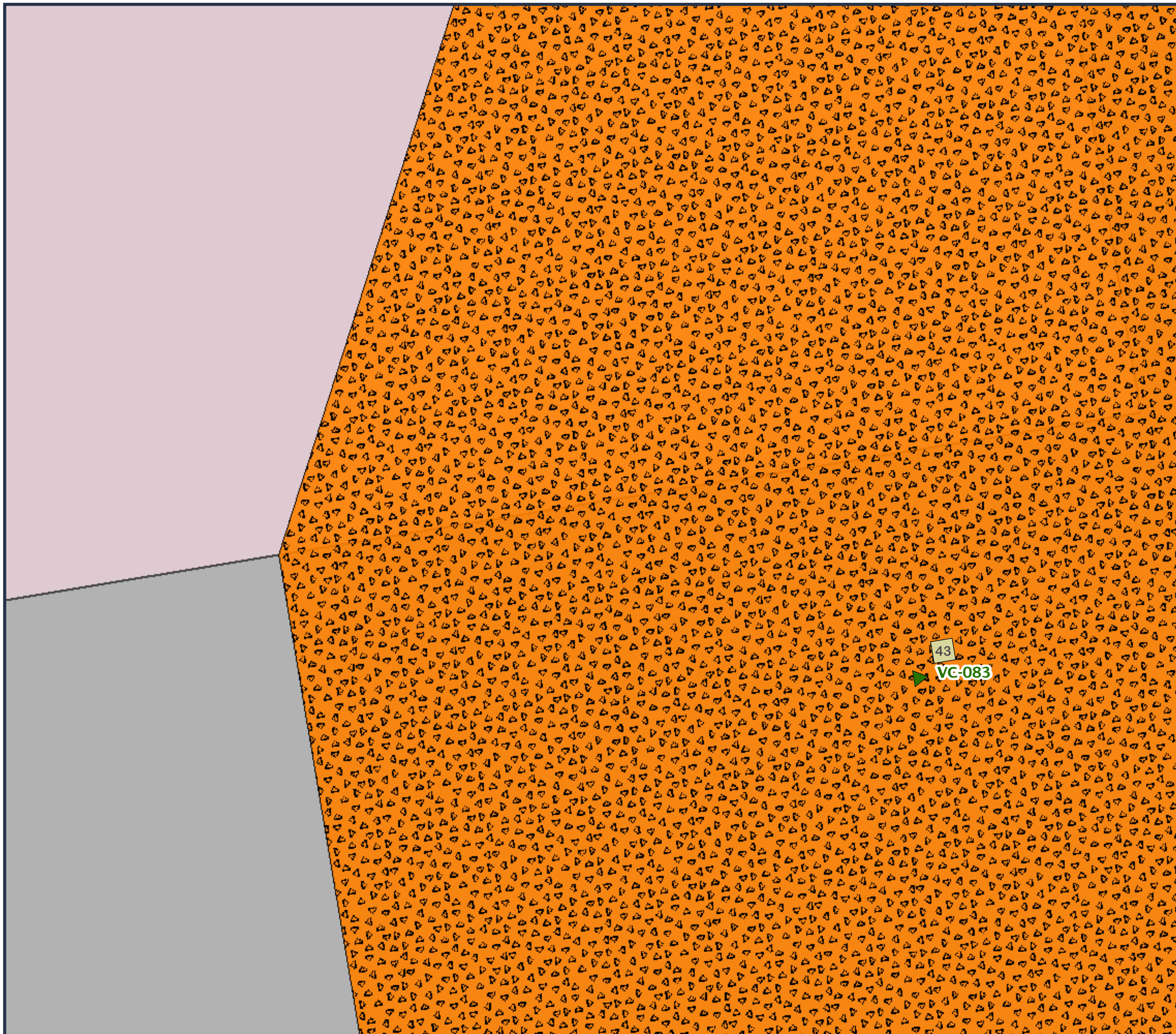
VINEYARD NORTHEAST
VINEYARD OFFSHORE

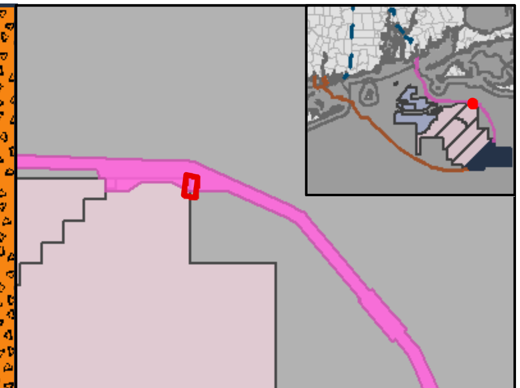


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

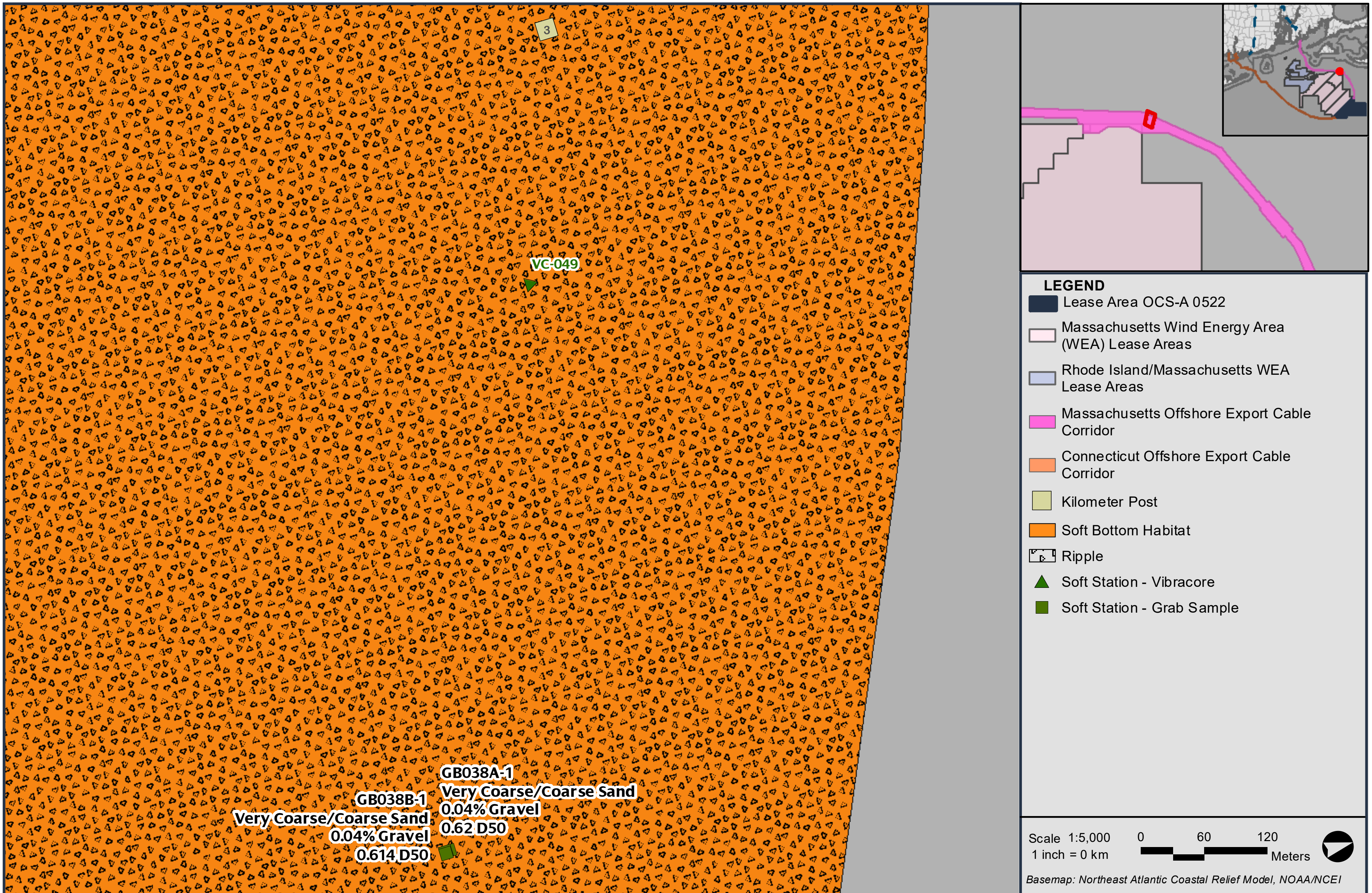
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

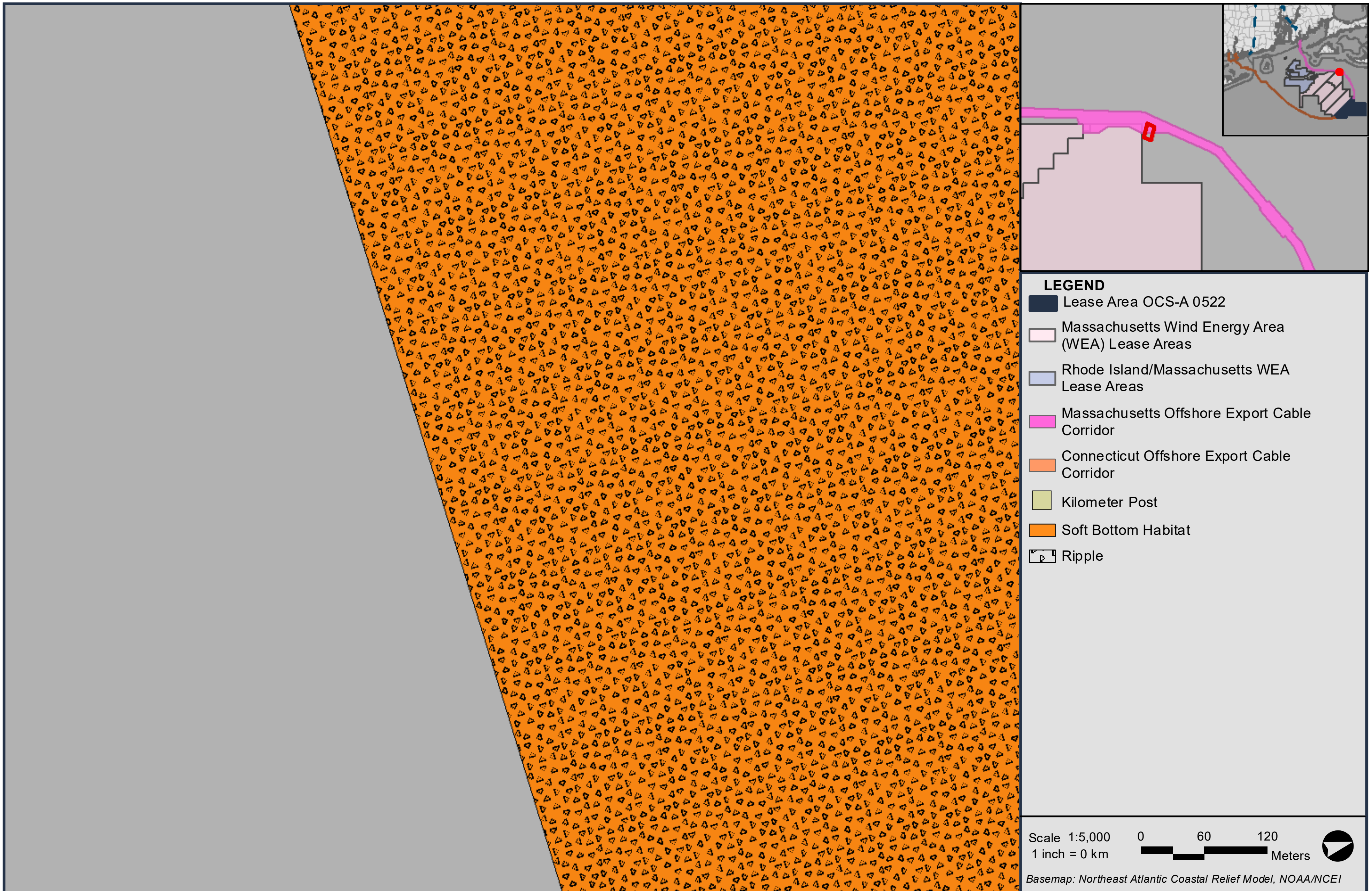
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple

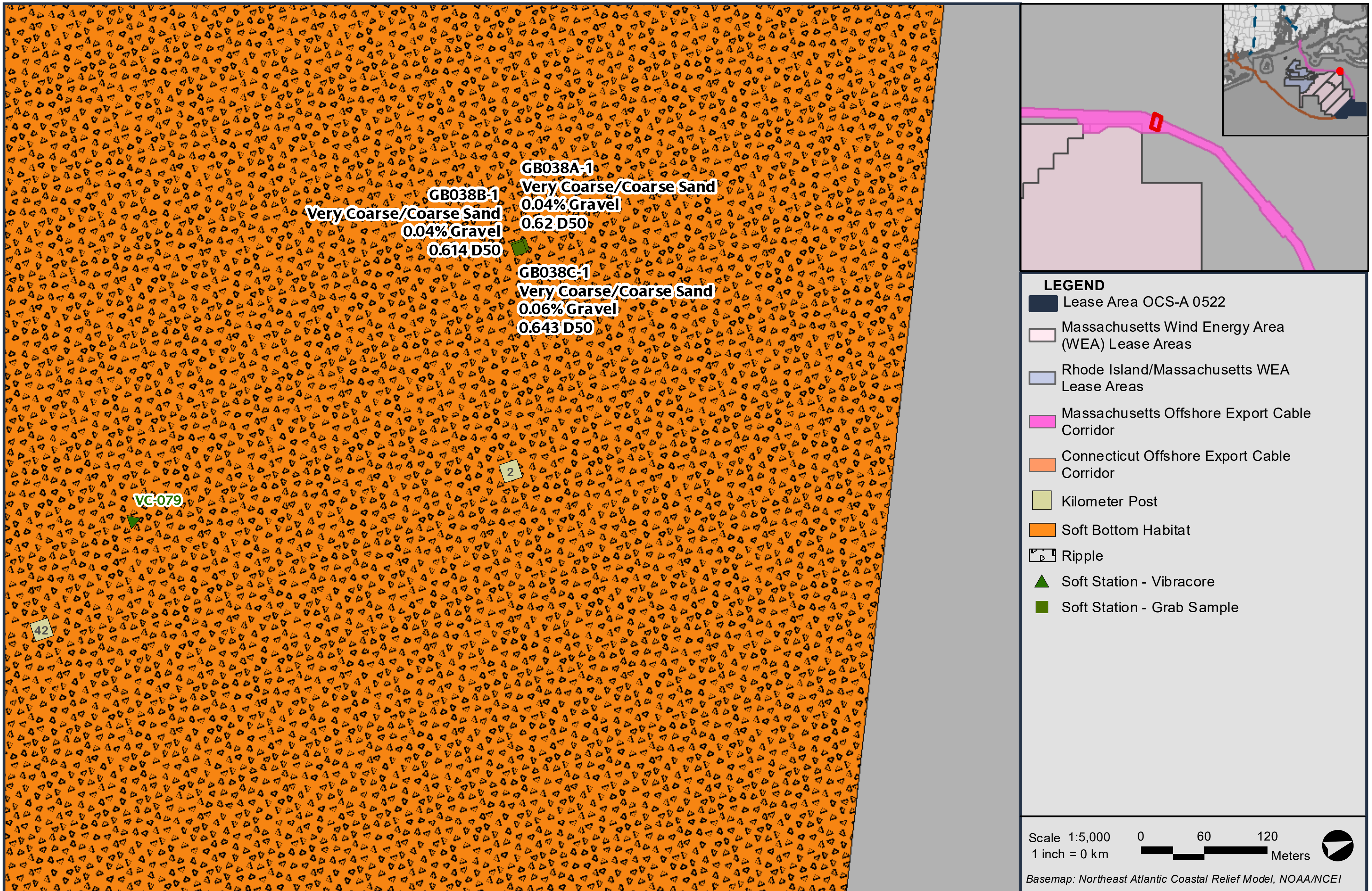
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

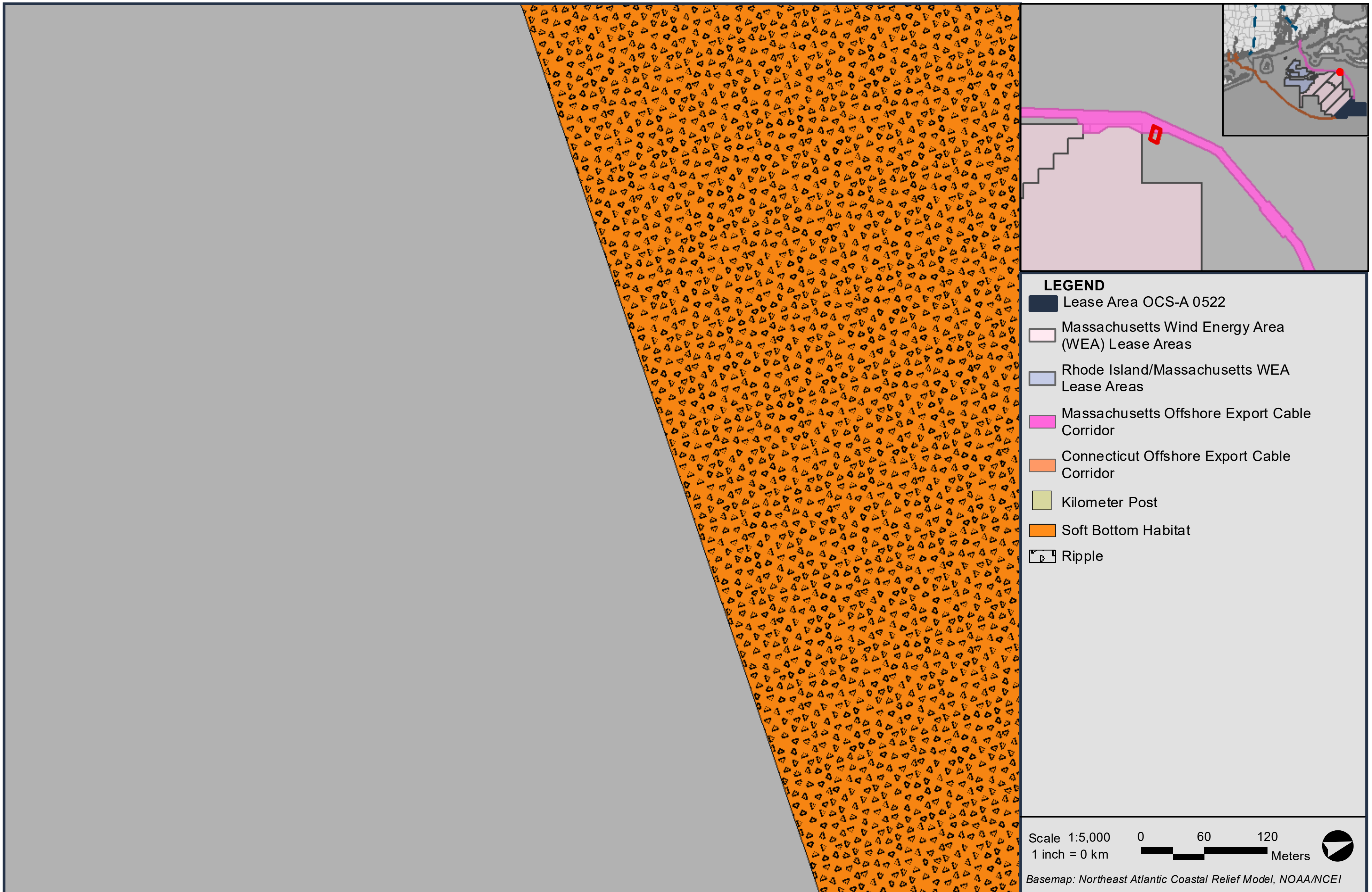
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE

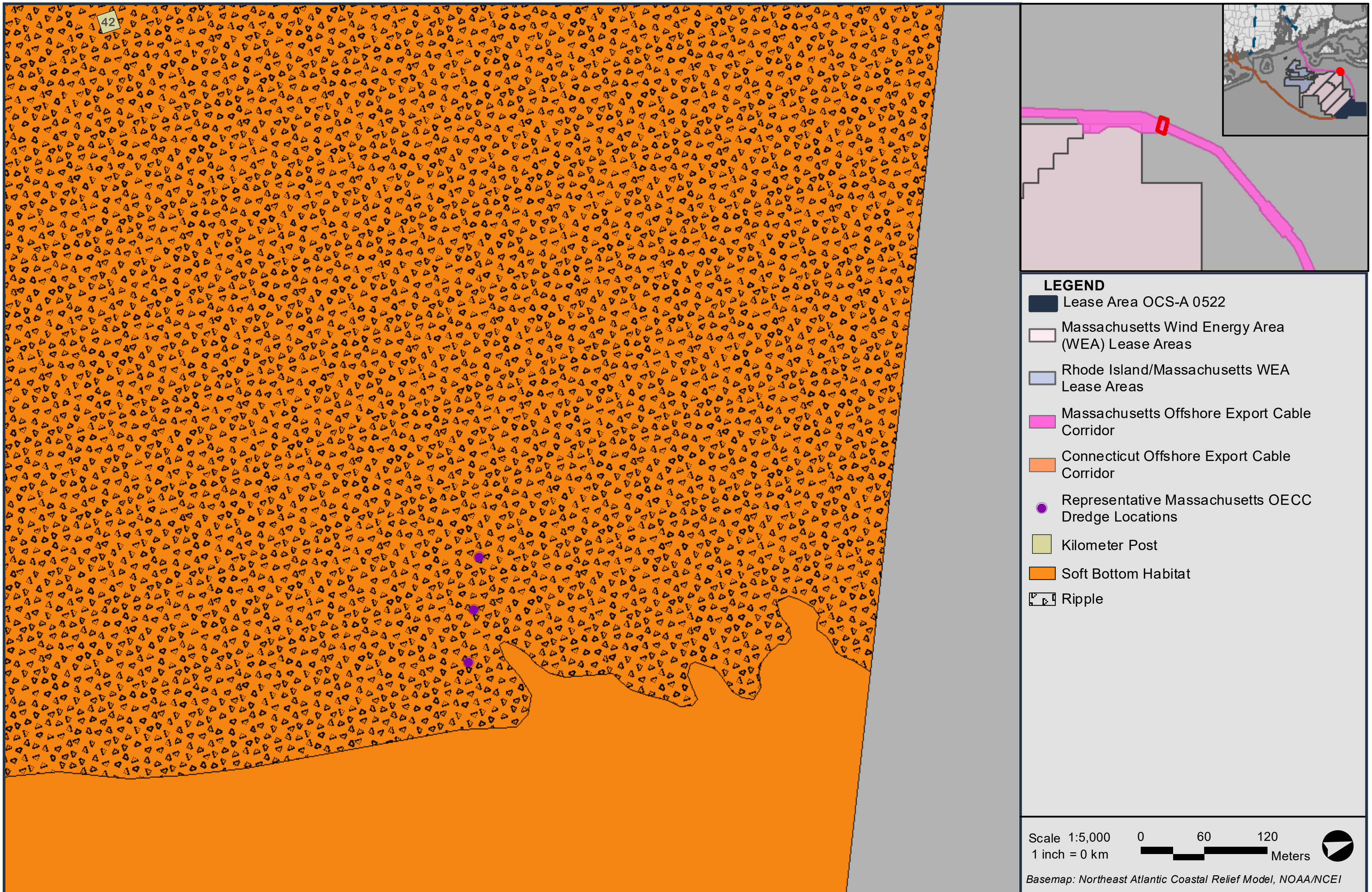


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC



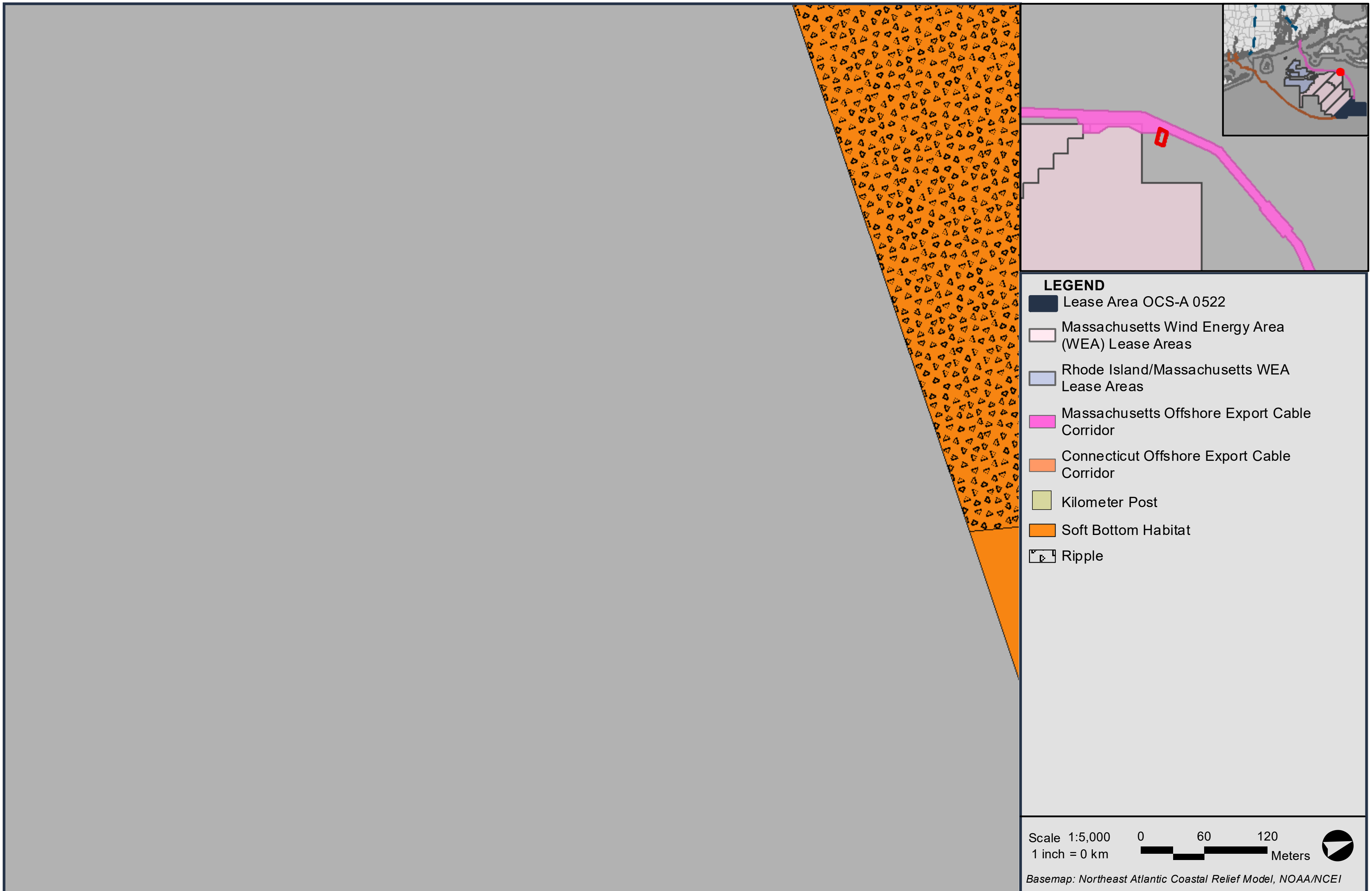
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



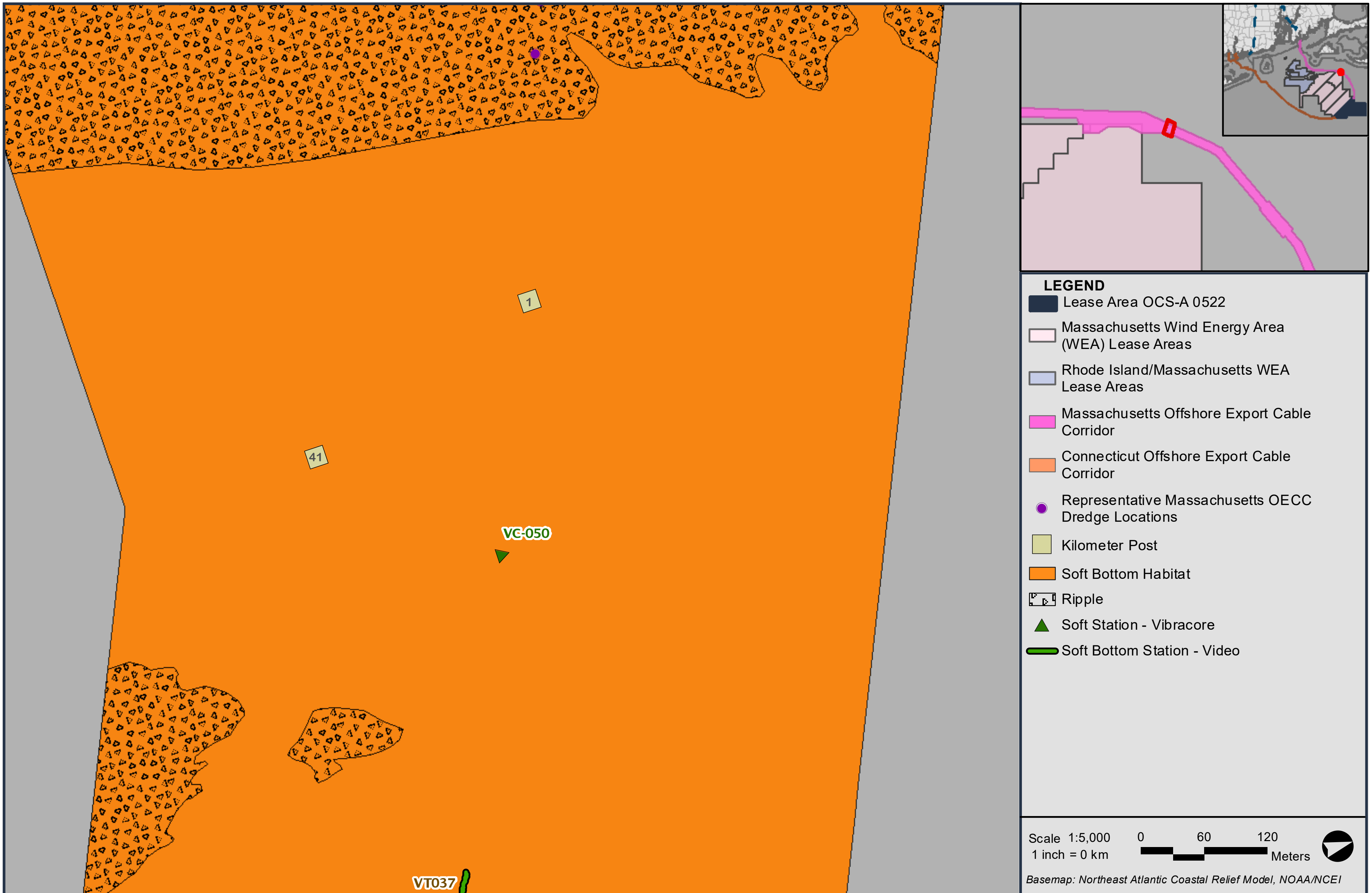
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



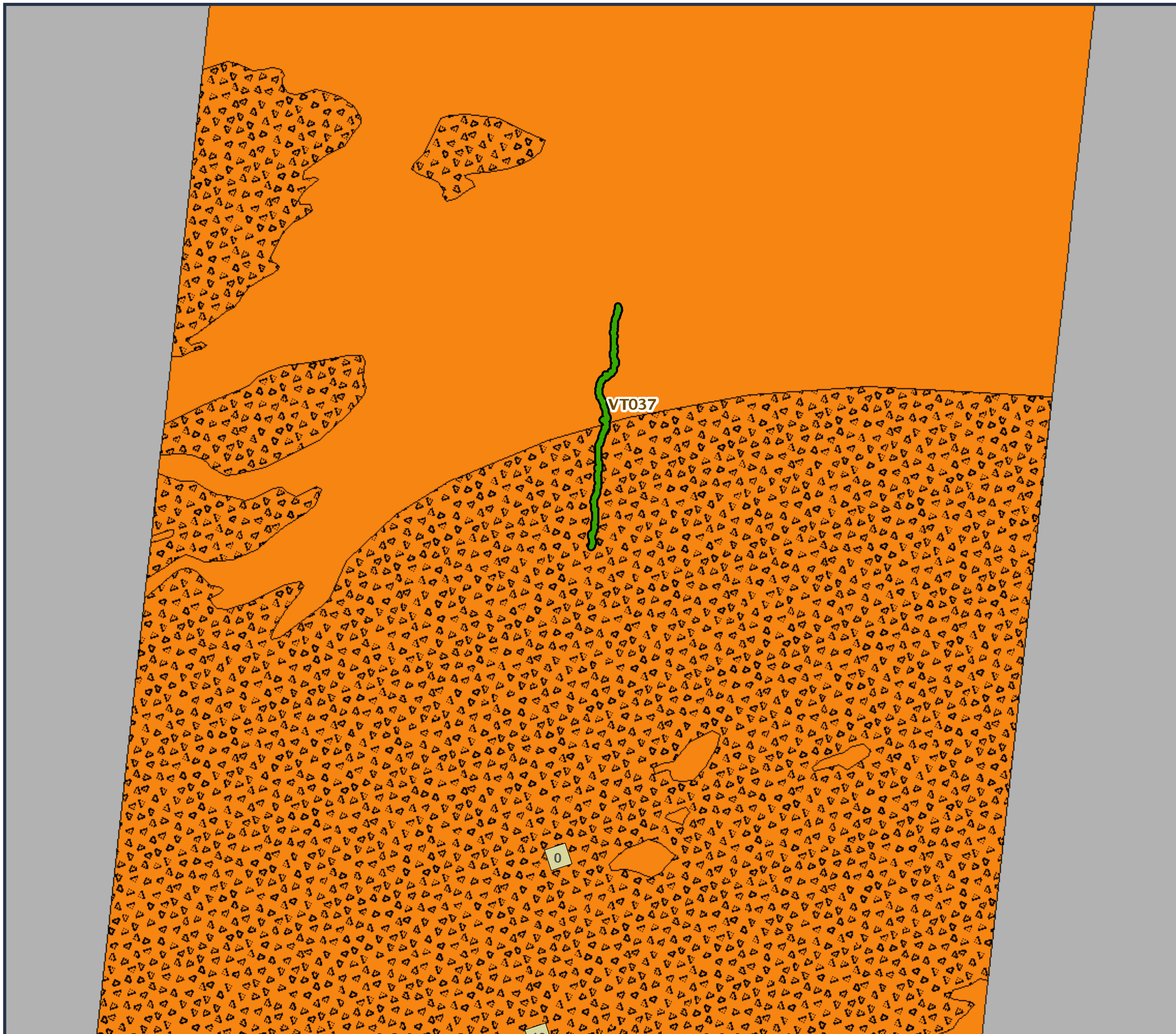
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

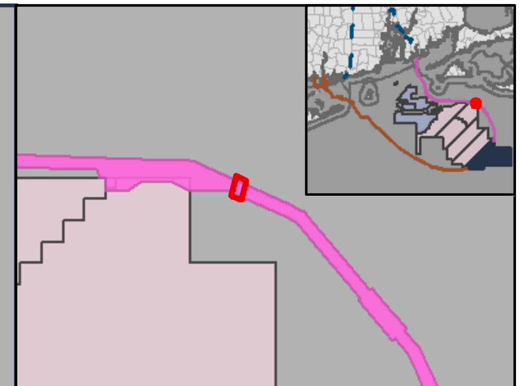
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Bottom Station - Video Transect

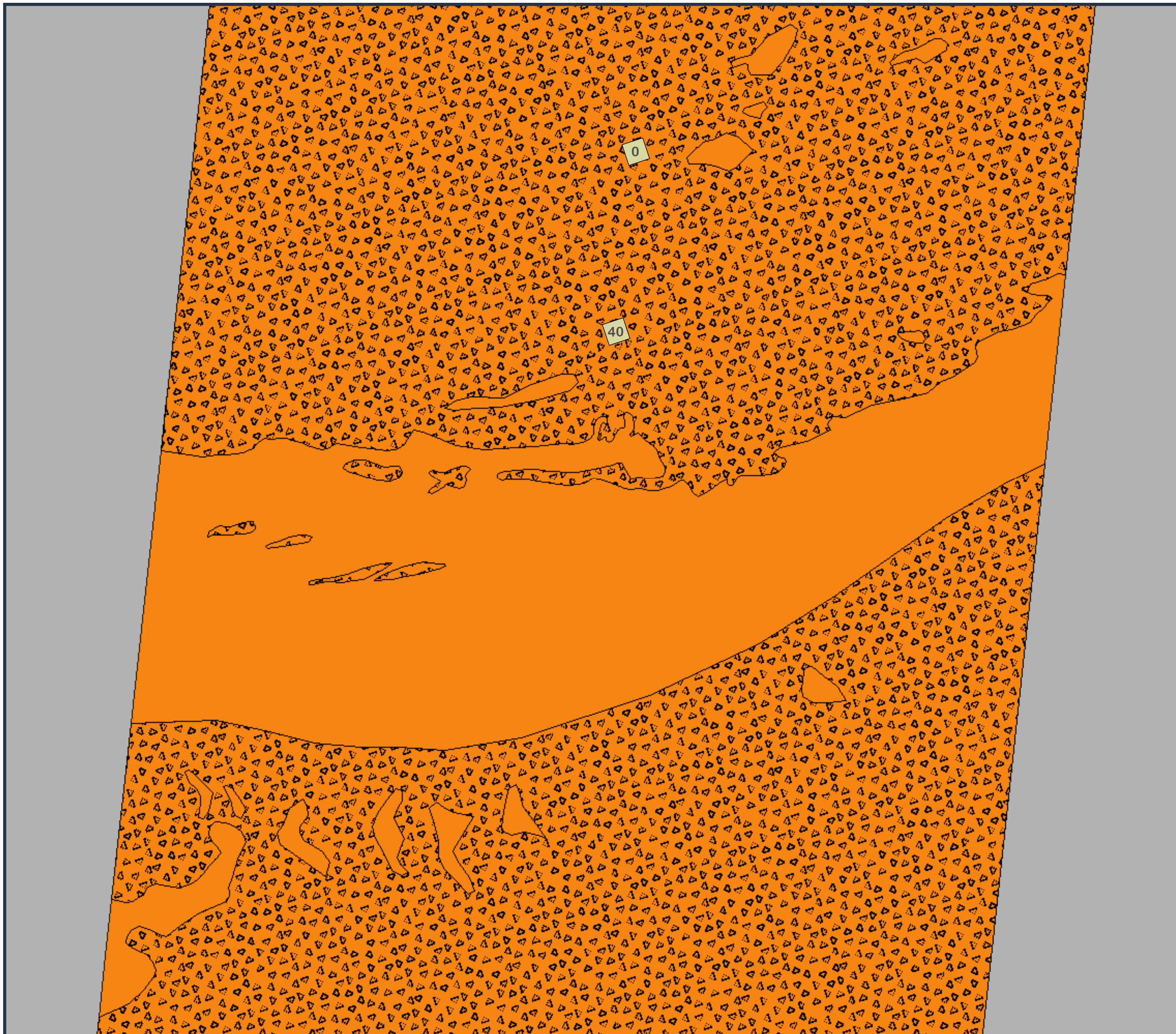
Scale 1:5,000
1 inch = 0 km

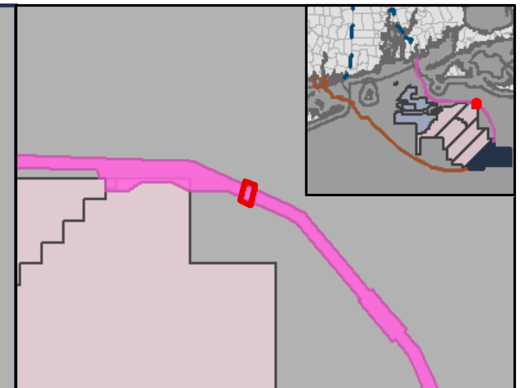
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple

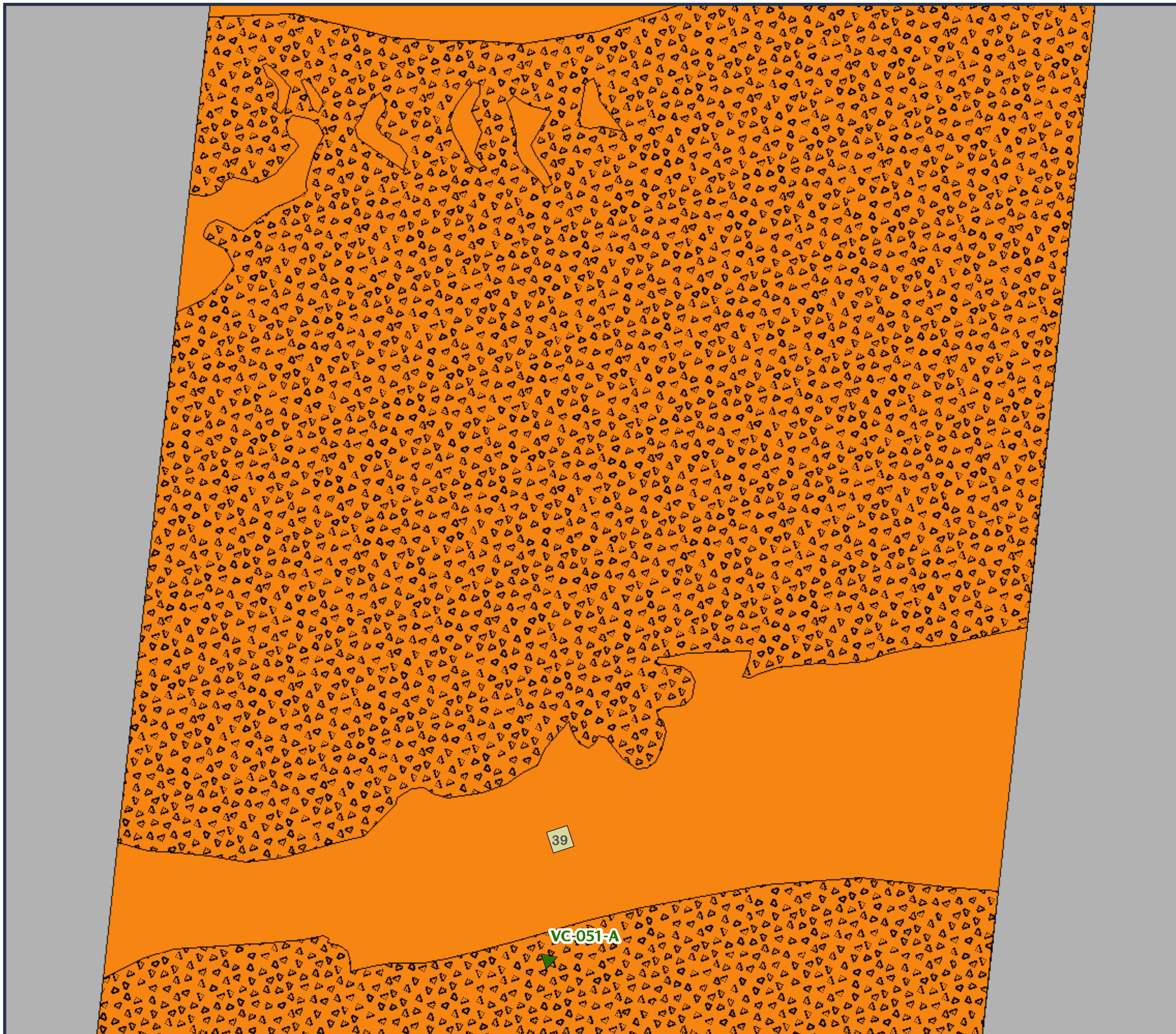
Scale 1:5,000
1 inch = 0 km

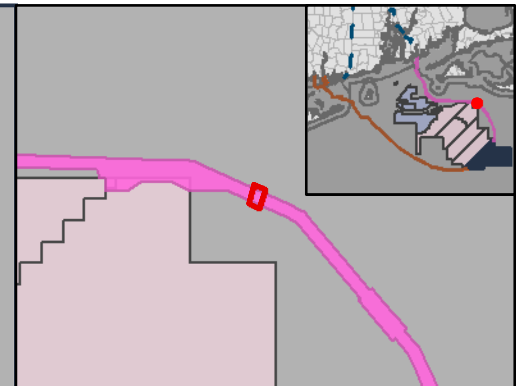
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

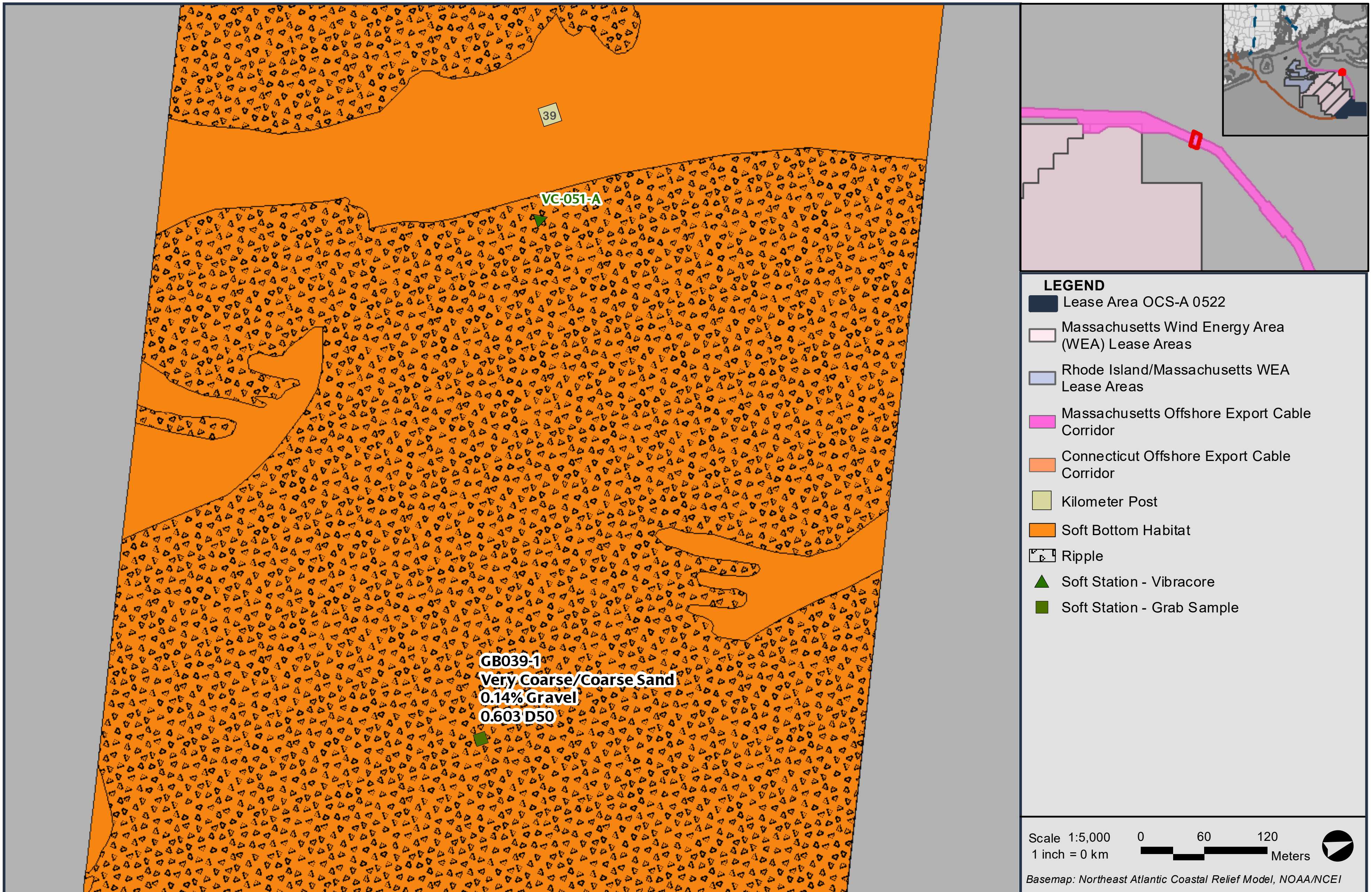
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

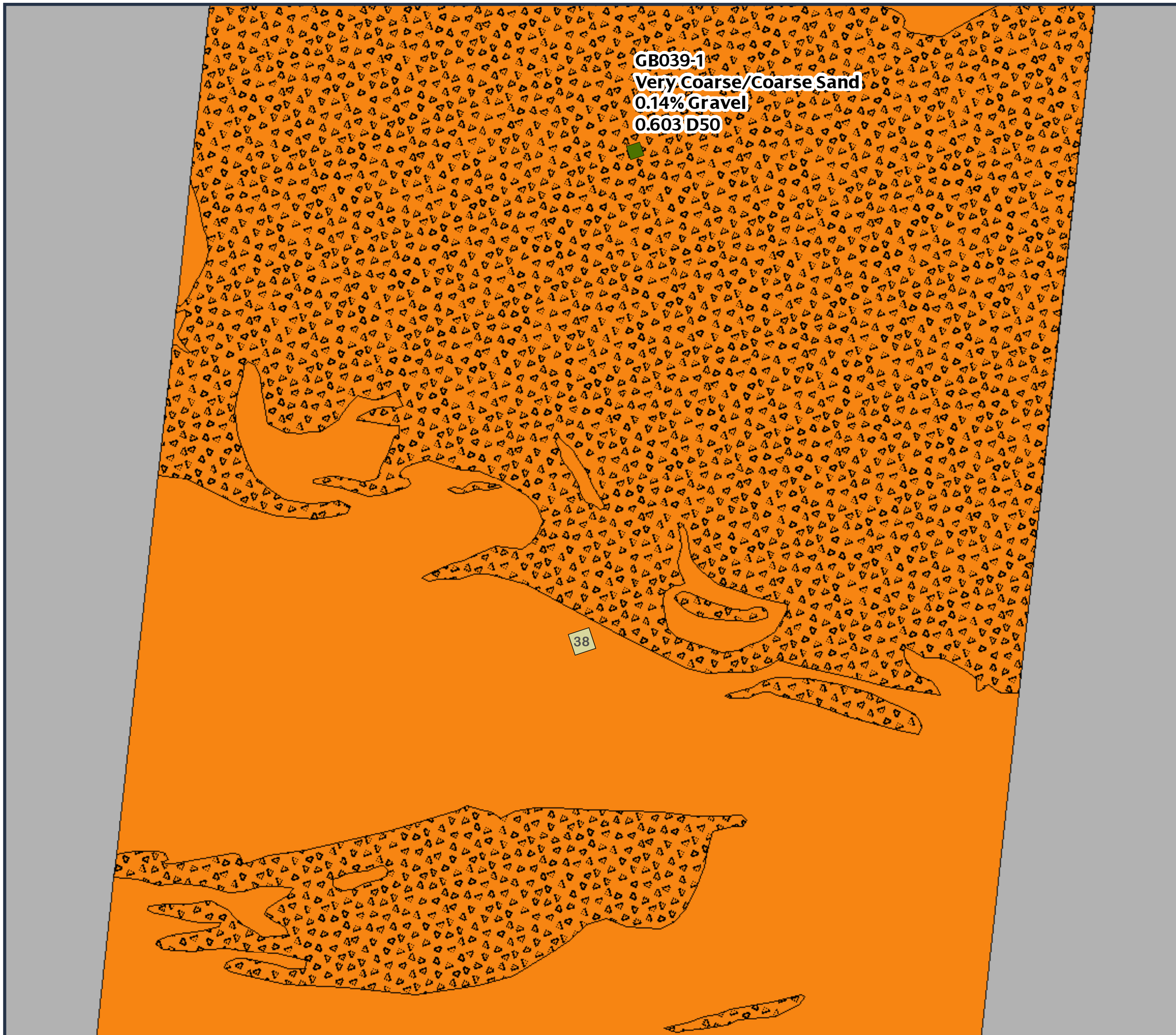
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

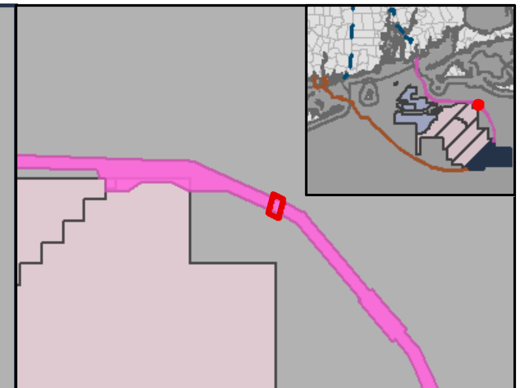
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

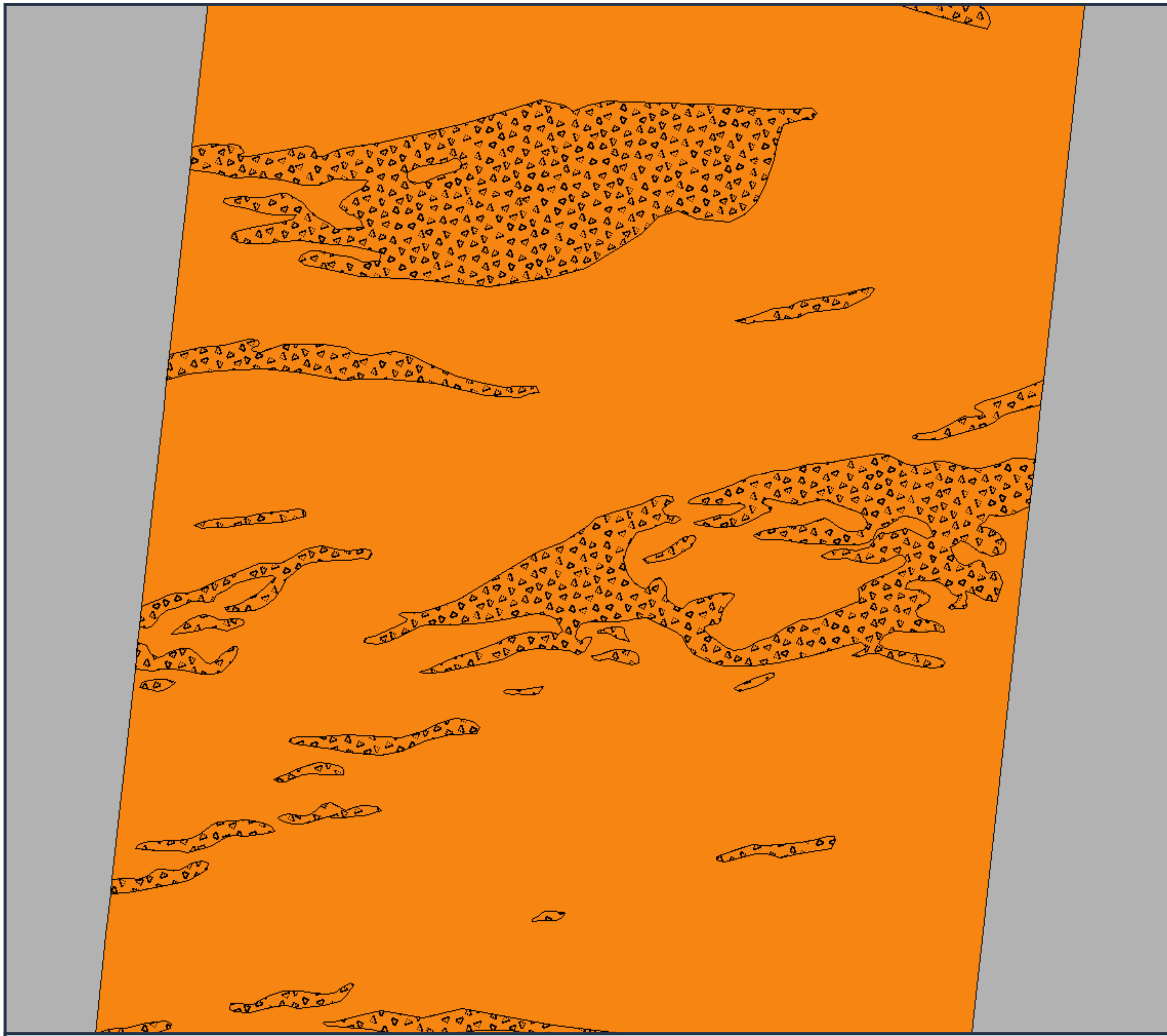
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Grab Sample

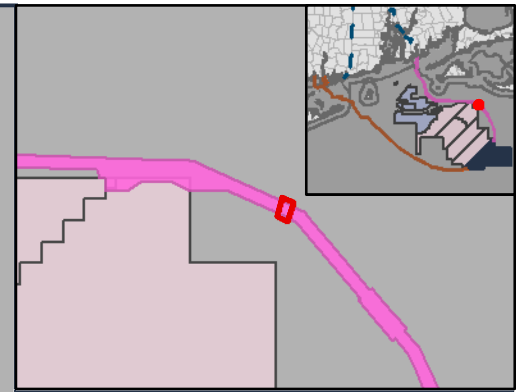
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





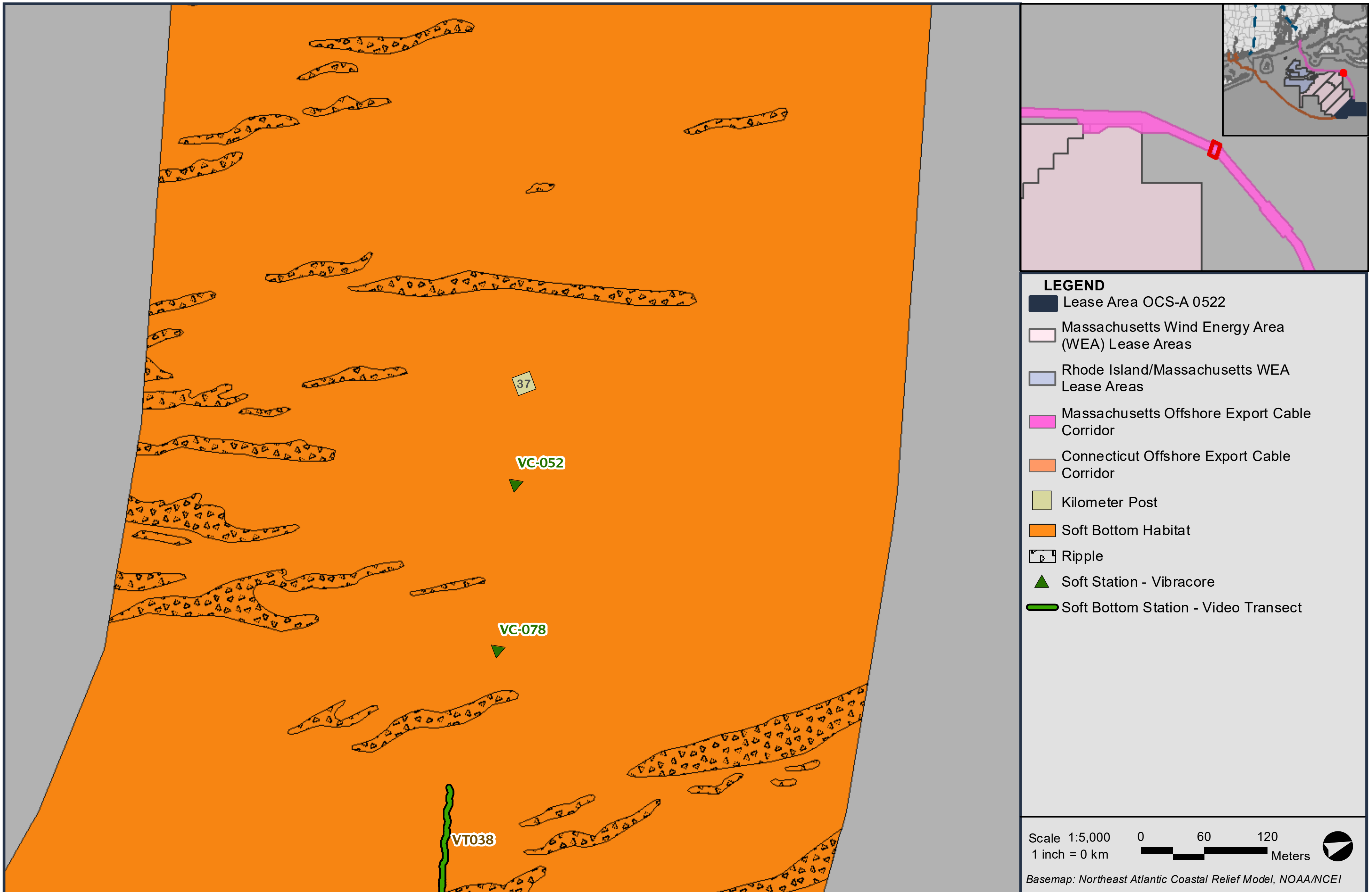
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Ripple

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

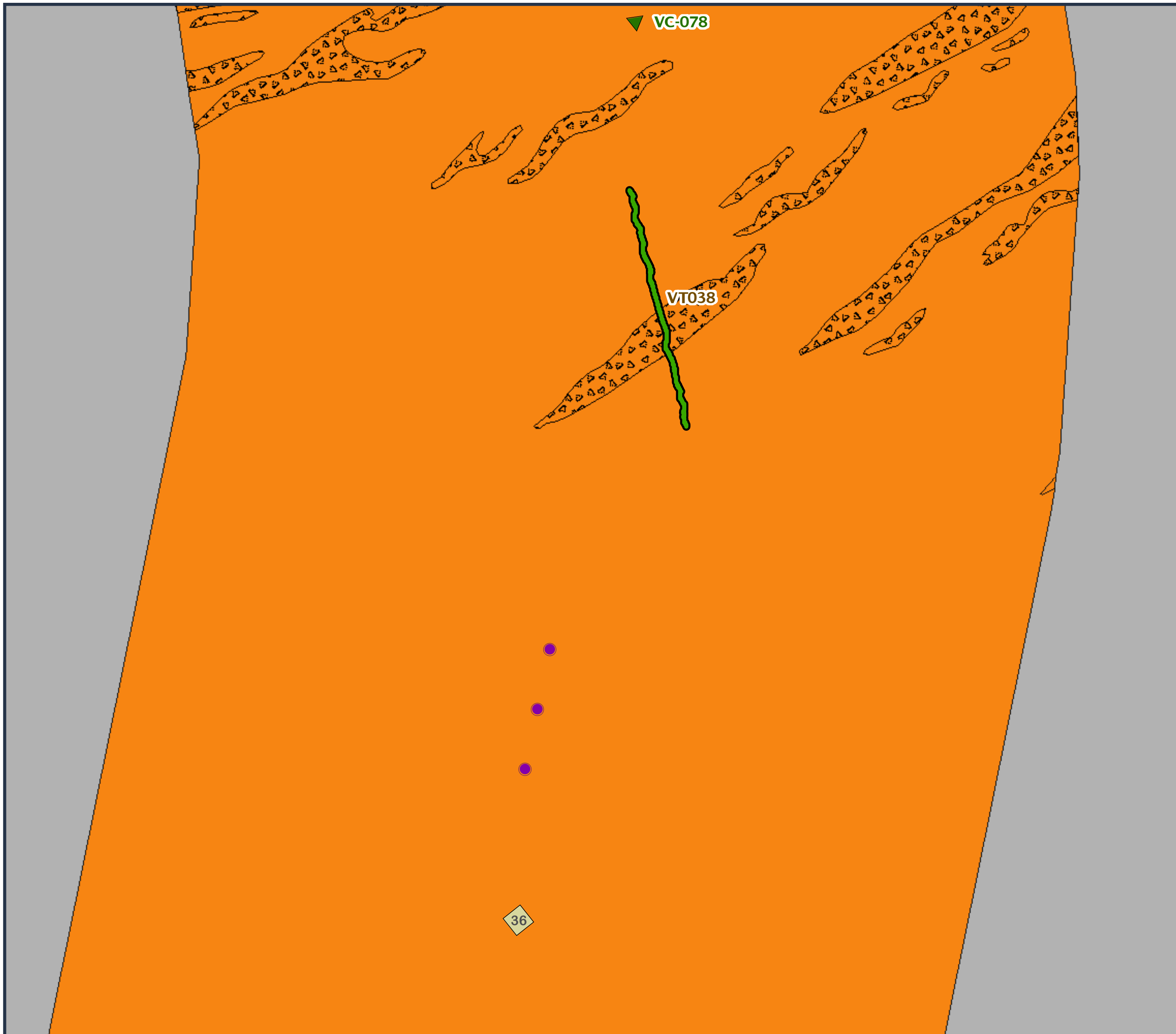
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

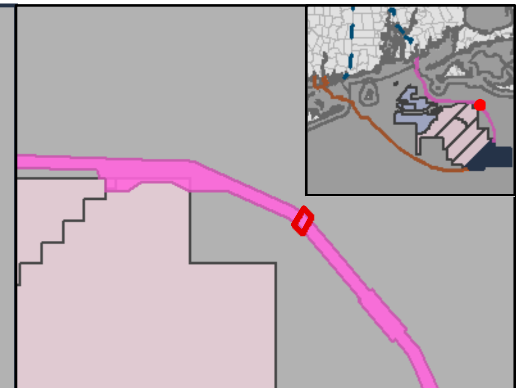
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Representative Massachusetts OECC Dredge Locations
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore
- Soft Bottom Station - Video

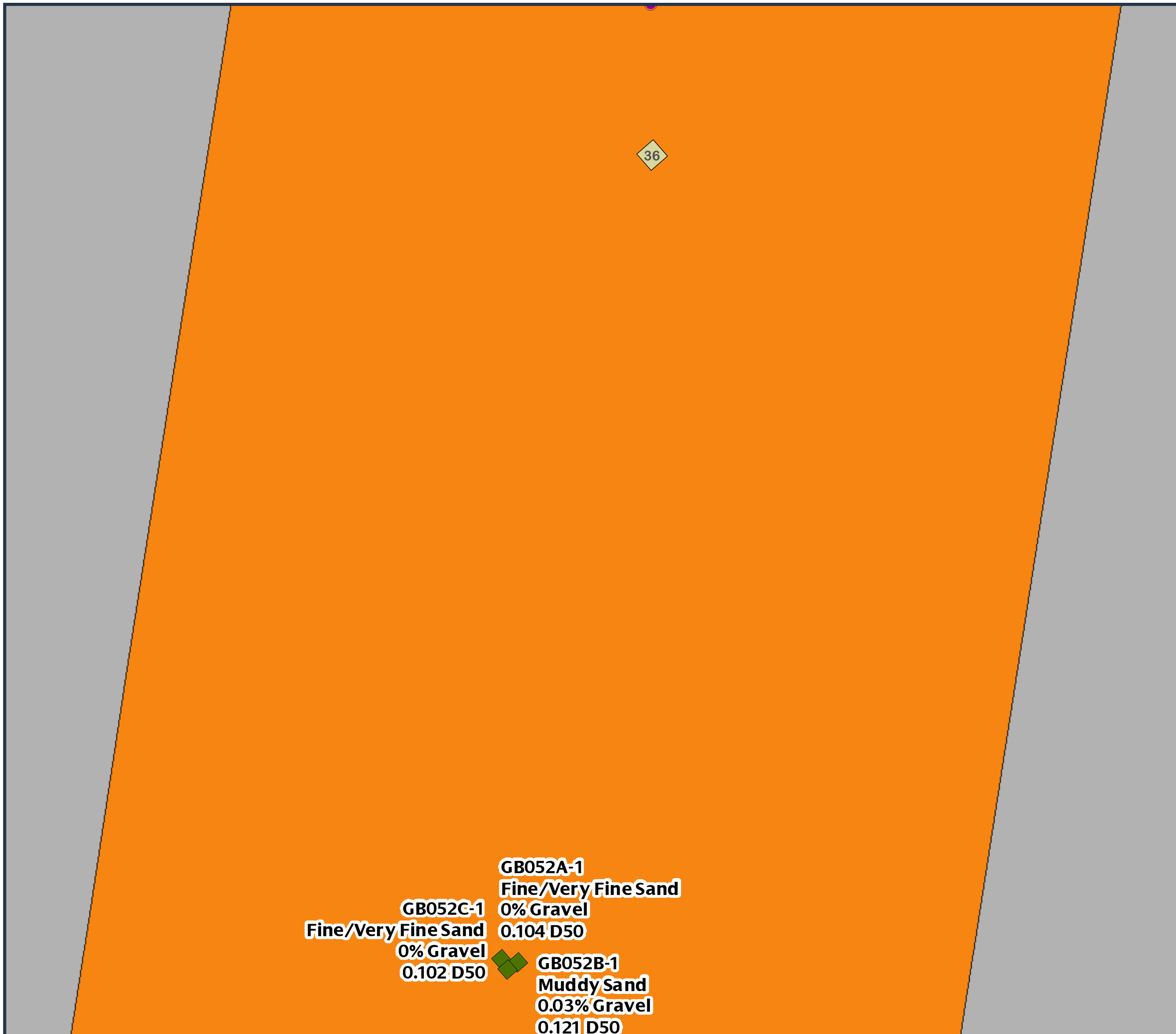
Scale 1:5,000
1 inch = 0 km

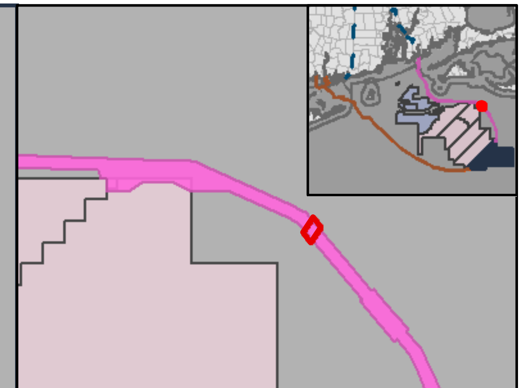
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

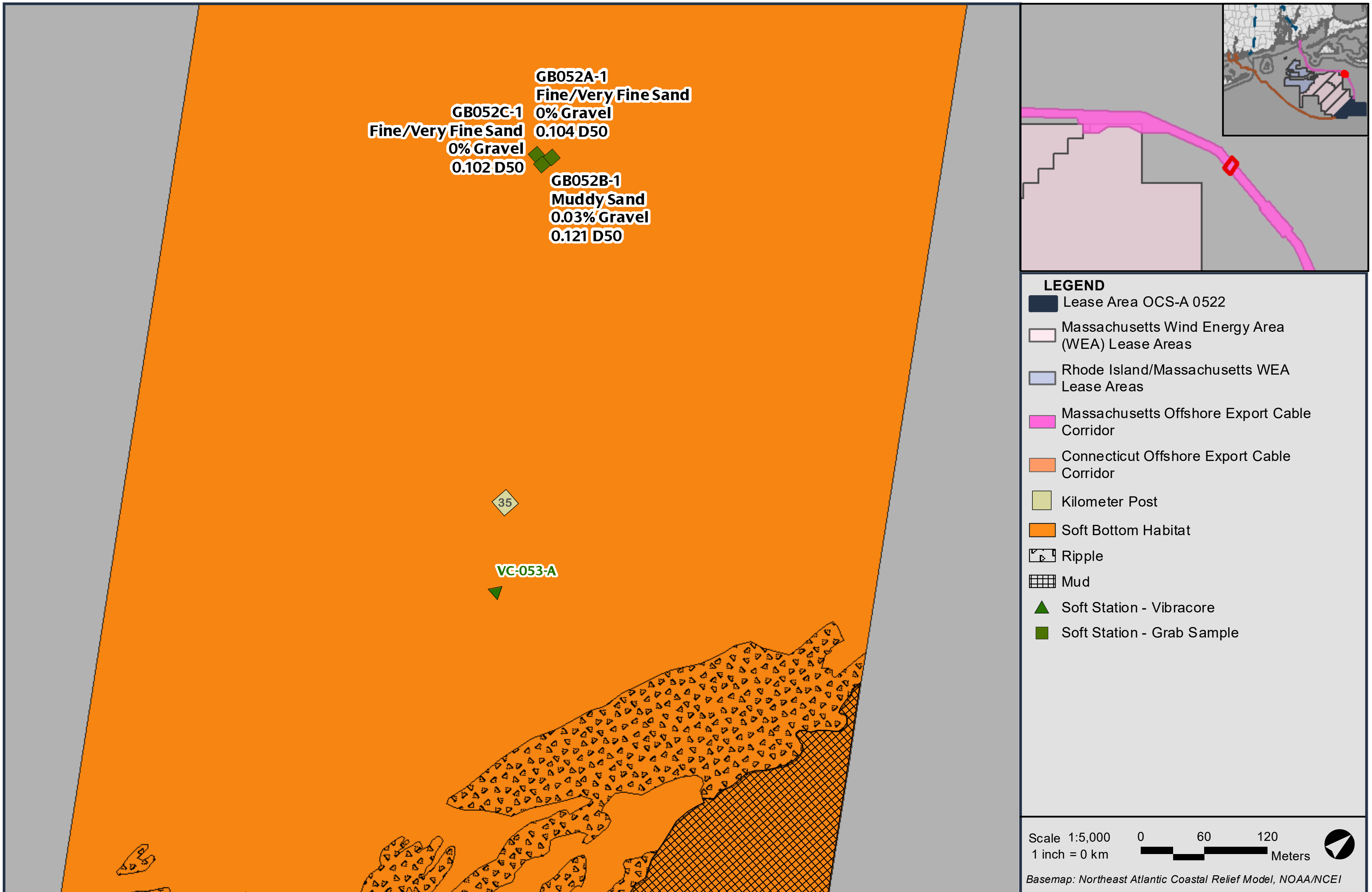
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Representative Massachusetts OECC Dredge Locations
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

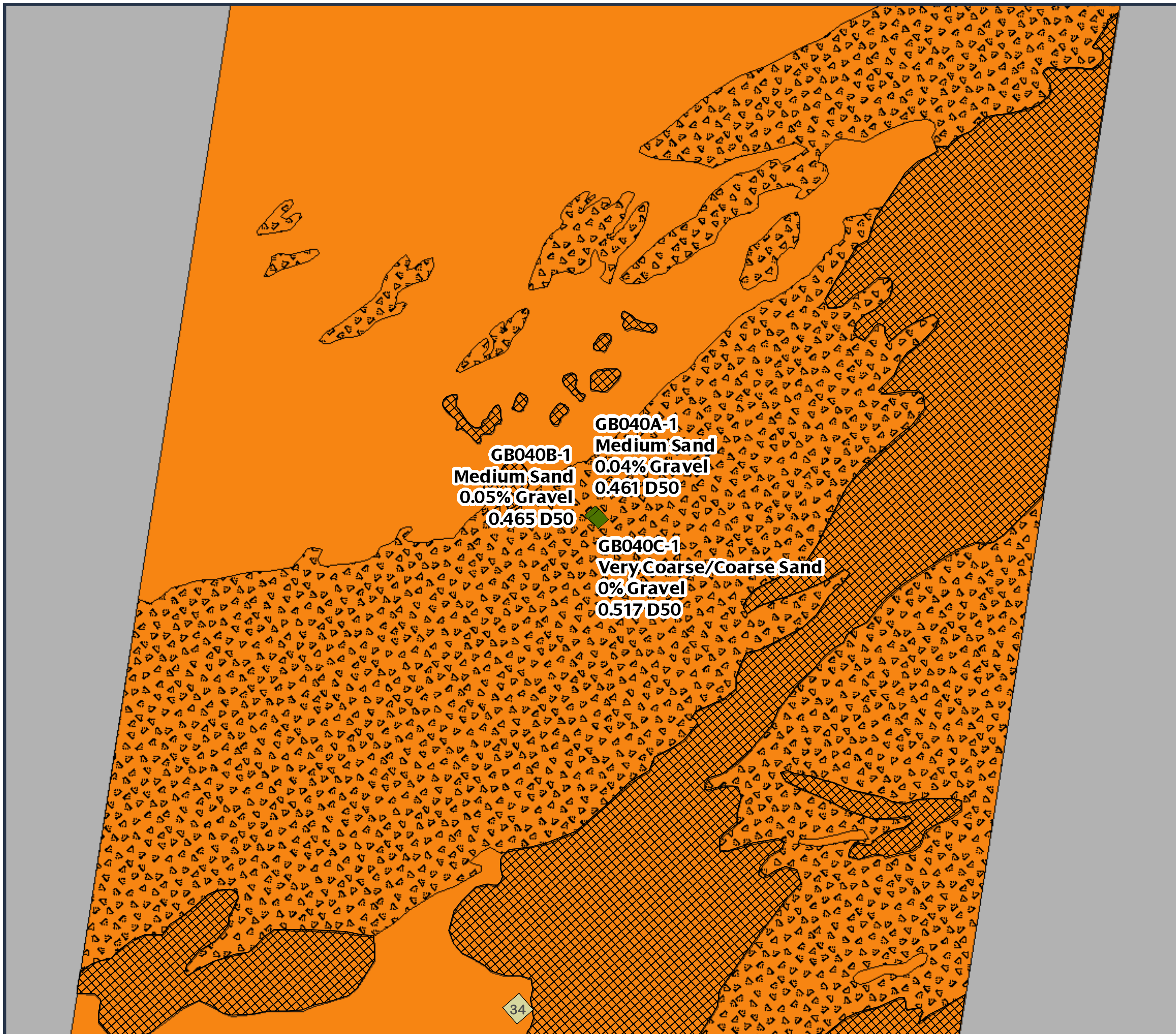
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

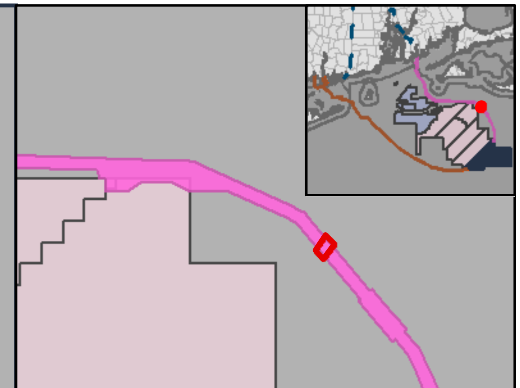
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

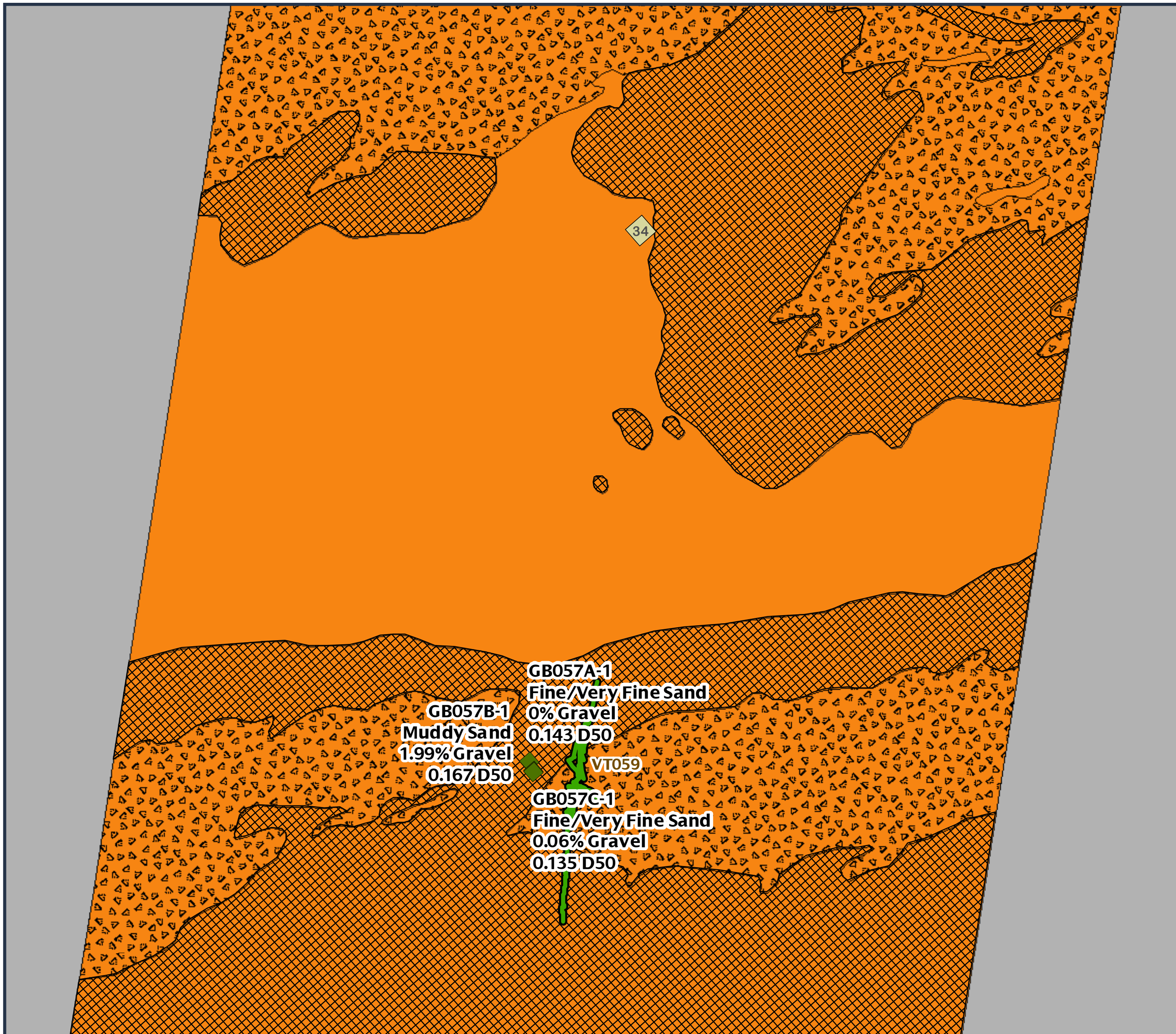
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Mud
- Soft Station - Grab Sample

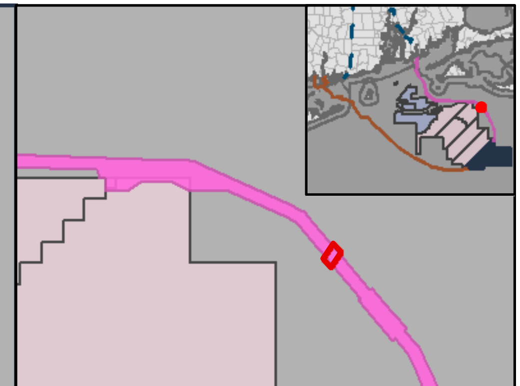
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Mud
- Soft Station - Grab Sample
- Soft Bottom Station - Video

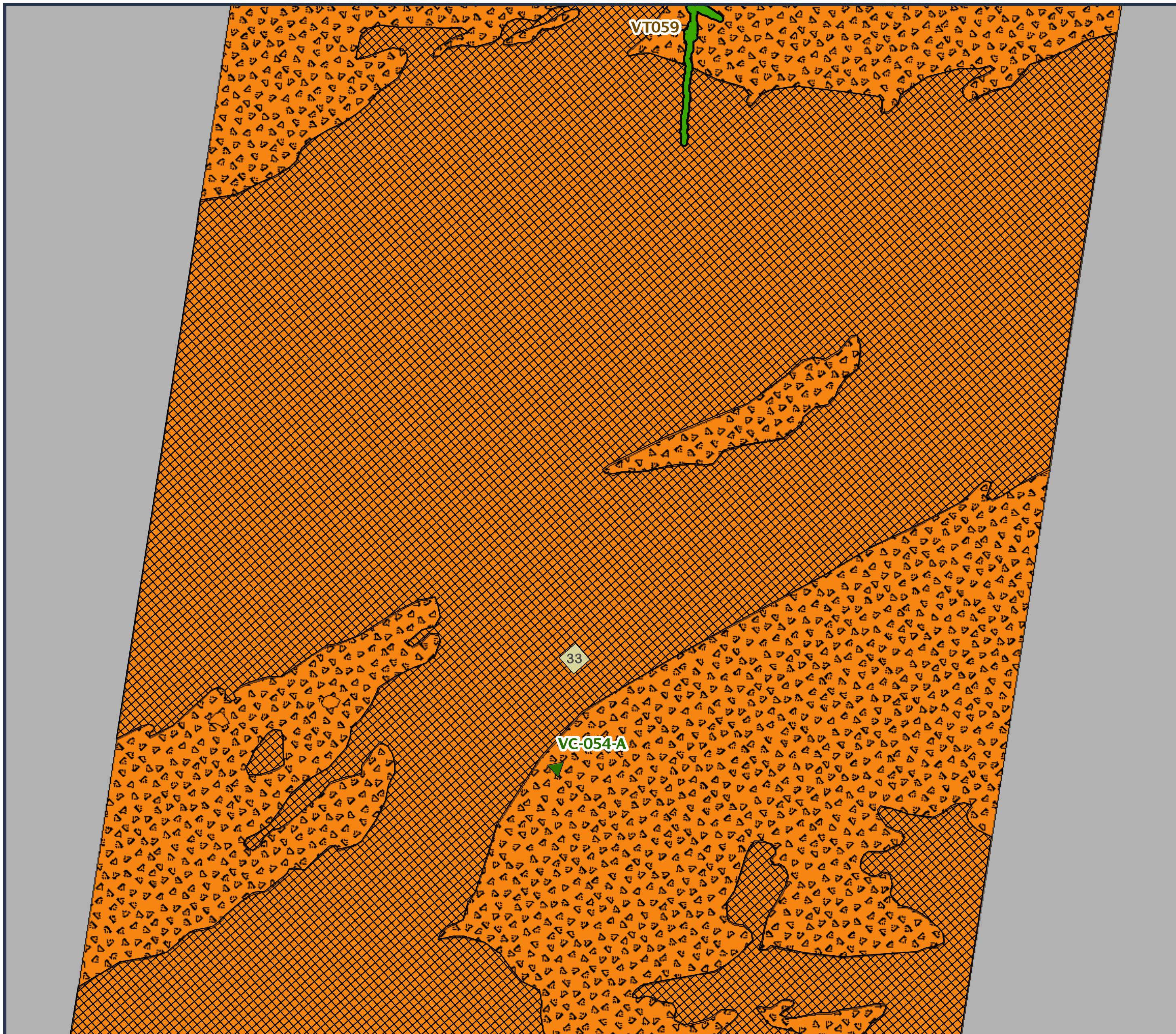
Scale 1:5,000
1 inch = 0 km

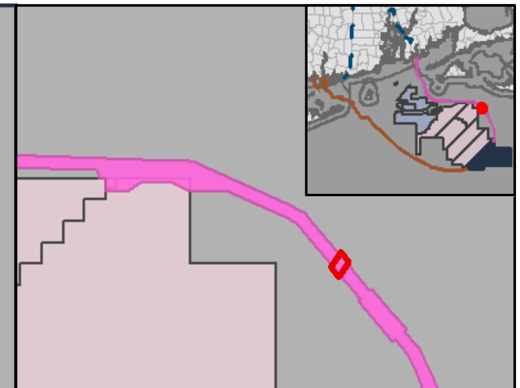
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Mud
- Soft Station - Vibracore
- Soft Station - Grab Sample
- Soft Bottom Station - Video Transect

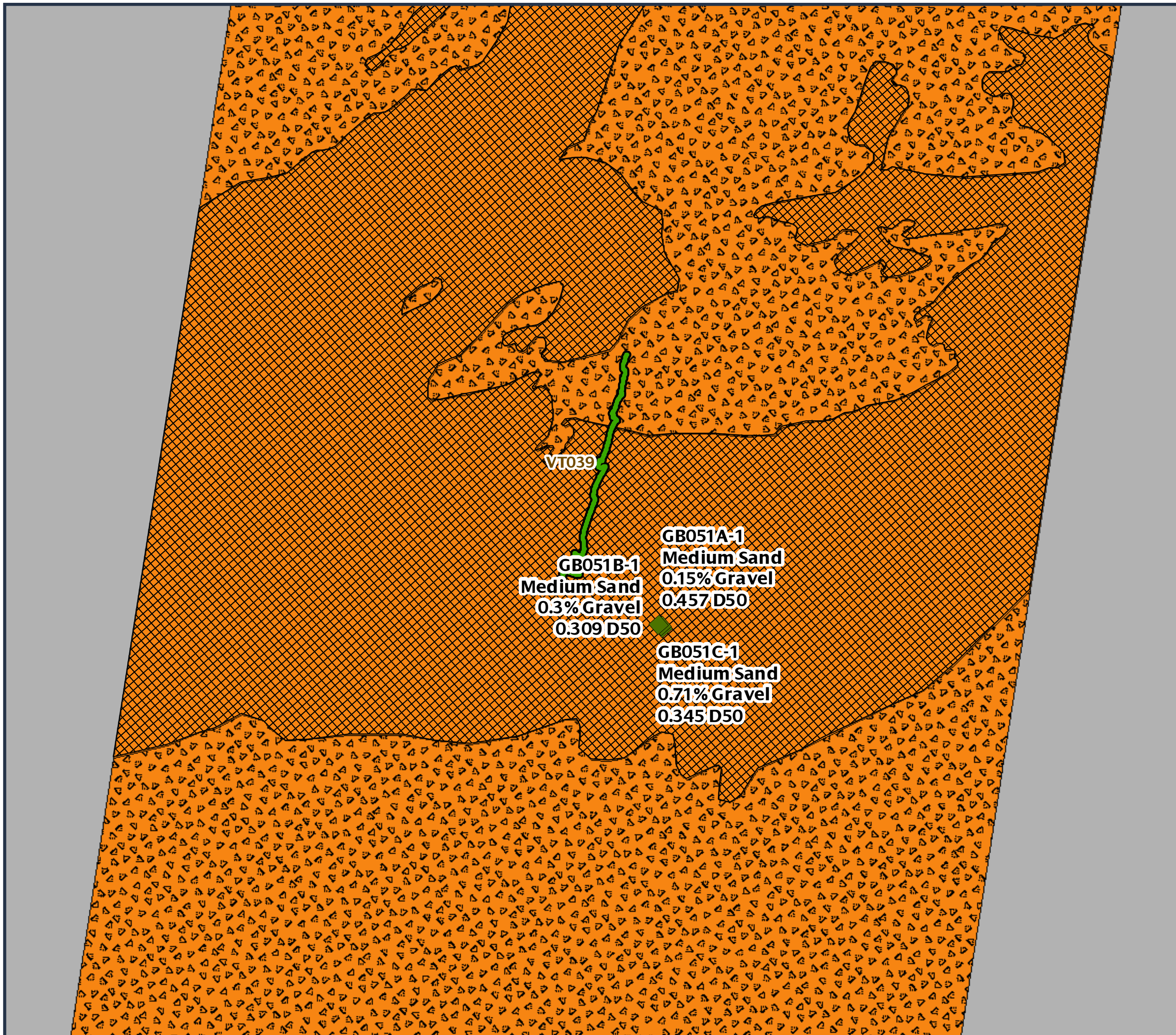
Scale 1:5,000
1 inch = 0 km

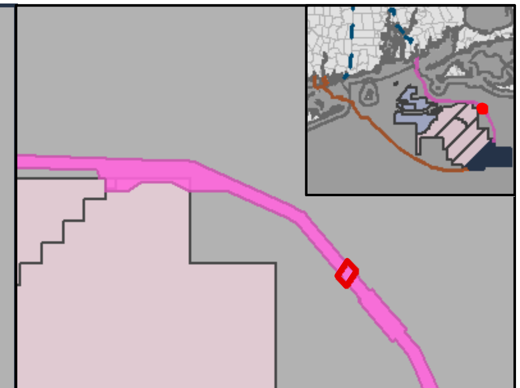
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Mud
- Soft Station - Grab Sample
- Soft Bottom Station - Video

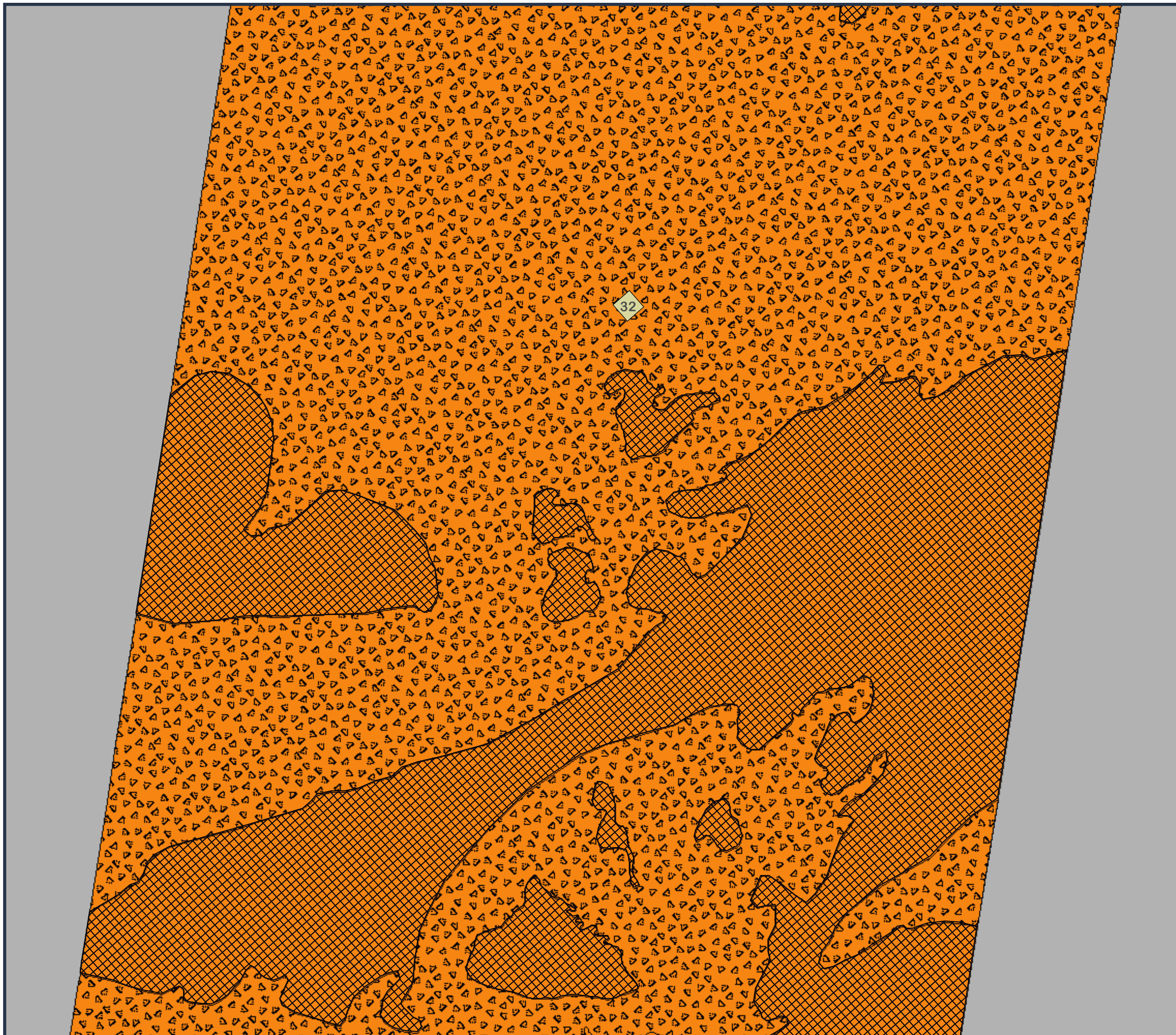
Scale 1:5,000
1 inch = 0 km

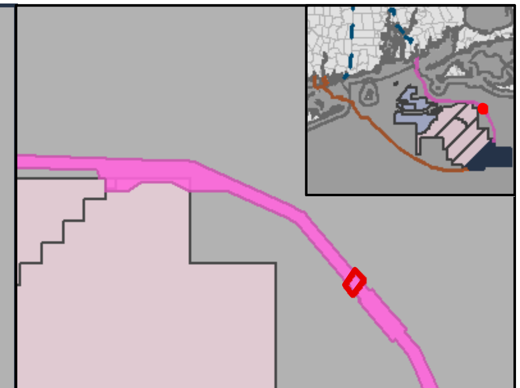
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Mud

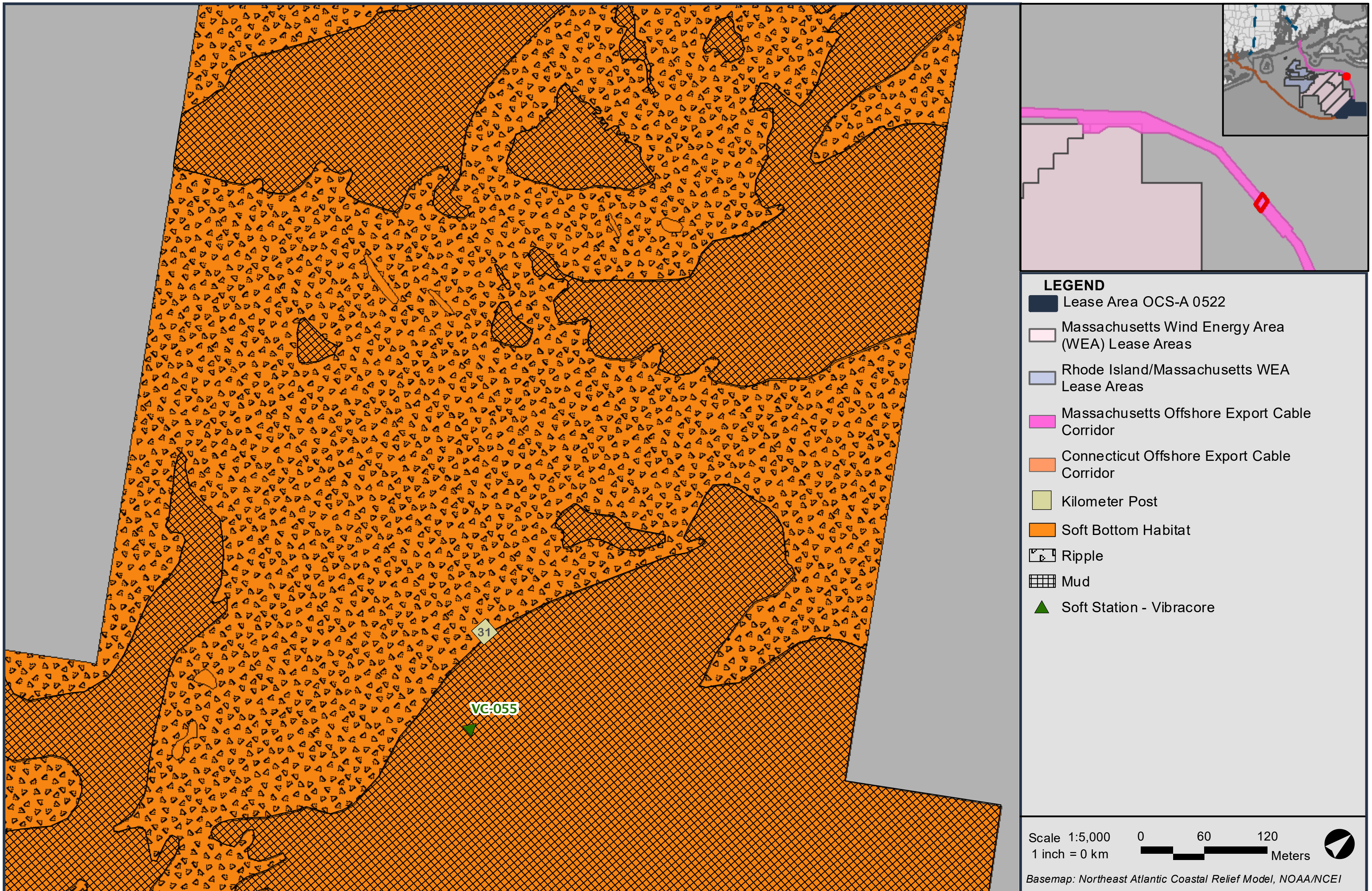
Scale 1:5,000
1 inch = 0 km

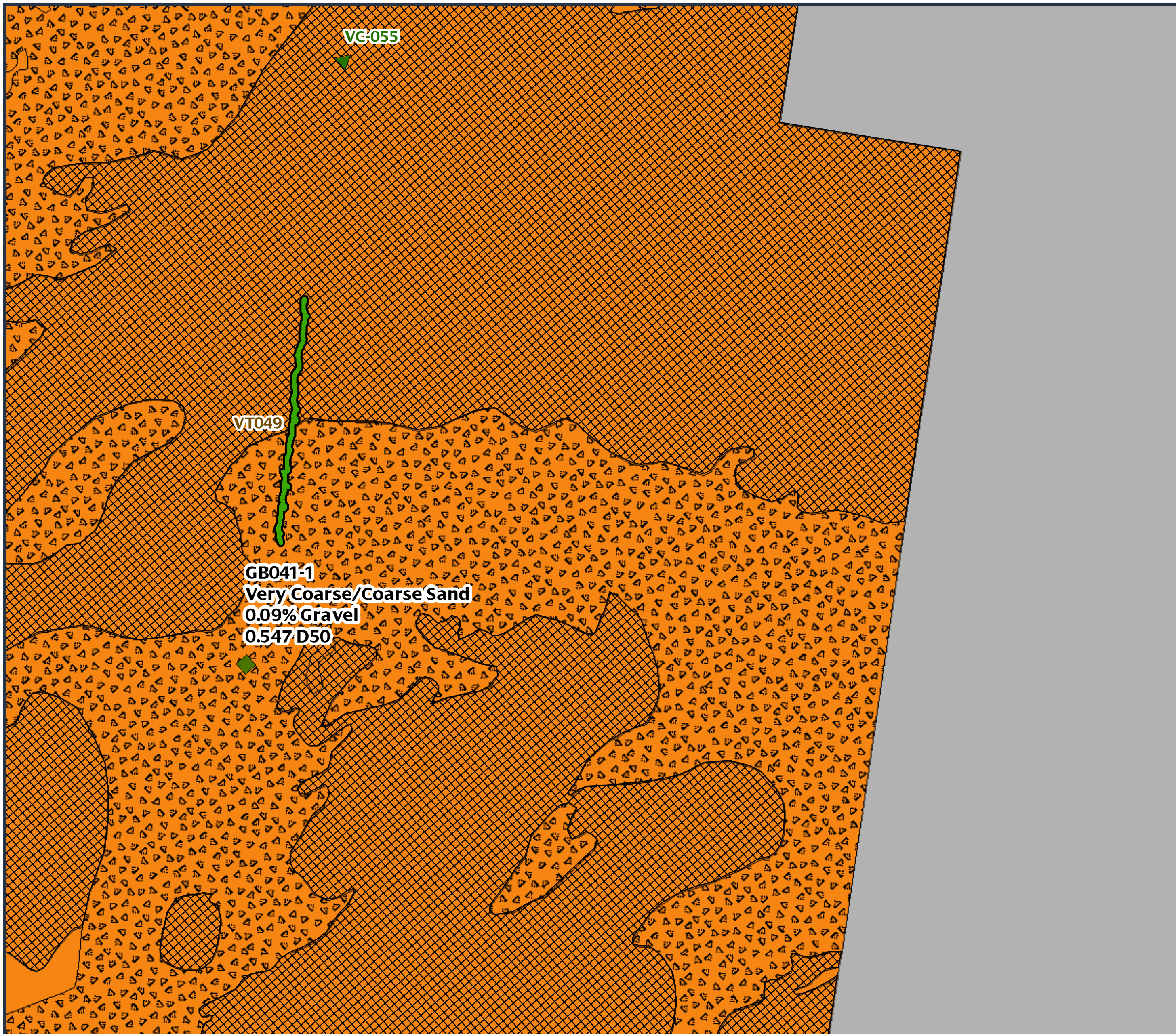
0 60 120 Meters

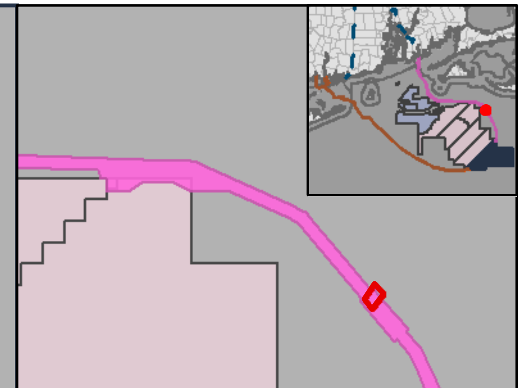
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE


31
VC-055
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Ripple
Mud
Soft Station - Vibracore
Scale 1:5,000
1 inch = 0 km
0
60
120
Meters
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Mud
- Soft Station - Vibracore
- Soft Station - Grab Sample
- Soft Bottom Station - Video Transect

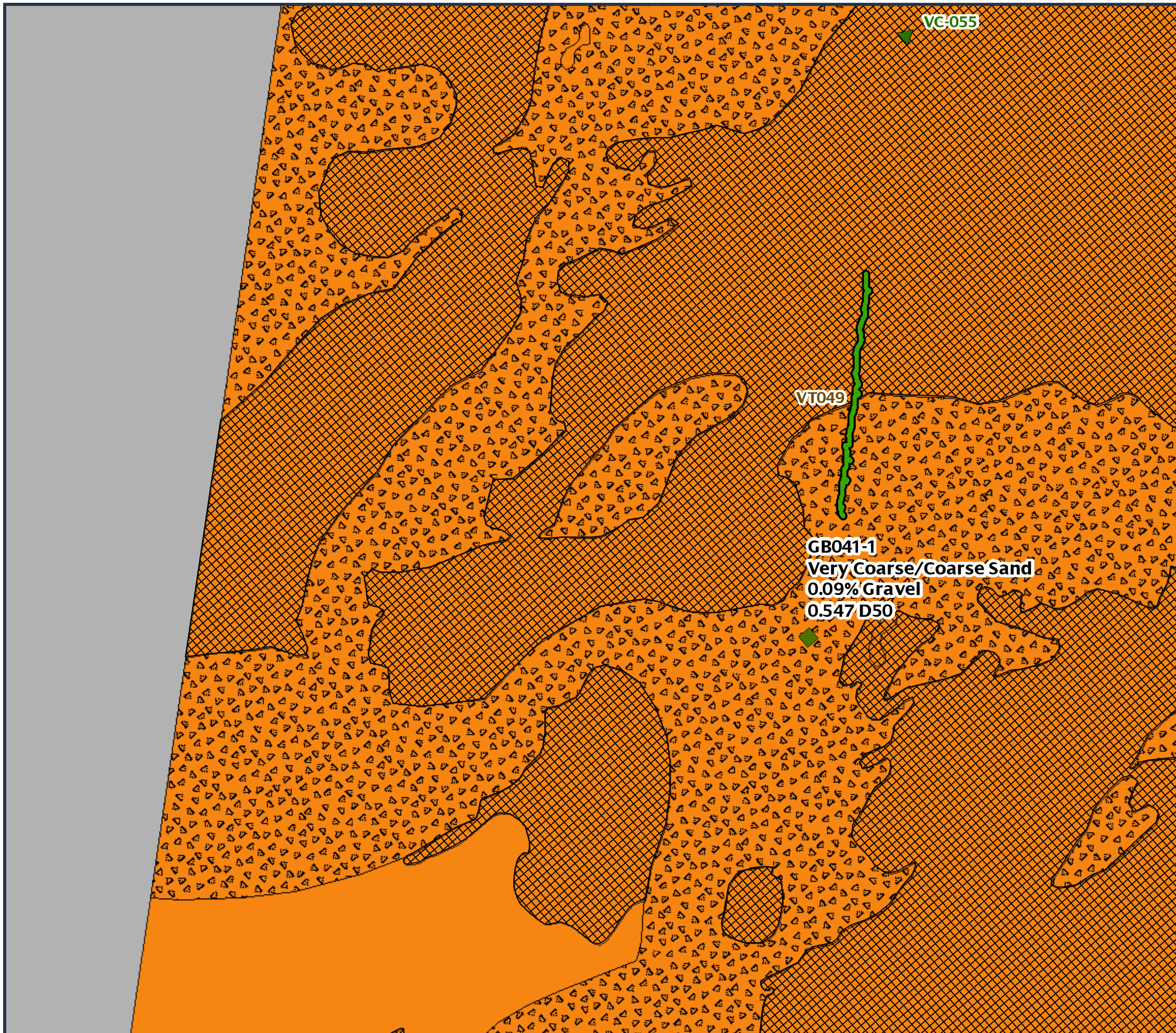
Scale 1:5,000
1 inch = 0 km

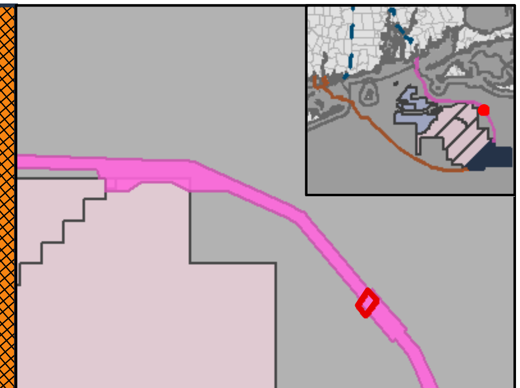
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





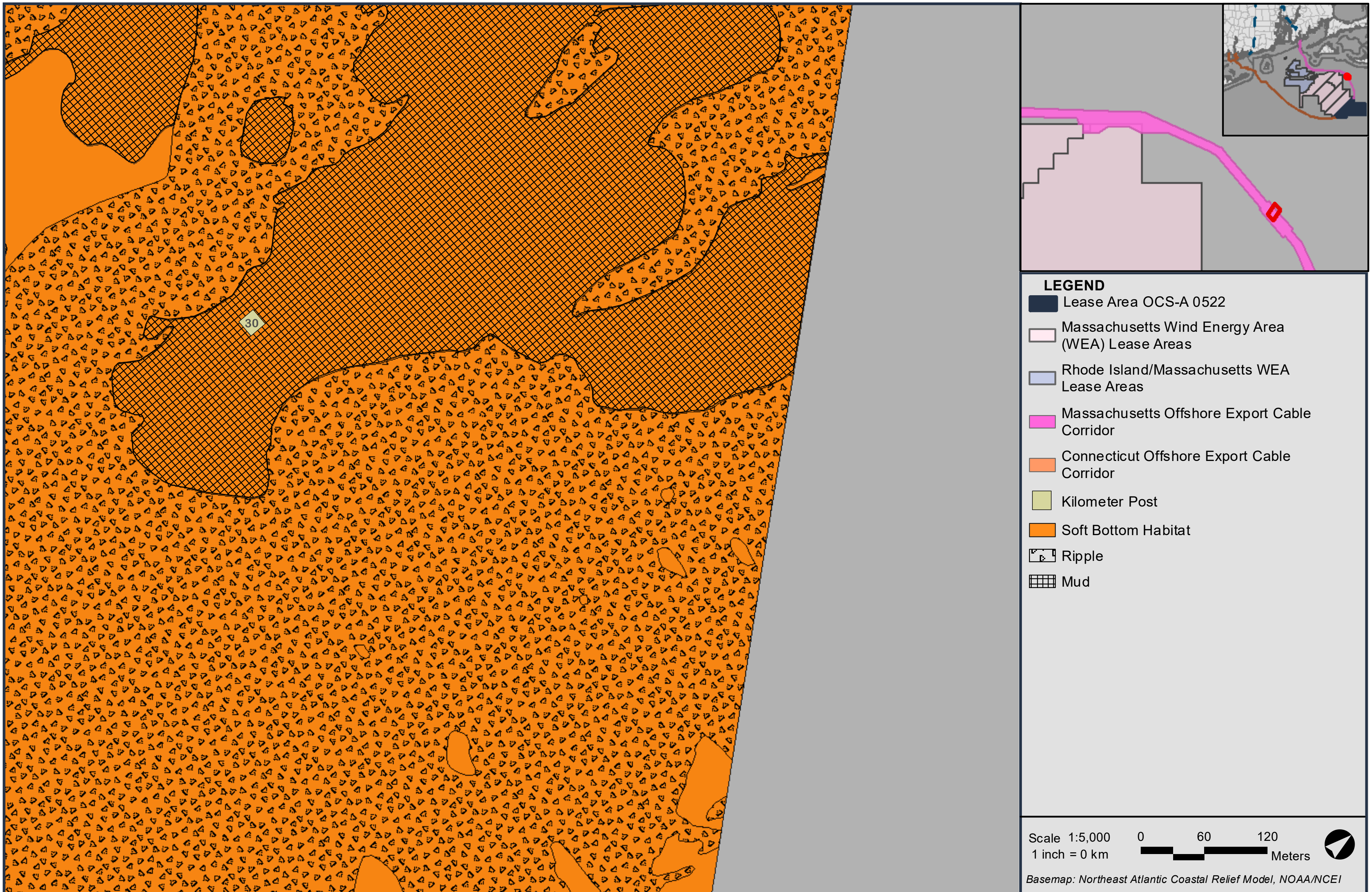
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Mud
- Soft Station - Vibracore
- Soft Station - Grab Sample
- Soft Bottom Station - Video

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

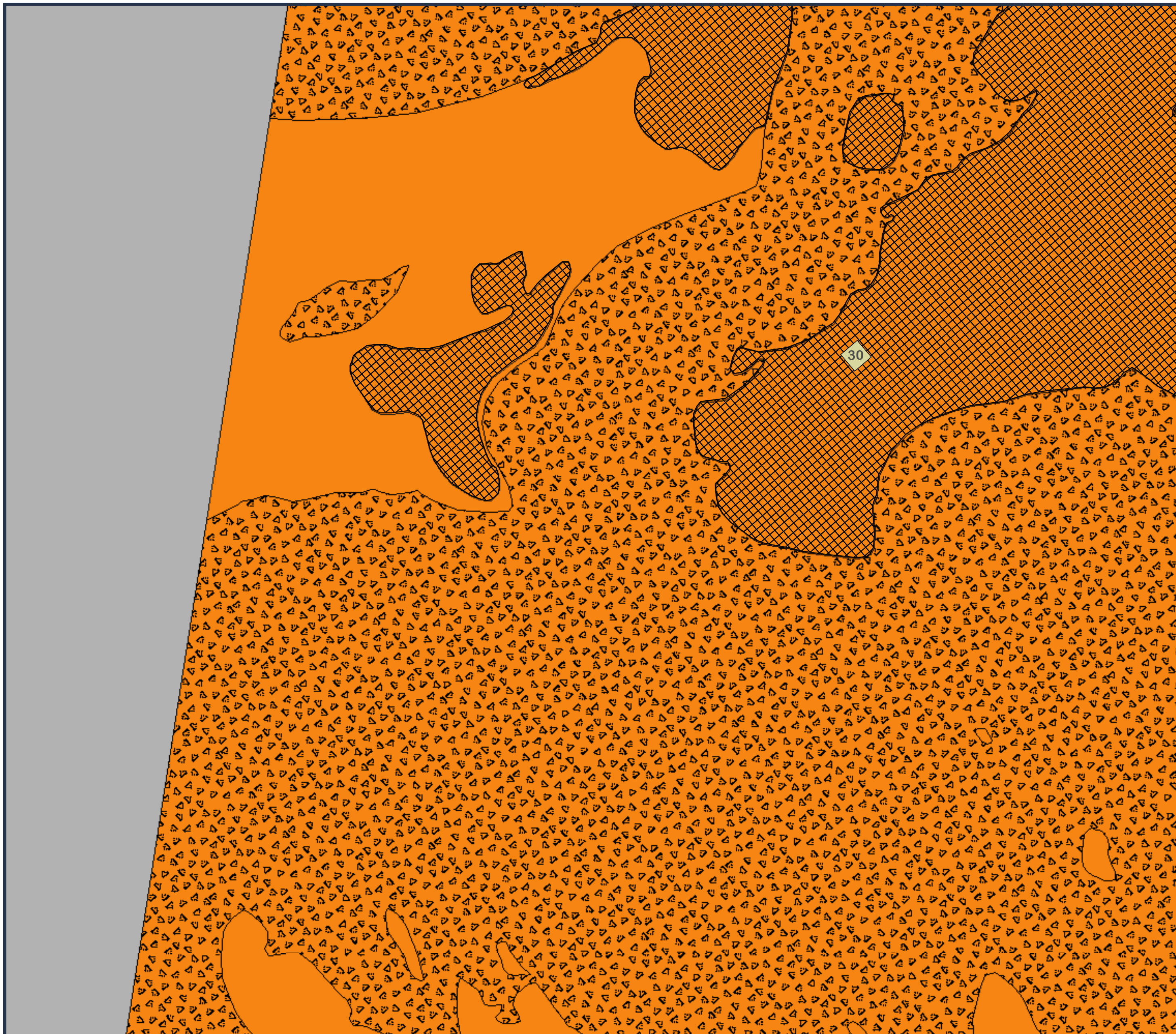
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

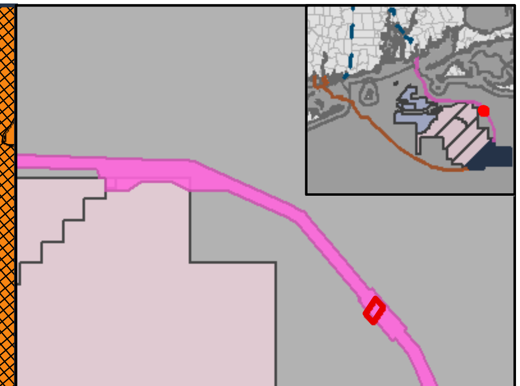
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





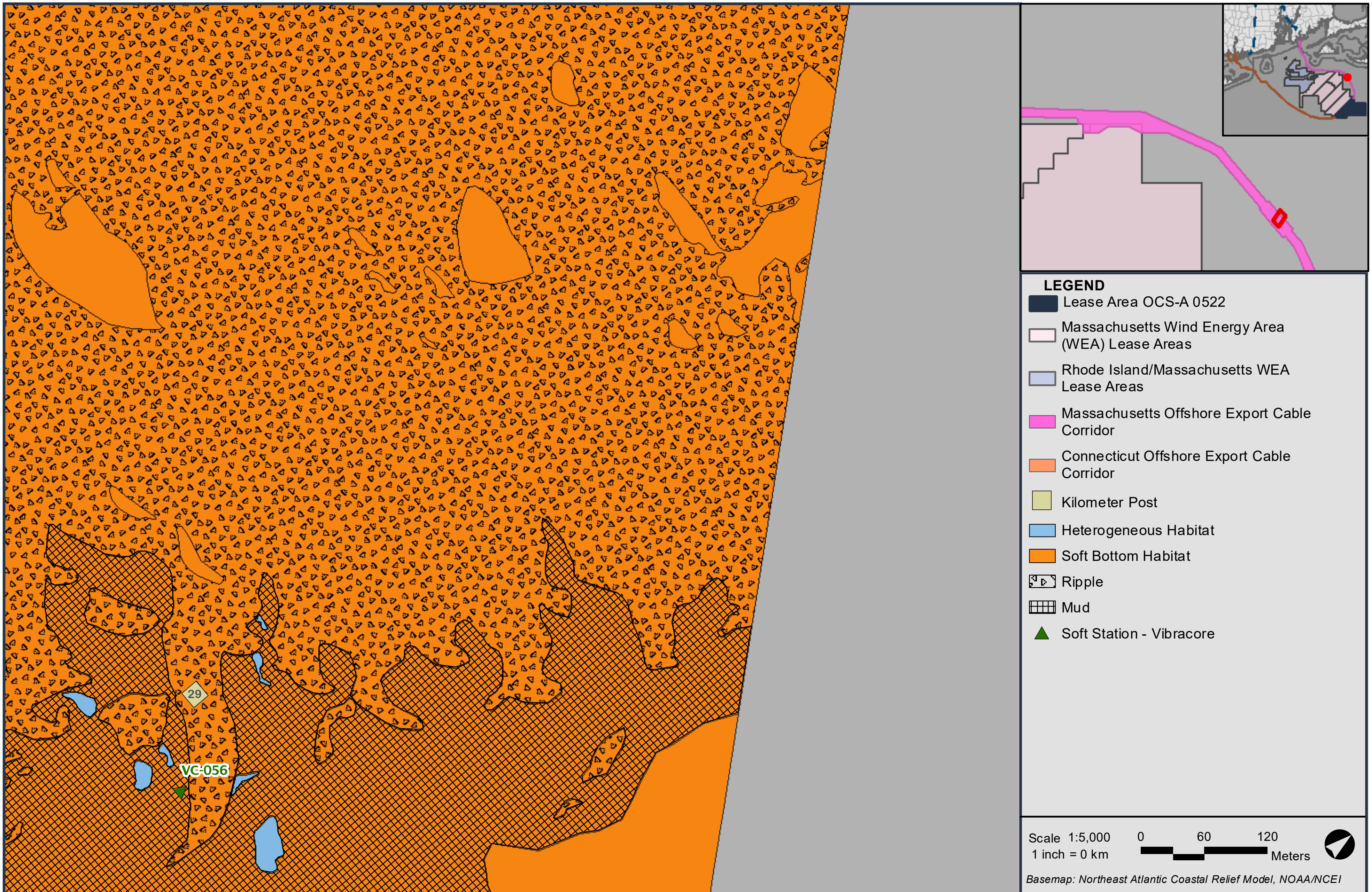
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Ripple
Mud

Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

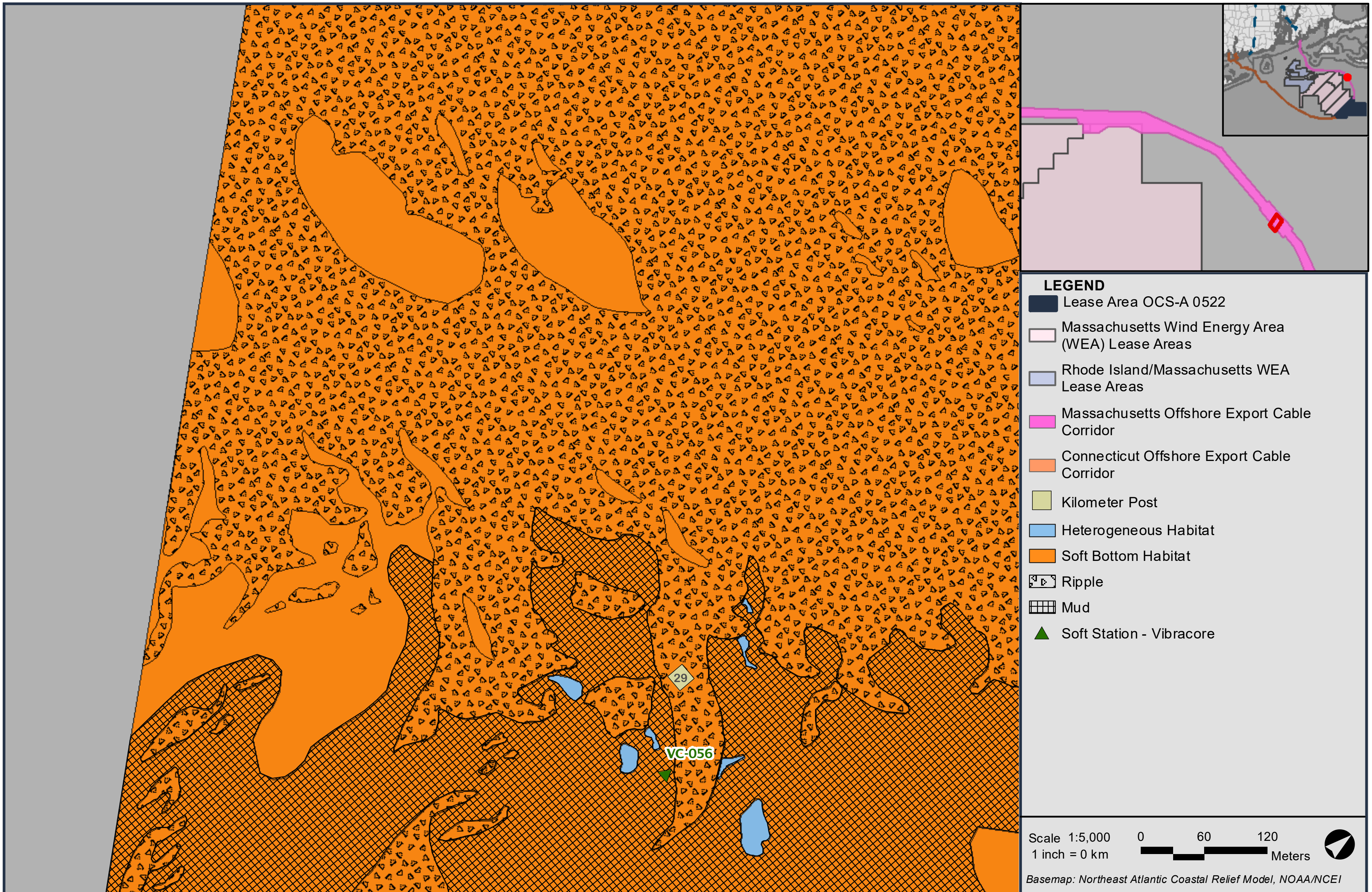
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

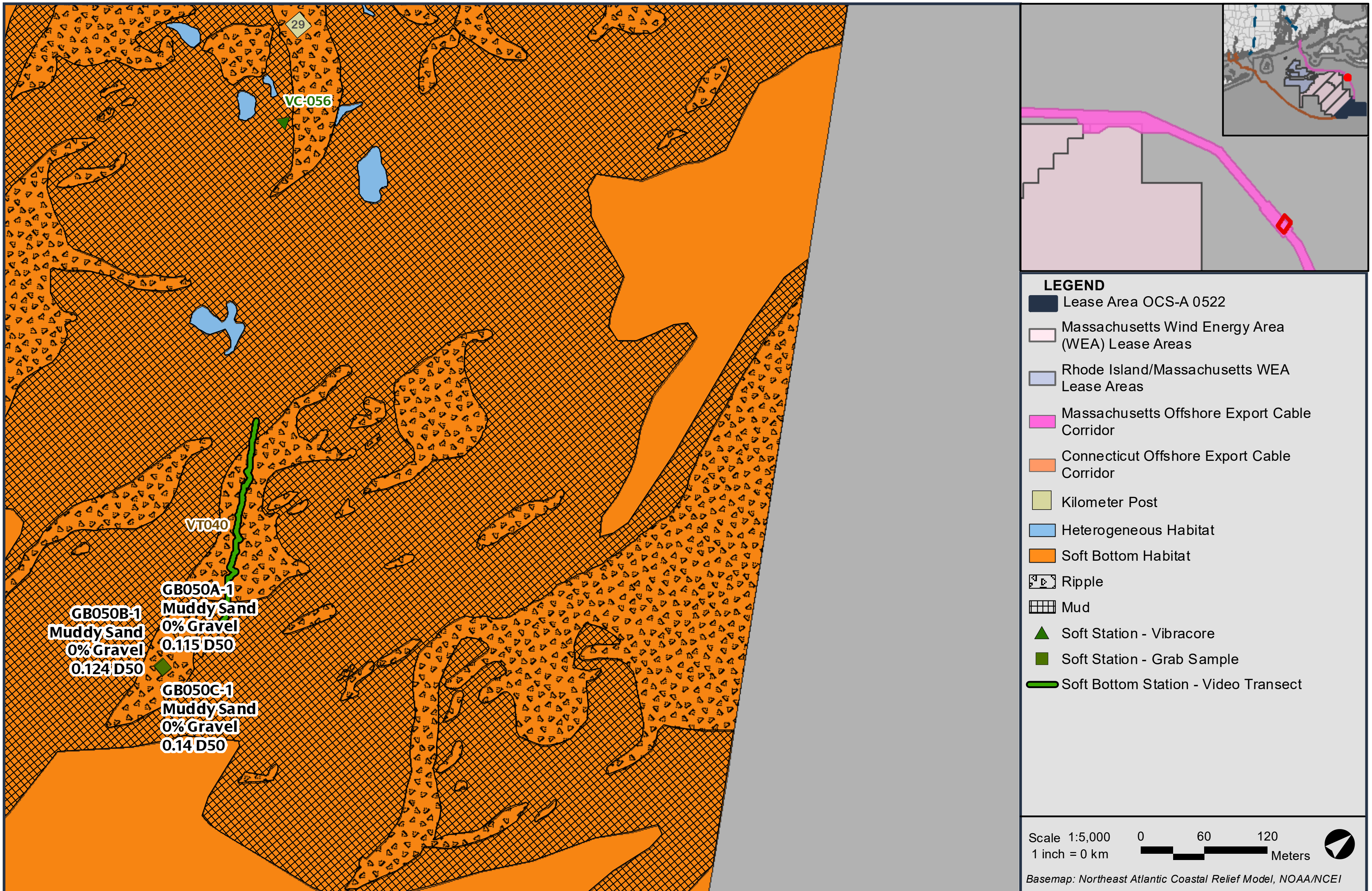
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

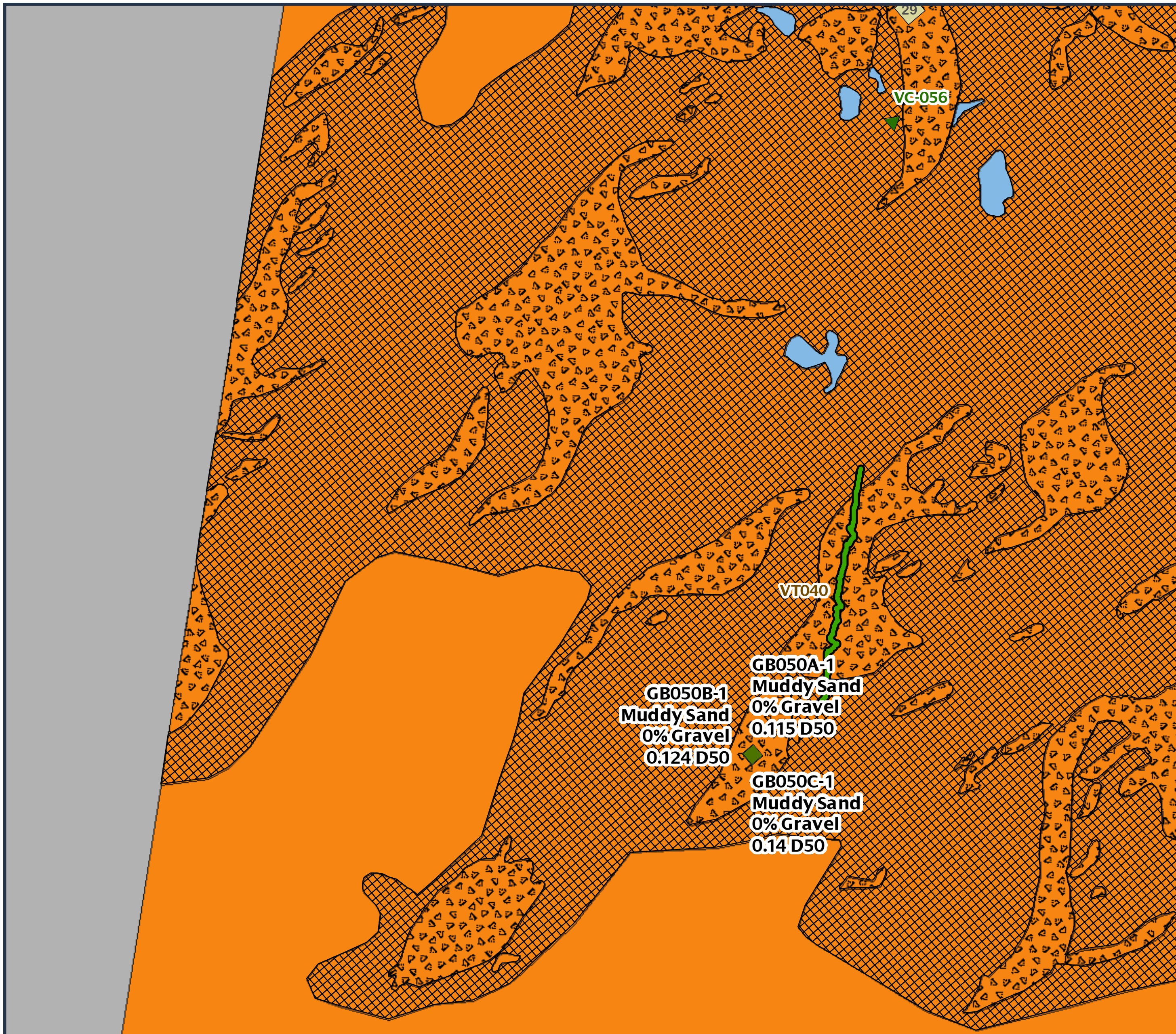
VINEYARD NORTHEAST

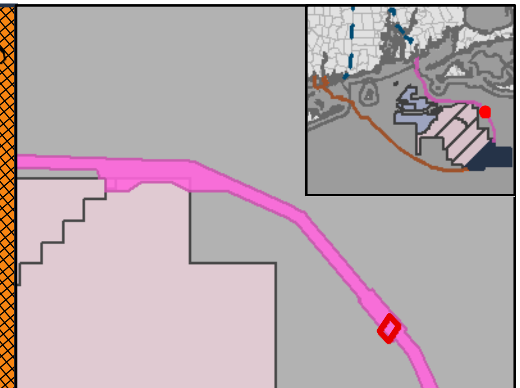
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Soft Bottom Habitat
- Ripple
- Mud
- Soft Station - Vibracore
- Soft Station - Grab Sample
- Soft Bottom Station - Video

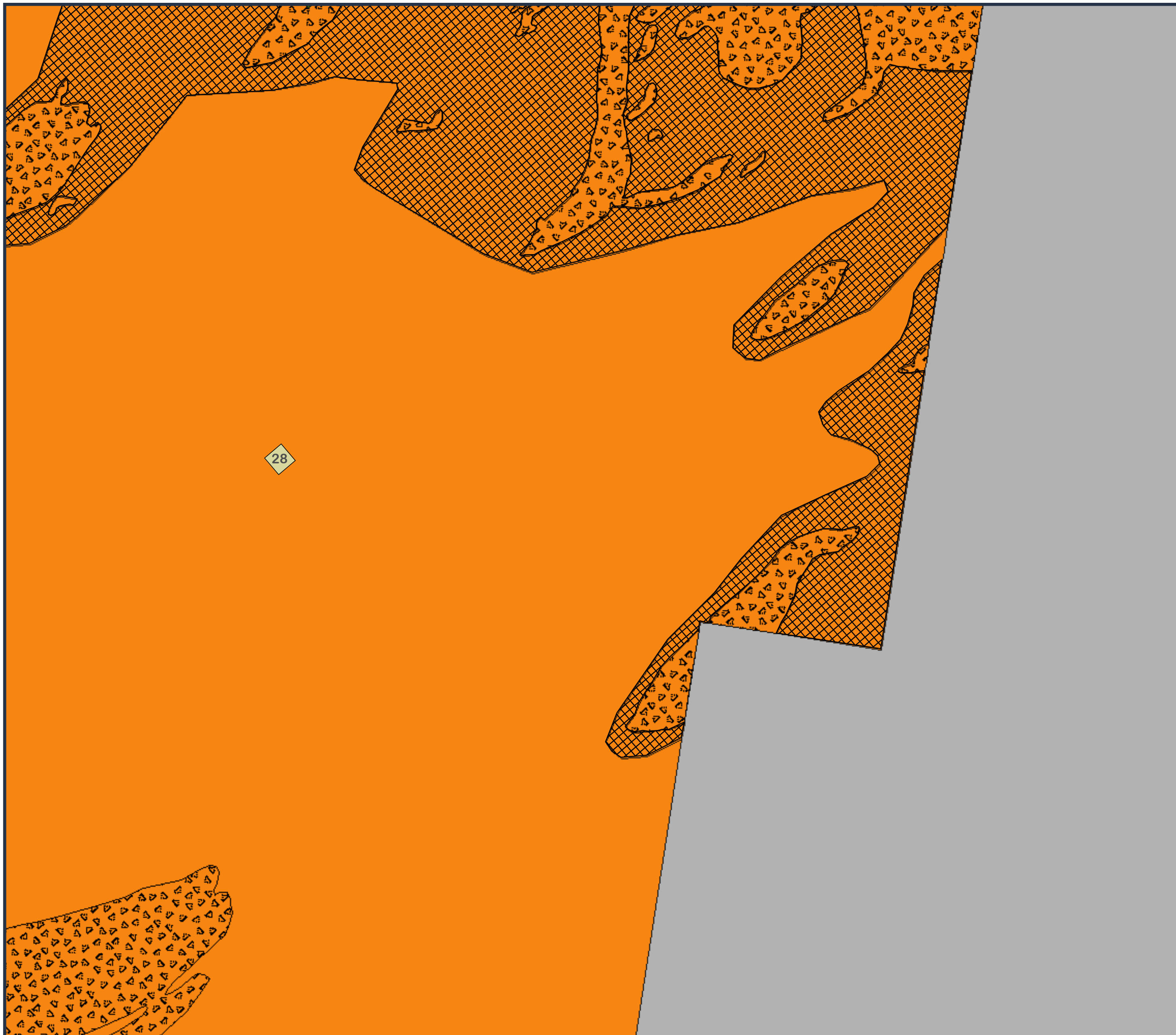
Scale 1:5,000
1 inch = 0 km

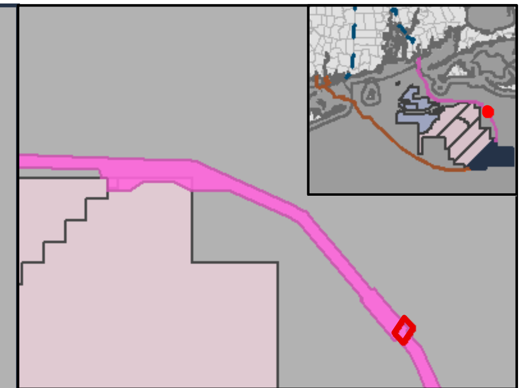
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Mud
- Soft Station - Grab Sample

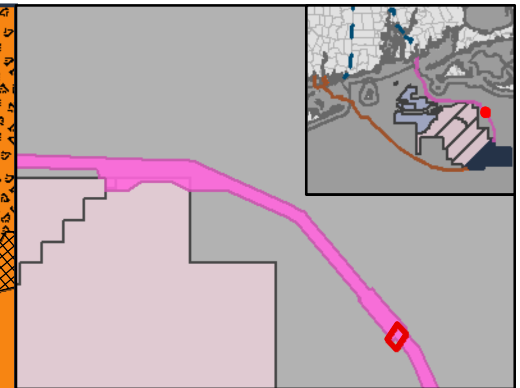
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Mud

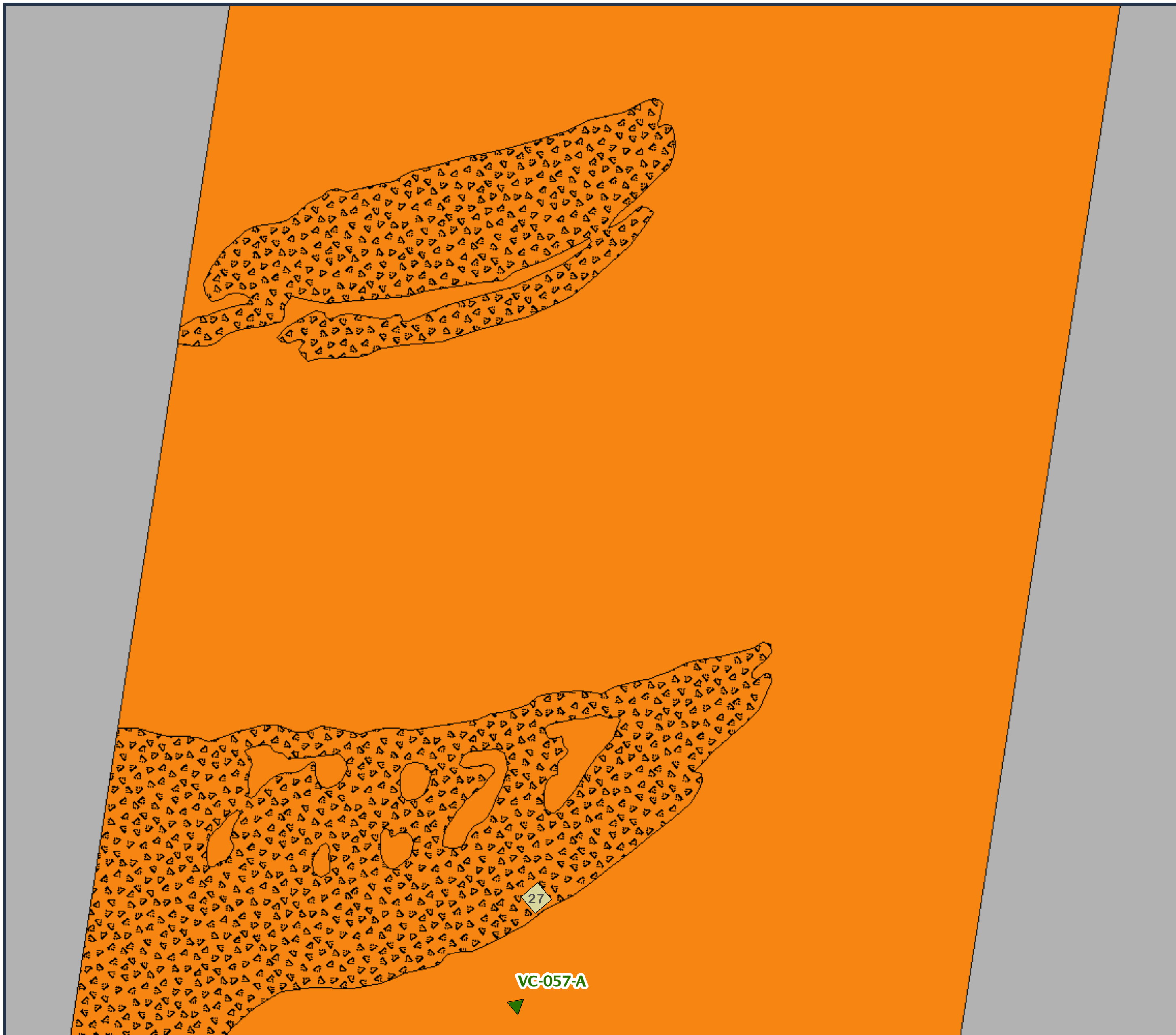
Scale 1:5,000
1 inch = 0 km

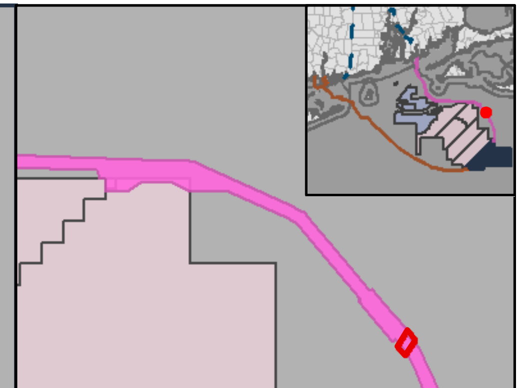
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore

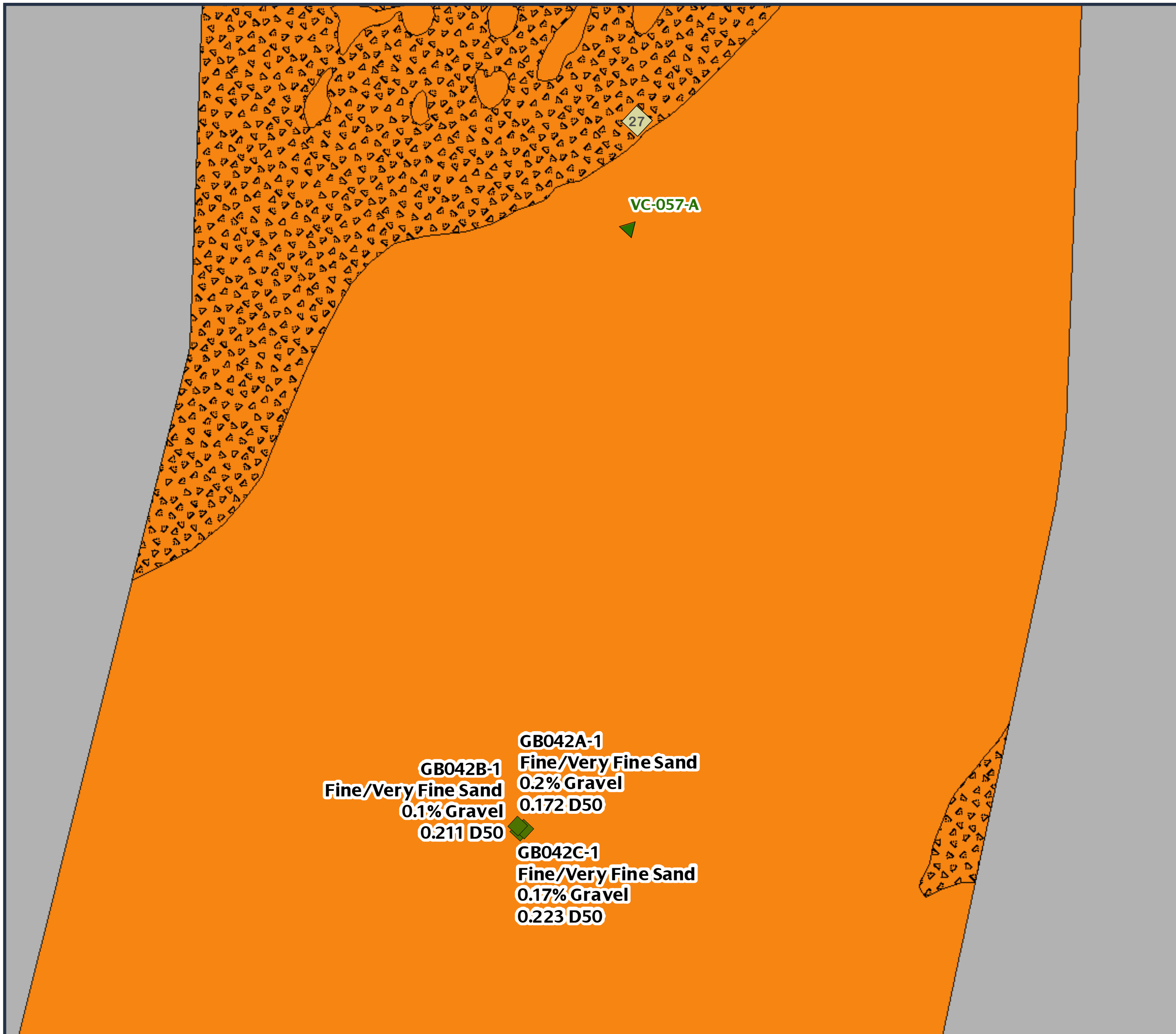
Scale 1:5,000
1 inch = 0 km

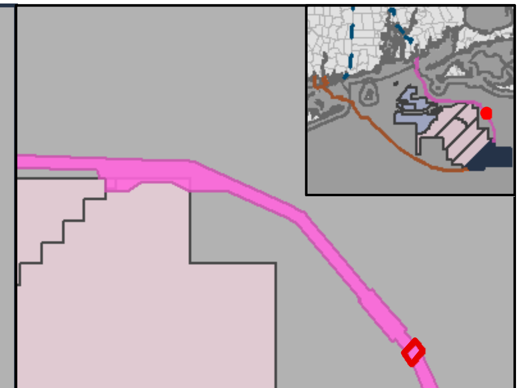
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore
- Soft Station - Grab Sample

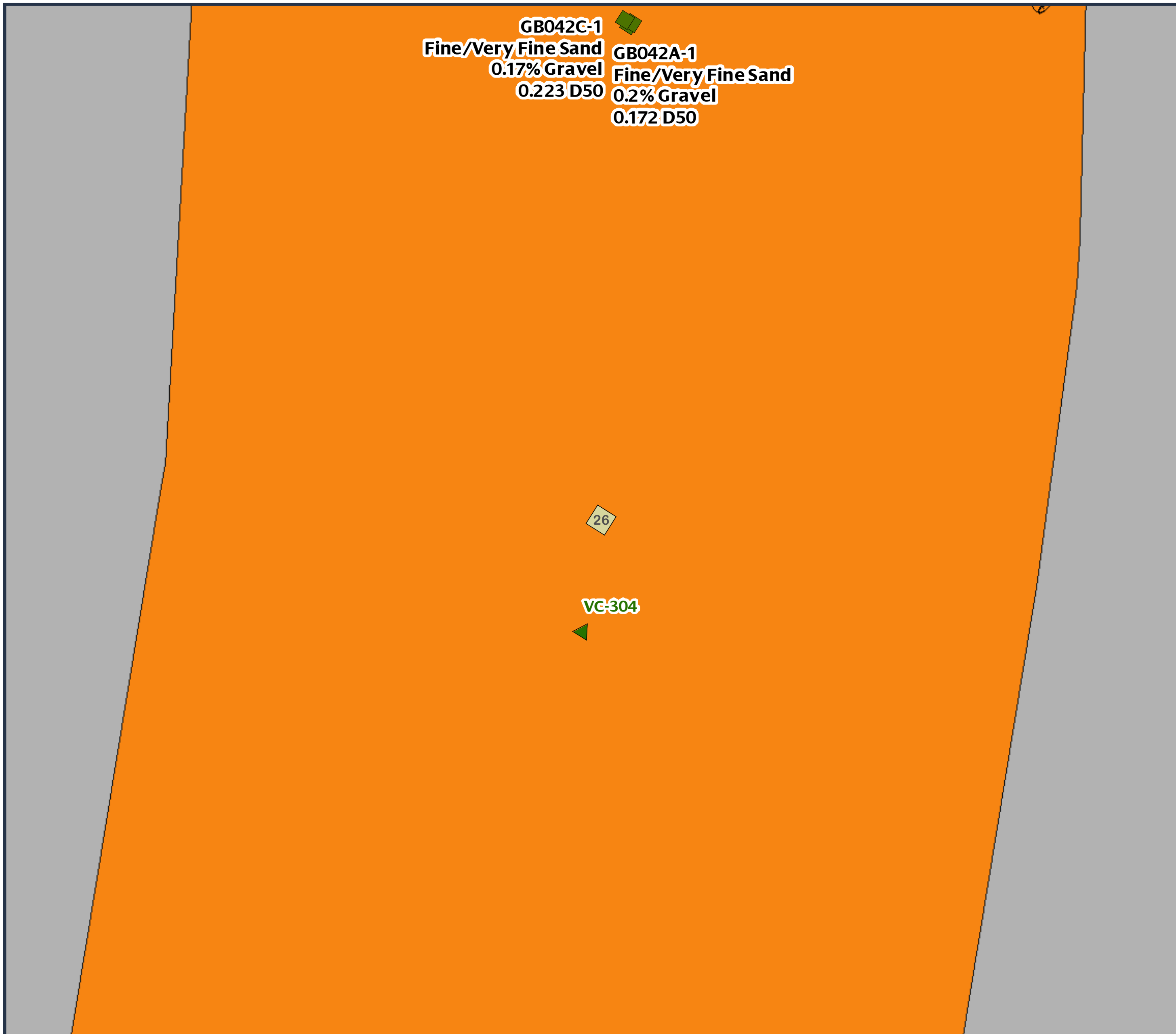
Scale 1:5,000
1 inch = 0 km

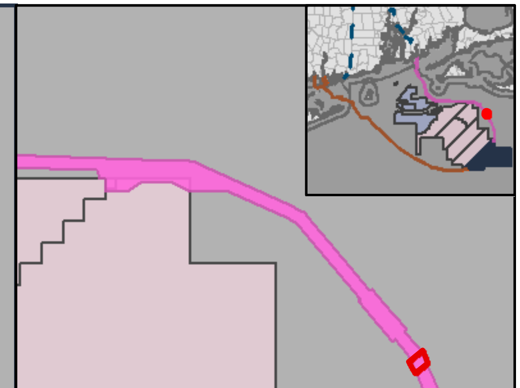
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore
- Soft Station - Grab Sample

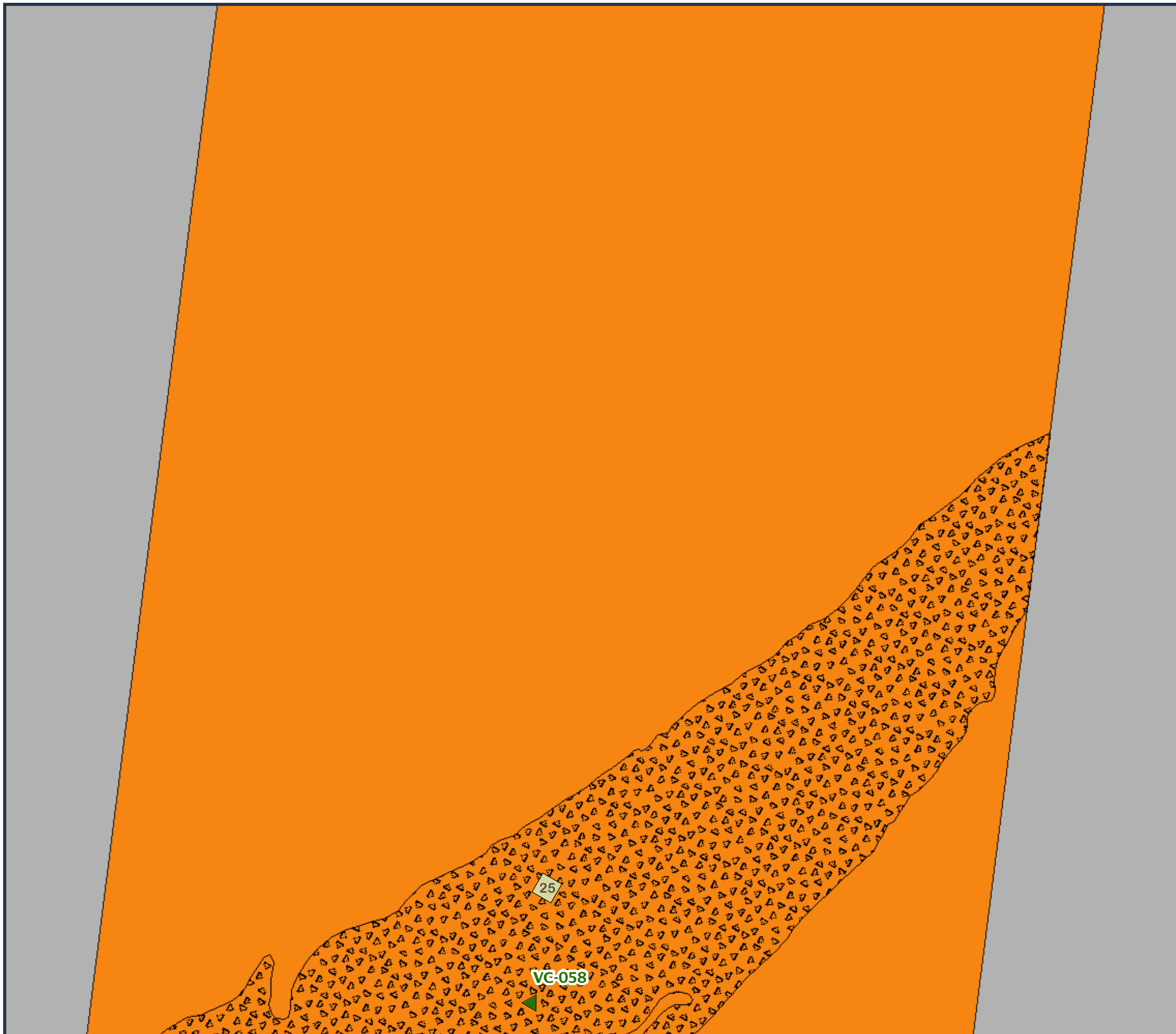
Scale 1:5,000
1 inch = 0 km

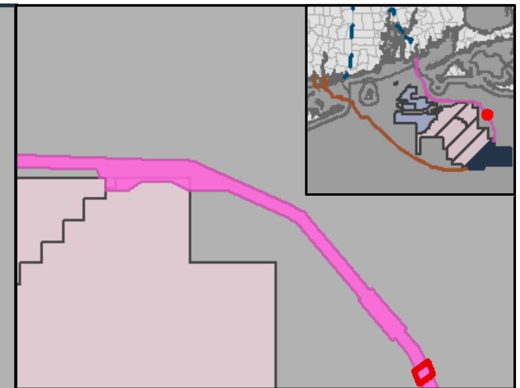
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



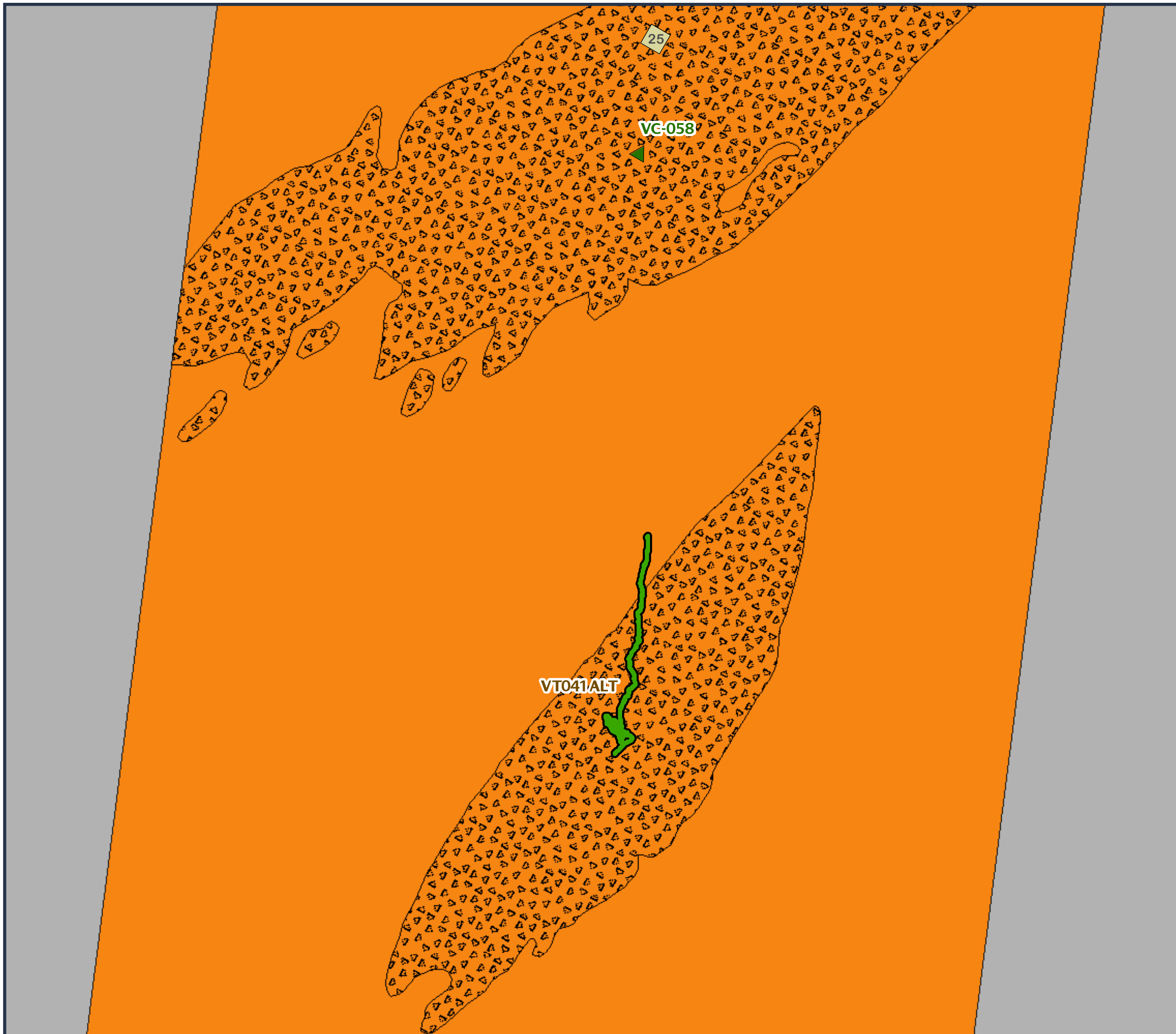


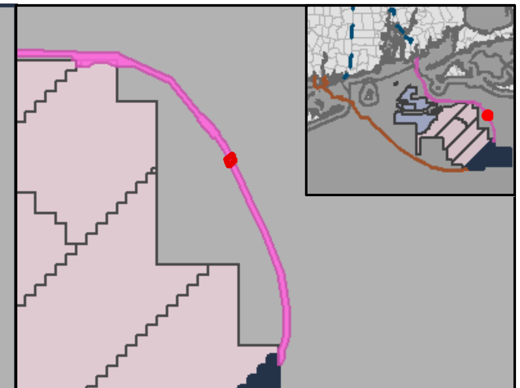
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

Scale 1:5,000
1 inch = 0 km

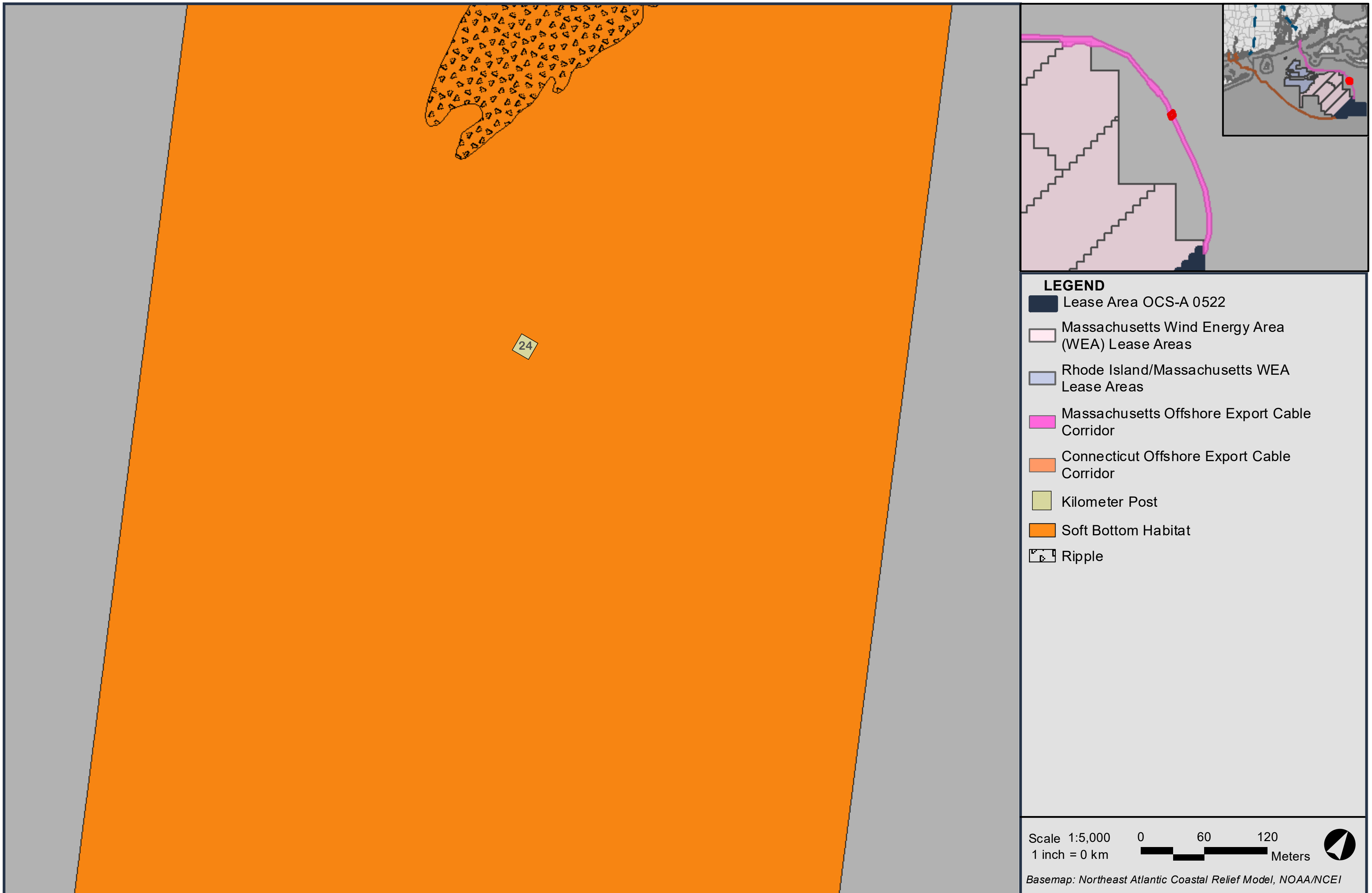
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

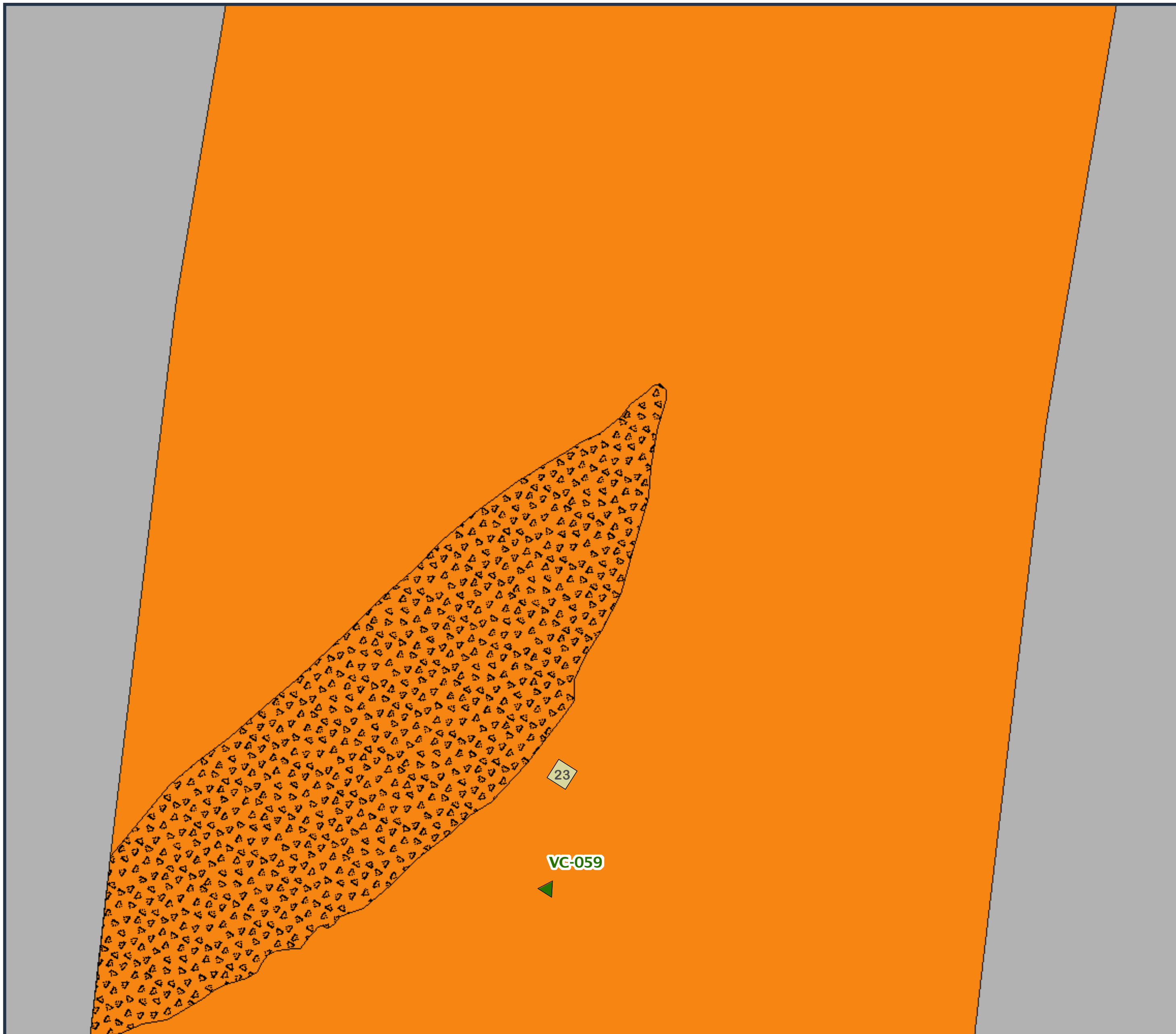
VINEYARD NORTHEAST

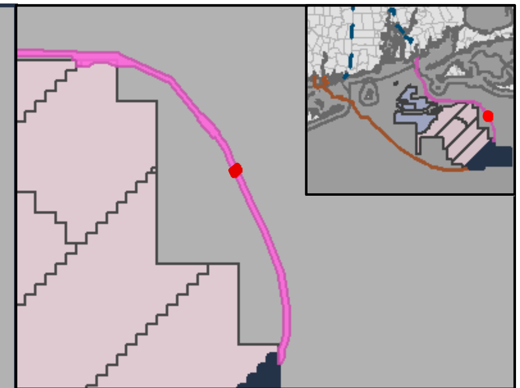
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

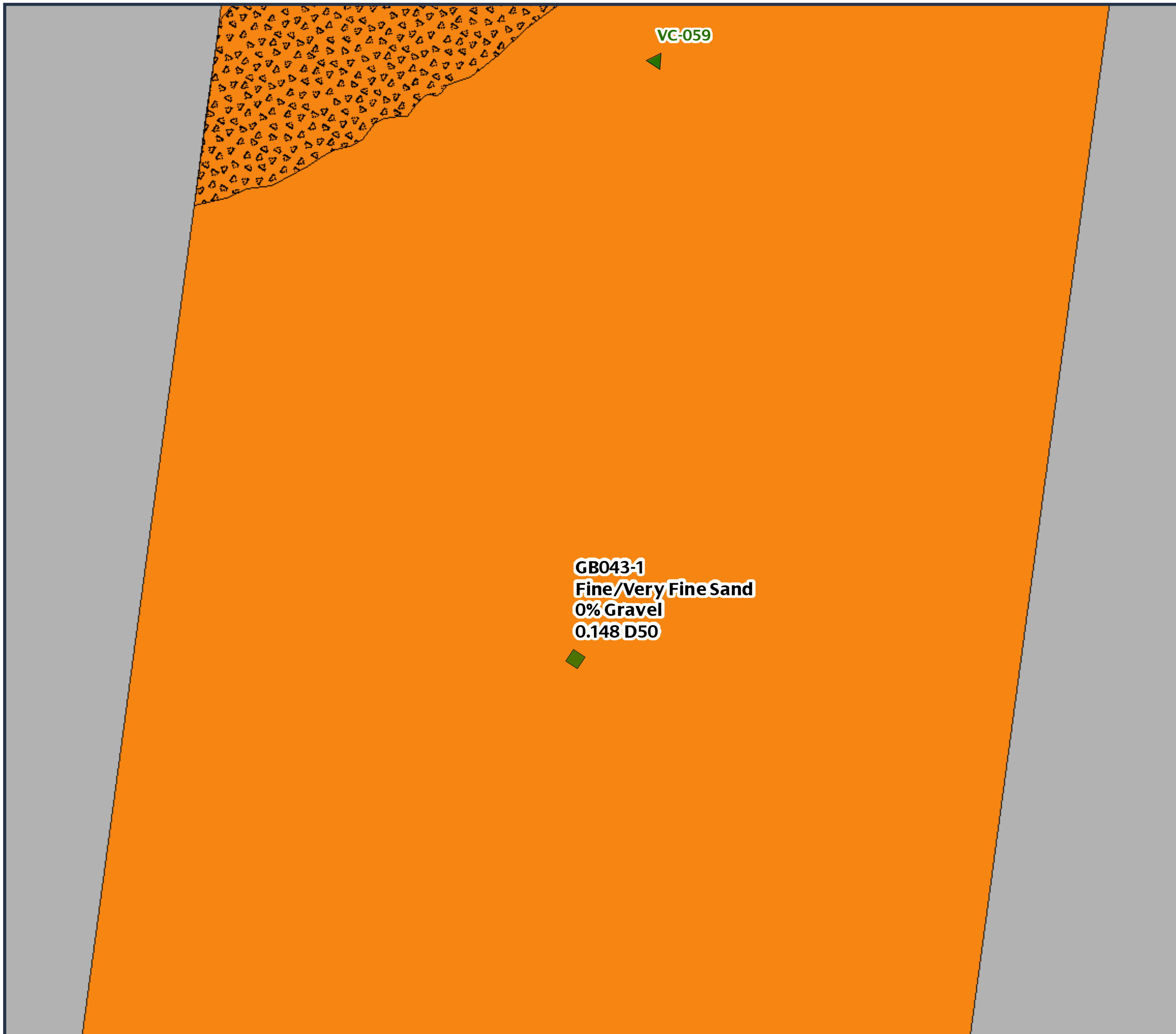
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore

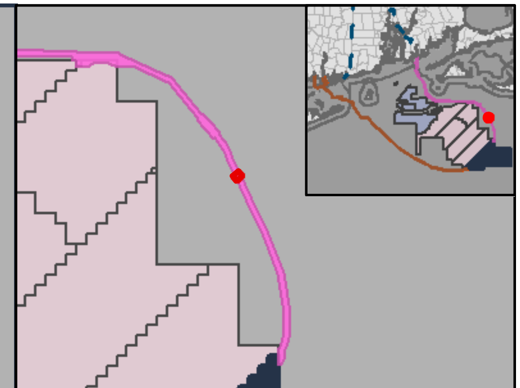
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple
- Soft Station - Vibracore
- Soft Station - Grab Sample

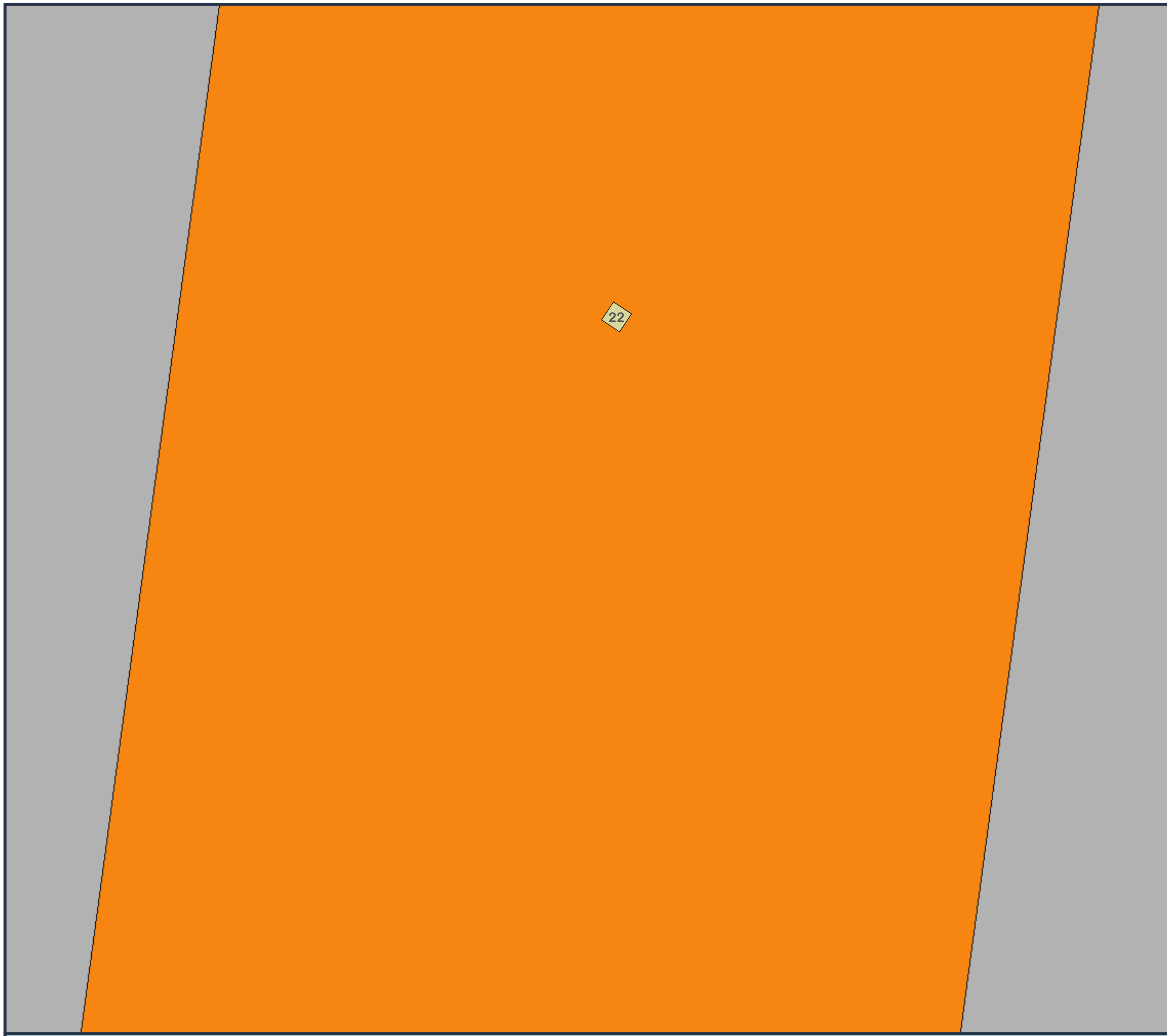
Scale 1:5,000
1 inch = 0 km

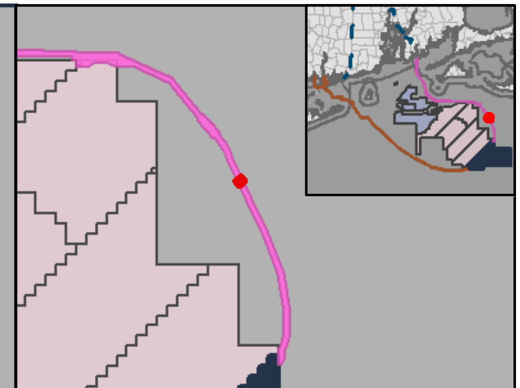
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat

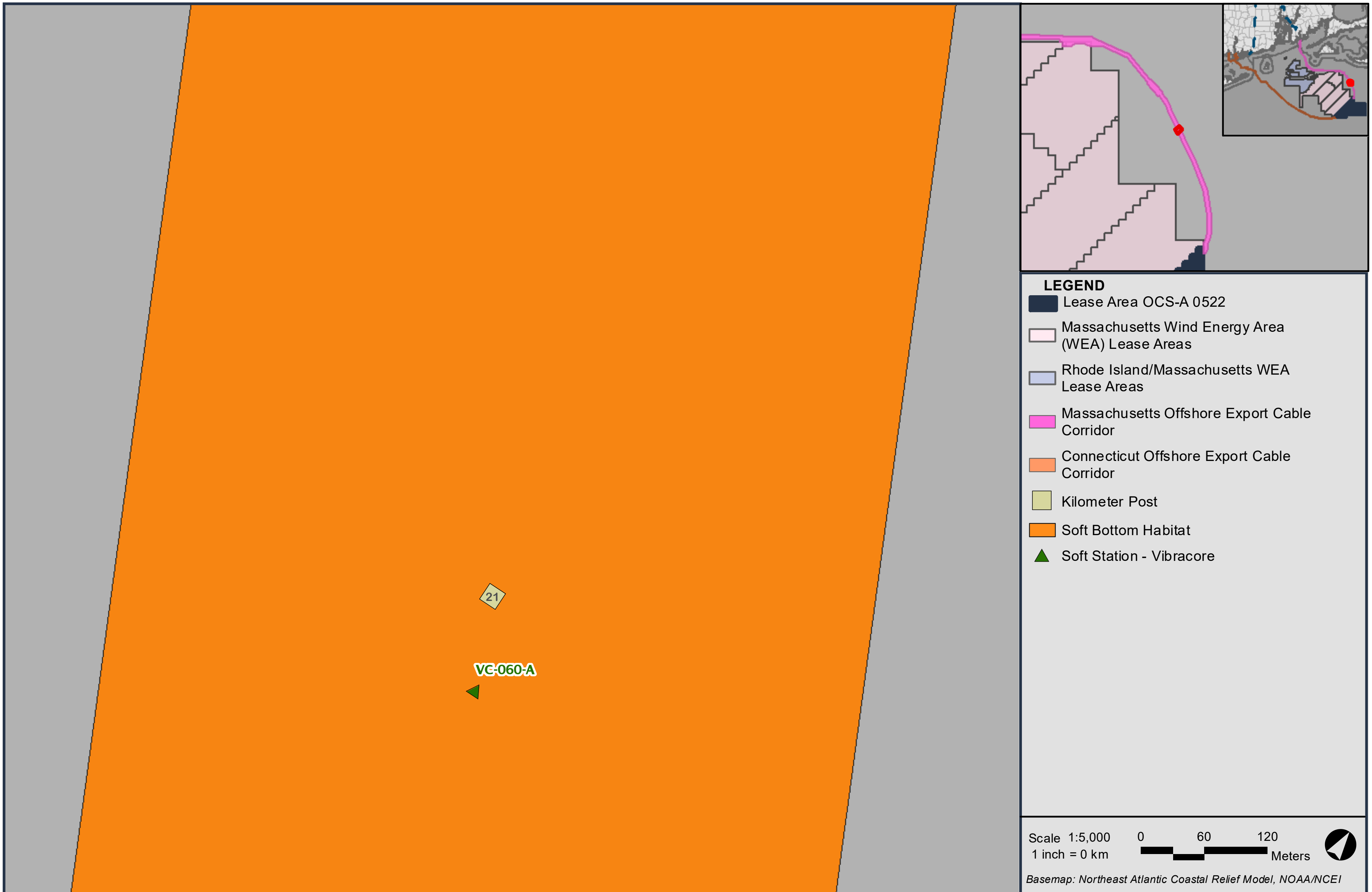
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km

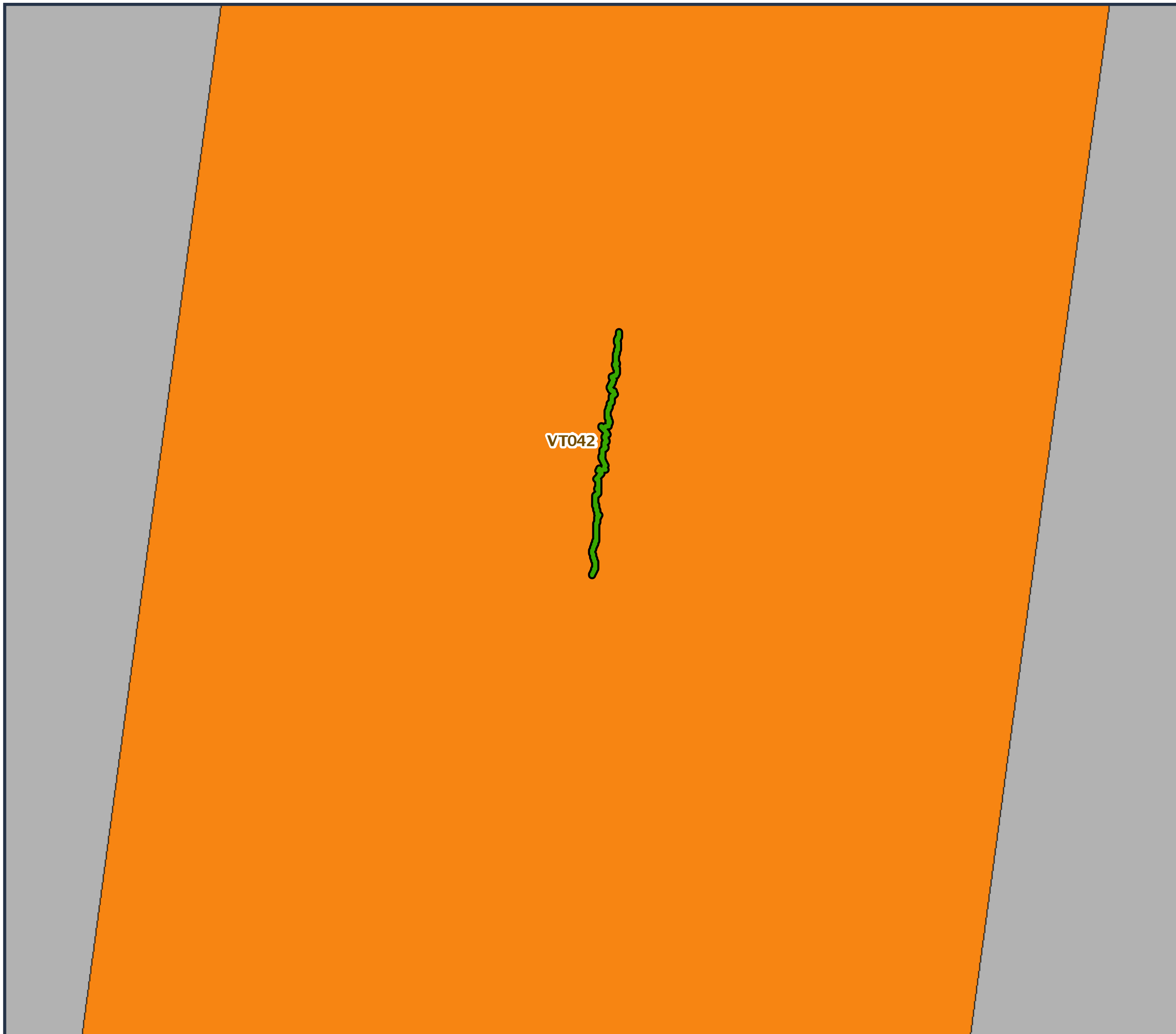
0 60 120 Meters

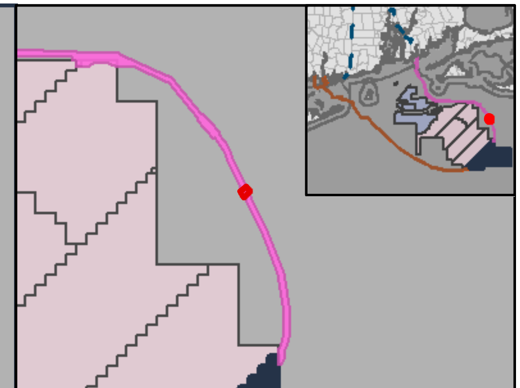
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Bottom Station - Video Transect

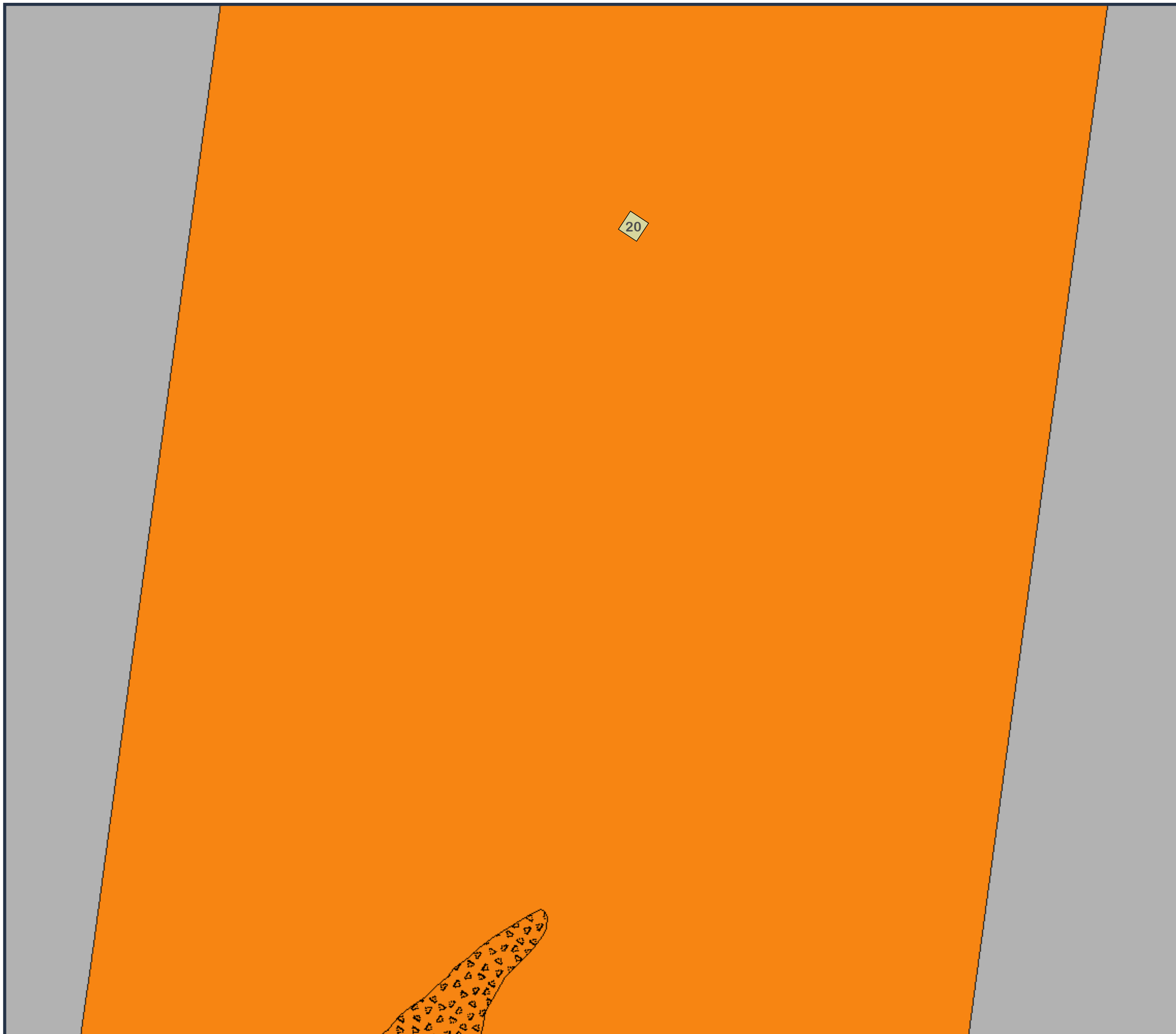
Scale 1:5,000
1 inch = 0 km

0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Ripple

Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE

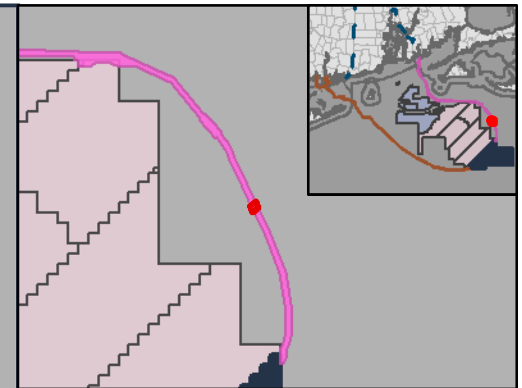
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Ripple
Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

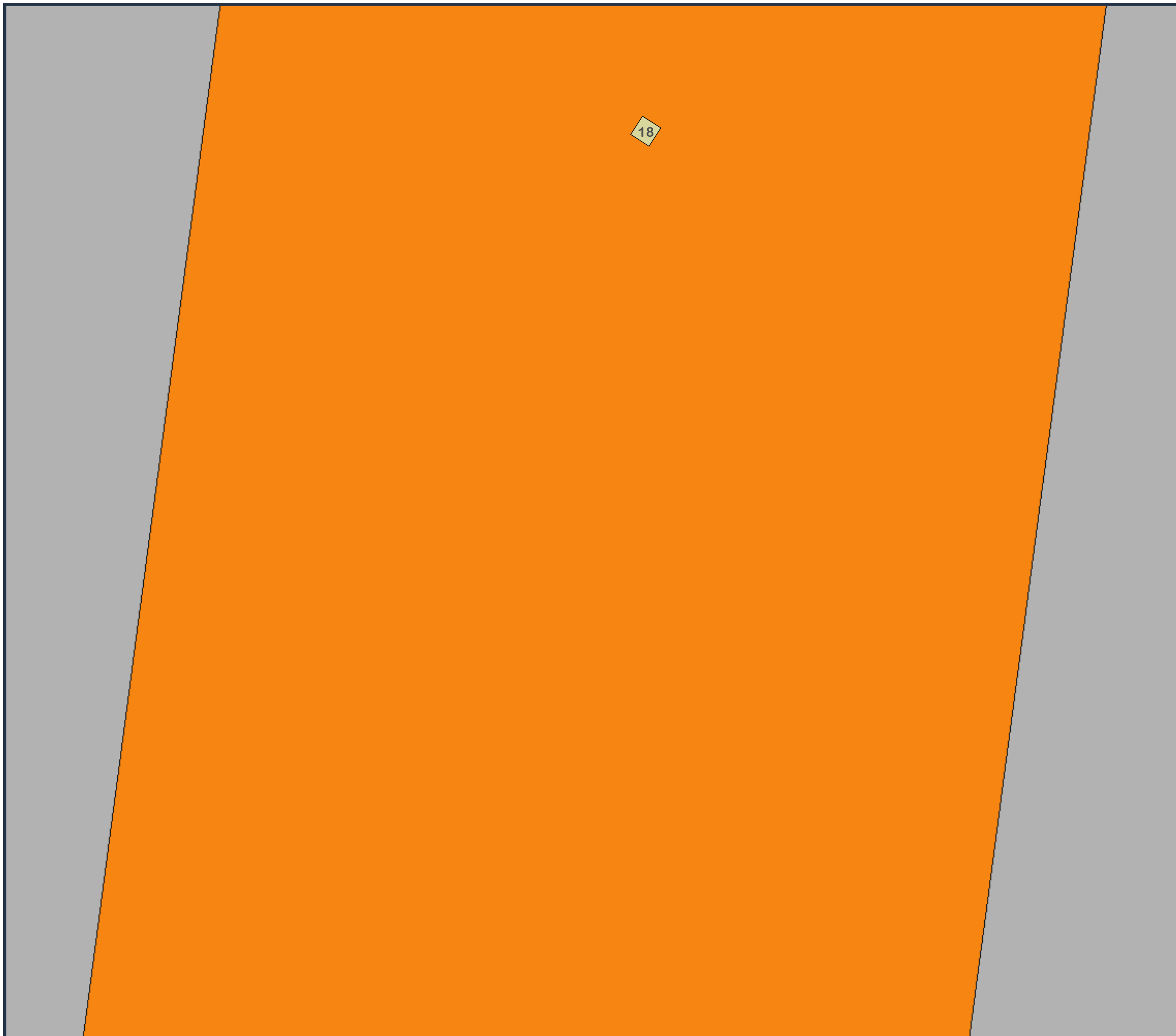
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample

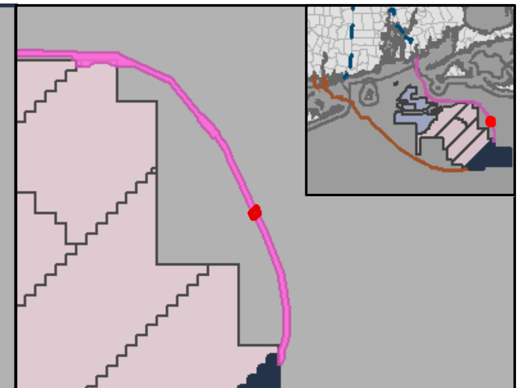
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat

Scale 1:5,000
1 inch = 0 km

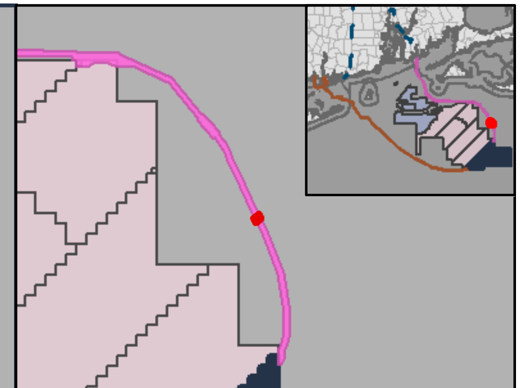
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE



LEGEND

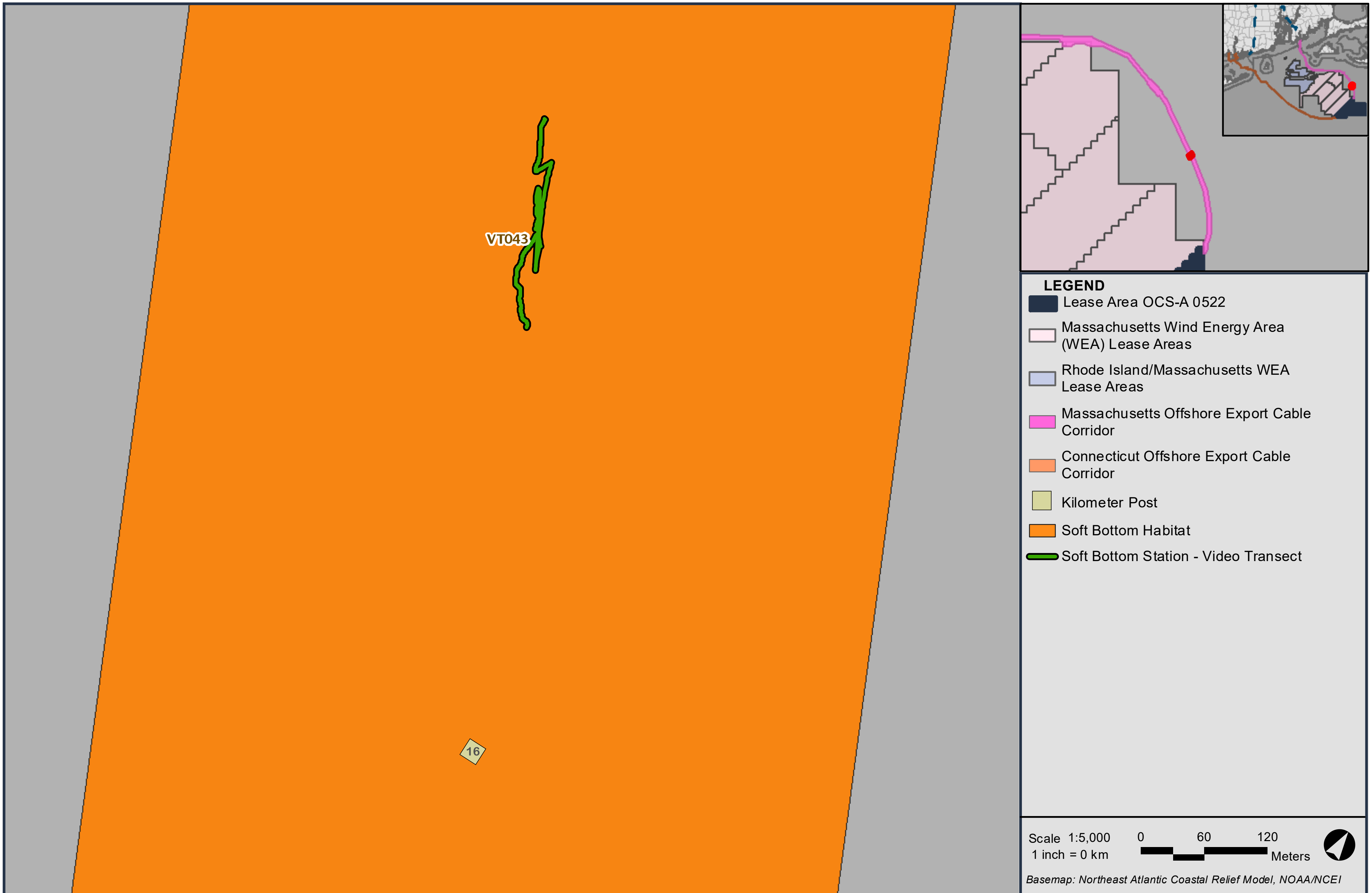
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

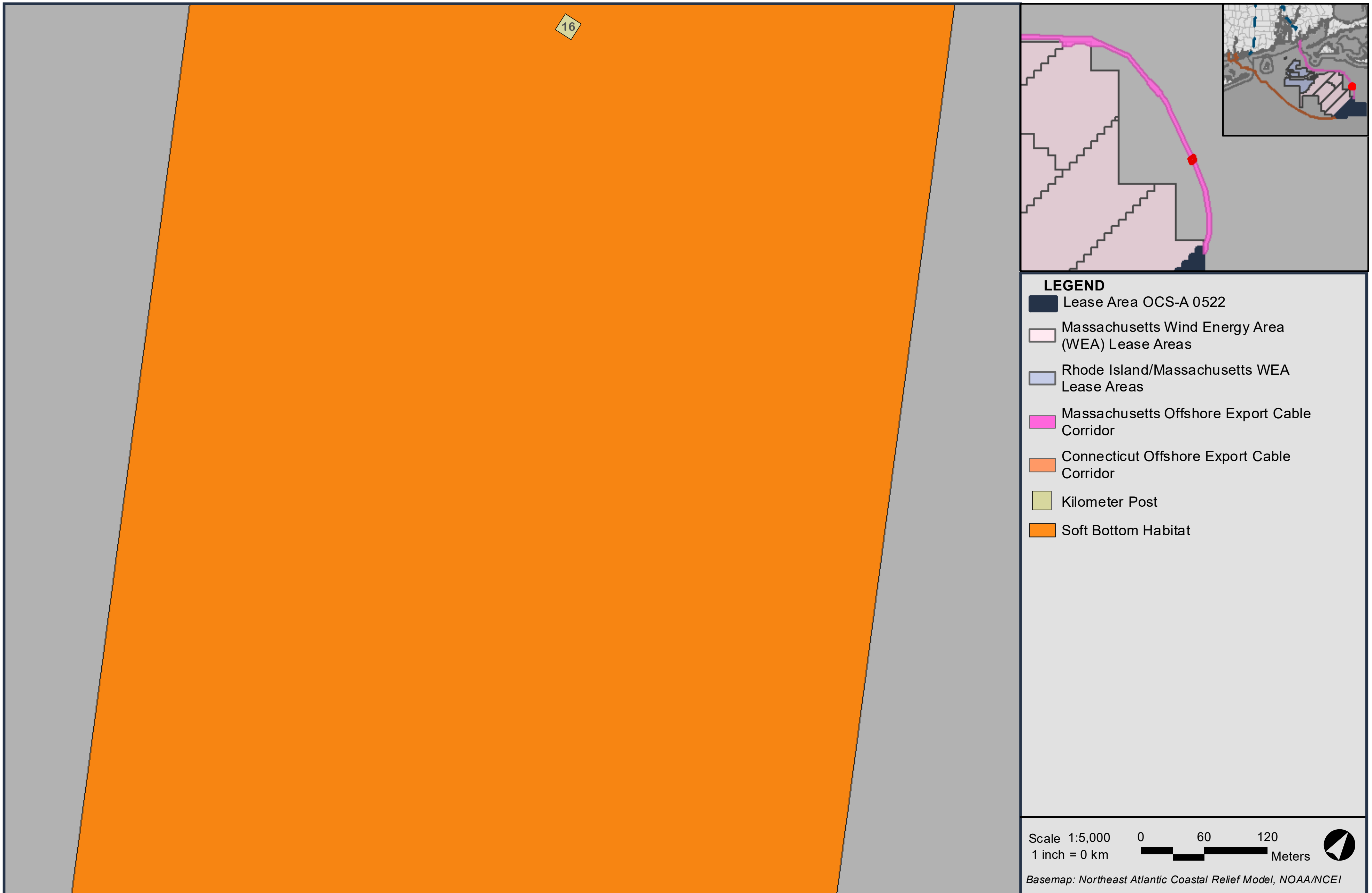
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE

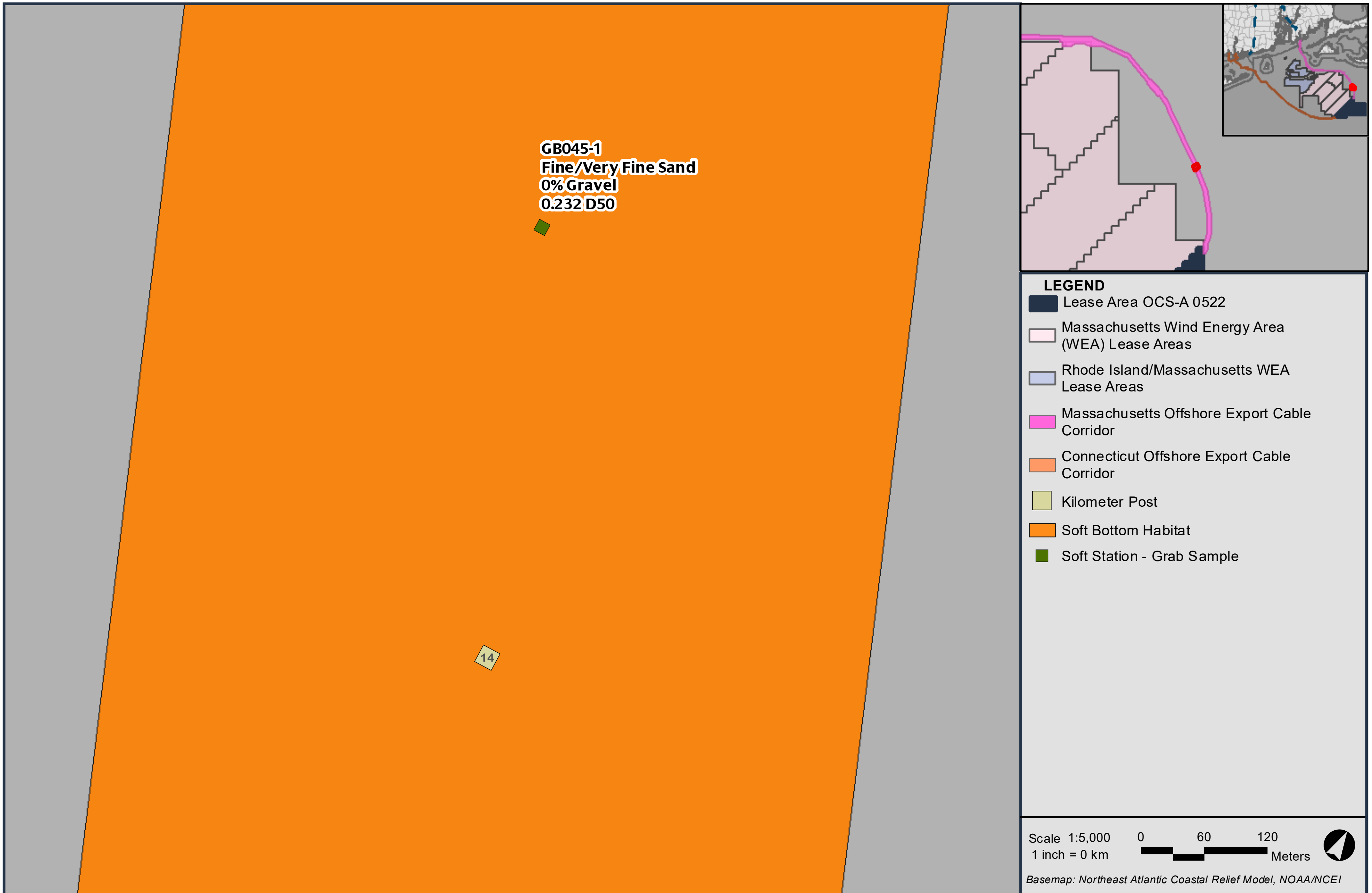
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

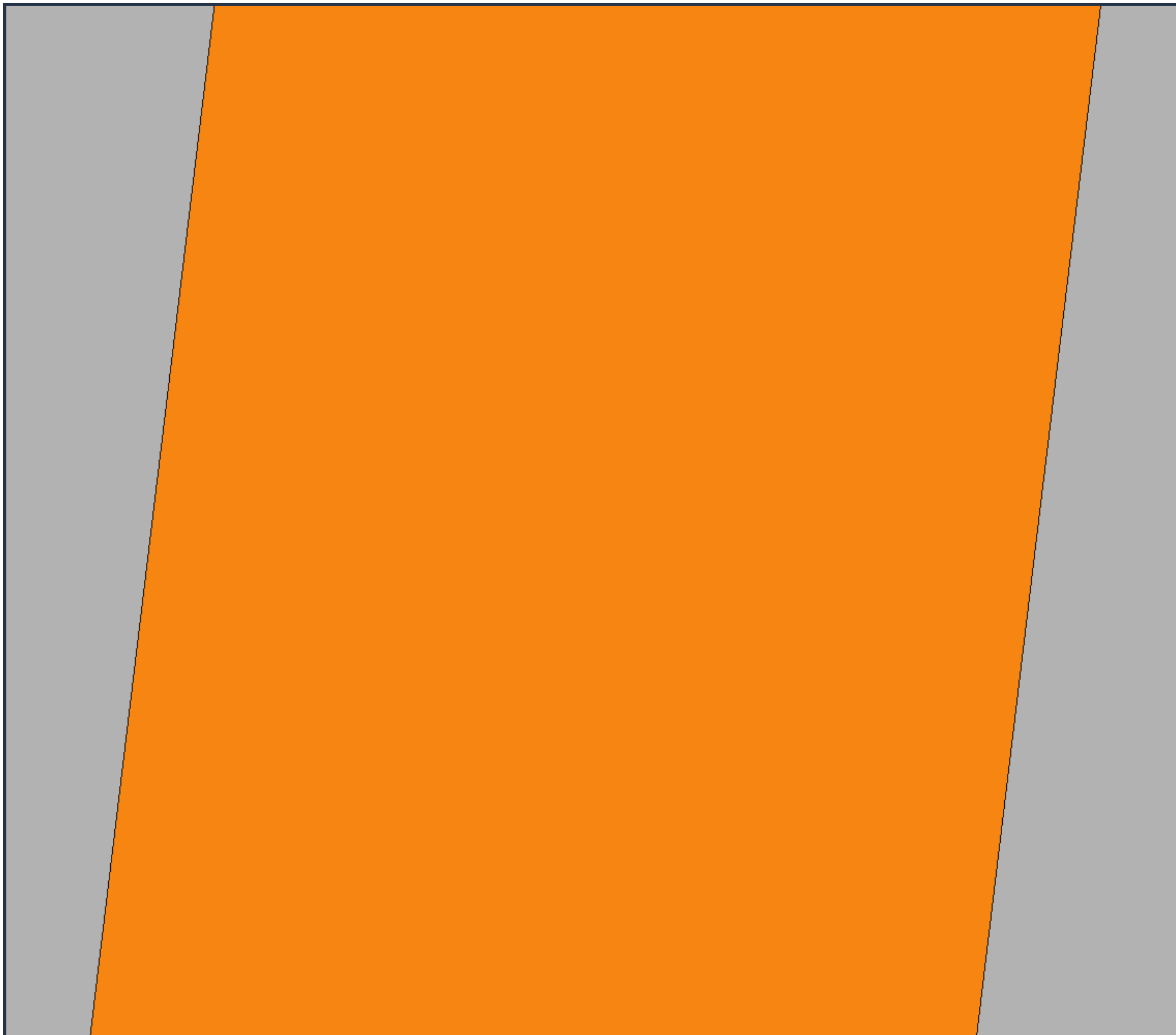
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

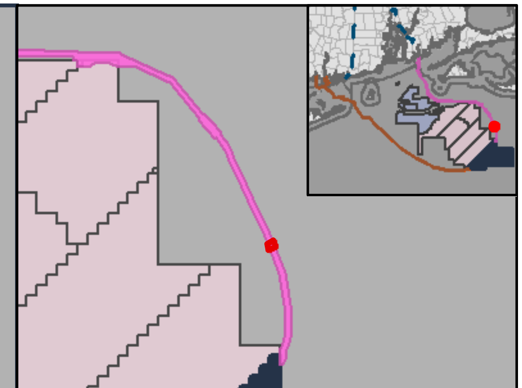
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

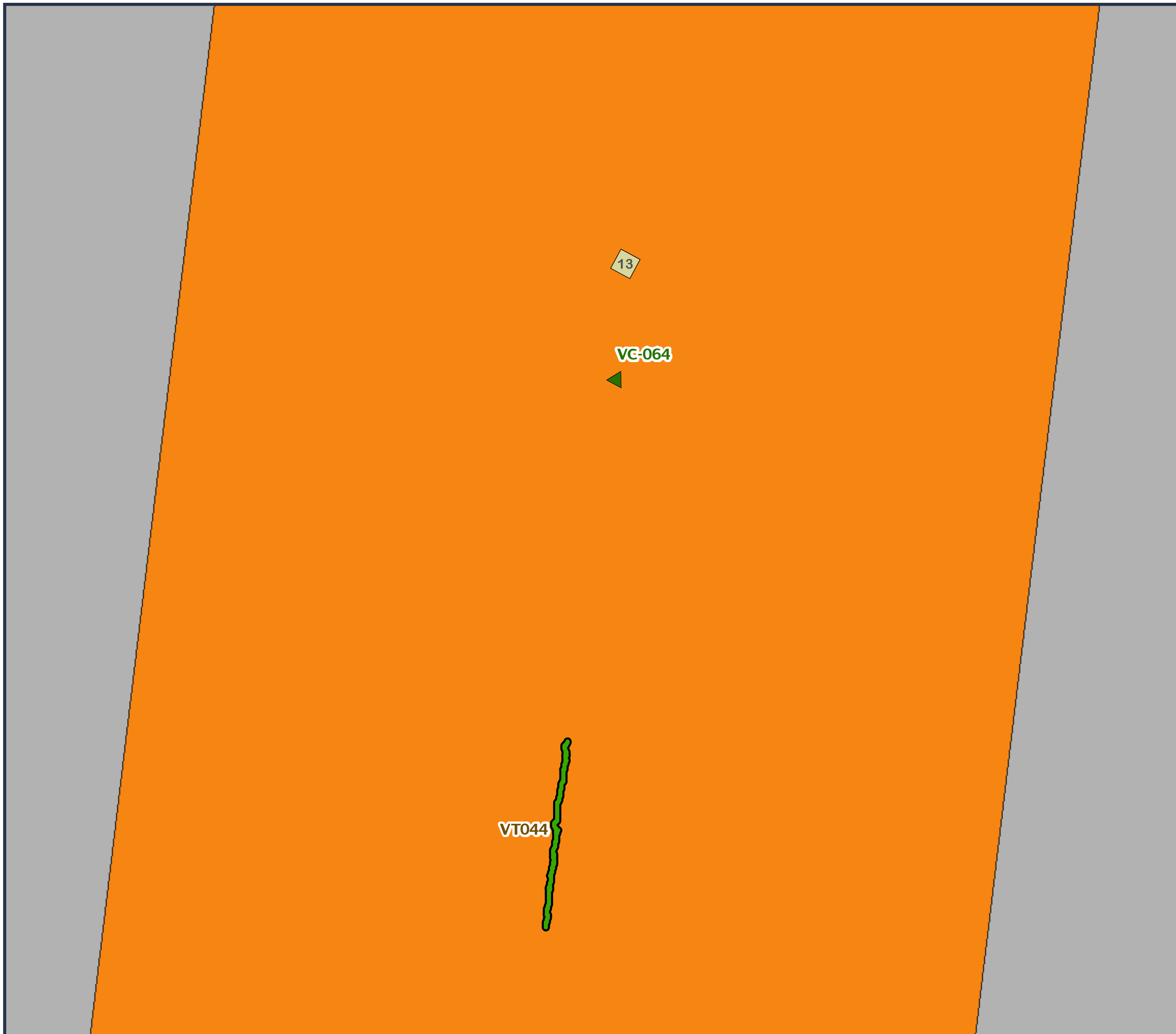
VINEYARD NORTHEAST
VINEYARD OFFSHORE

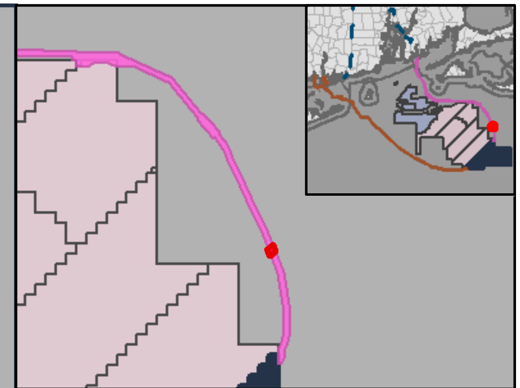




Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

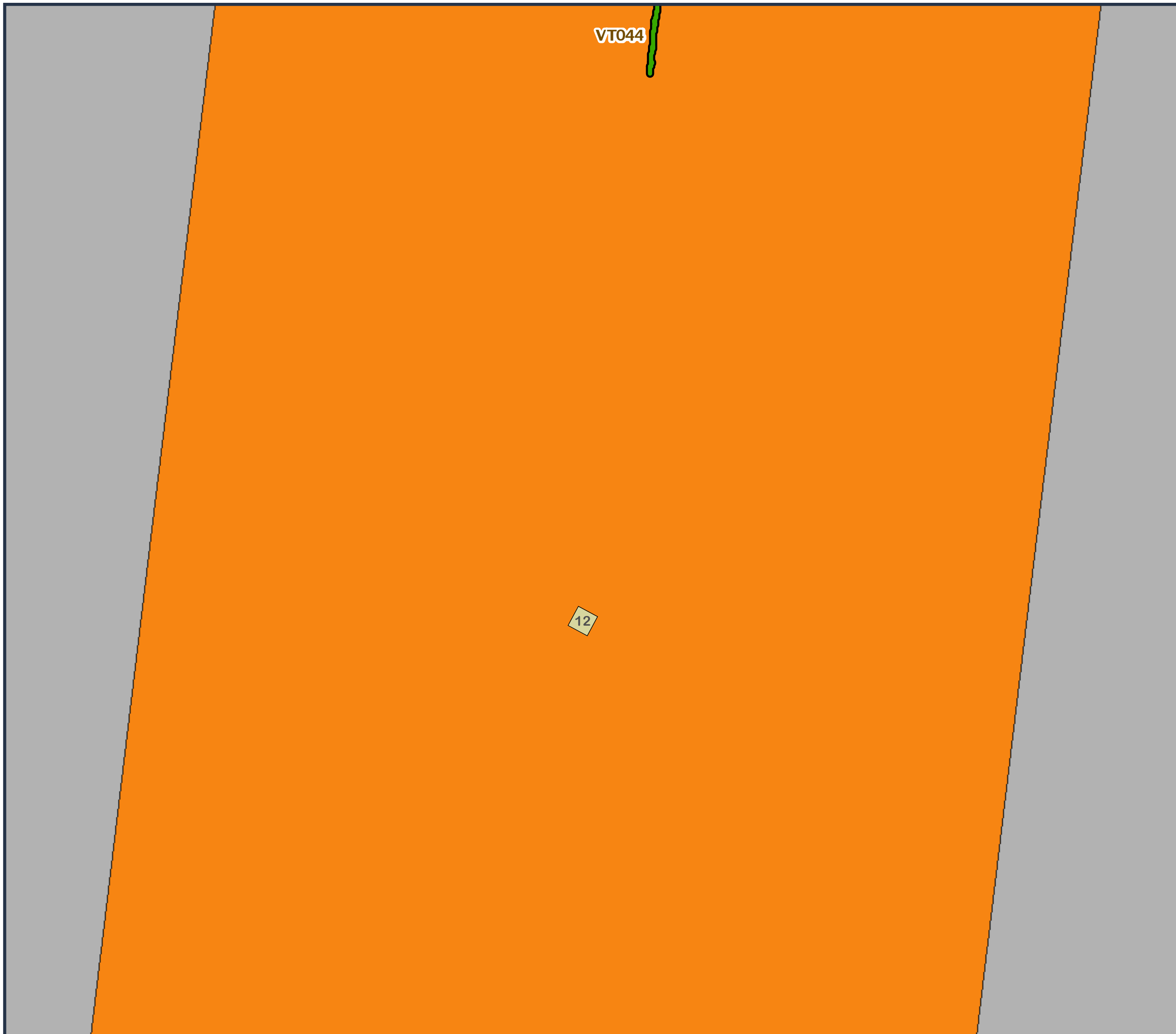
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Bottom Station - Video

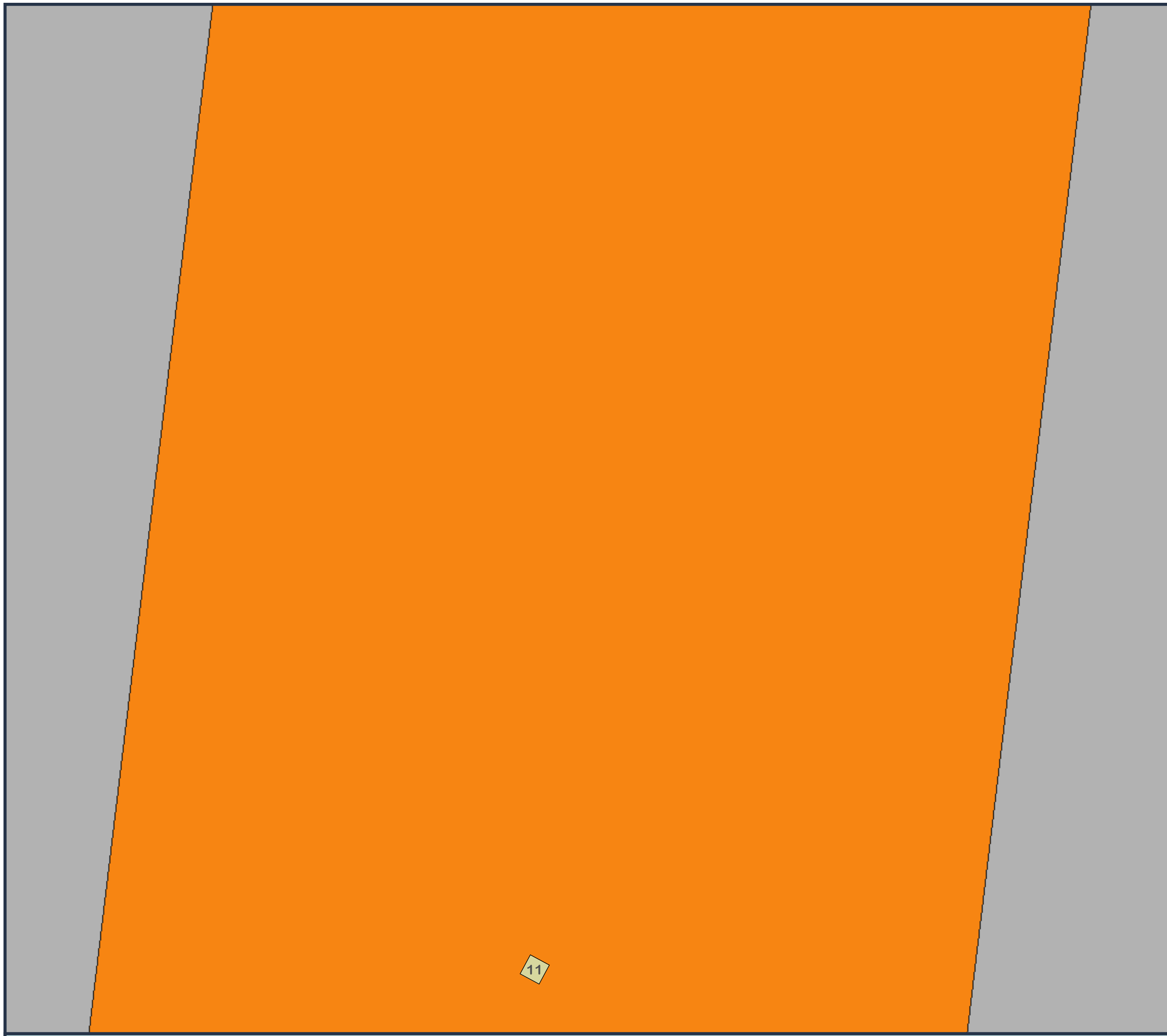
Scale 1:5,000
1 inch = 0 km

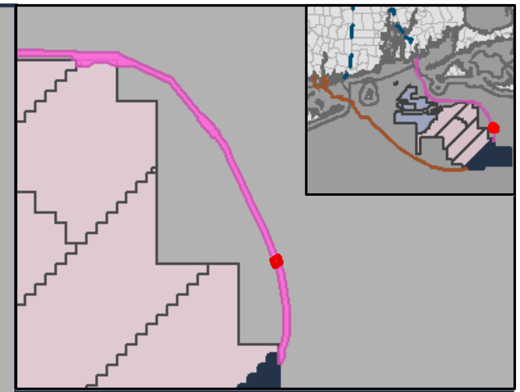
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat

Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE

LEGEND

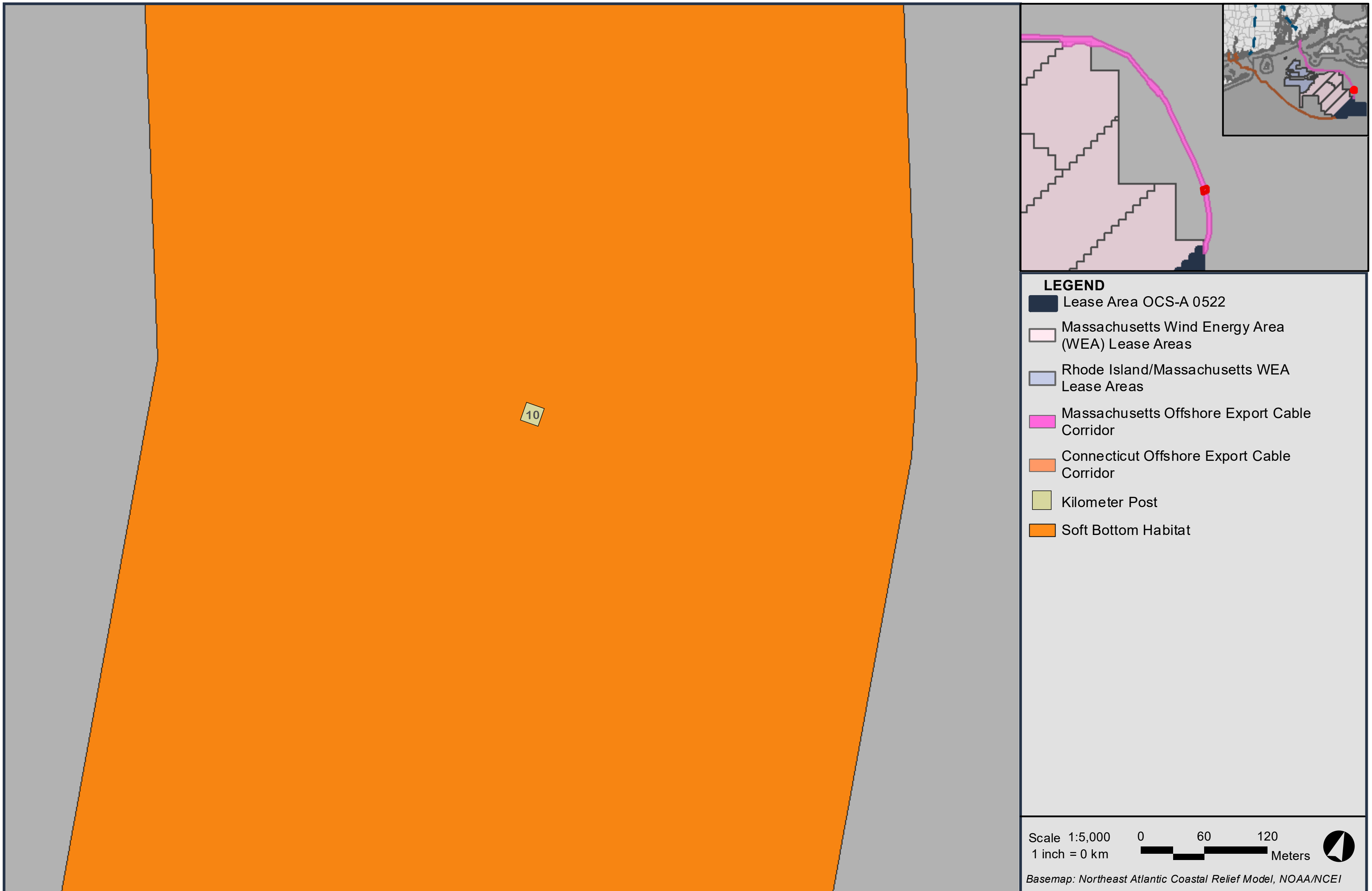
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Station - Grab Sample

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

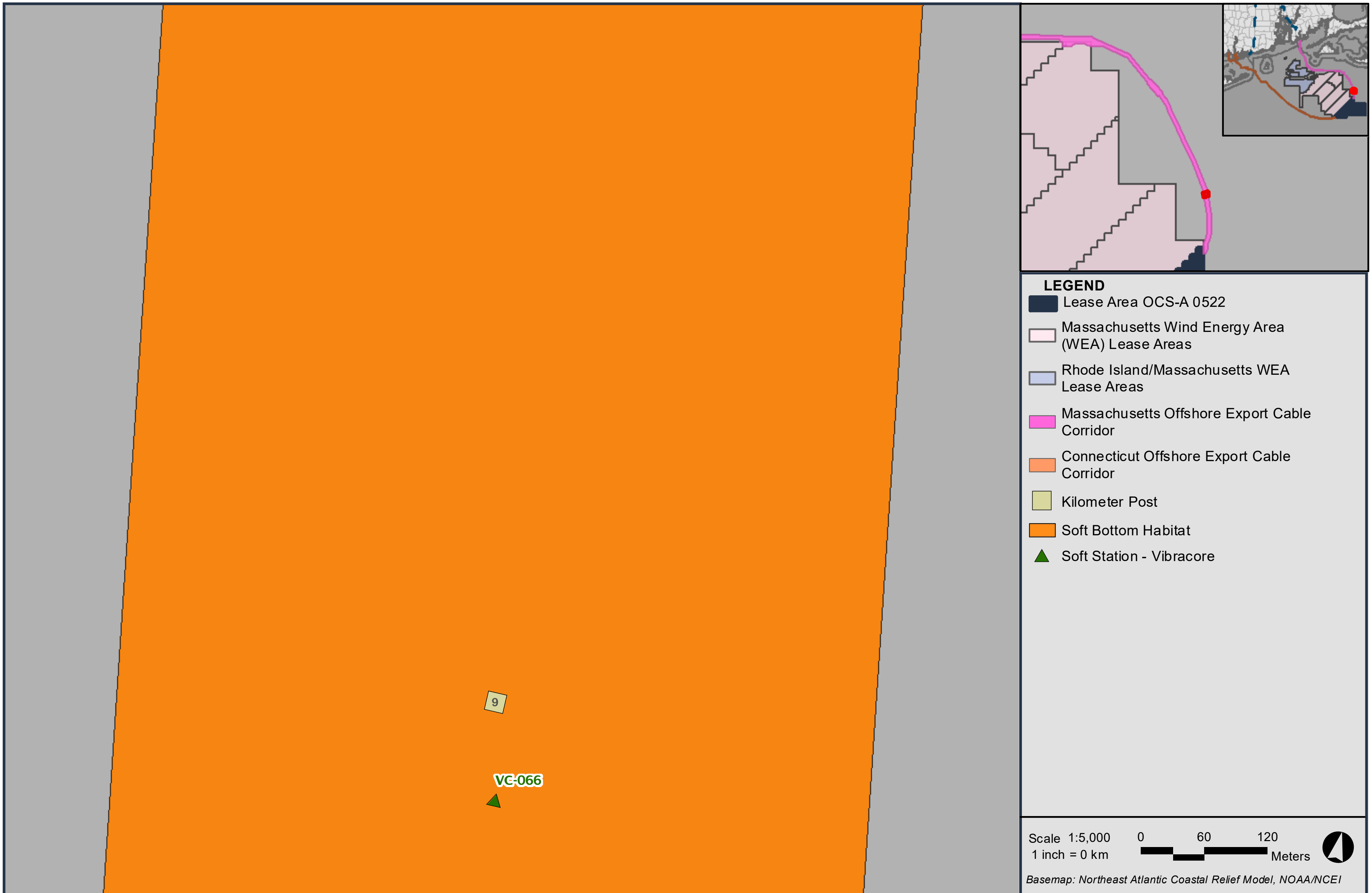
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



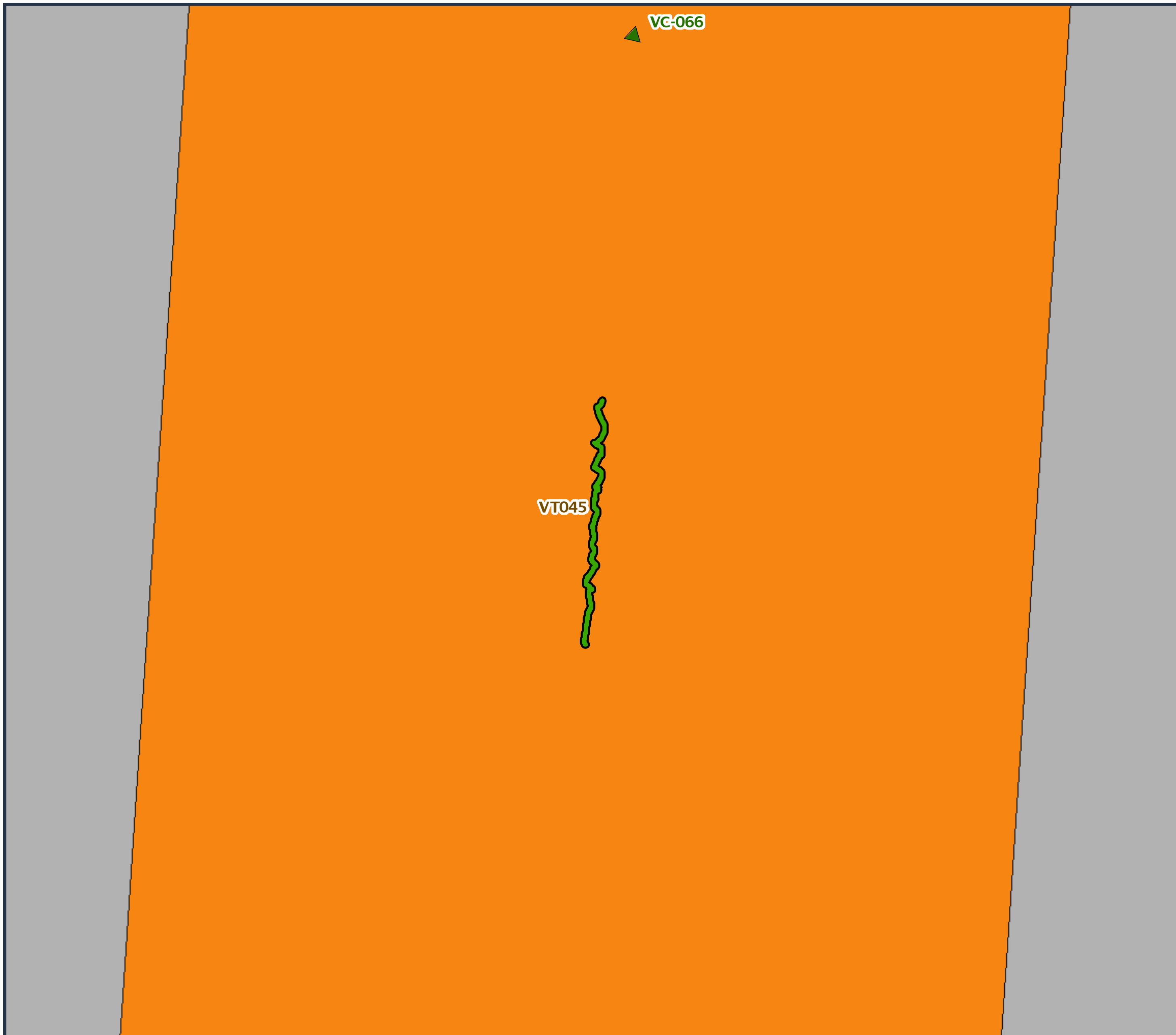
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

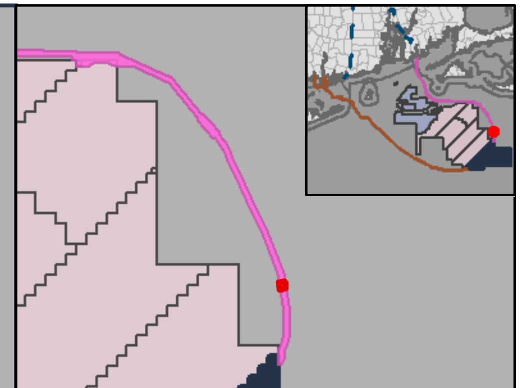
VINEYARD NORTHEAST
VINEYARD OFFSHORE



VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

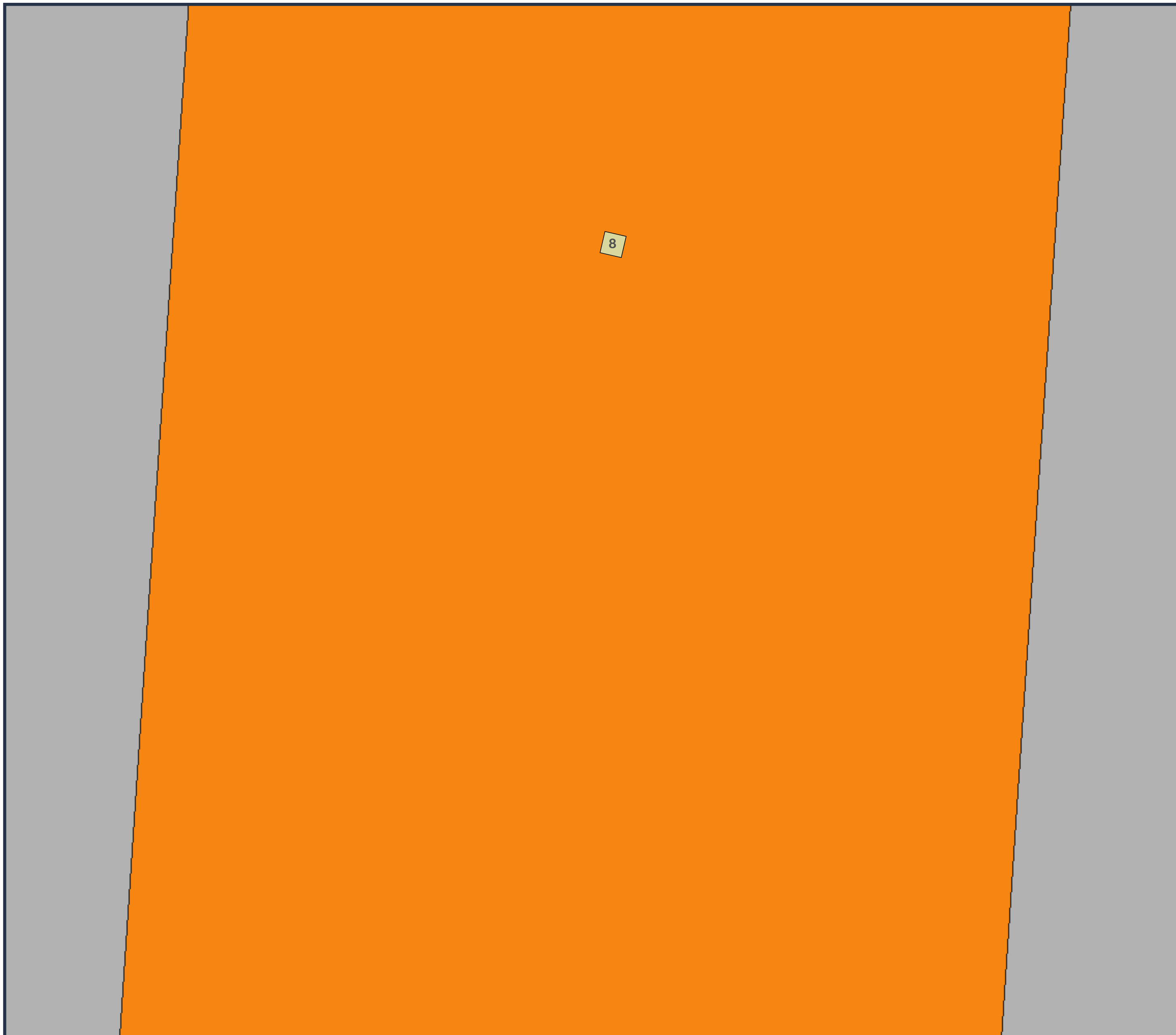
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

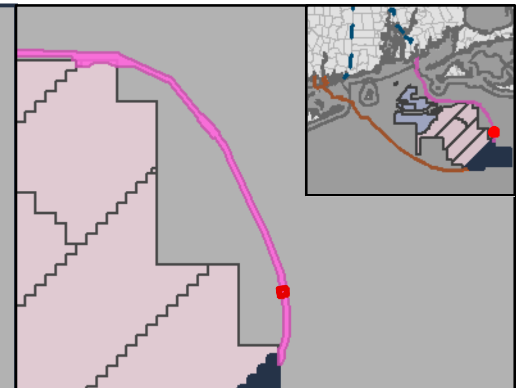
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat

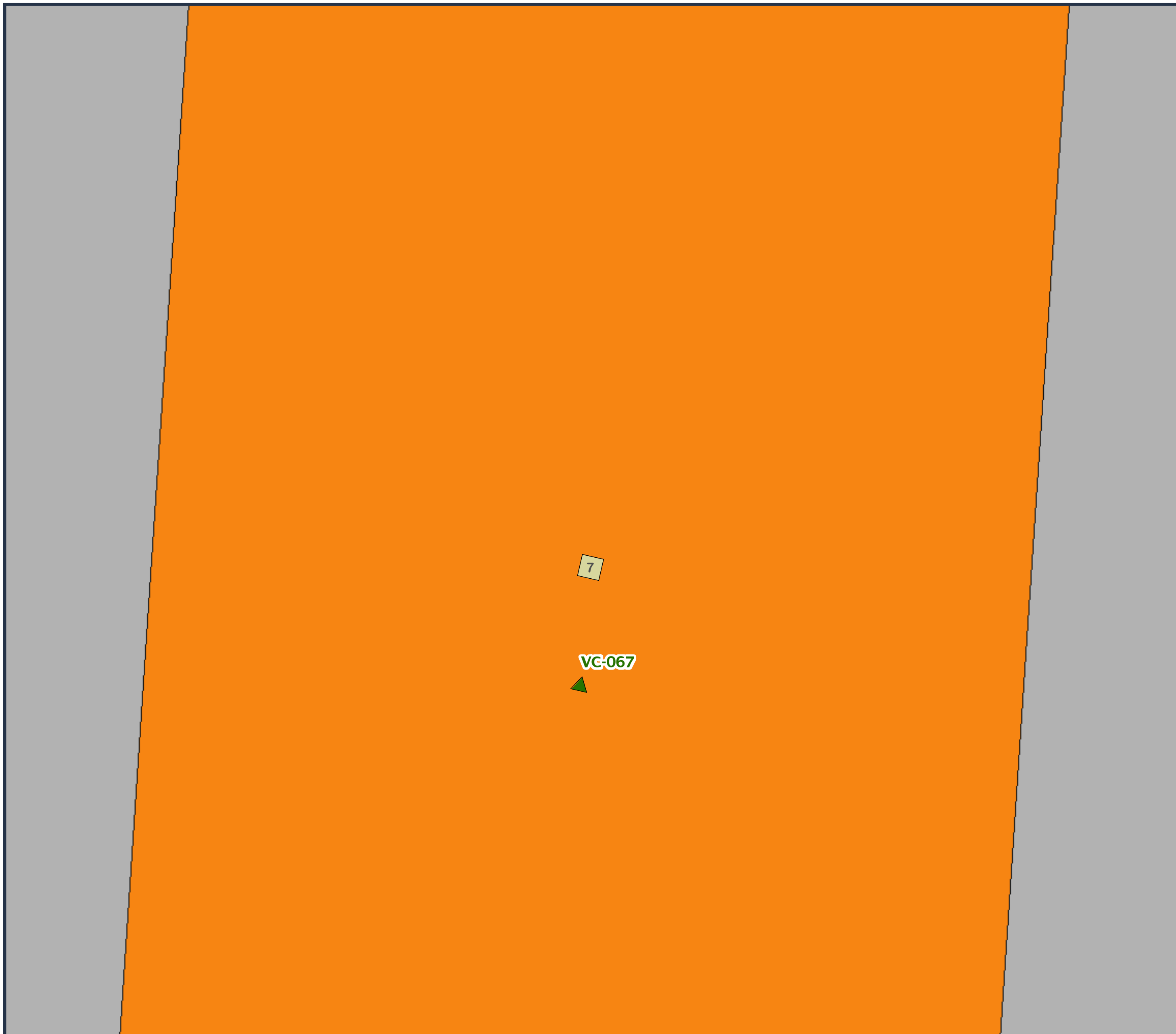
Scale 1:5,000
1 inch = 0 km

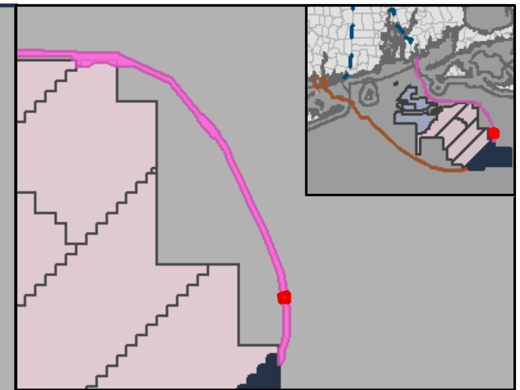
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

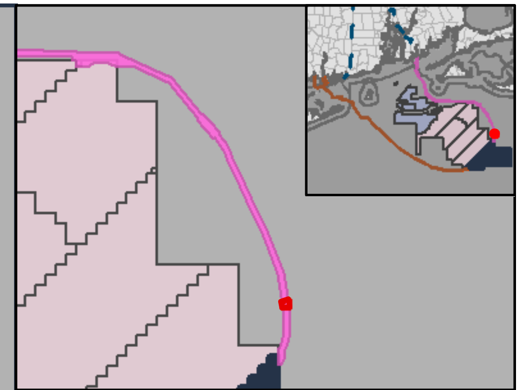
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



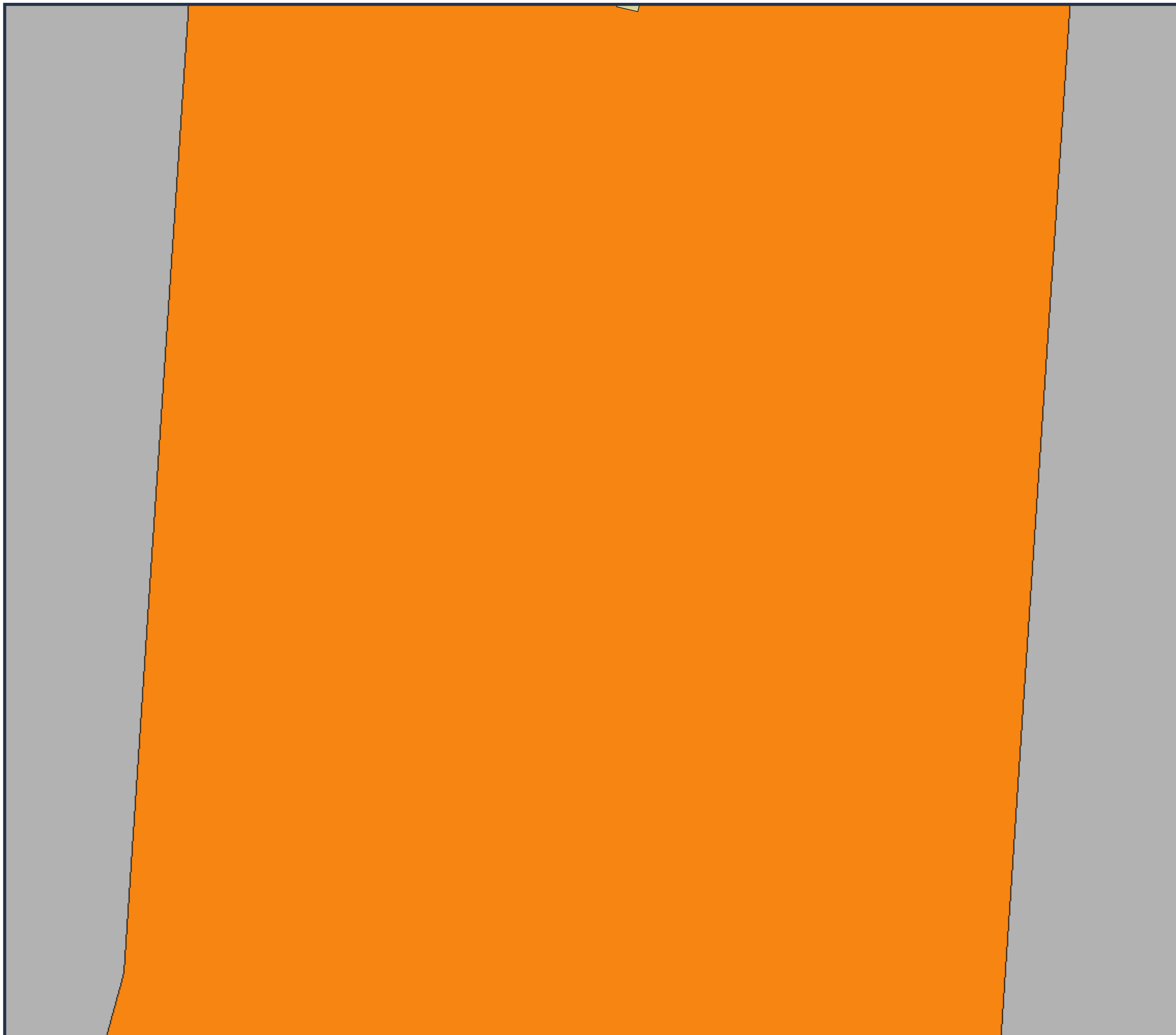
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample

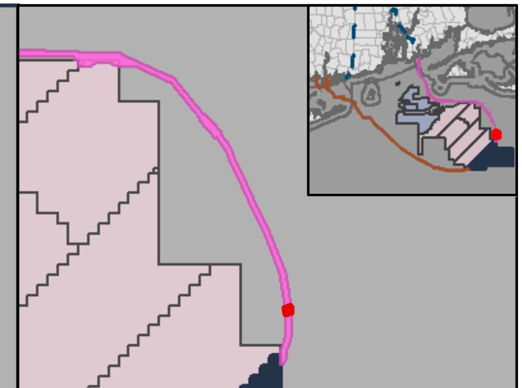
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat

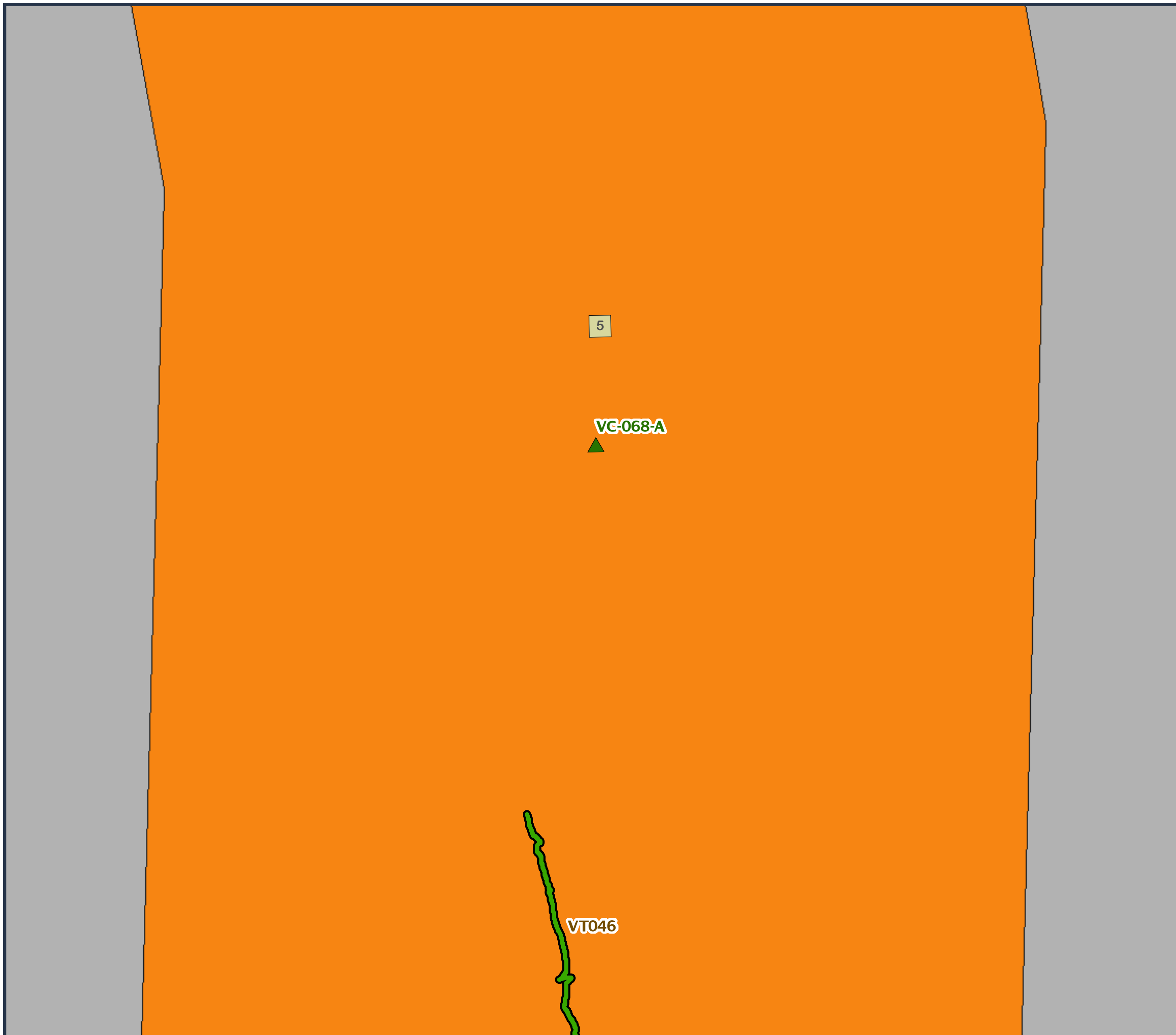
Scale 1:5,000
1 inch = 0 km

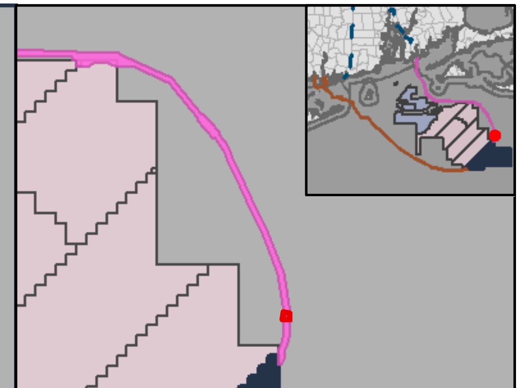
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

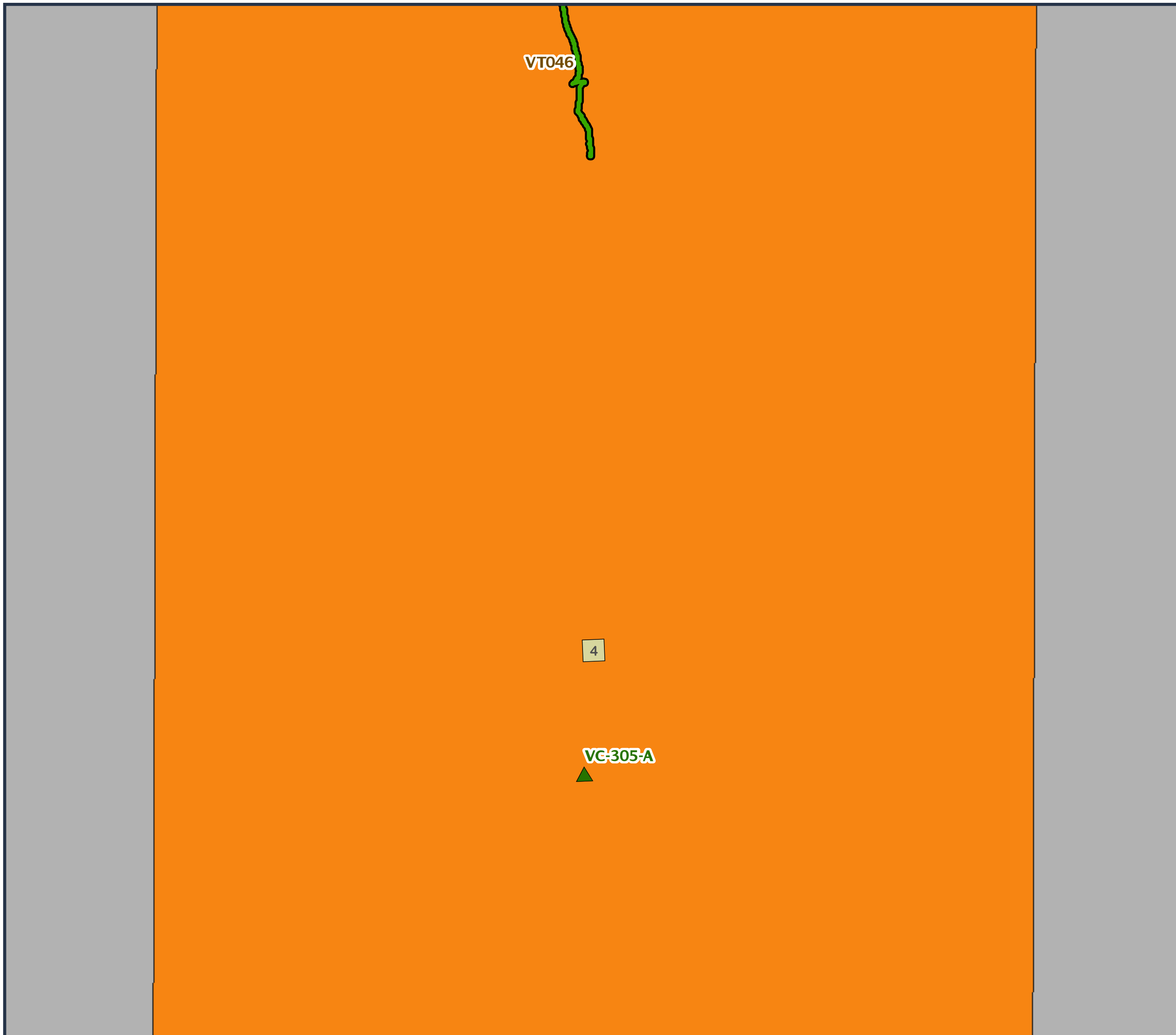
Scale 1:5,000
1 inch = 0 km

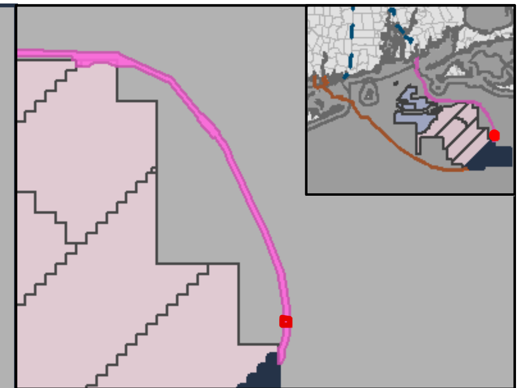
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video

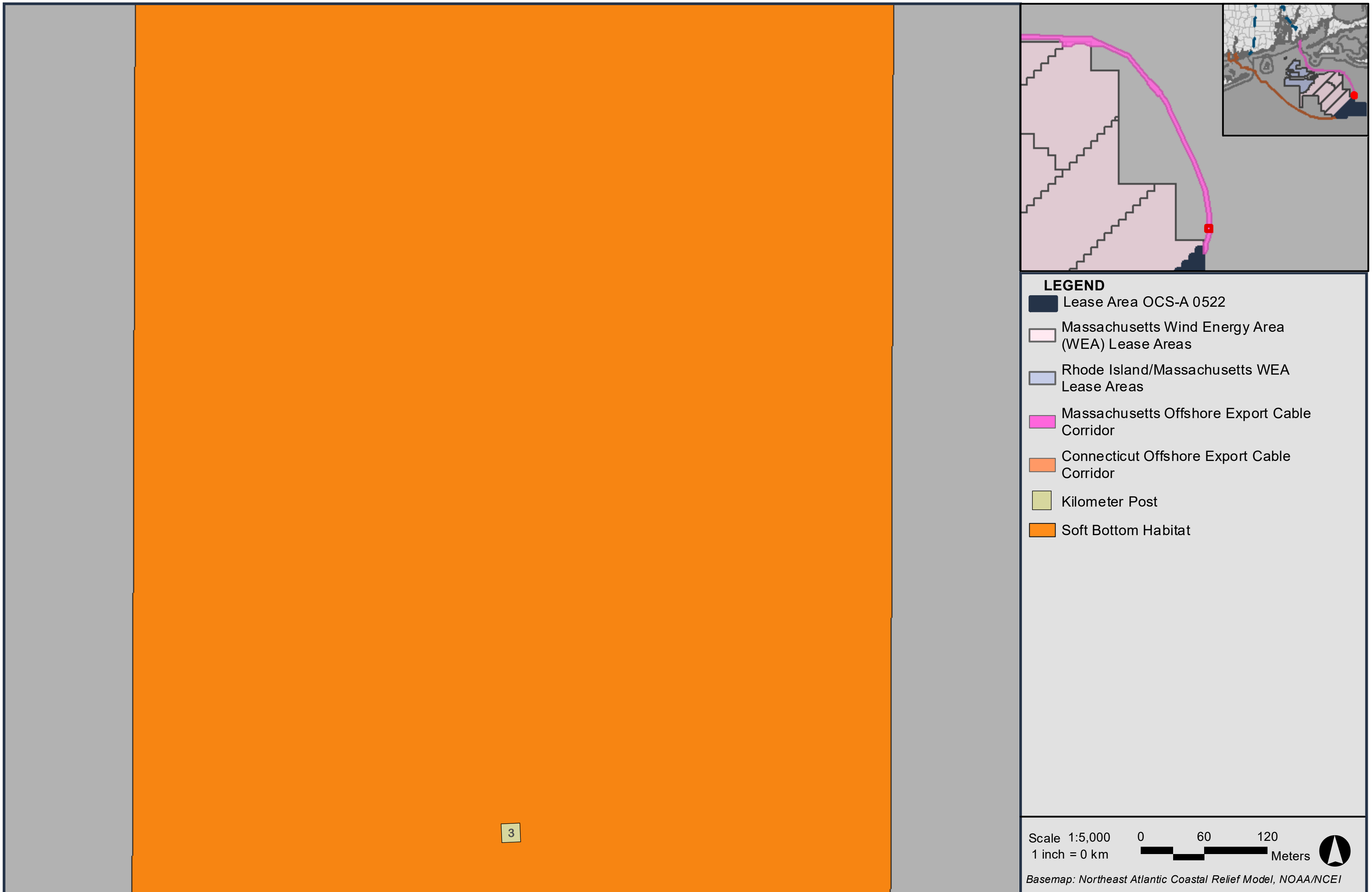
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

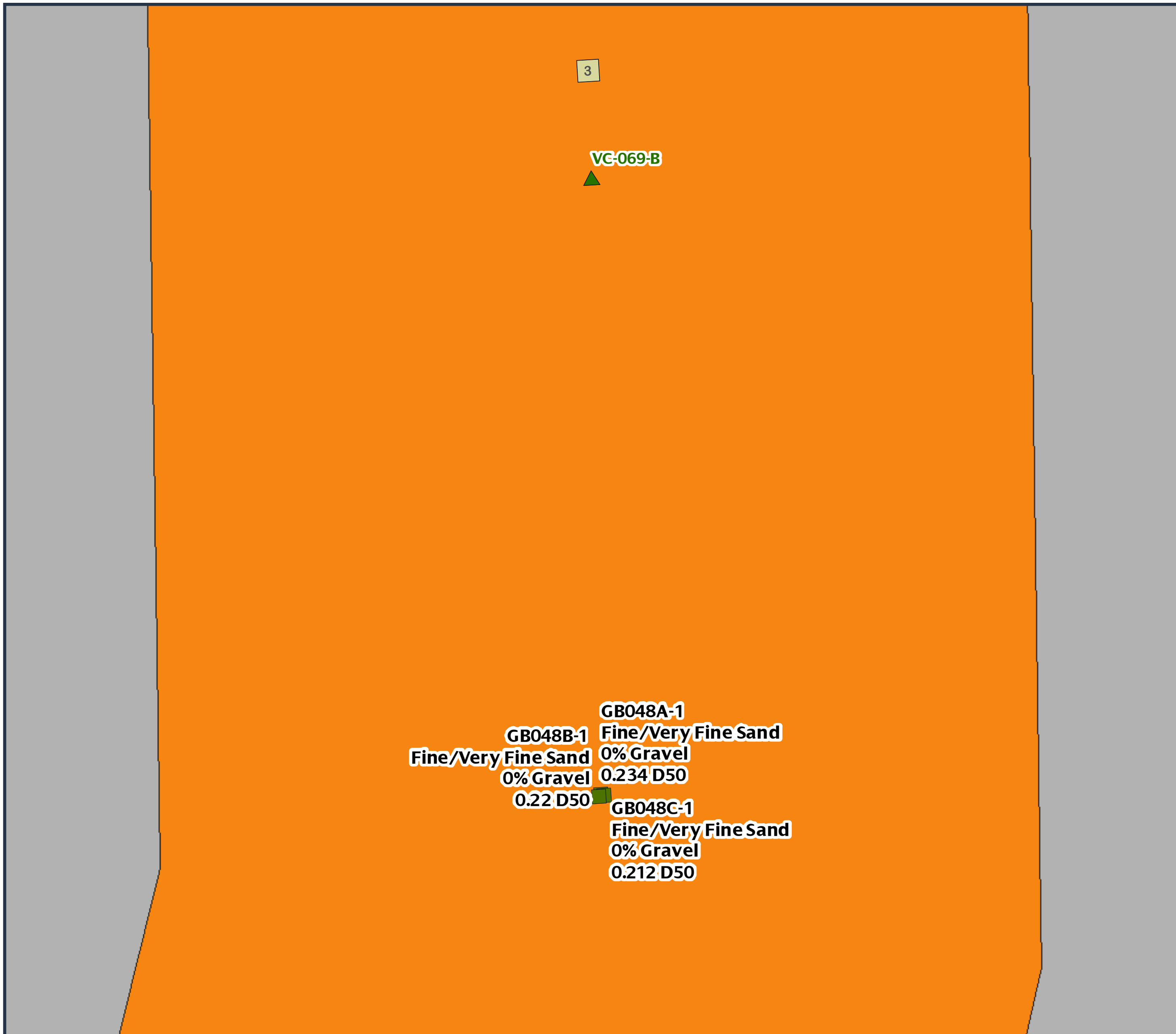
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

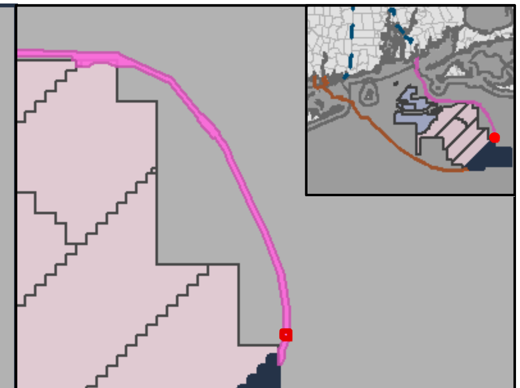
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Station - Grab Sample

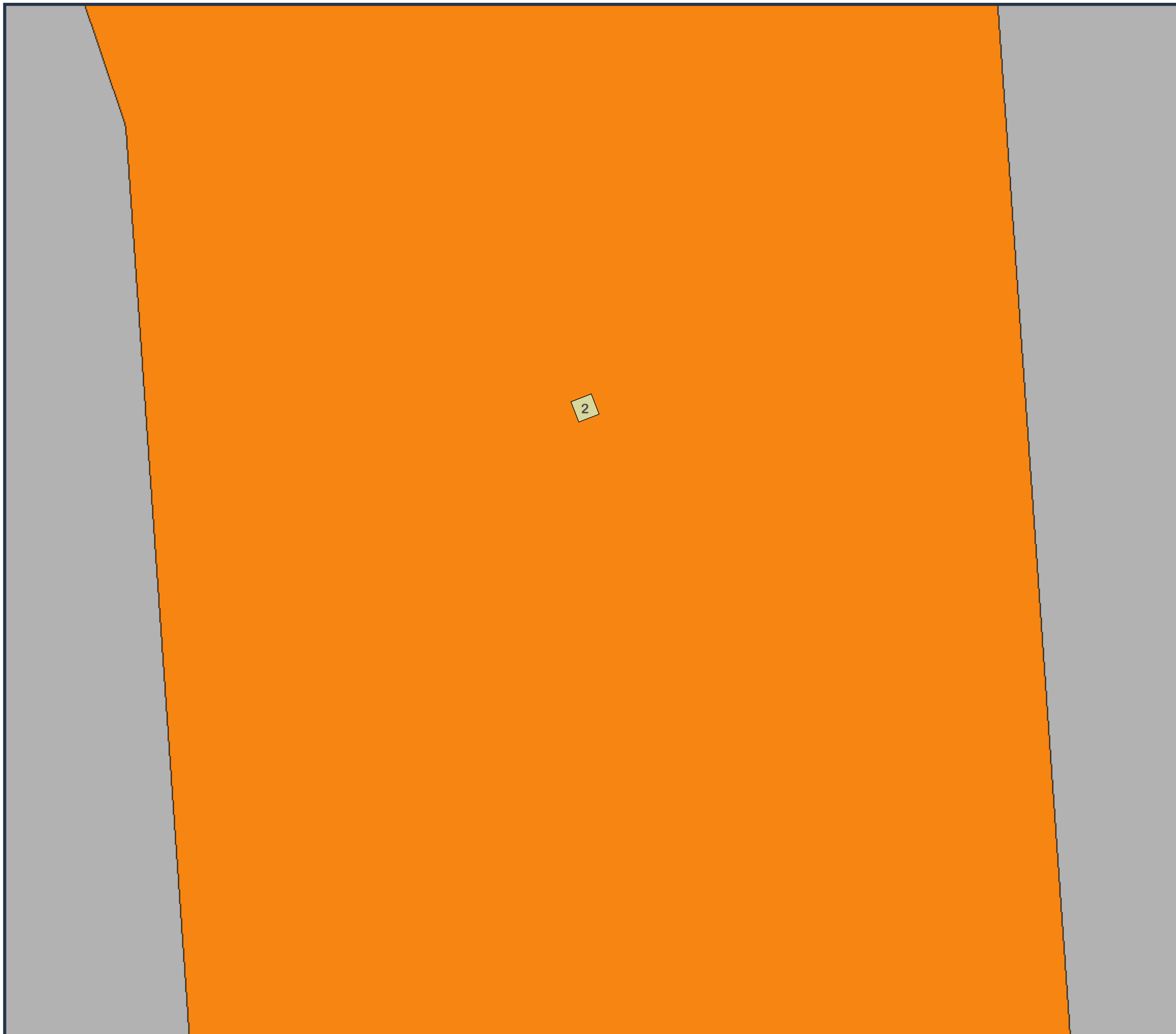
Scale 1:5,000
1 inch = 0 km

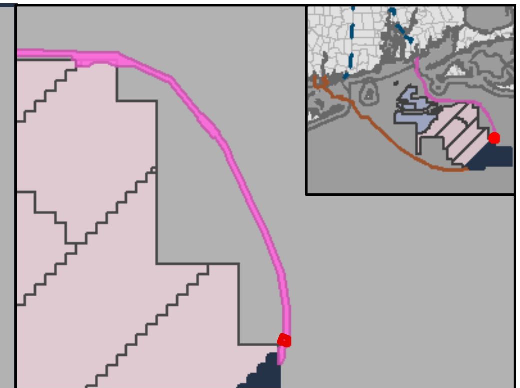
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

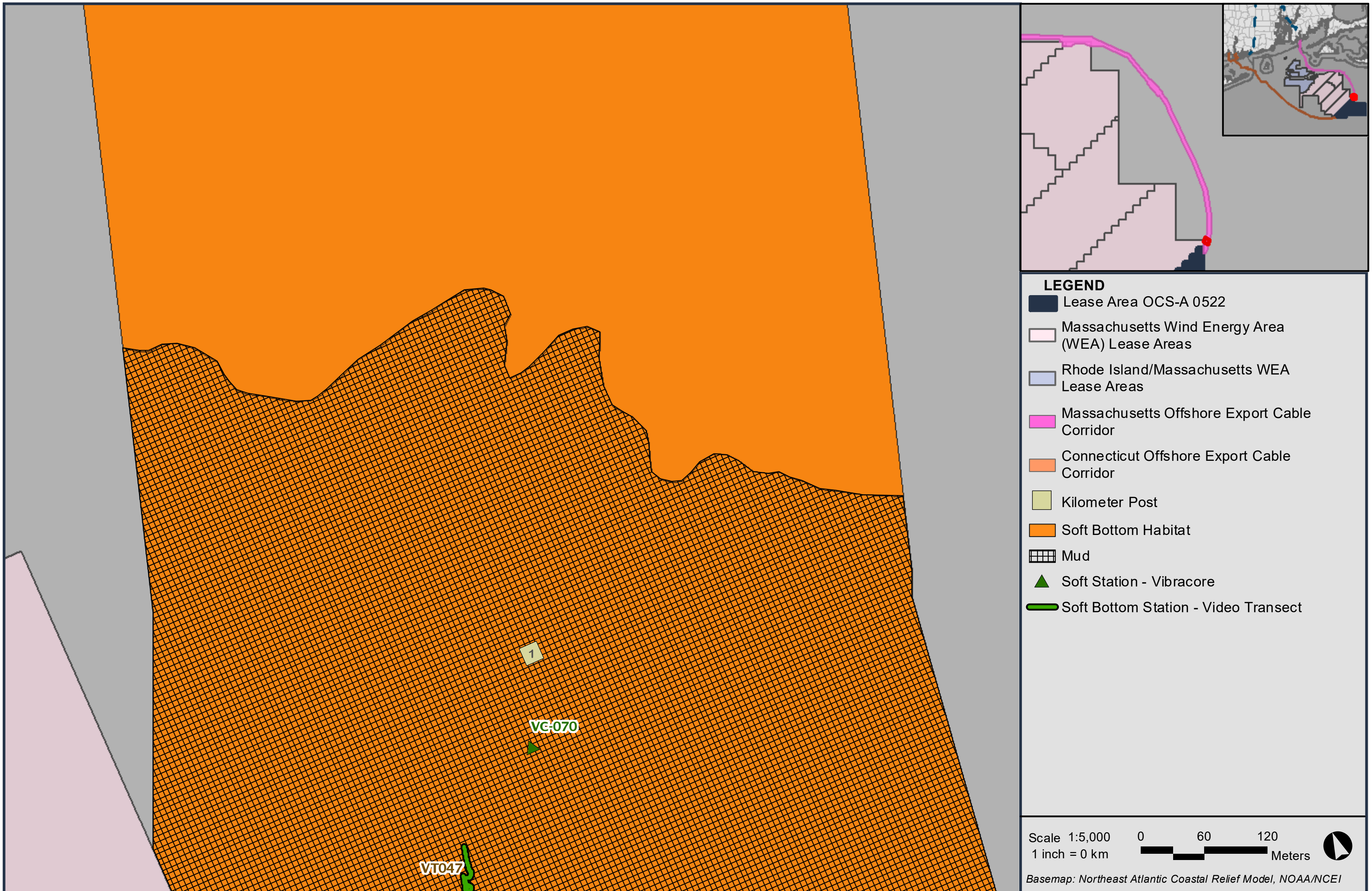
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





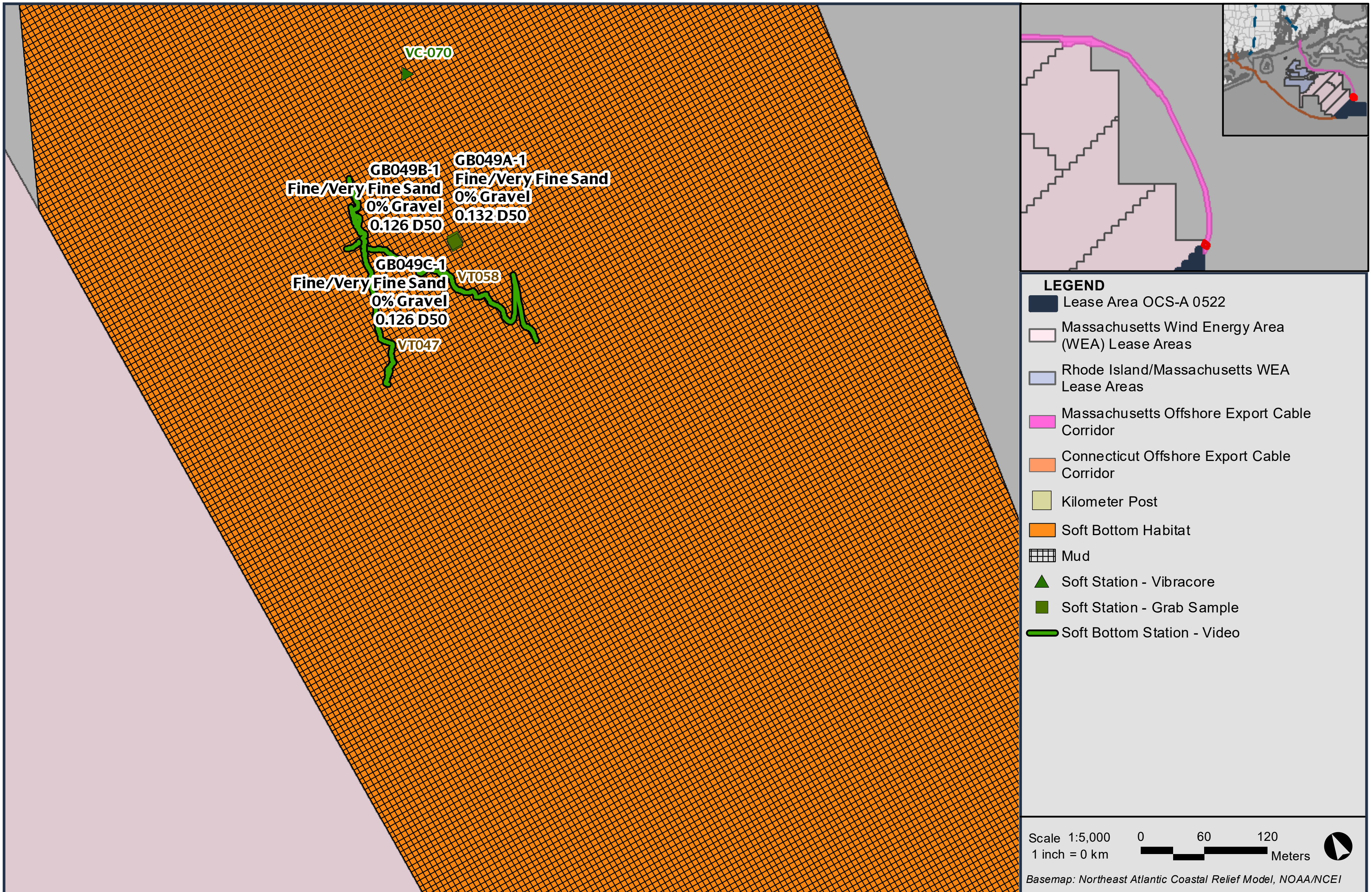
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

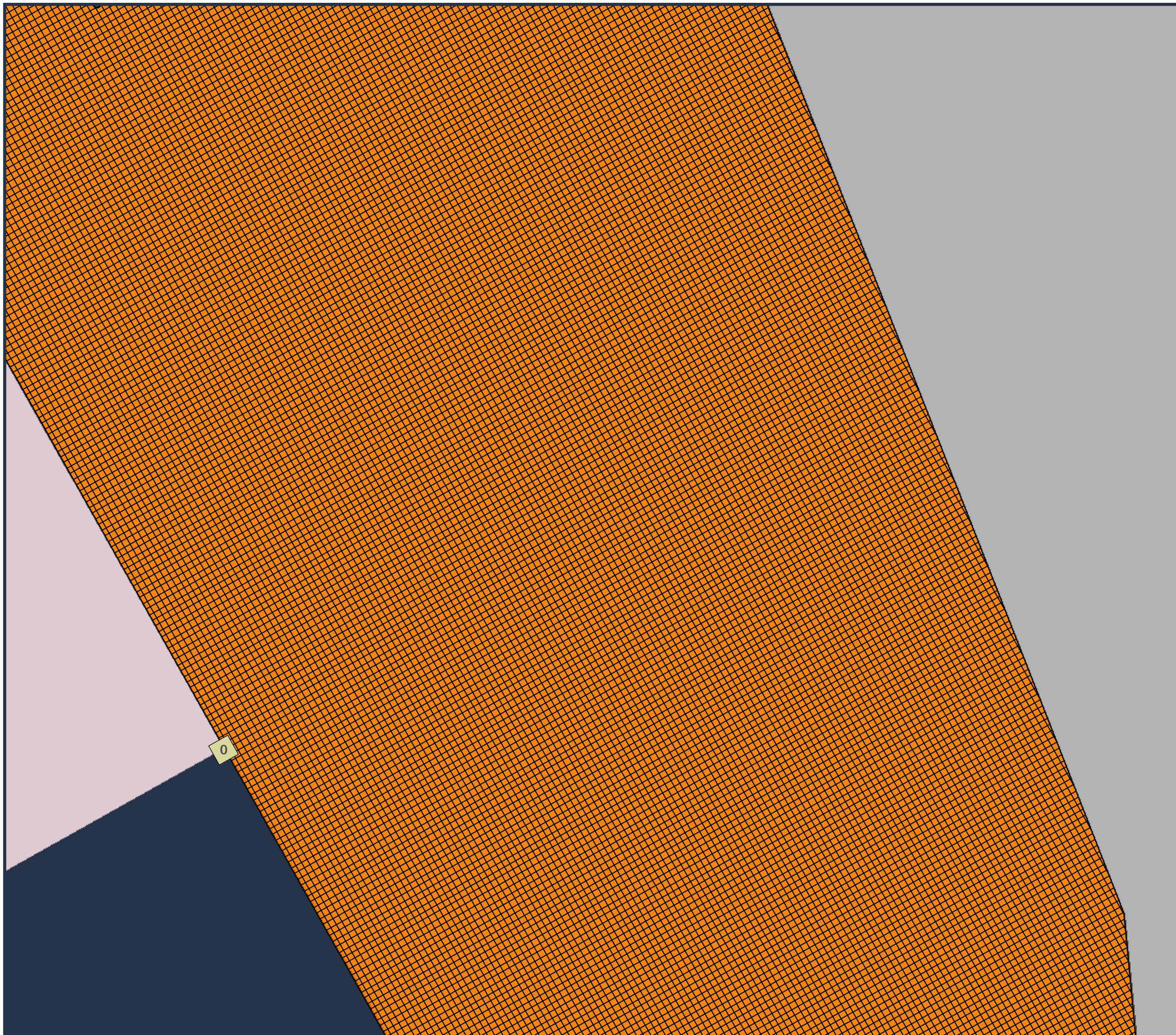
VINEYARD NORTHEAST

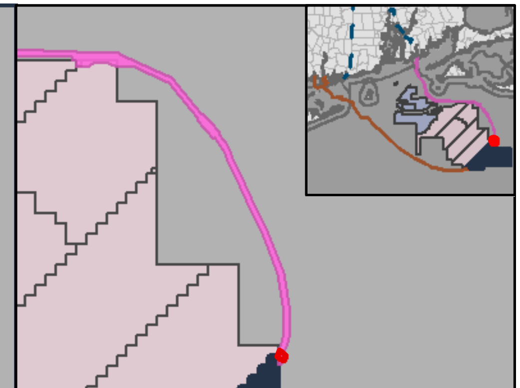
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Mud
- Soft Bottom Station - Video Transect

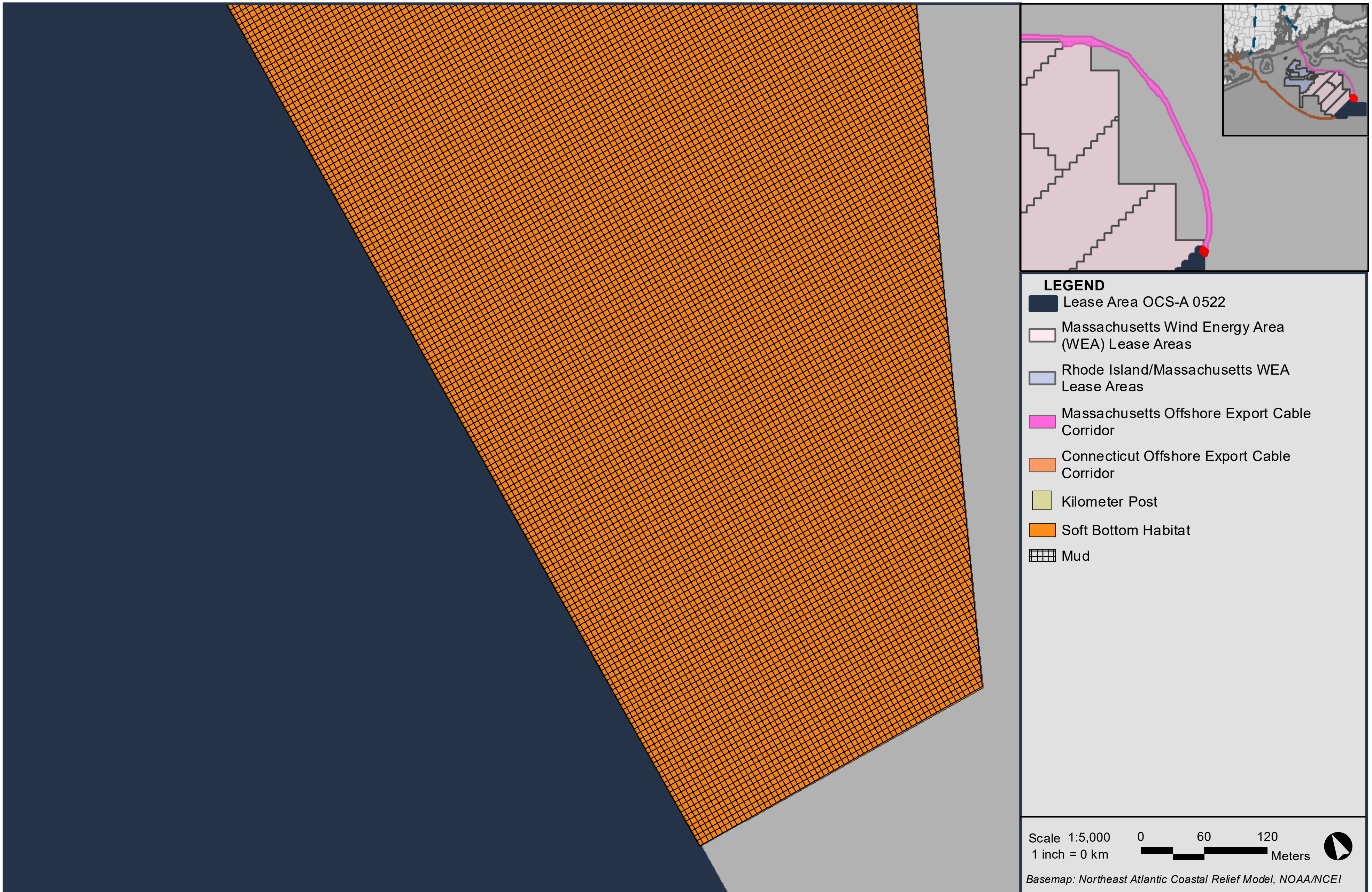
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

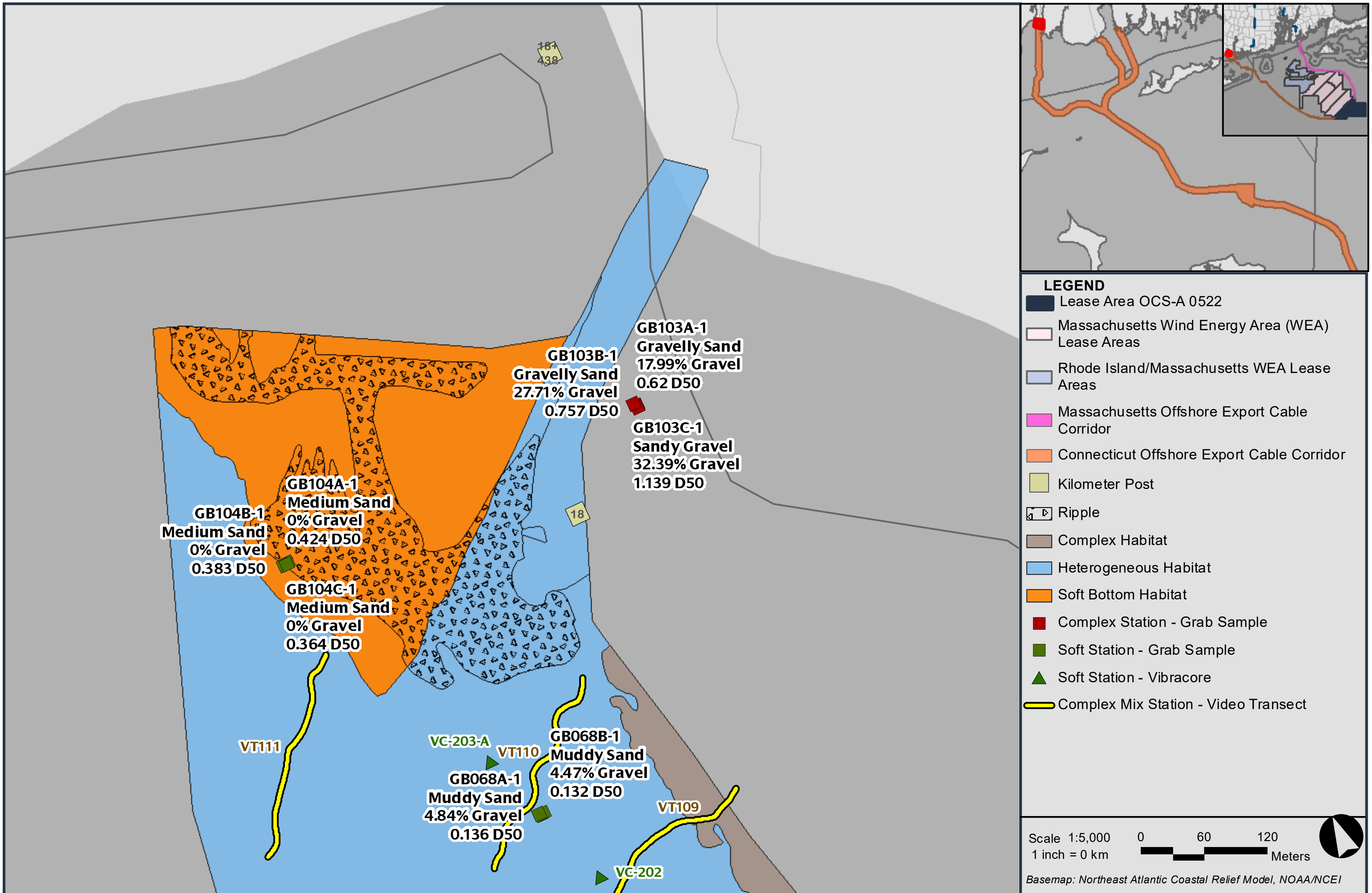
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Massachusetts OECC

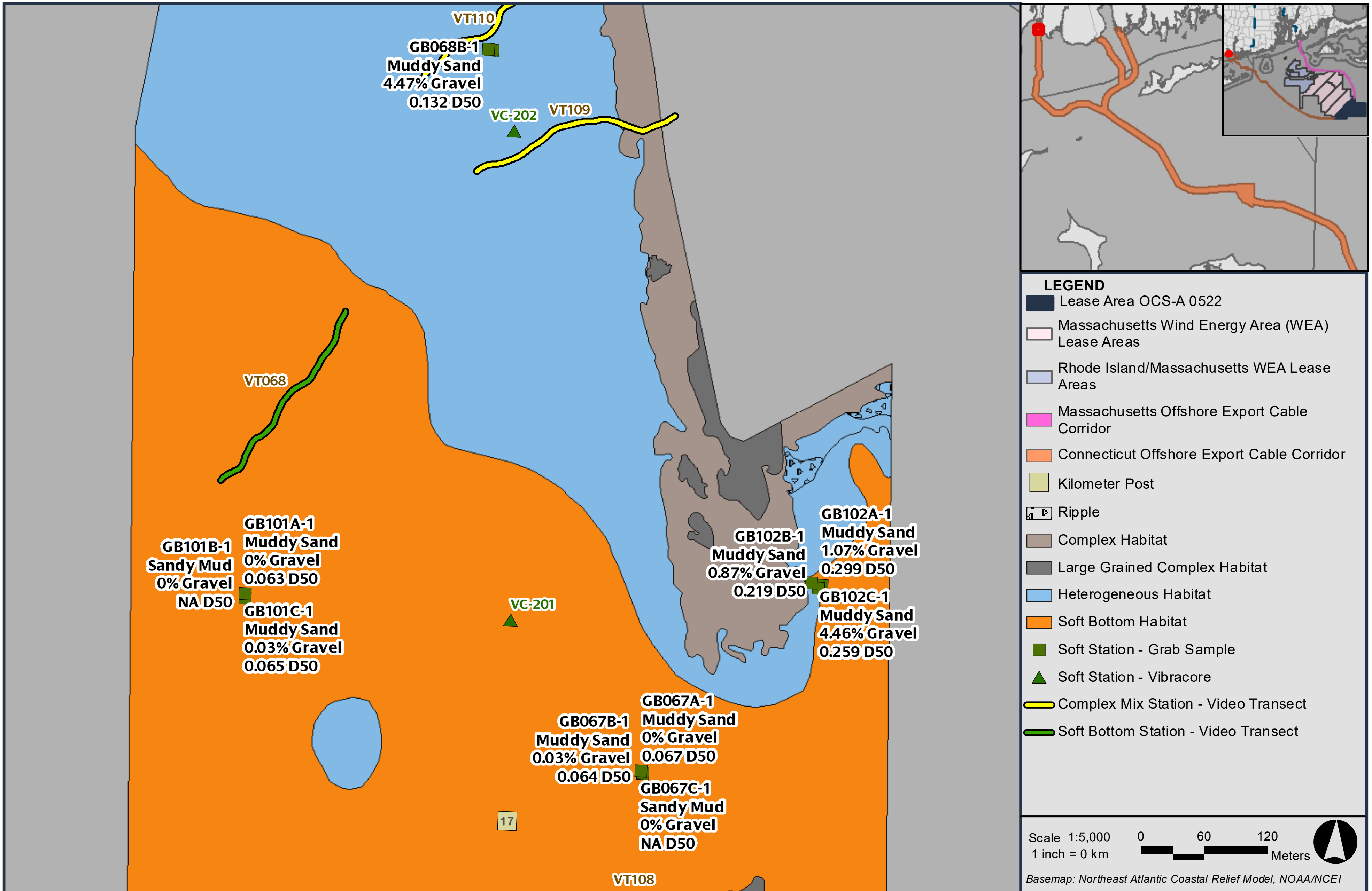
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

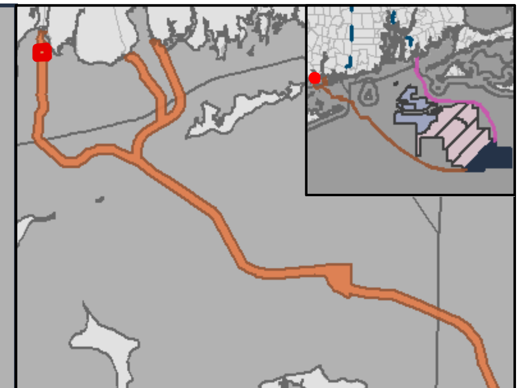
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE



LEGEND

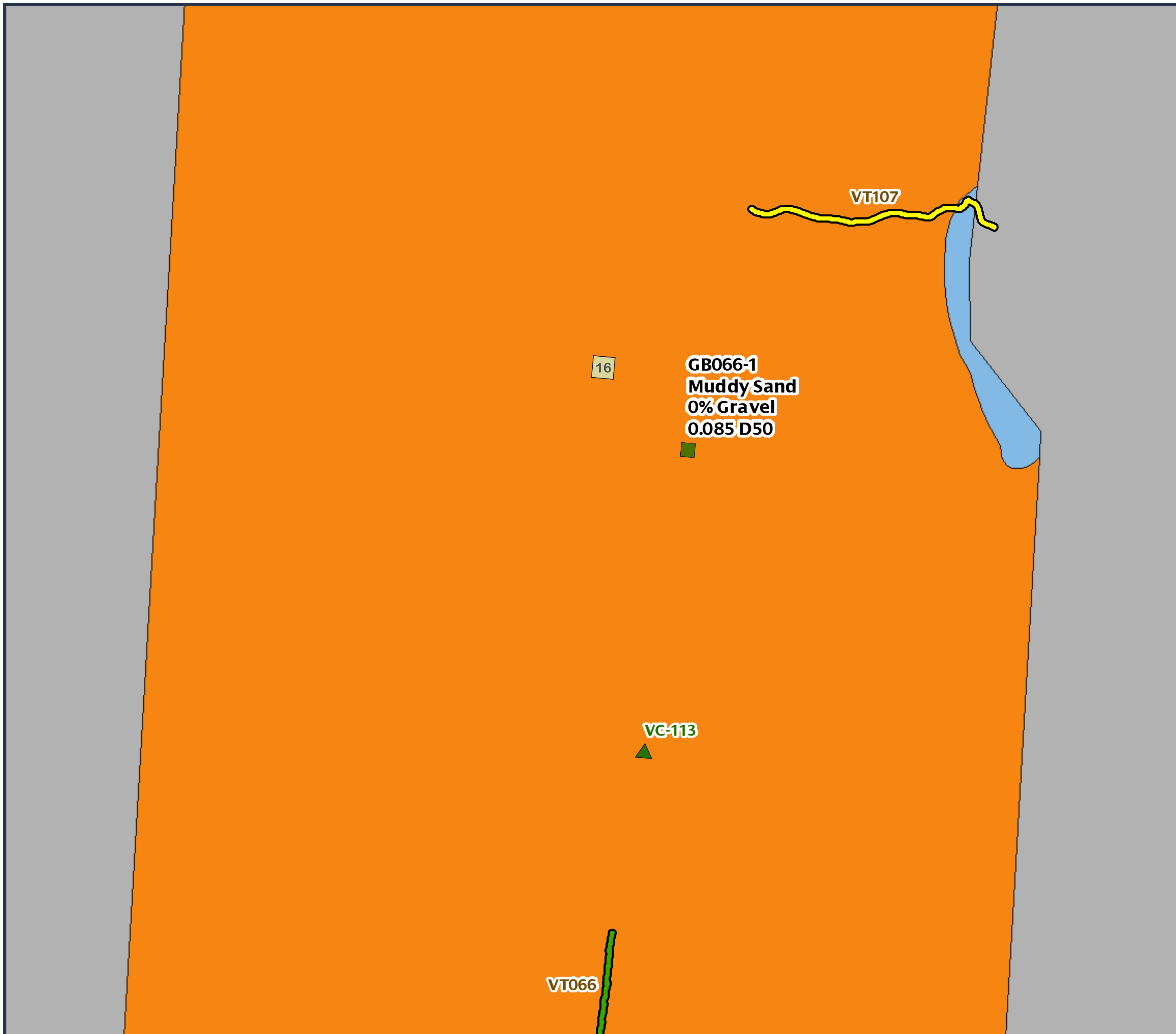
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Large Grained Complex Habitat
- Heterogeneous Habitat
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore
- Complex Mix Station - Video Transect
- Soft Bottom Station - Video Transect

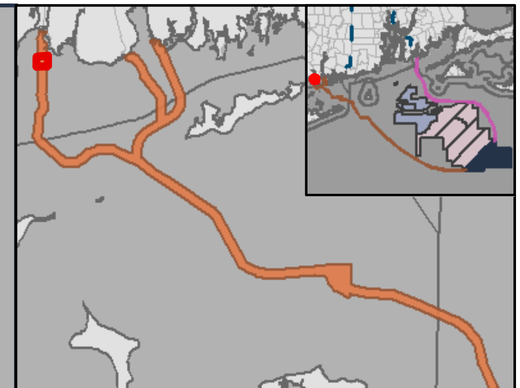
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





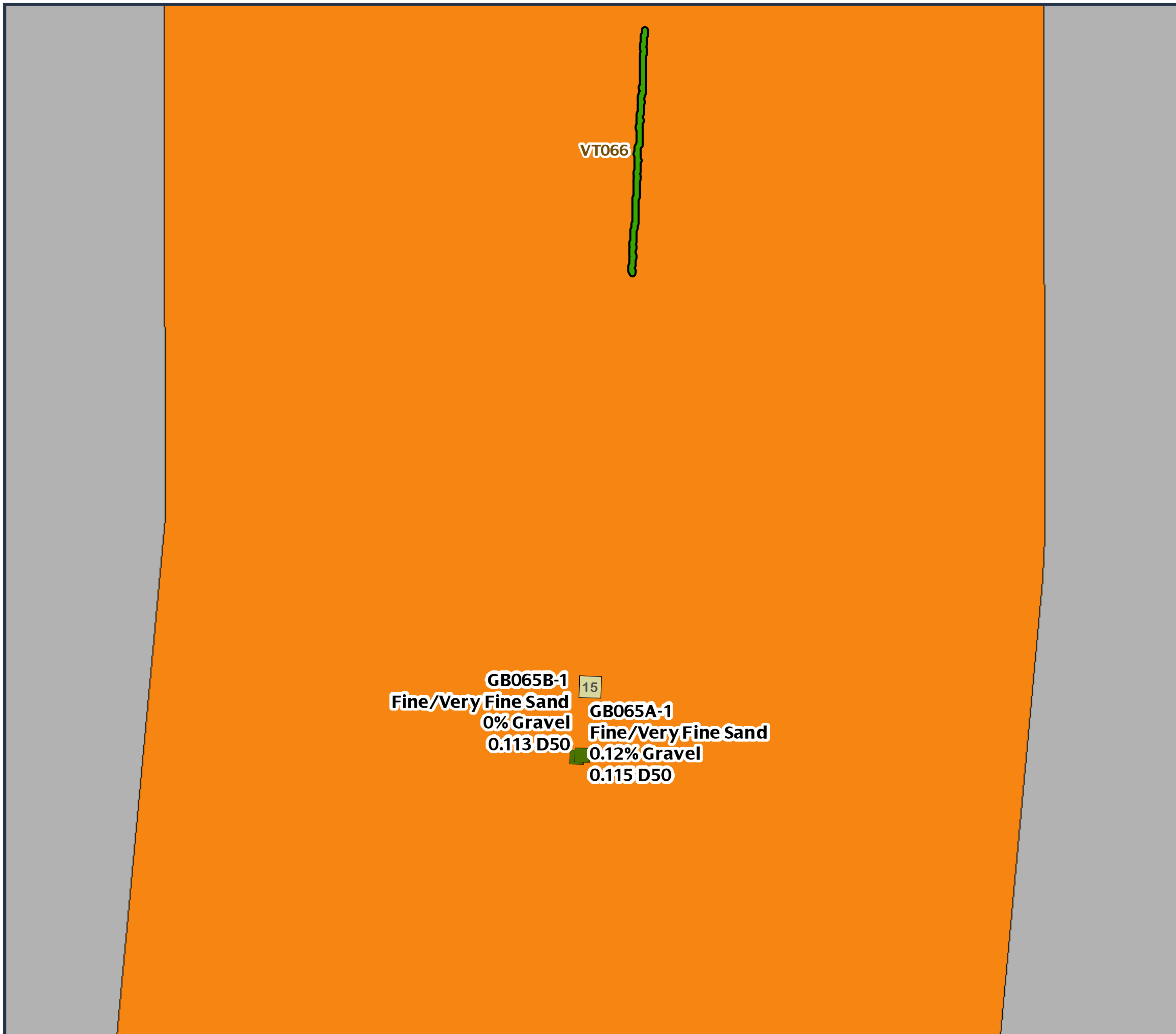
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore
- Complex Mix Station - Video Transect
- Soft Bottom Station - Video Transect

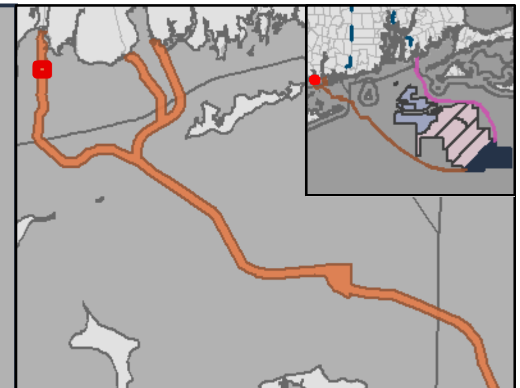
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

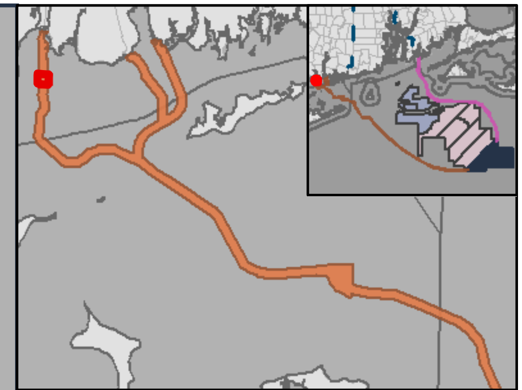
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Bottom Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connectiuct OECC Dredge Locations
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

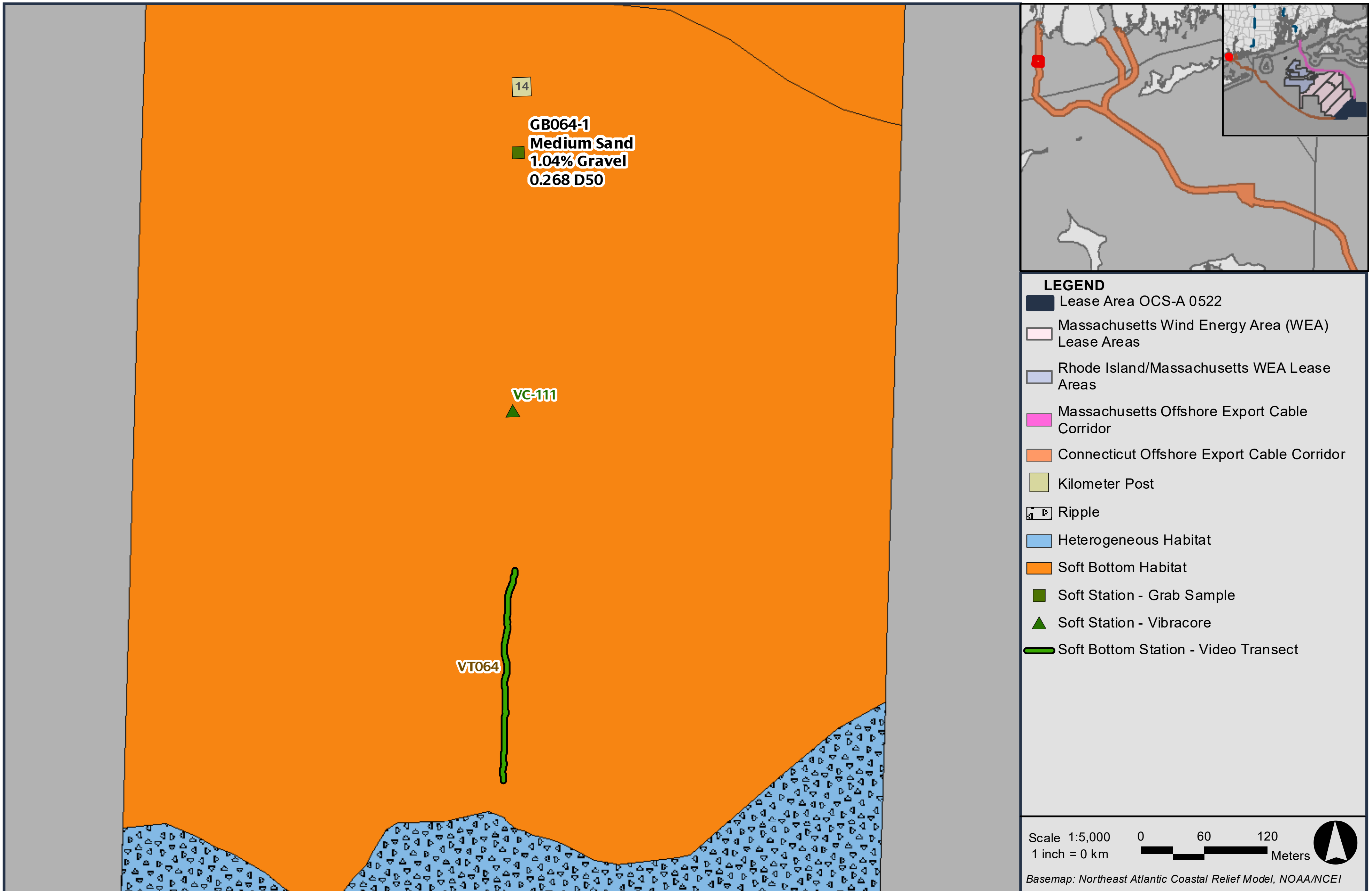
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

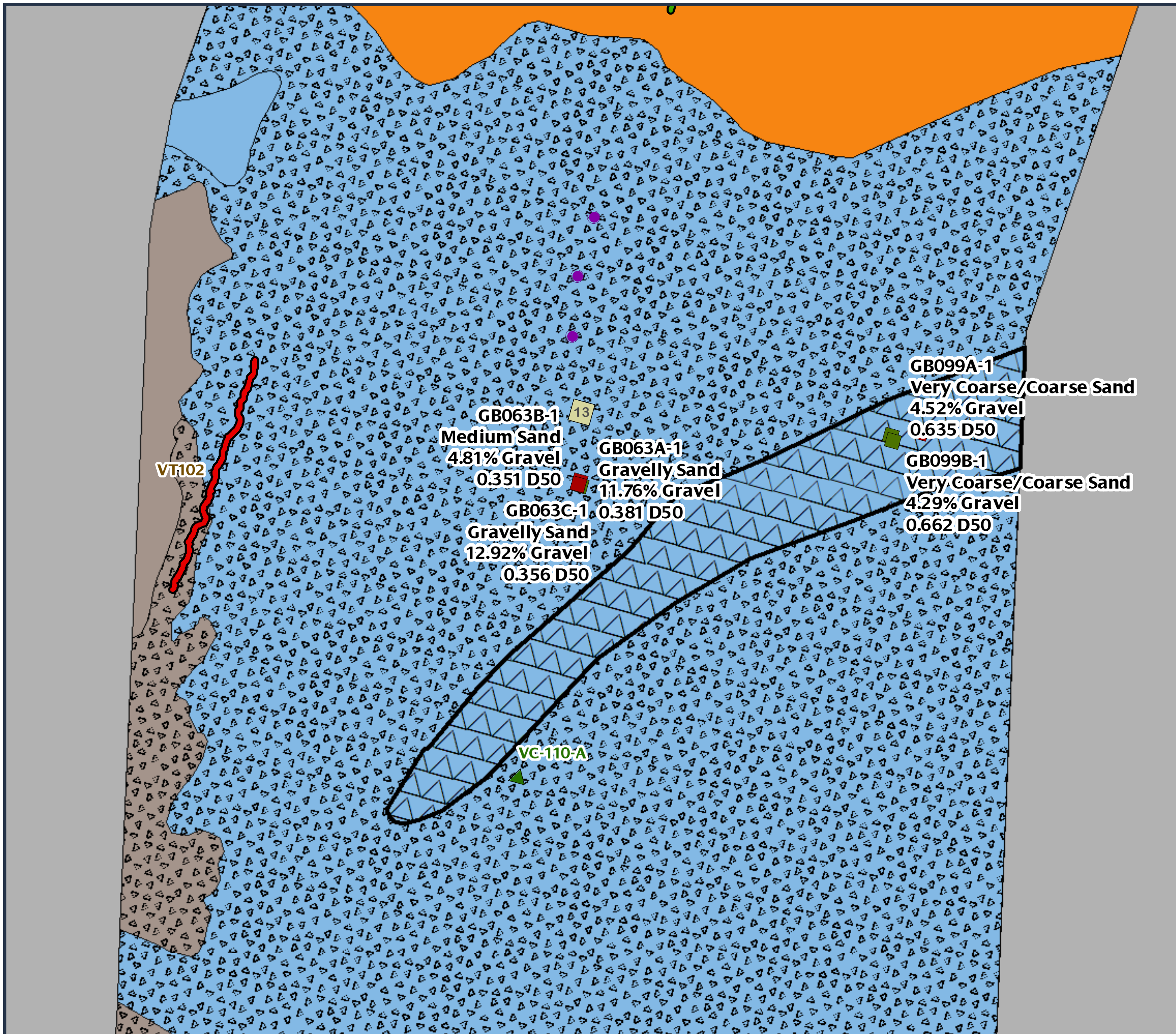
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

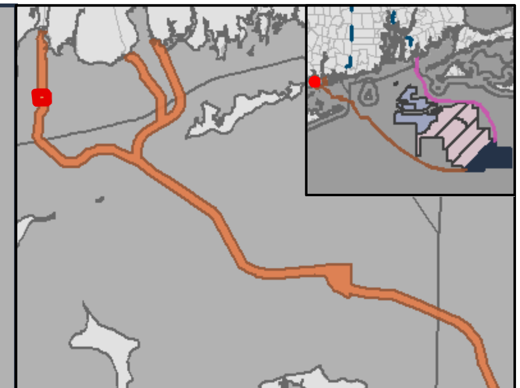
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

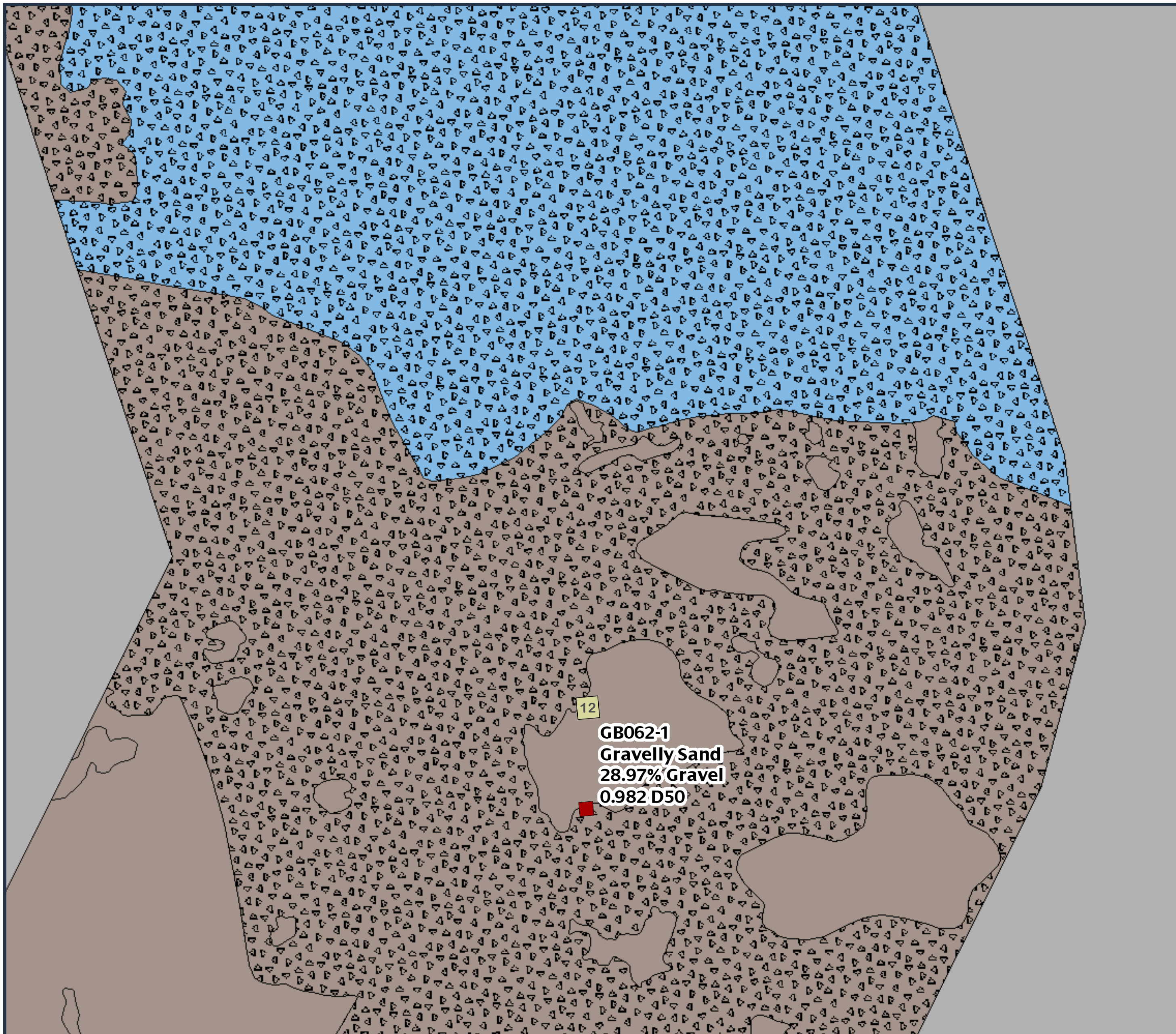
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Mega Ripple
- Ripple
- Complex Habitat
- Heterogeneous Habitat
- Soft Bottom Habitat
- Complex Station - Grab Sample
- Soft Station - Grab Sample
- Soft Station - Vibracore
- Complex Station - Video Transect
- Soft Bottom Station - Video Transect

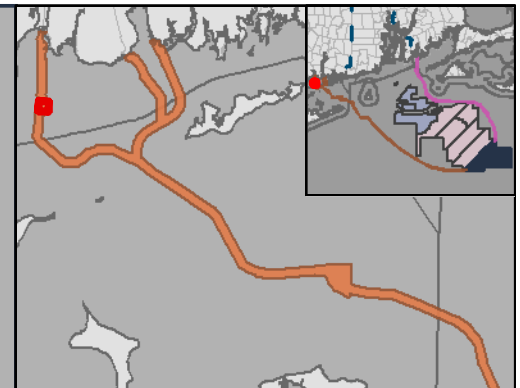
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

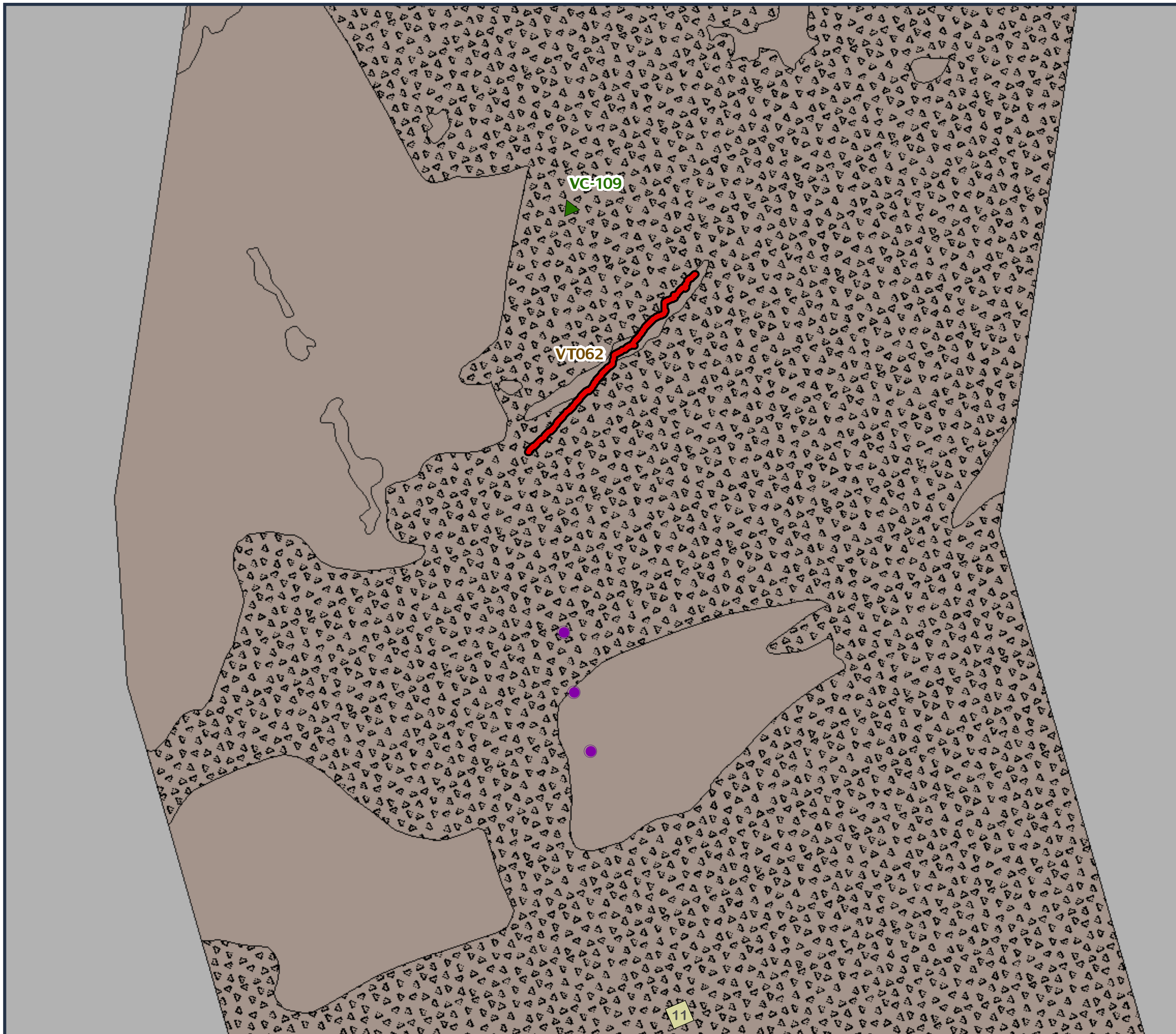
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Complex Habitat
- Heterogeneous Habitat
- Complex Station - Grab Sample
- Soft Station - Vibracore

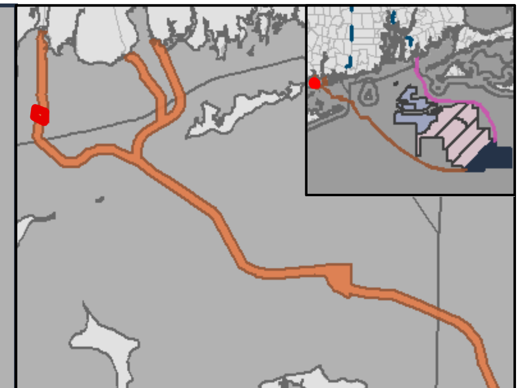
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Ripple
- Complex Habitat
- Soft Station - Vibracore
- Complex Station - Video Transect

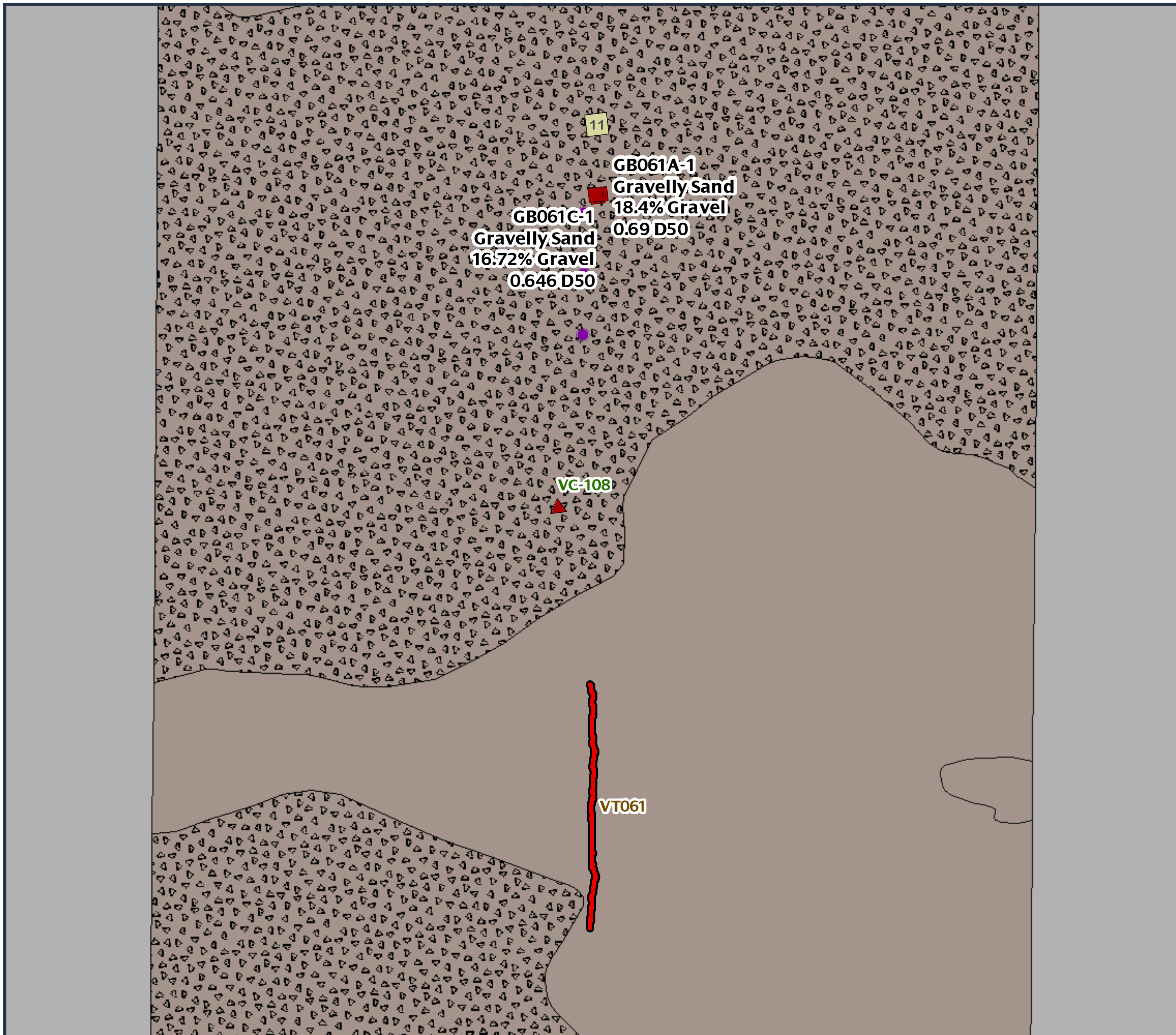
Scale 1:5,000
1 inch = 0 km

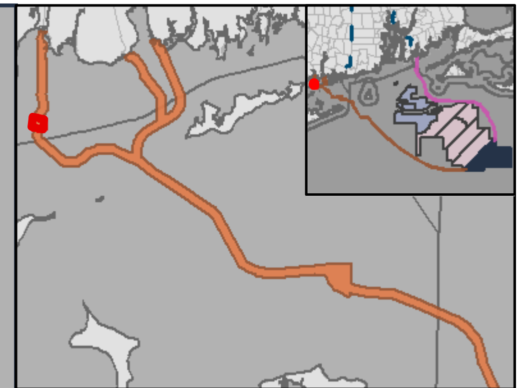
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





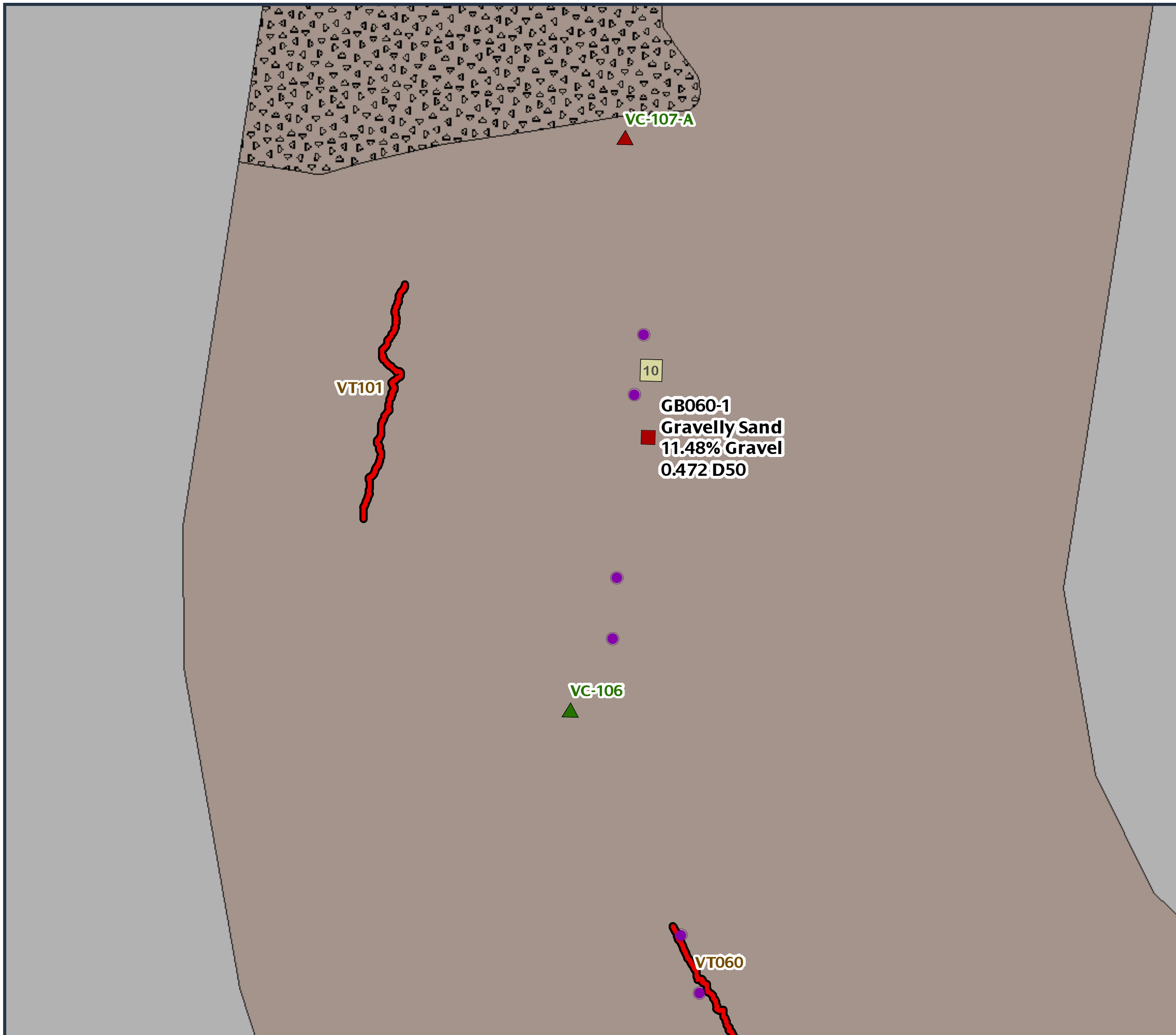
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Representative Connecticut OECC Dredge Locations
Ripple
Complex Habitat
Complex Station - Grab Sample
Complex Station - Vibracore
Complex Station - Video Transect

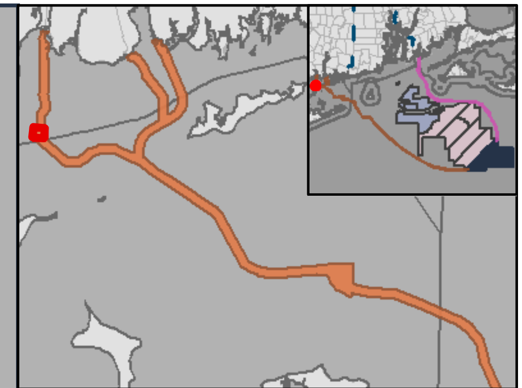
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

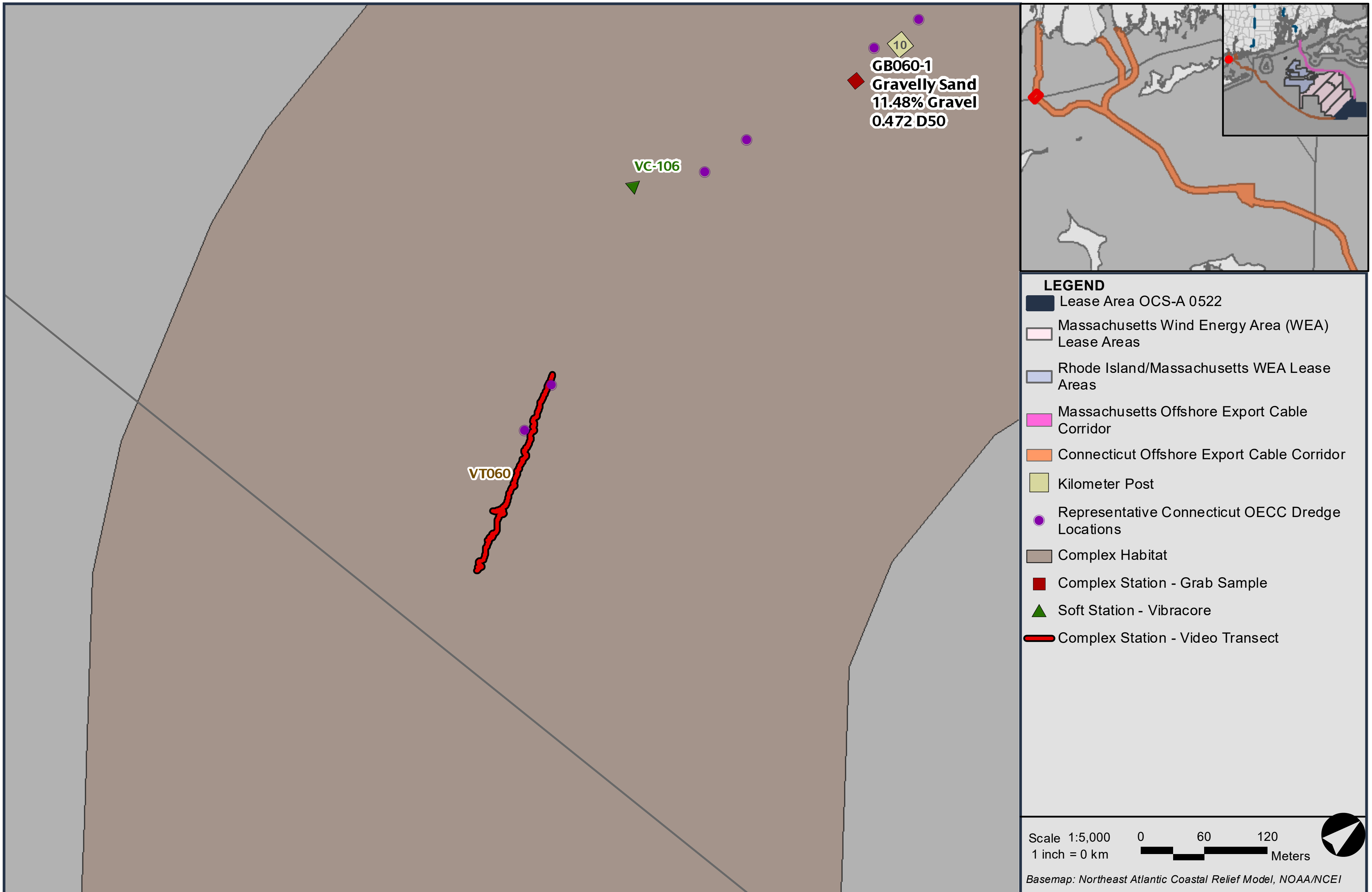
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Ripple
- Complex Habitat
- Complex Station - Grab Sample
- Complex Station - Vibracore
- Soft Station - Vibracore
- Complex Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

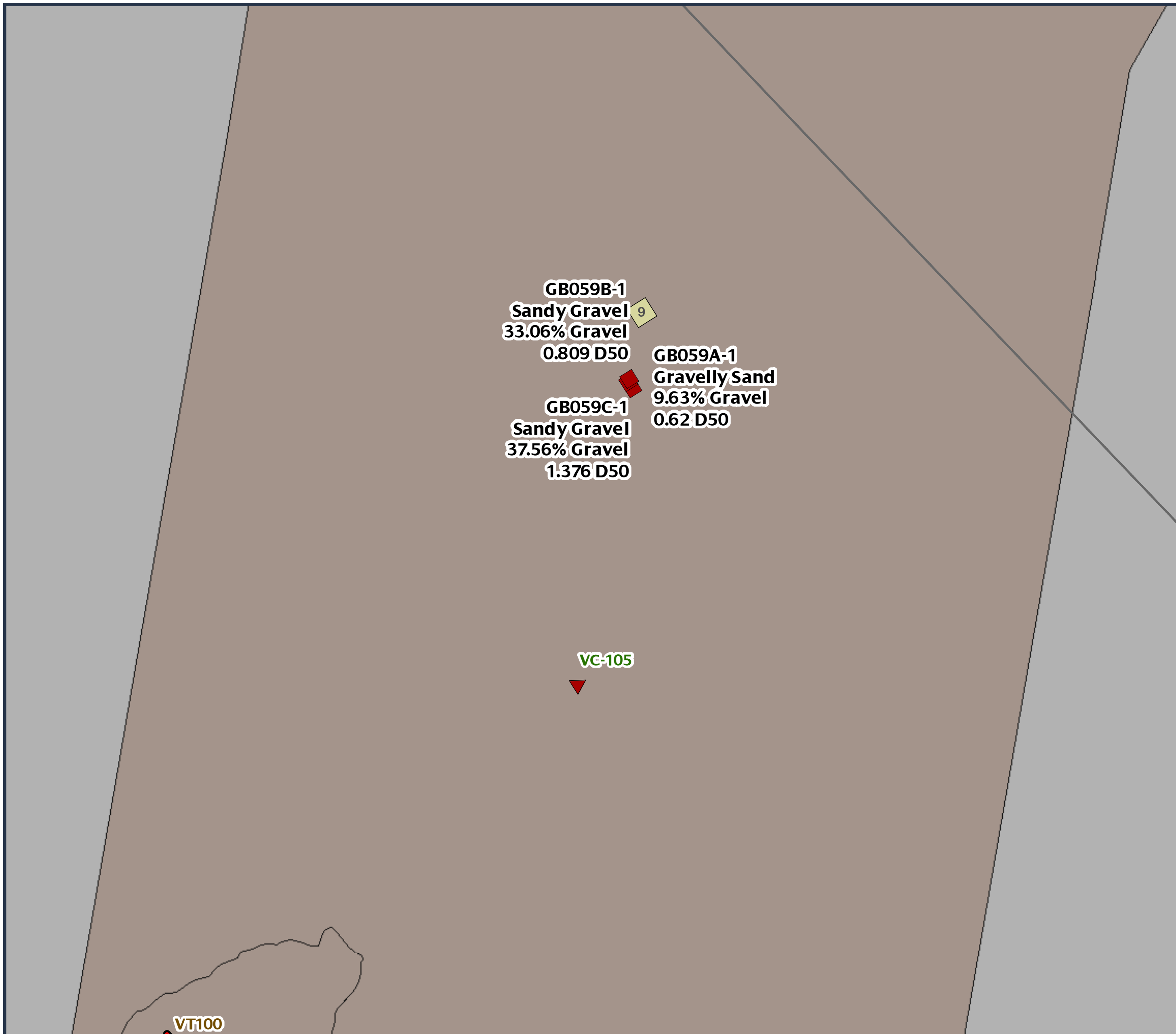
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

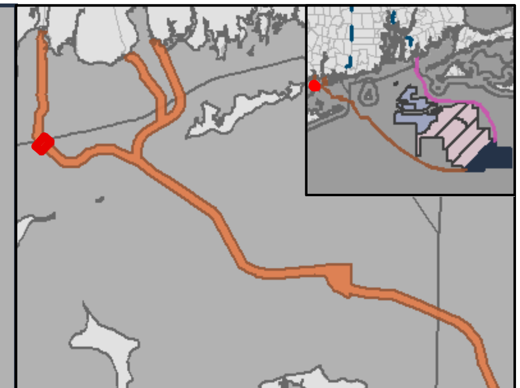
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

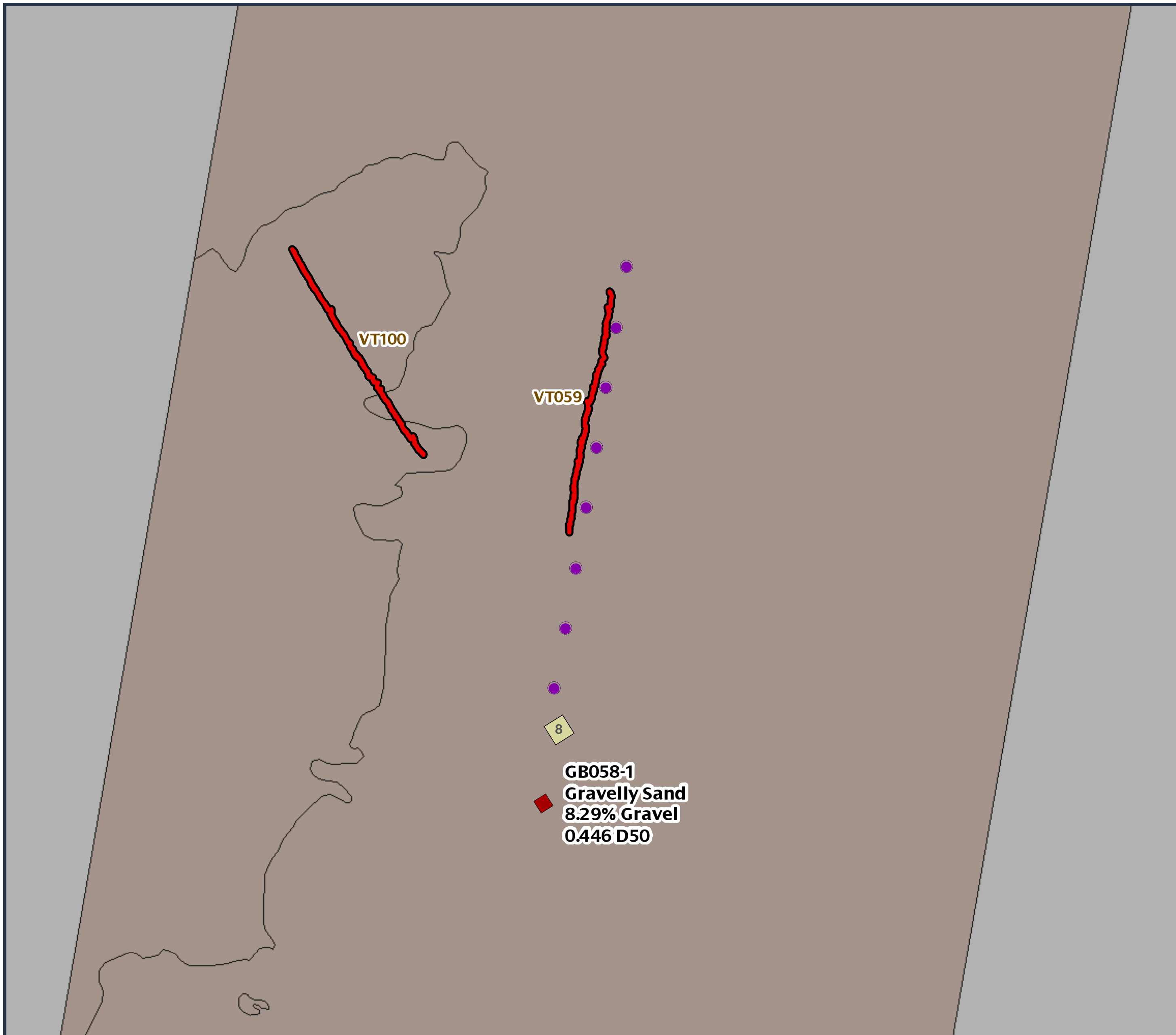
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Complex Station - Grab Sample
- Complex Station - Vibracore
- Complex Station - Video Transect

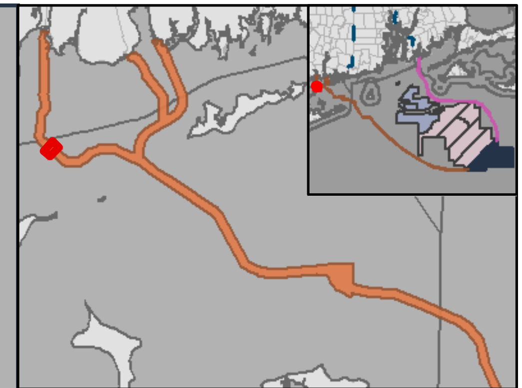
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Complex Habitat
- Complex Station - Grab Sample
- Complex Station - Video Transect

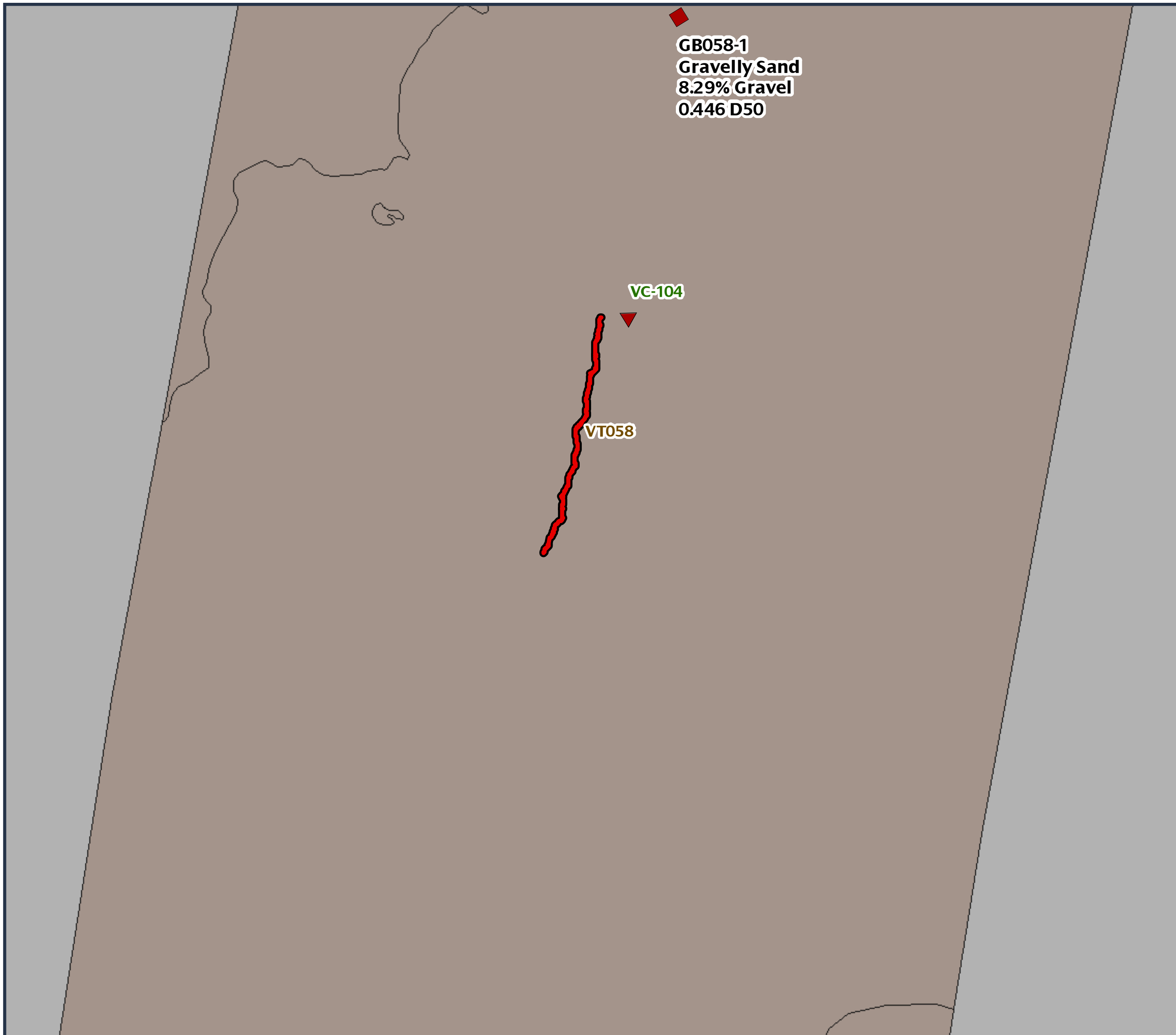
Scale 1:5,000
1 inch = 0 km

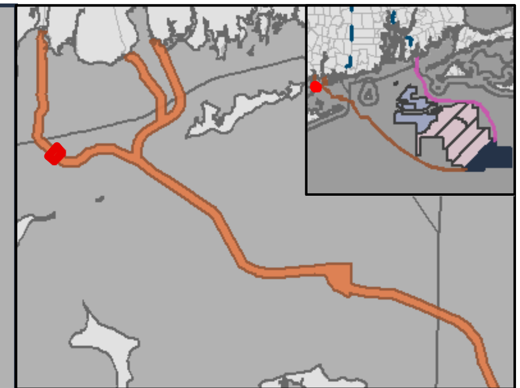
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





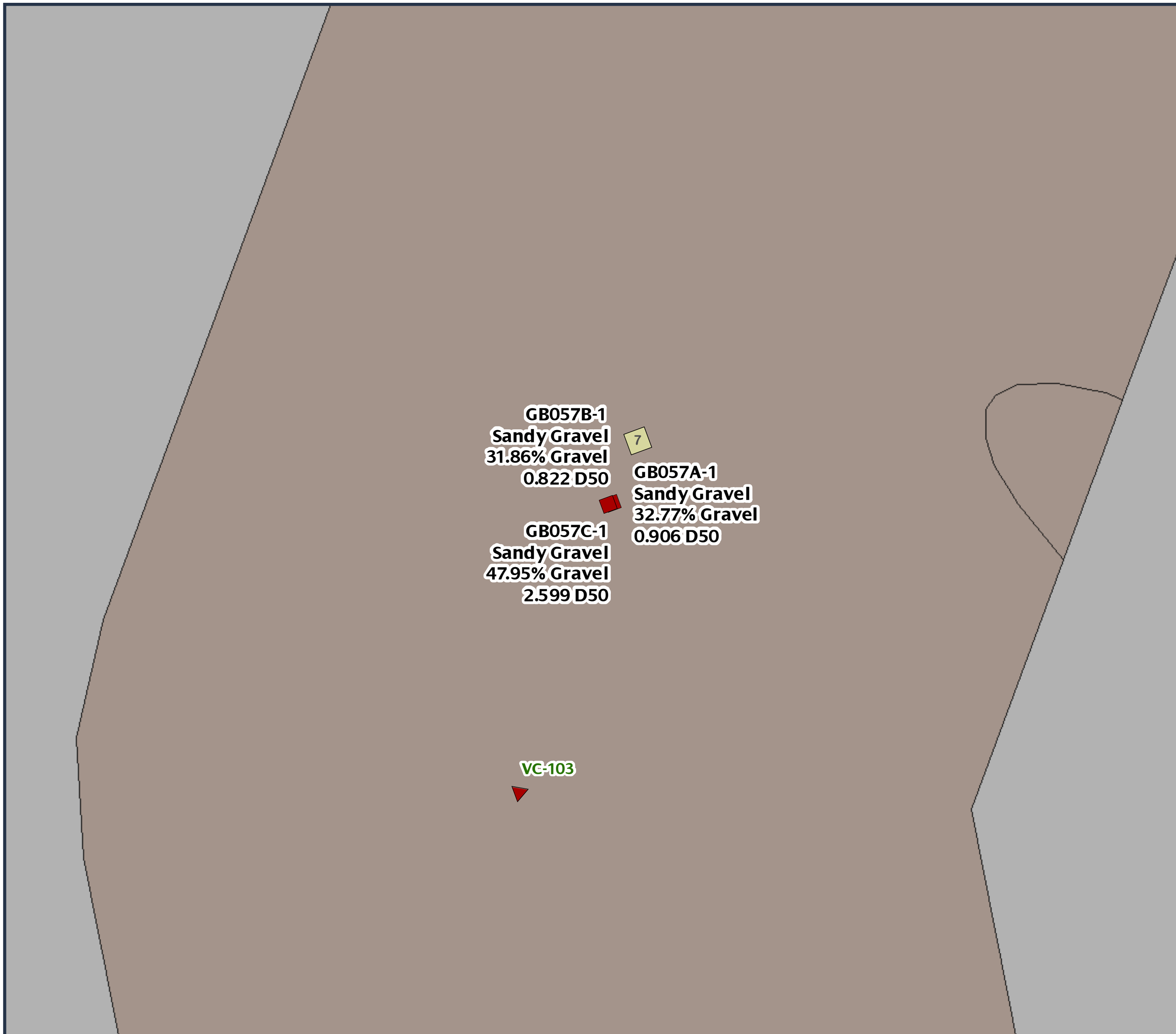
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Complex Habitat
- Complex Station - Grab Sample
- Complex Station - Vibracore
- Complex Station - Video Transect

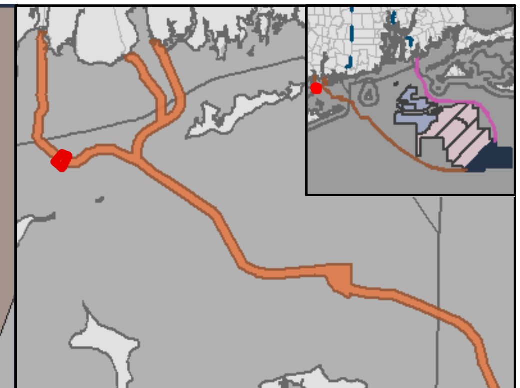
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





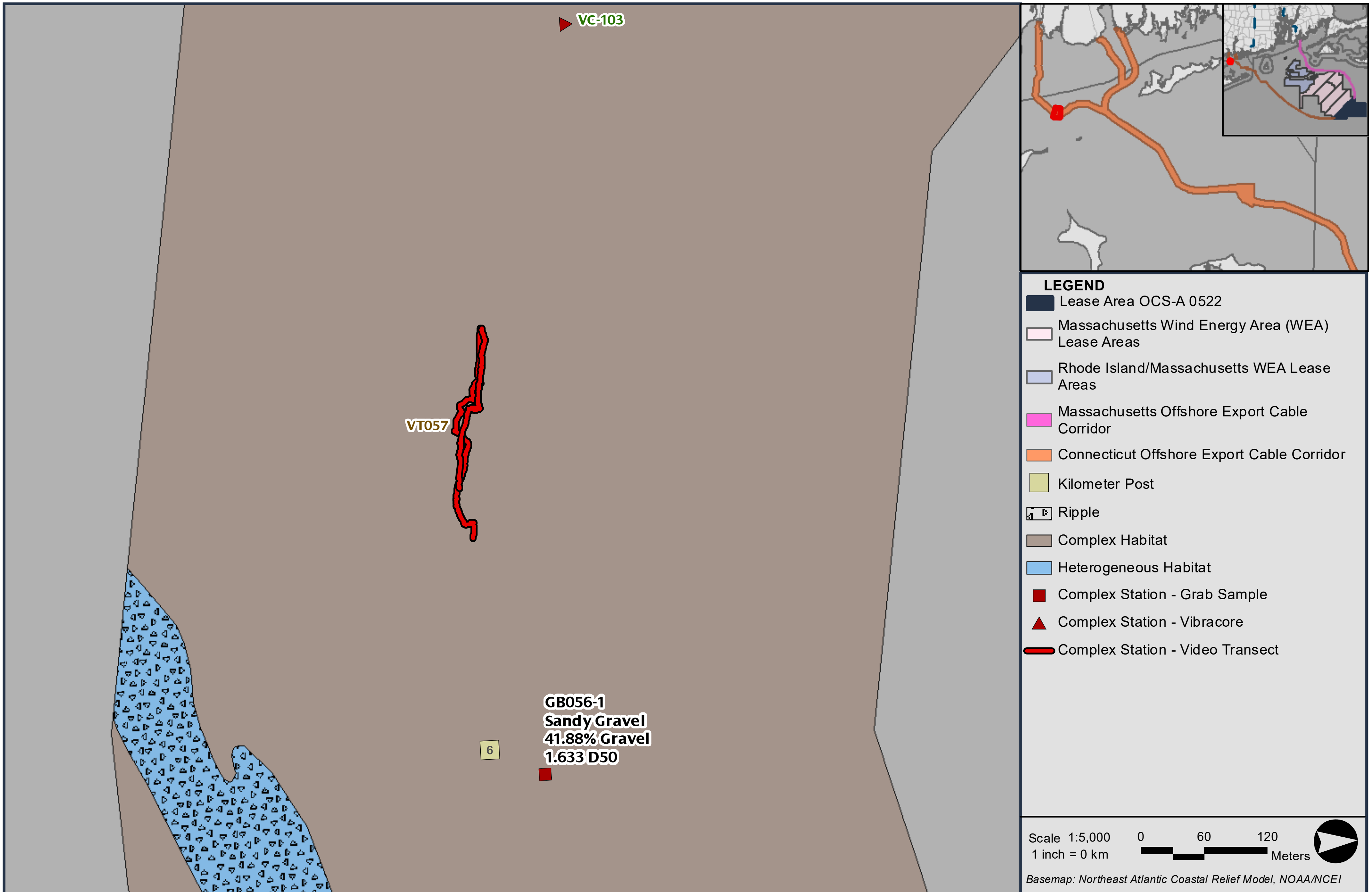
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Complex Station - Grab Sample
- Complex Station - Vibracore

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

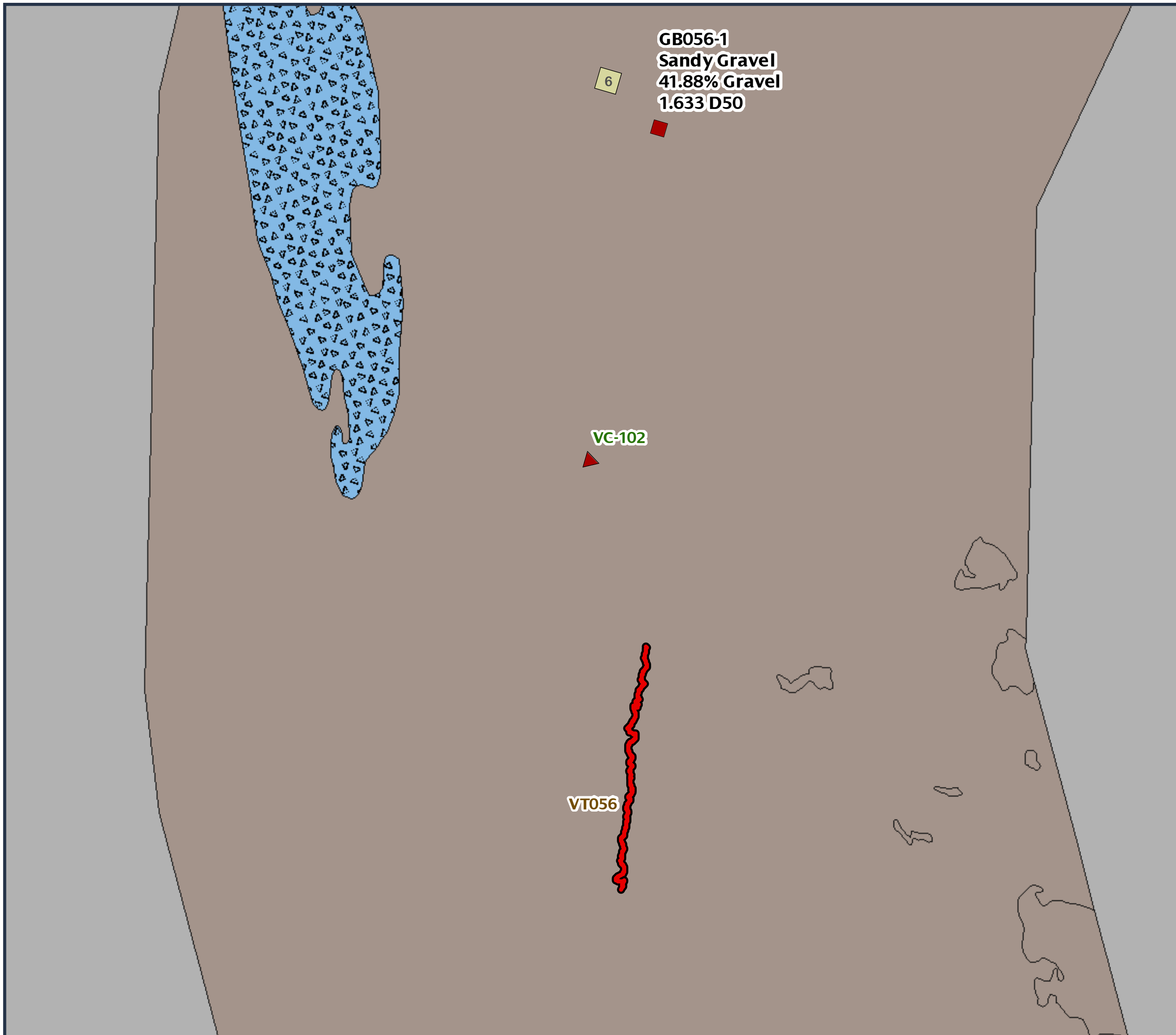
VINEYARD NORTHEAST
VINEYARD OFFSHORE

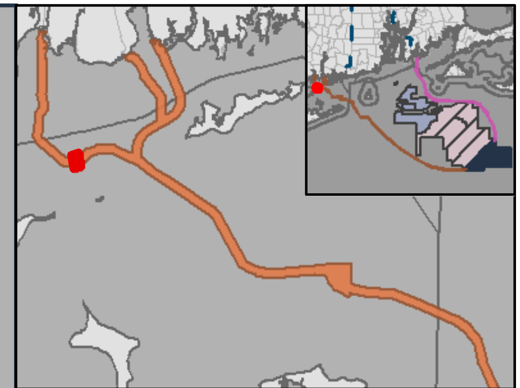


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Complex Habitat
- Heterogeneous Habitat
- Complex Station - Grab Sample
- Complex Station - Vibracore
- Complex Station - Video Transect

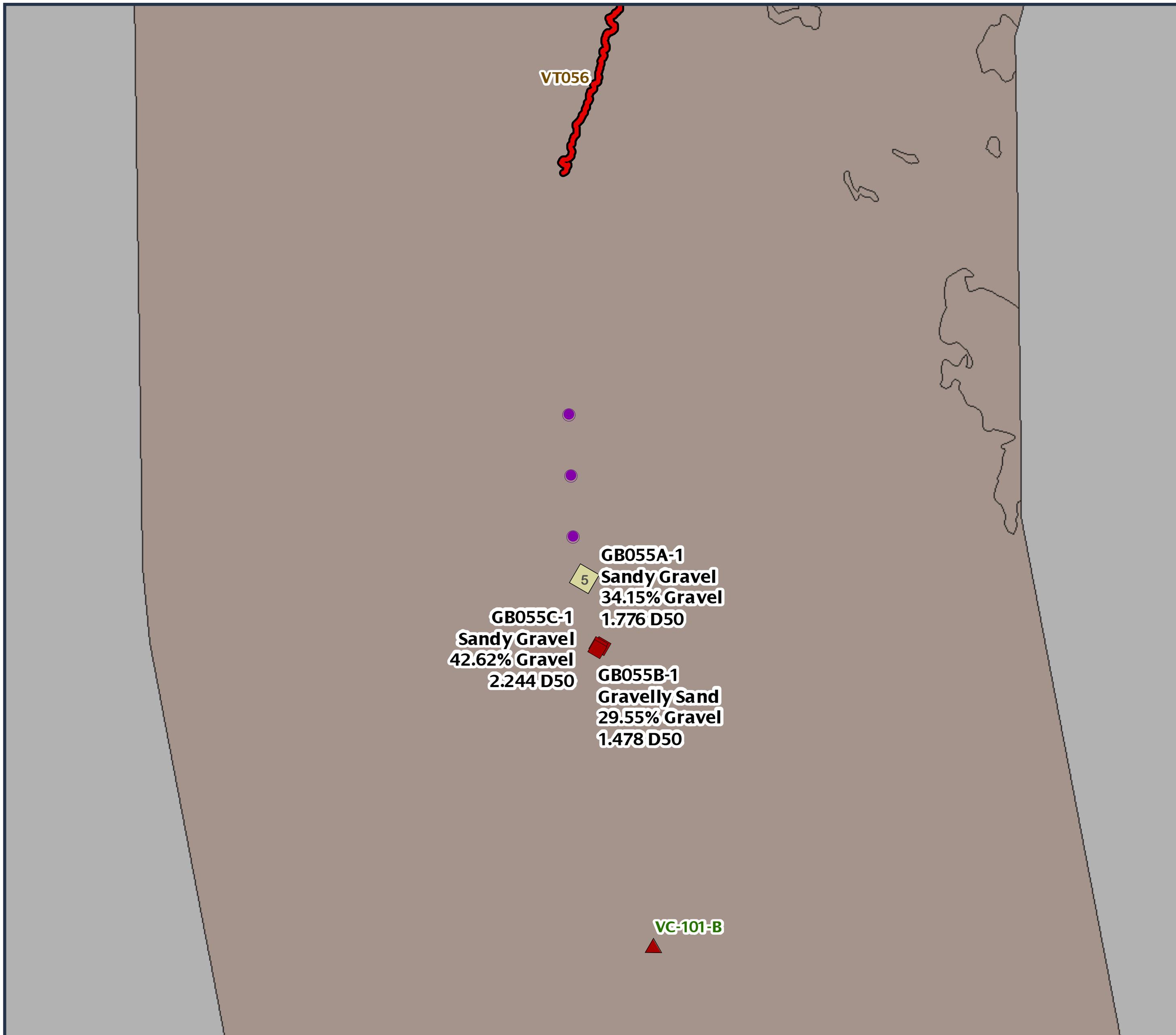
Scale 1:5,000
1 inch = 0 km

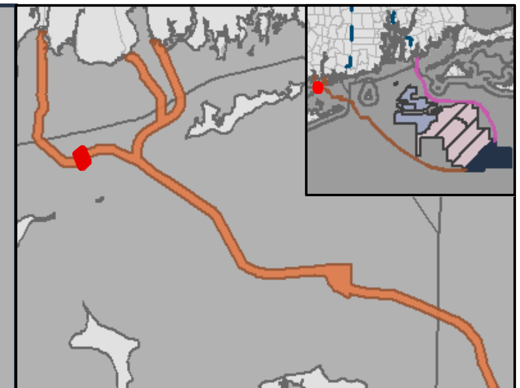
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connectiut OECC Dredge Locations
- Complex Habitat
- Complex Station - Grab Sample
- Complex Station - Vibracore
- Complex Station - Video Transect

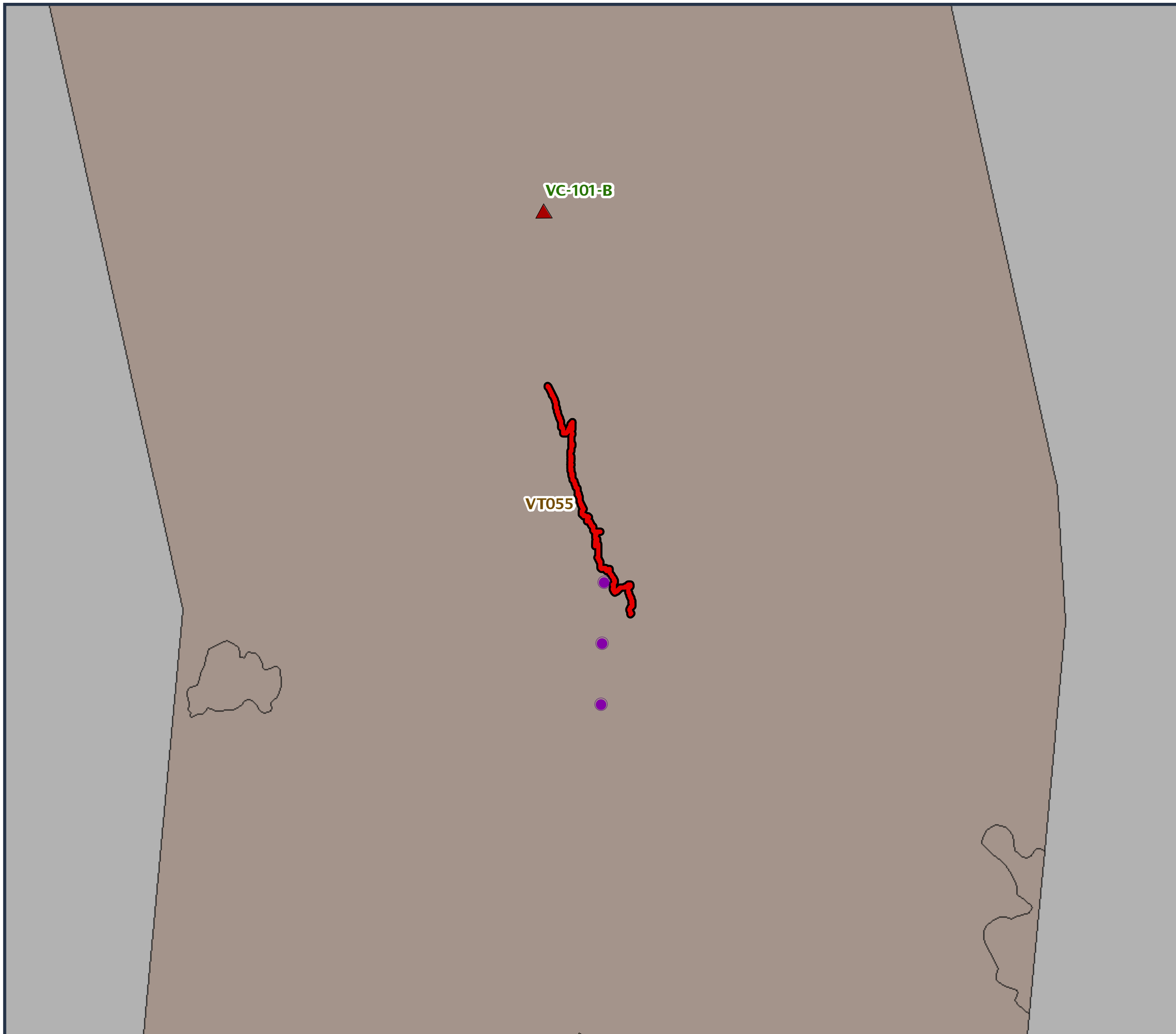
Scale 1:5,000
1 inch = 0 km

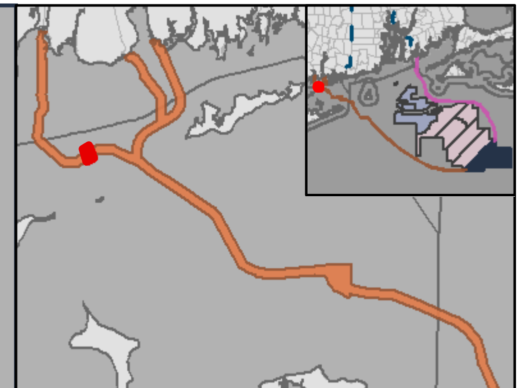
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

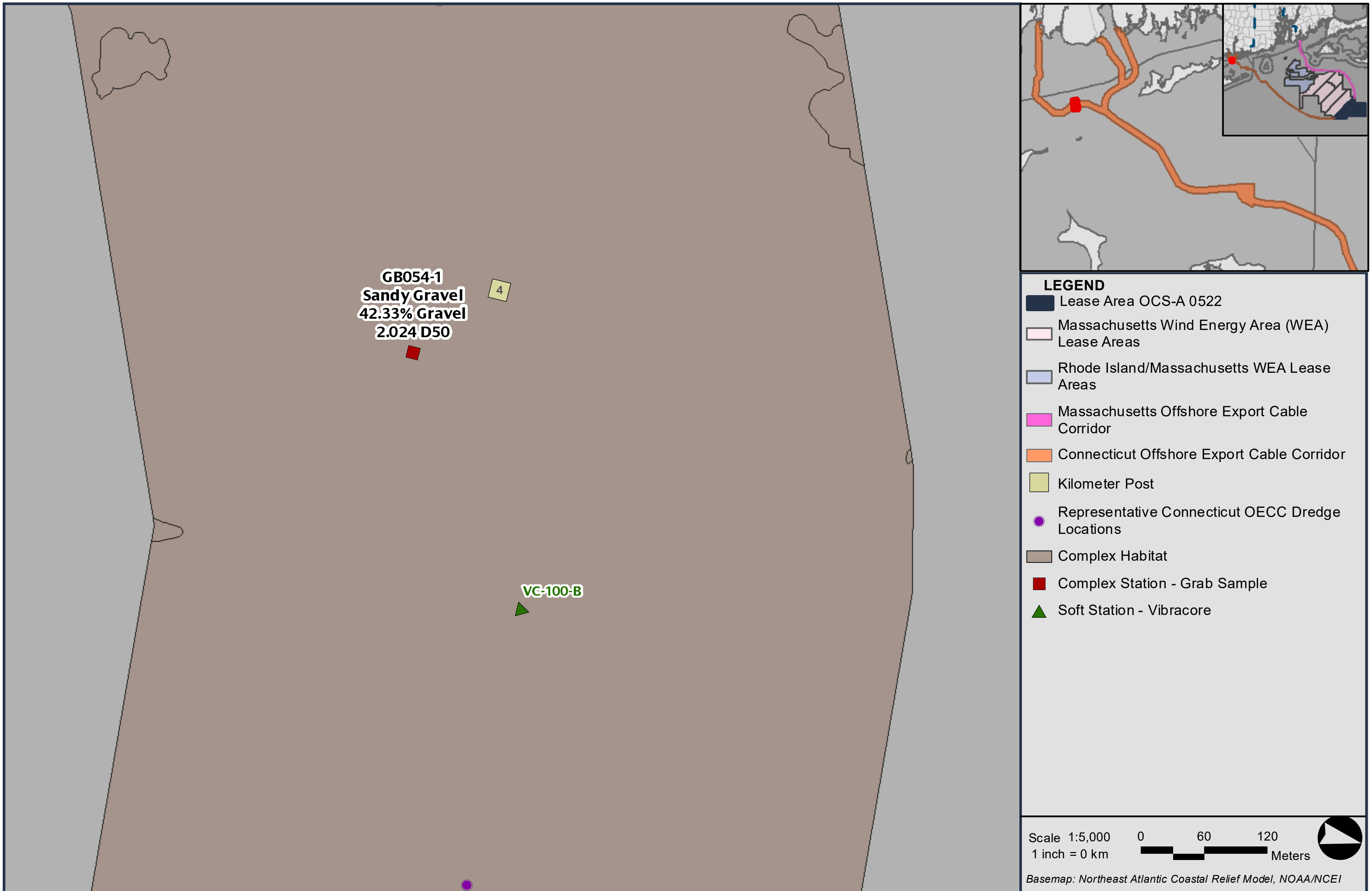
VINEYARD NORTHEAST
VINEYARD OFFSHORE





Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

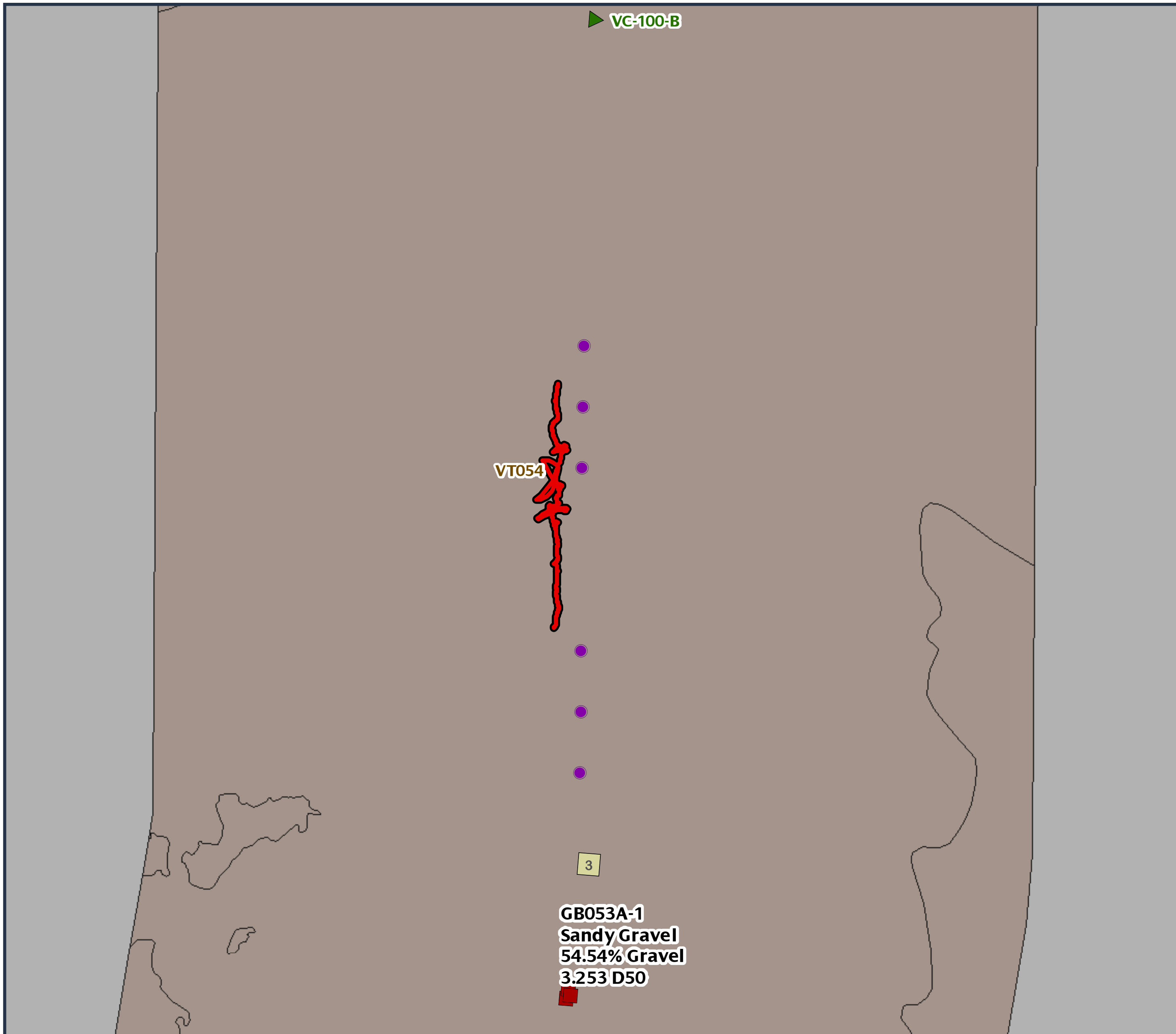
VINEYARD NORTHEAST
VINEYARD OFFSHORE

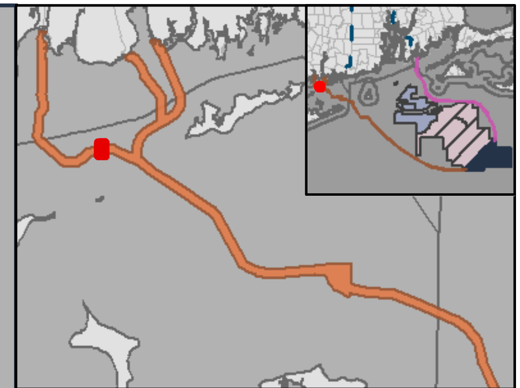


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Complex Habitat
- Complex Station - Grab Sample
- Soft Station - Vibracore
- Complex Station - Video Transect

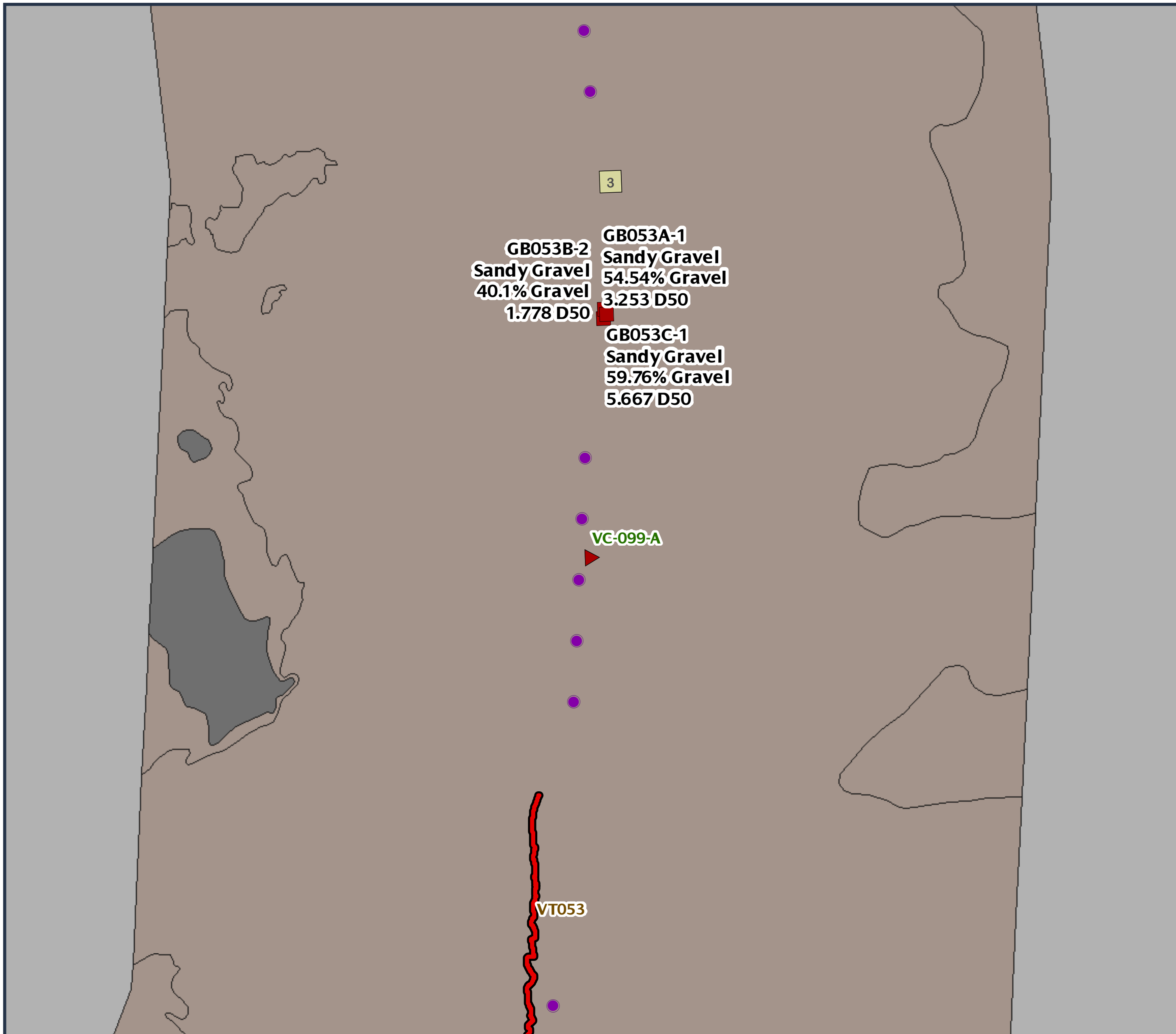
Scale 1:5,000
1 inch = 0 km

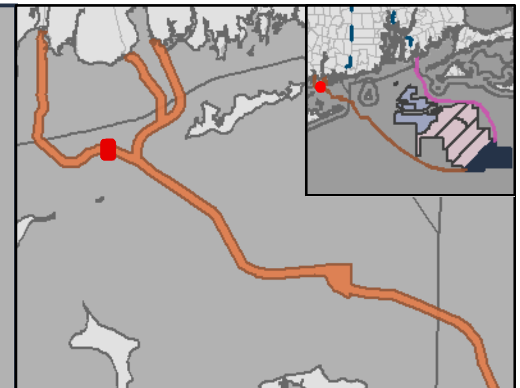
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





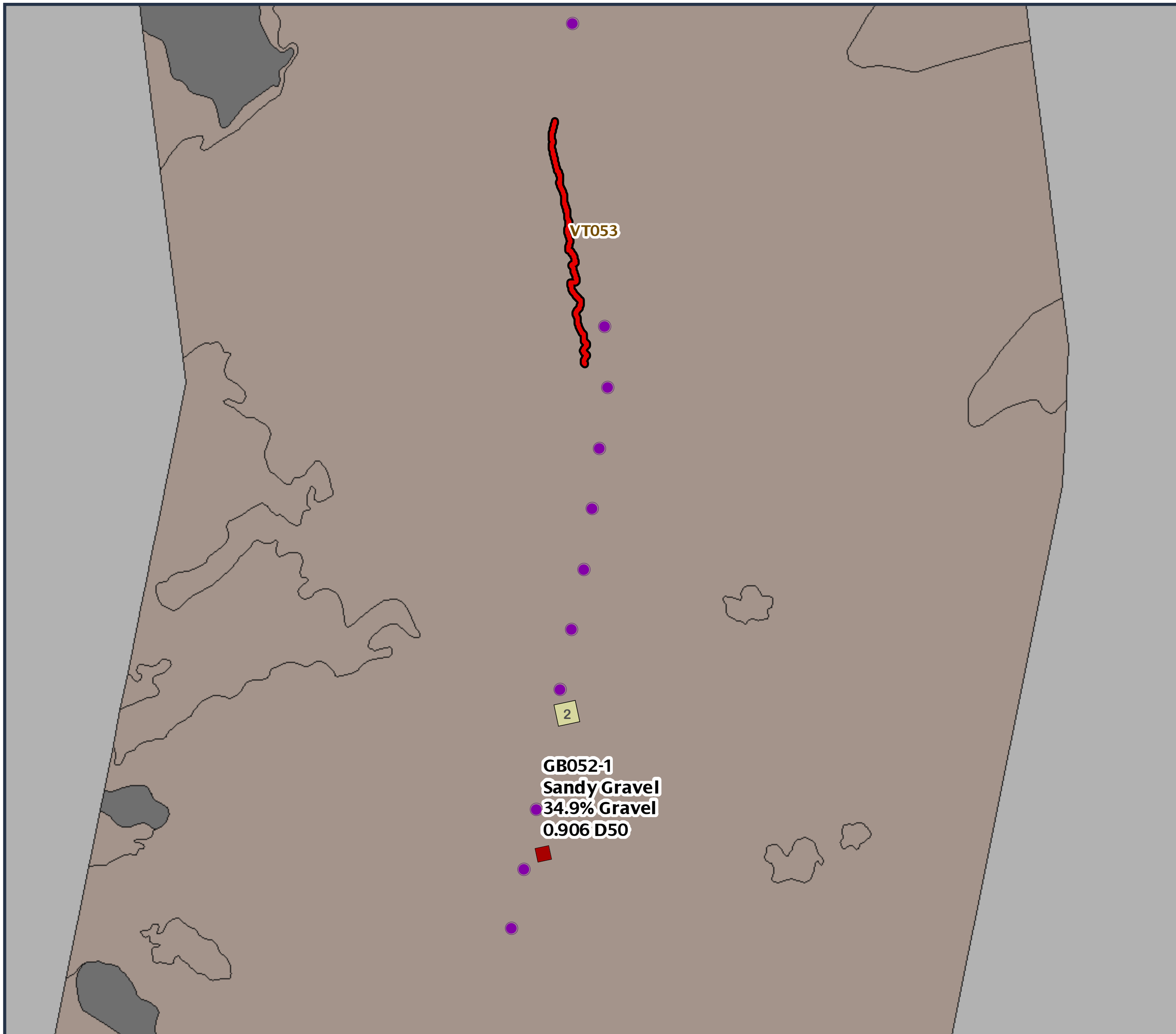
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Complex Habitat
- Large Grained Complex Habitat
- Complex Station - Grab Sample
- Complex Station - Vibracore
- Complex Station - Video Transect

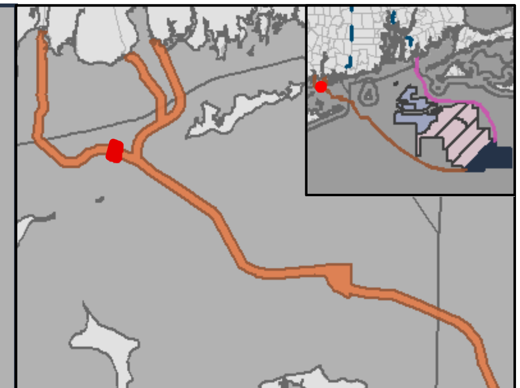
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Complex Habitat
- Large Grained Complex Habitat
- Complex Station - Grab Sample
- Complex Station - Video Transect

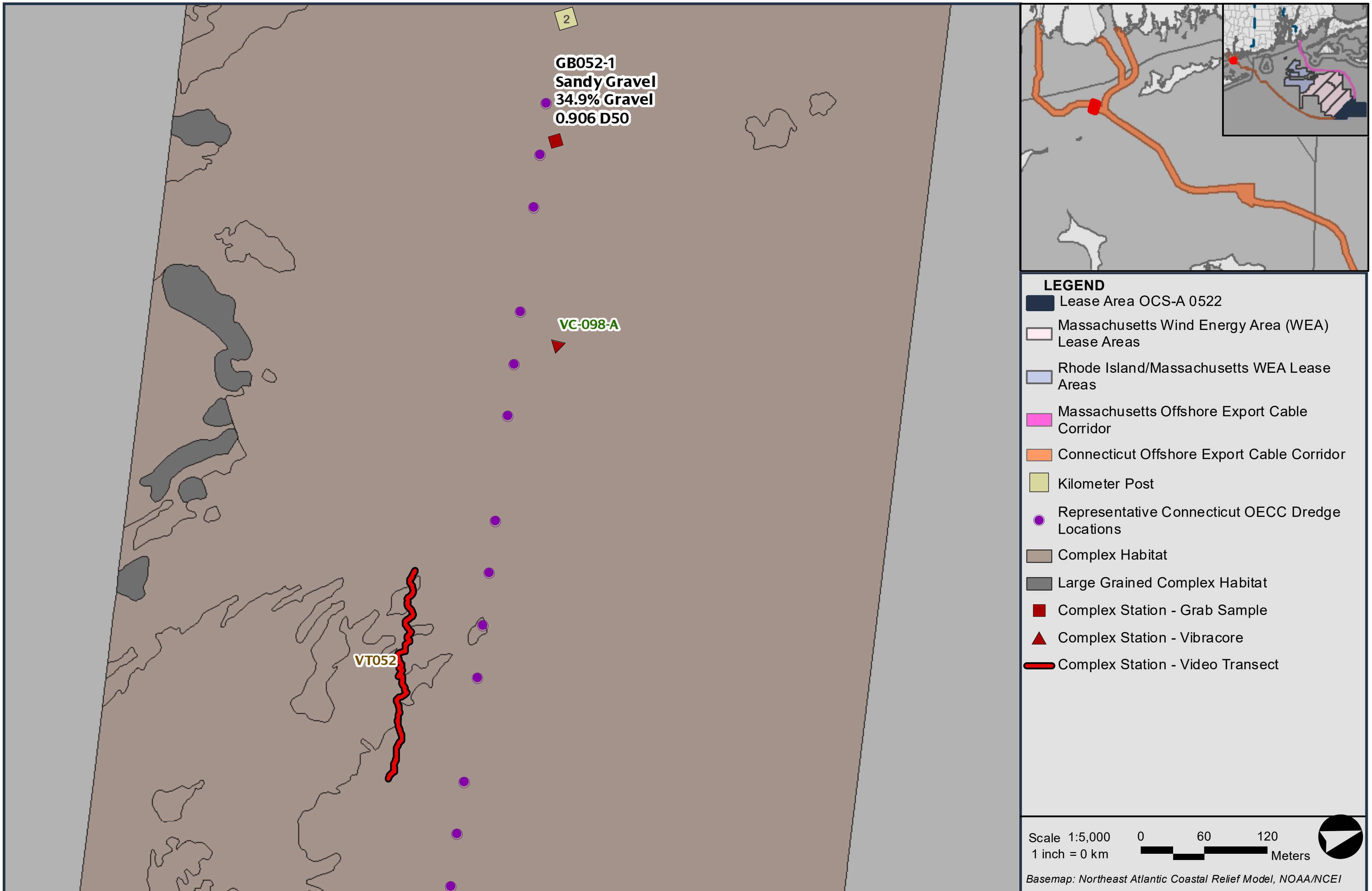
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

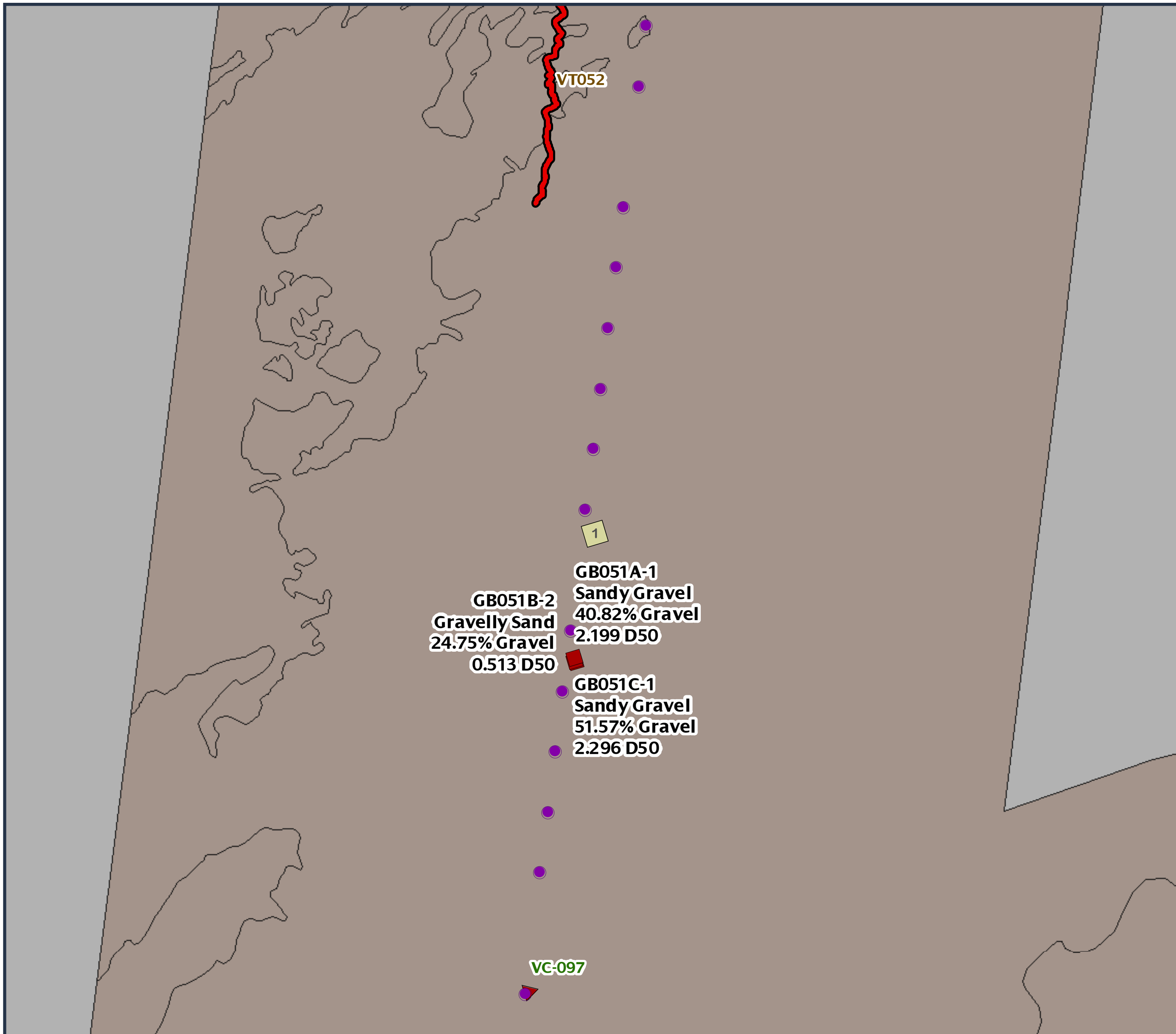
VINEYARD NORTHEAST
VINEYARD OFFSHORE

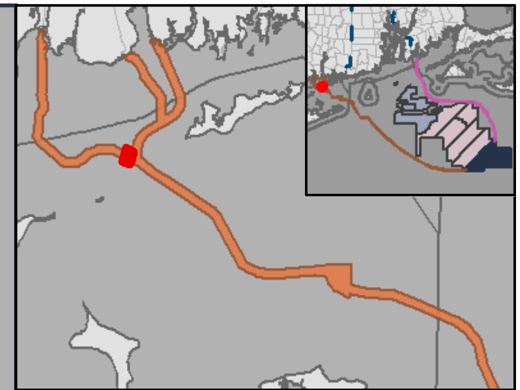


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

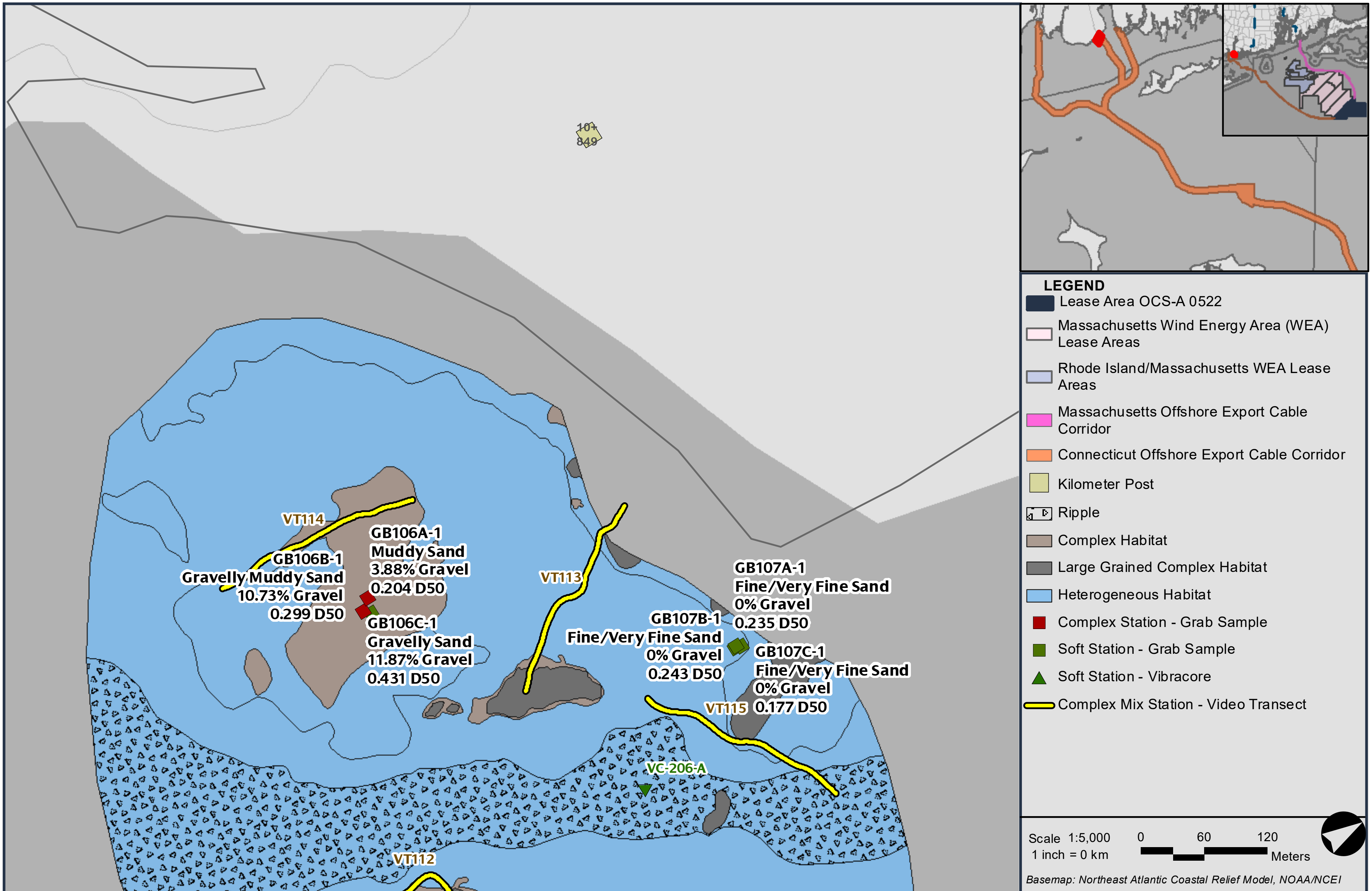
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Complex Habitat
- Complex Station - Grab Sample
- Complex Station - Vibracore
- Complex Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

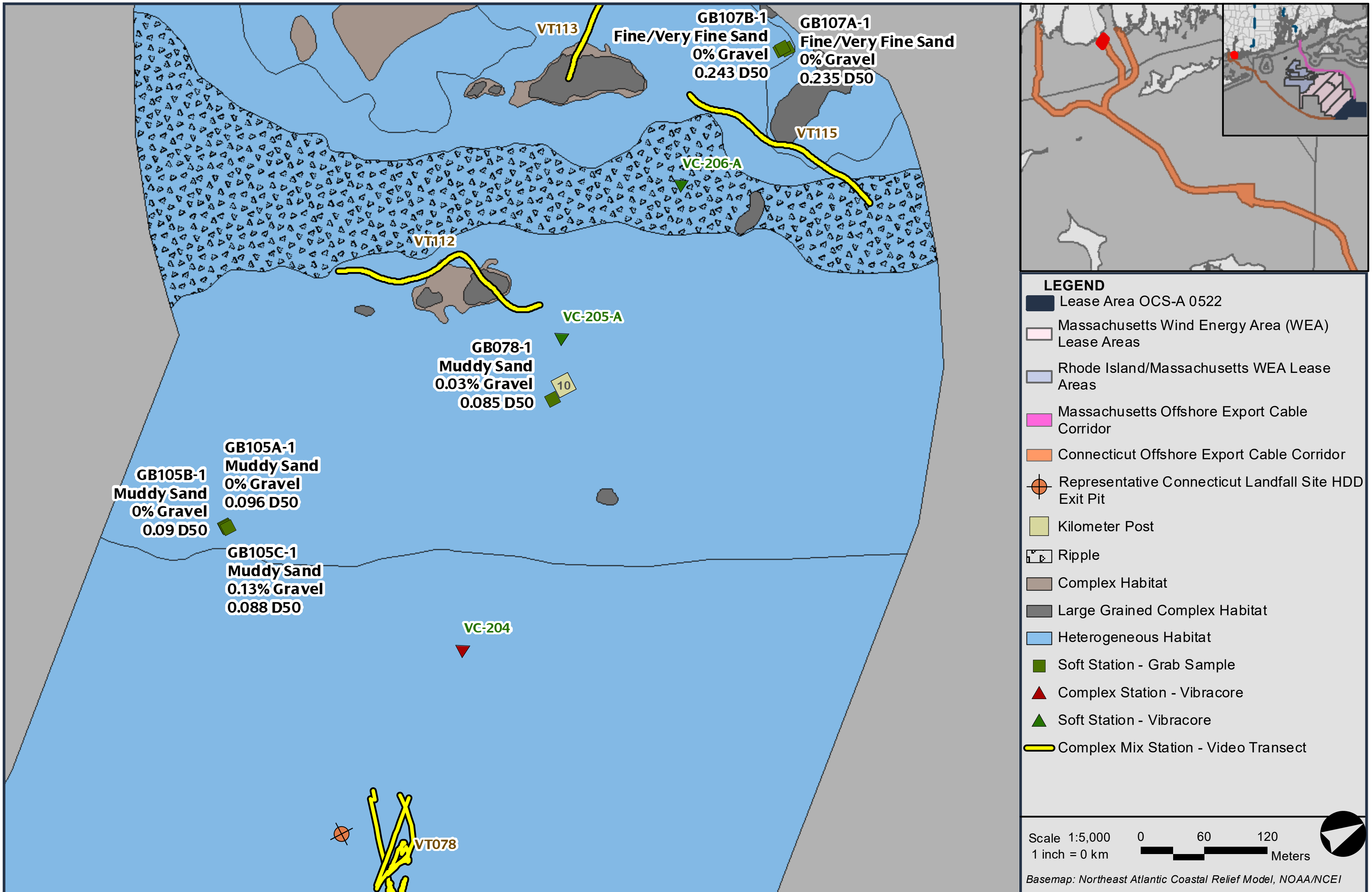
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

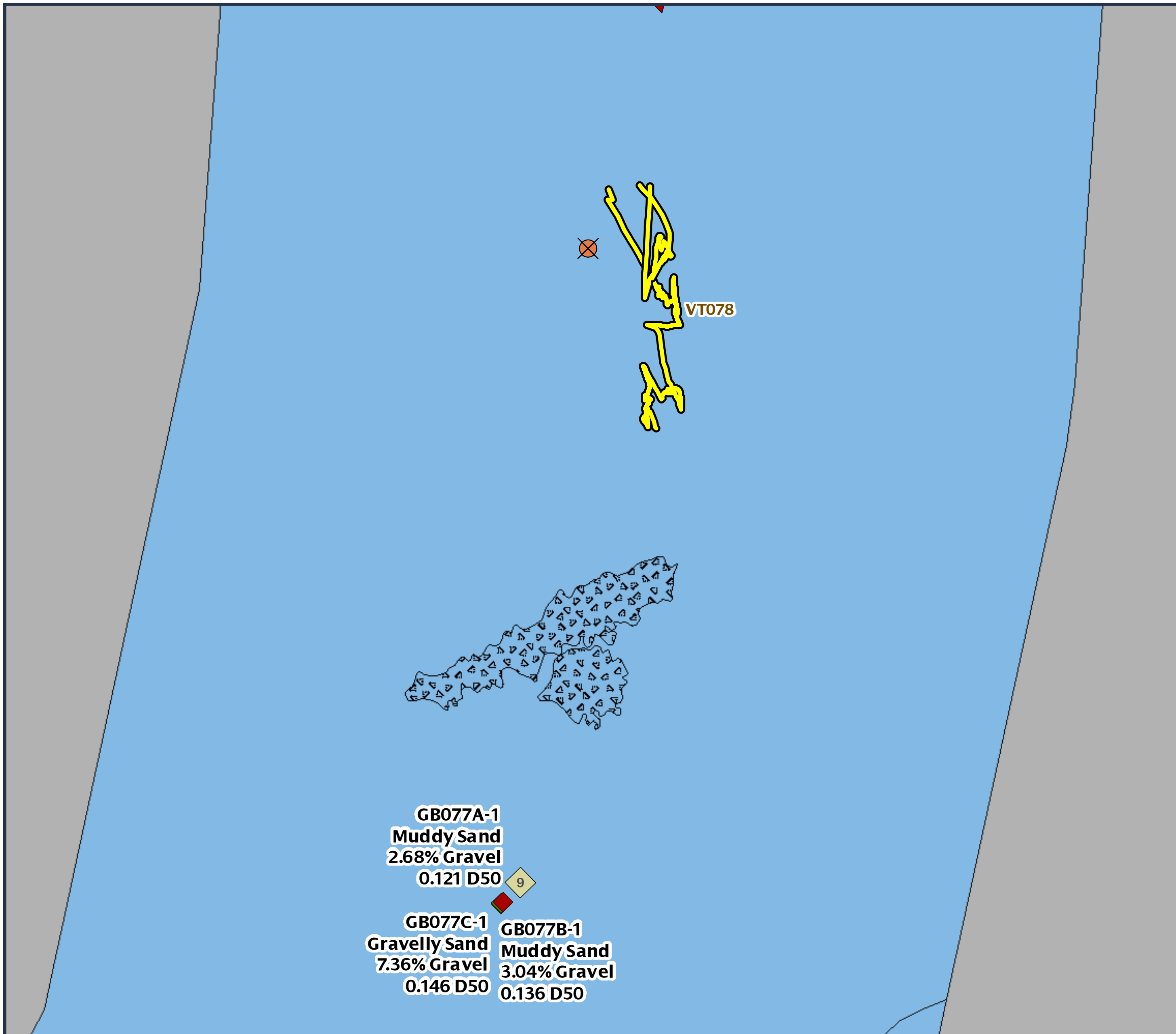
VINEYARD NORTHEAST
VINEYARD OFFSHORE

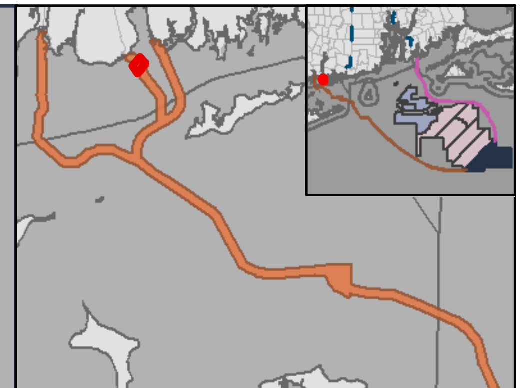


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

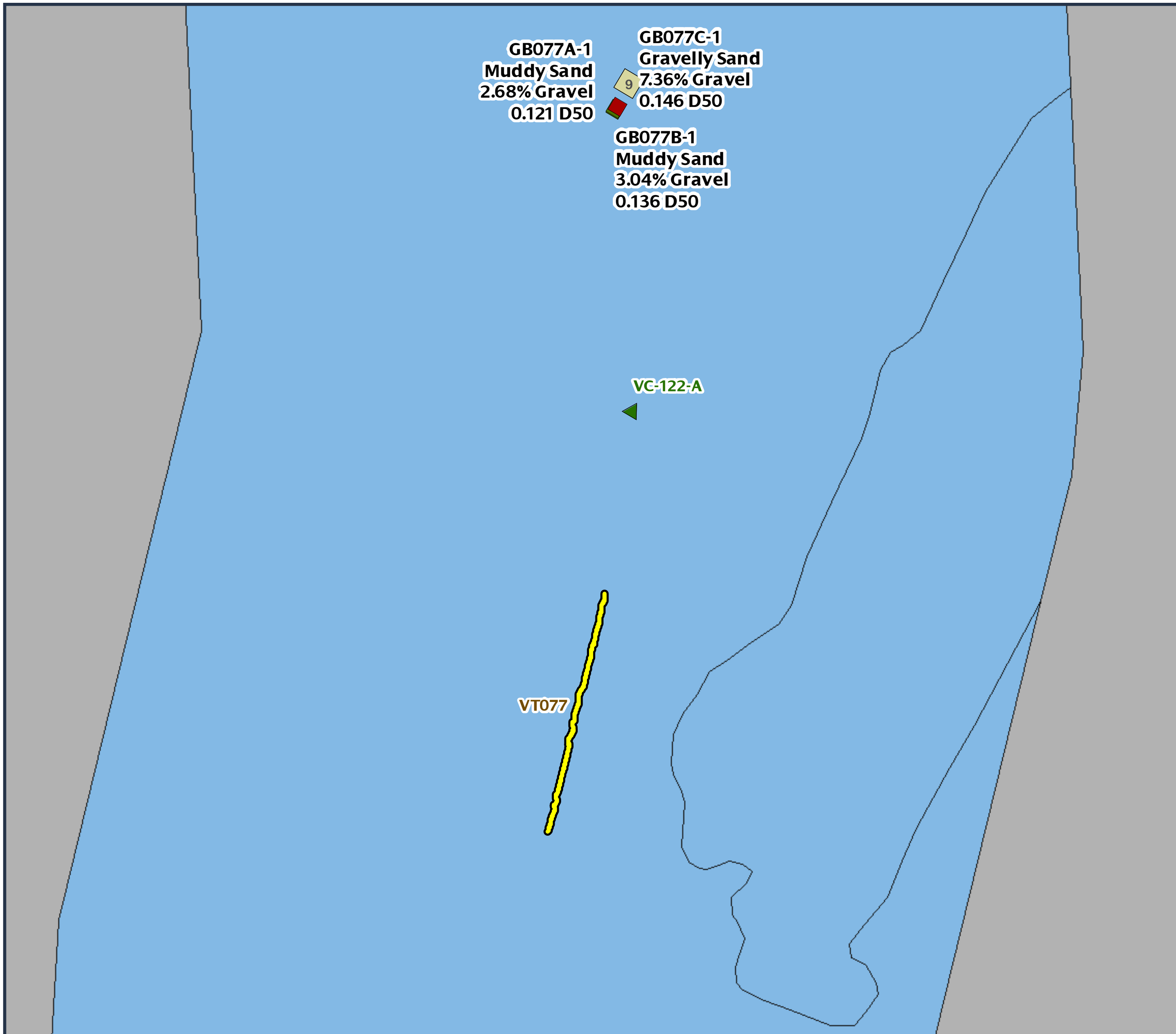
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Representative Connecticut Landfall Site HDD Exit Pit
- Kilometer Post
- Ripple
- Heterogeneous Habitat
- Complex Station - Grab Sample
- Soft Station - Grab Sample
- Complex Station - Vibracore
- Complex Mix Station - Video Transect

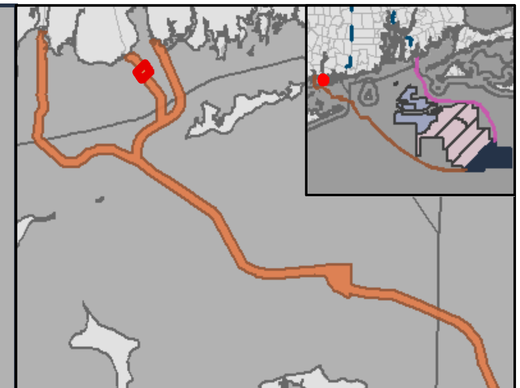
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

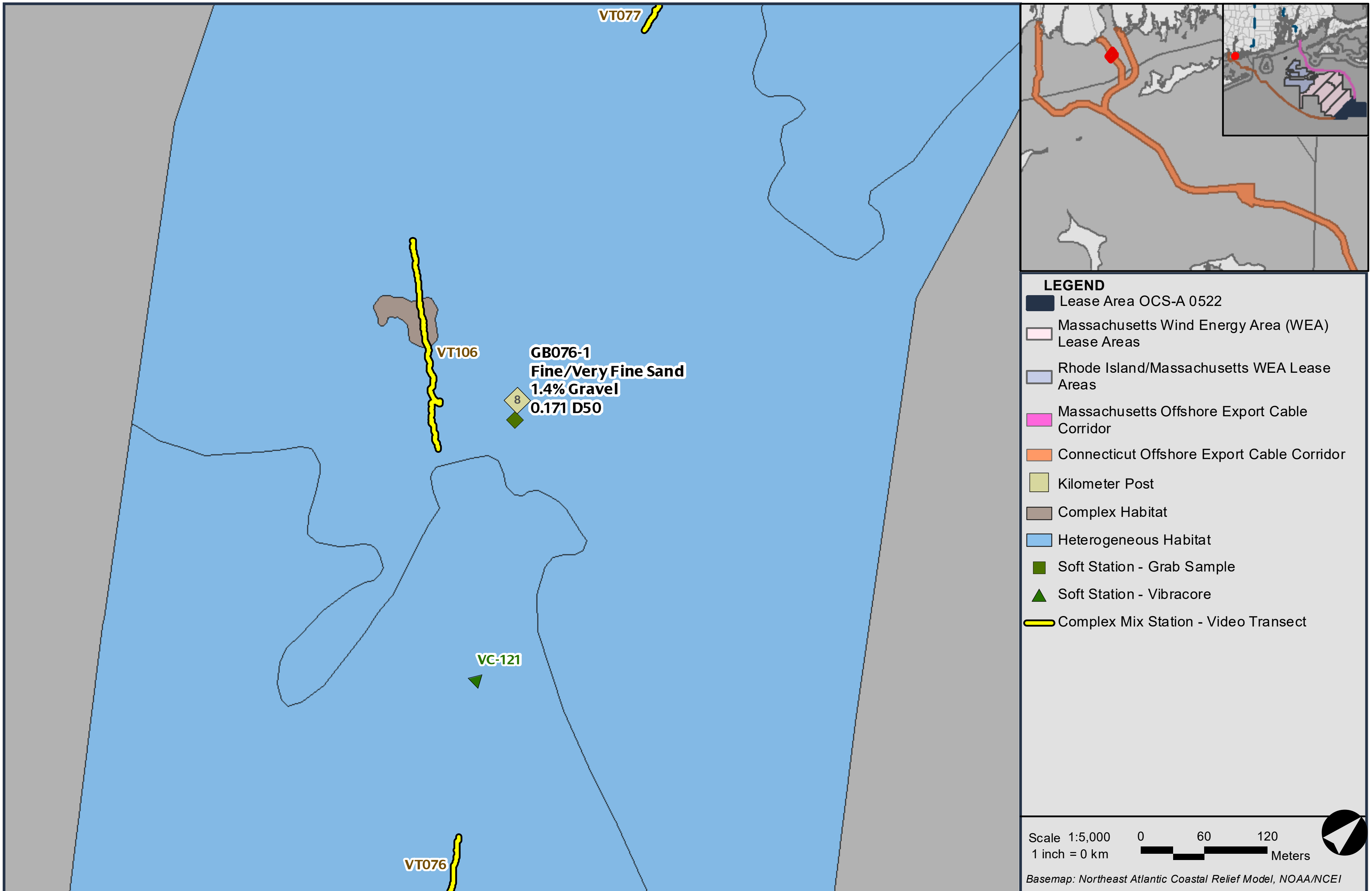
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Complex Station - Grab Sample
- Soft Station - Grab Sample
- Soft Station - Vibracore
- Complex Mix Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

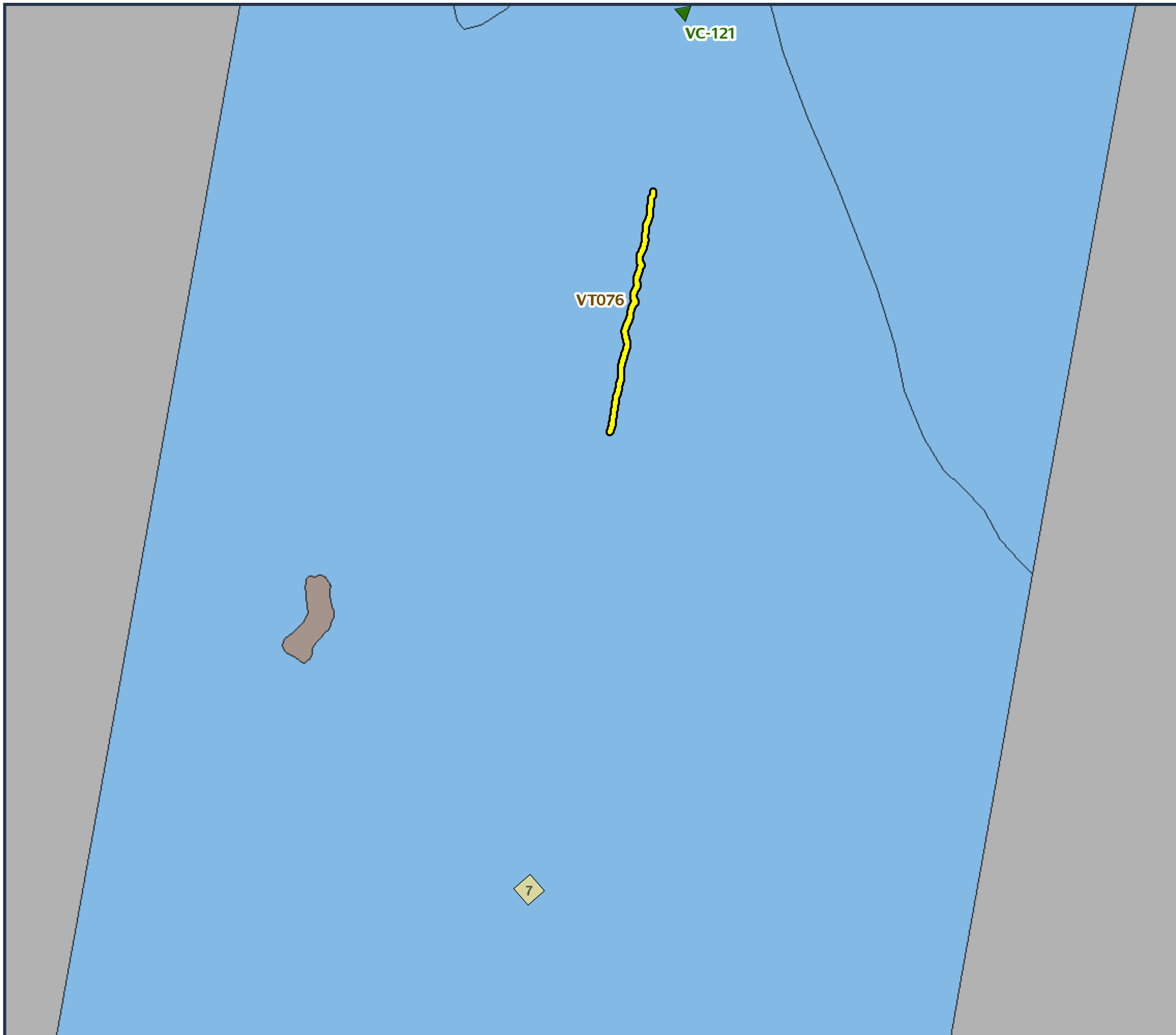
VINEYARD NORTHEAST
VINEYARD OFFSHORE

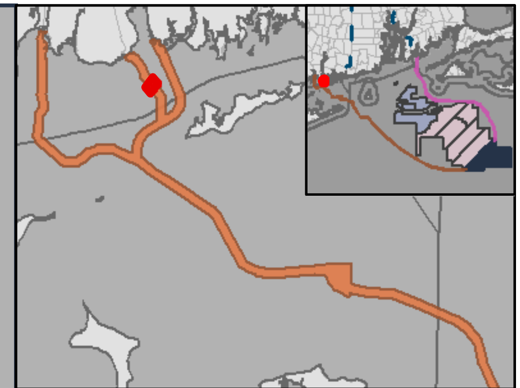


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





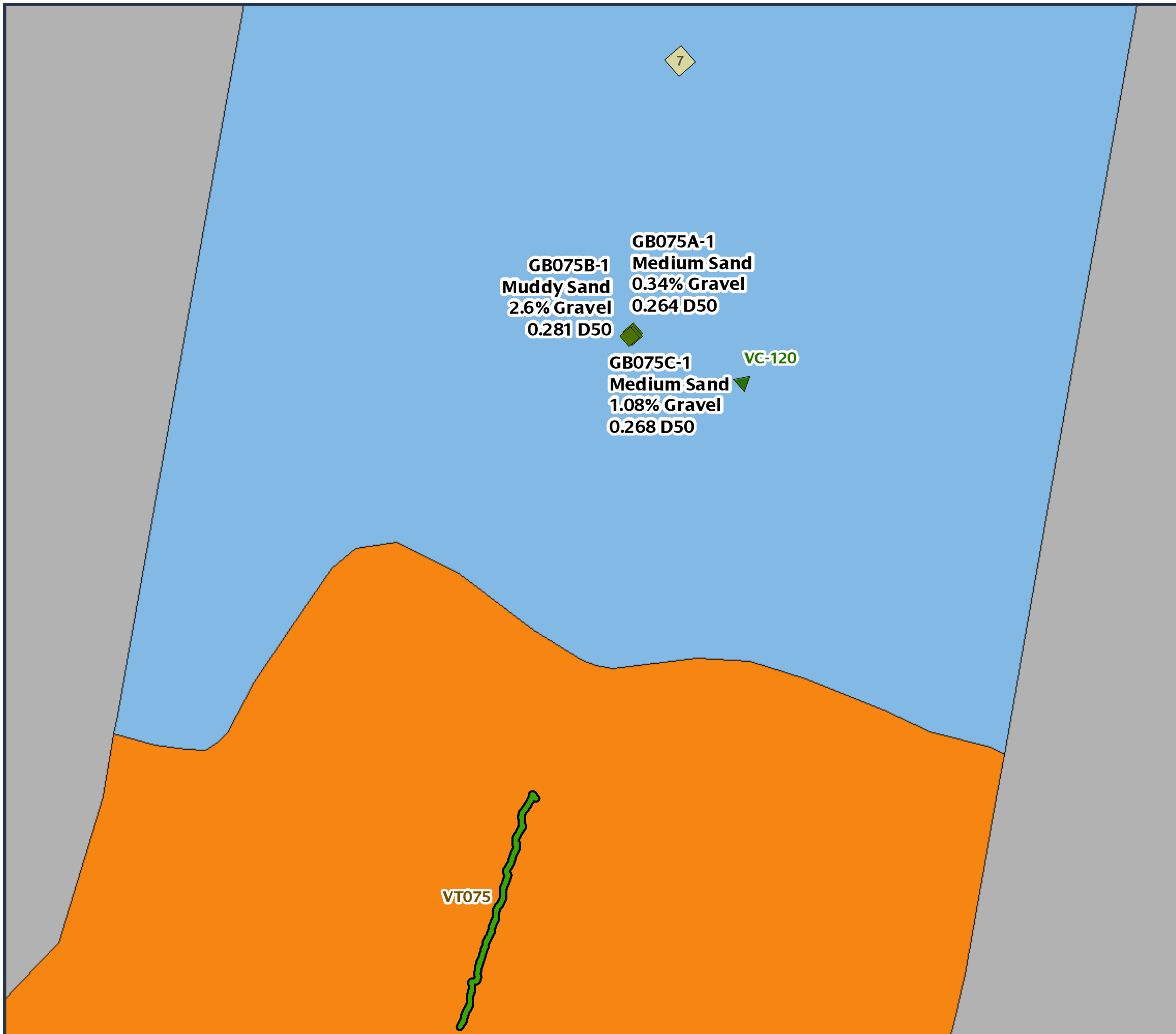
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Complex Habitat
Heterogeneous Habitat
Soft Station - Vibracore
Complex Mix Station - Video Transect

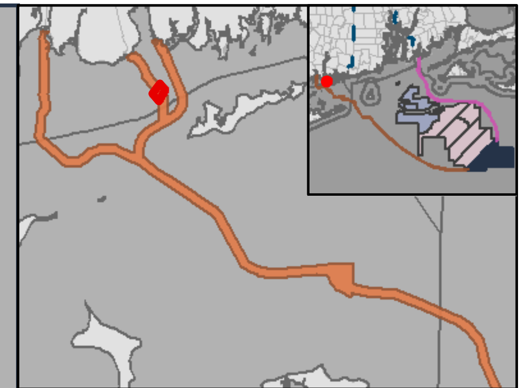
Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

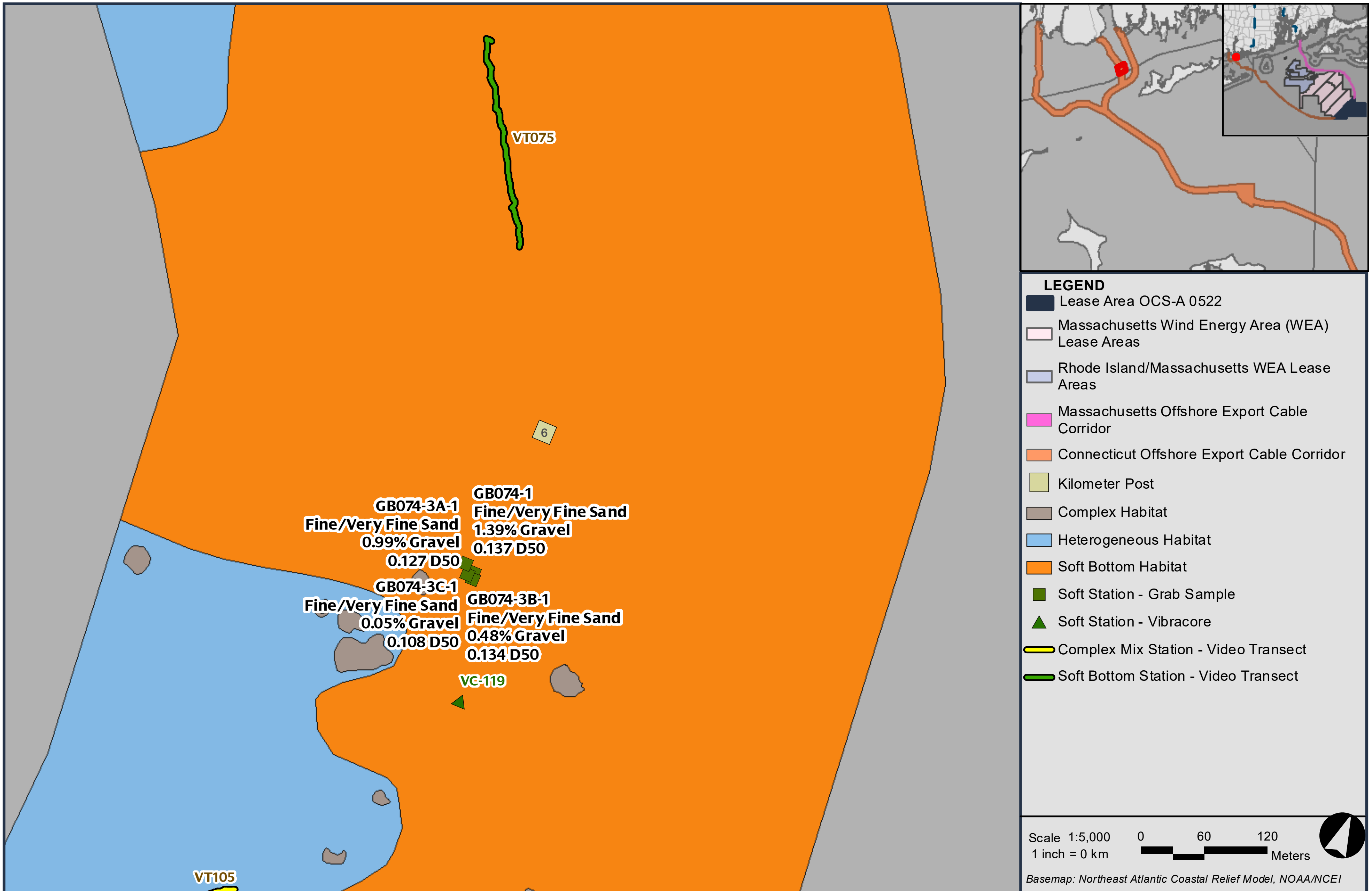
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

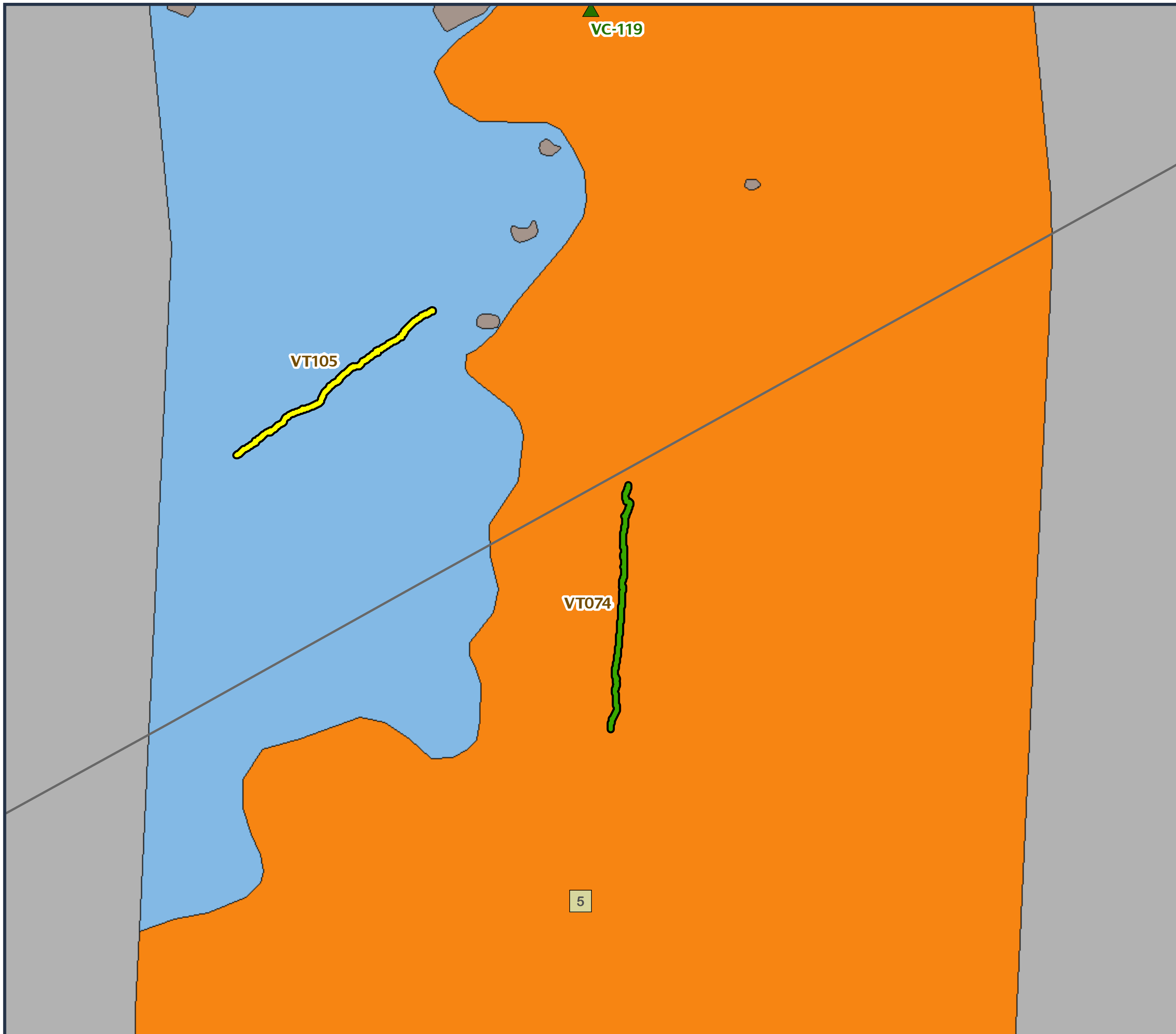
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

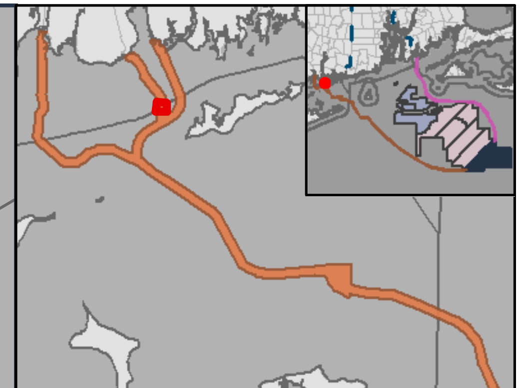
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





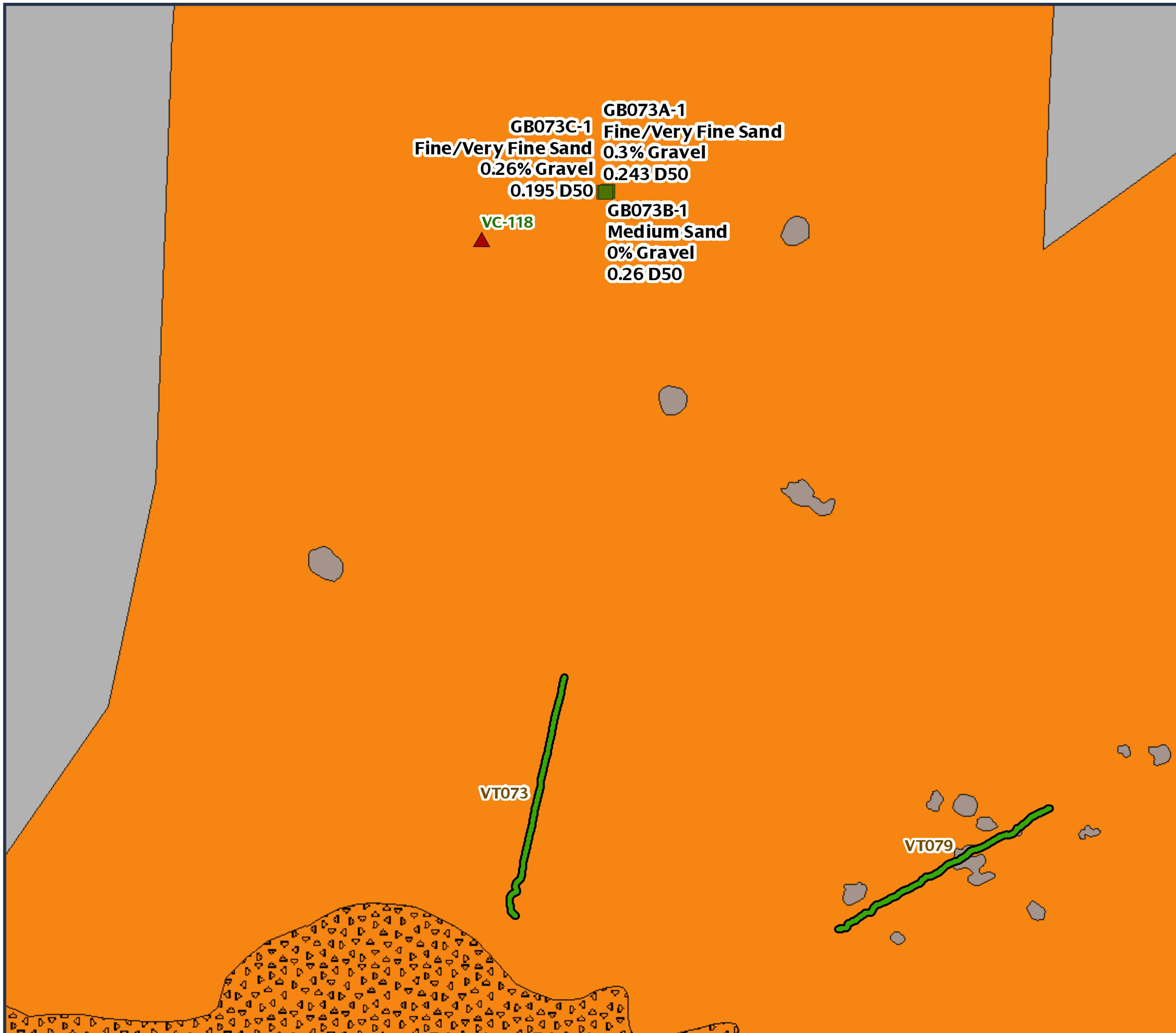
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Complex Habitat
Heterogeneous Habitat
Soft Bottom Habitat
Soft Station - Vibracore
Complex Mix Station - Video Transect
Soft Bottom Station - Video Transect

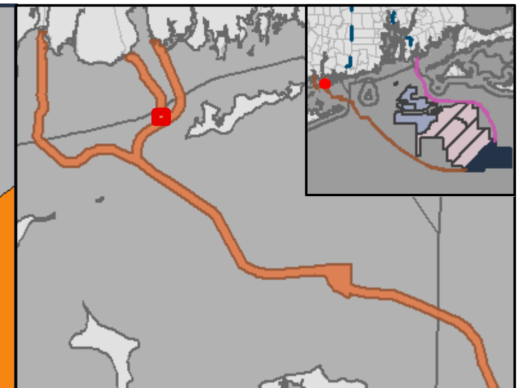
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

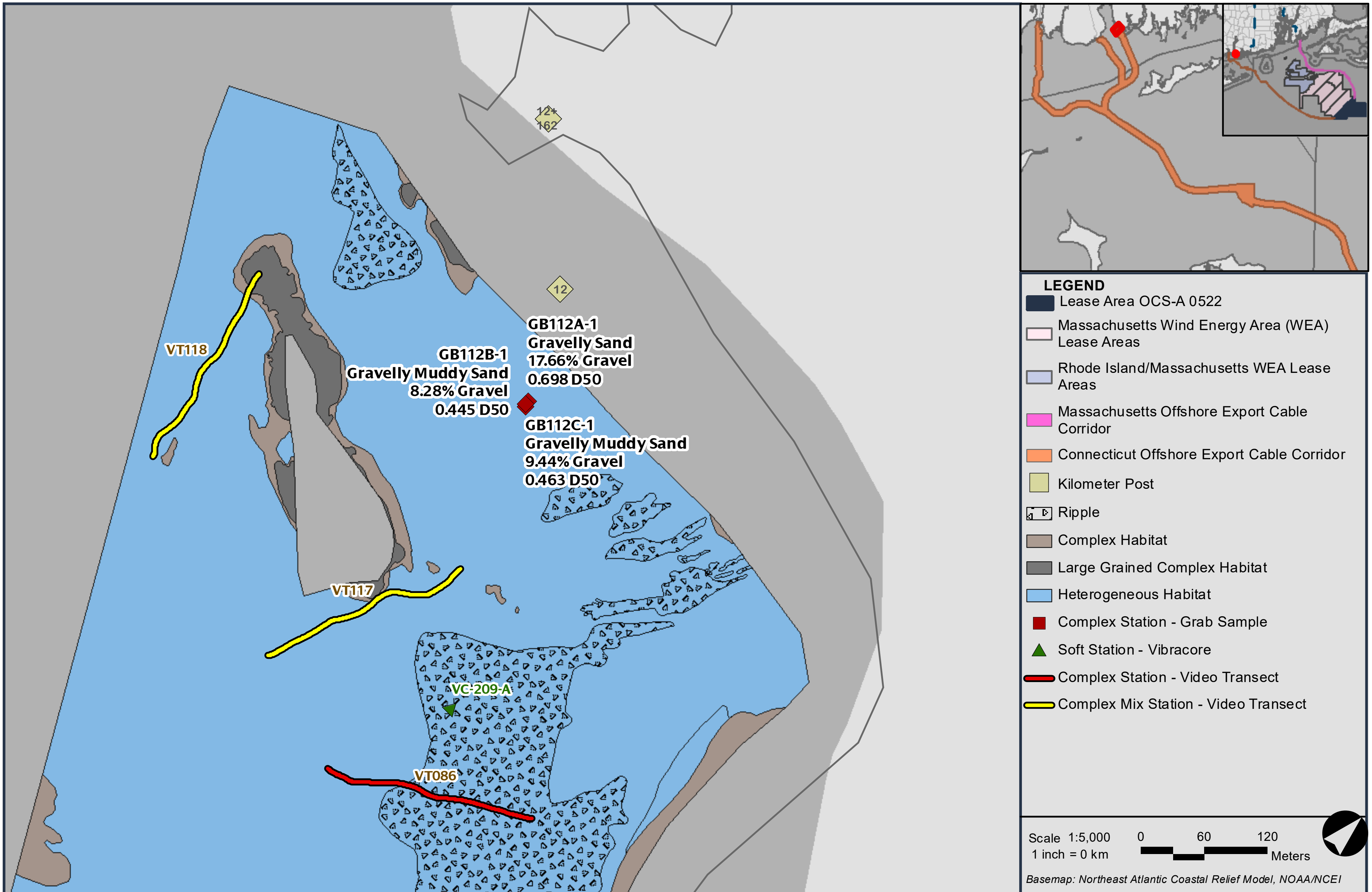
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Ripple
- Complex Habitat
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Complex Station - Vibracore
- Soft Bottom Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

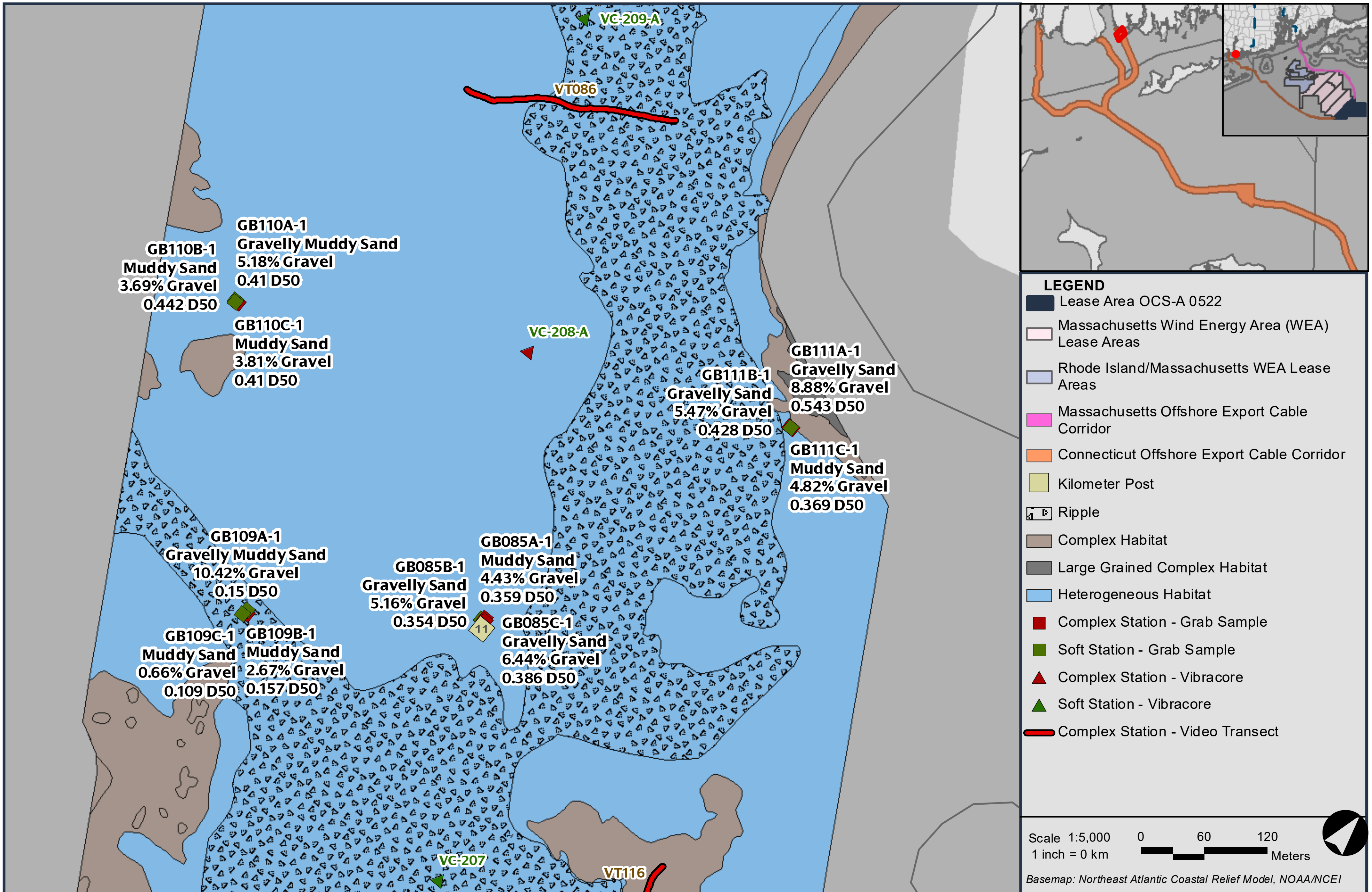
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

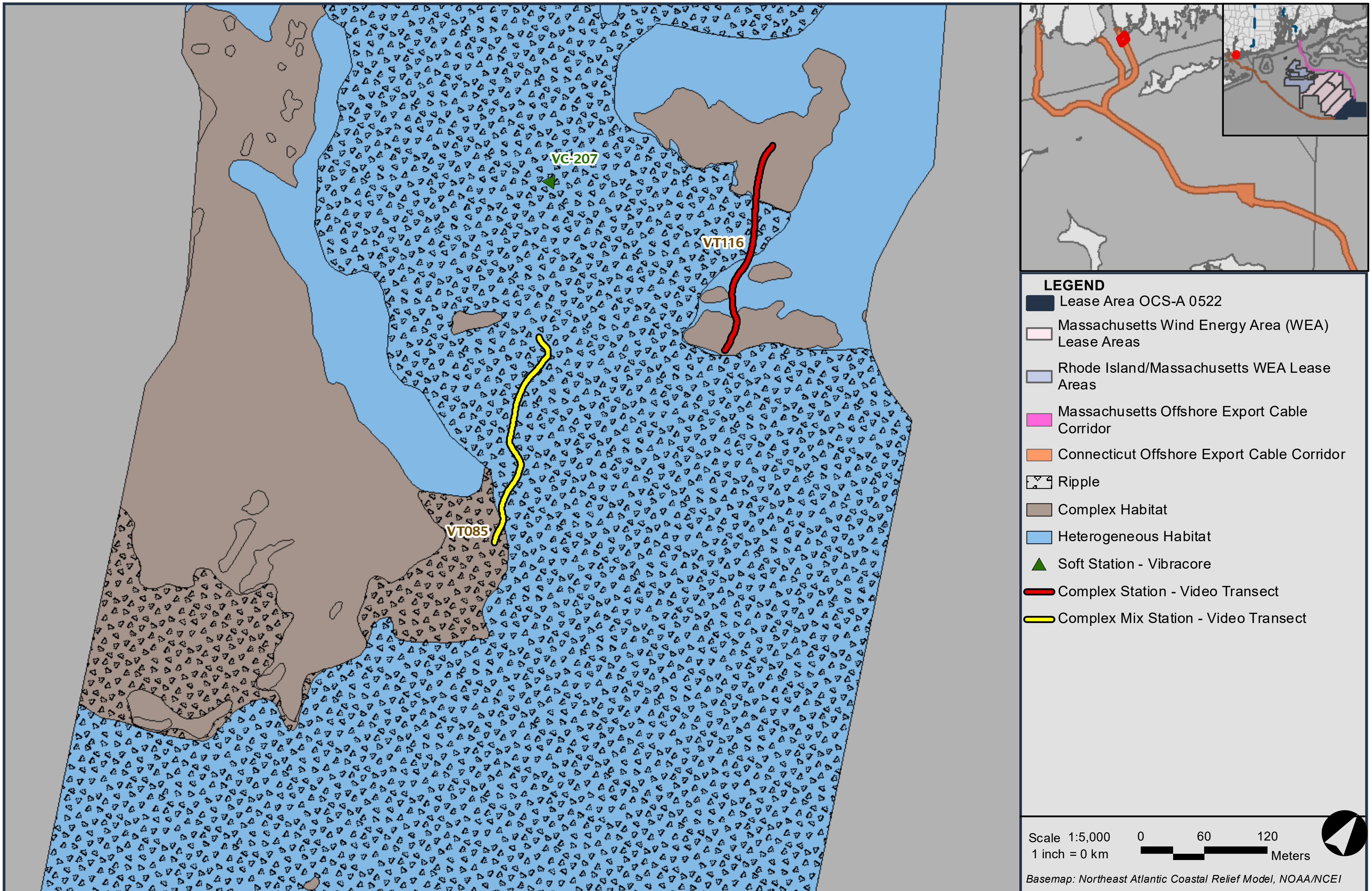
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

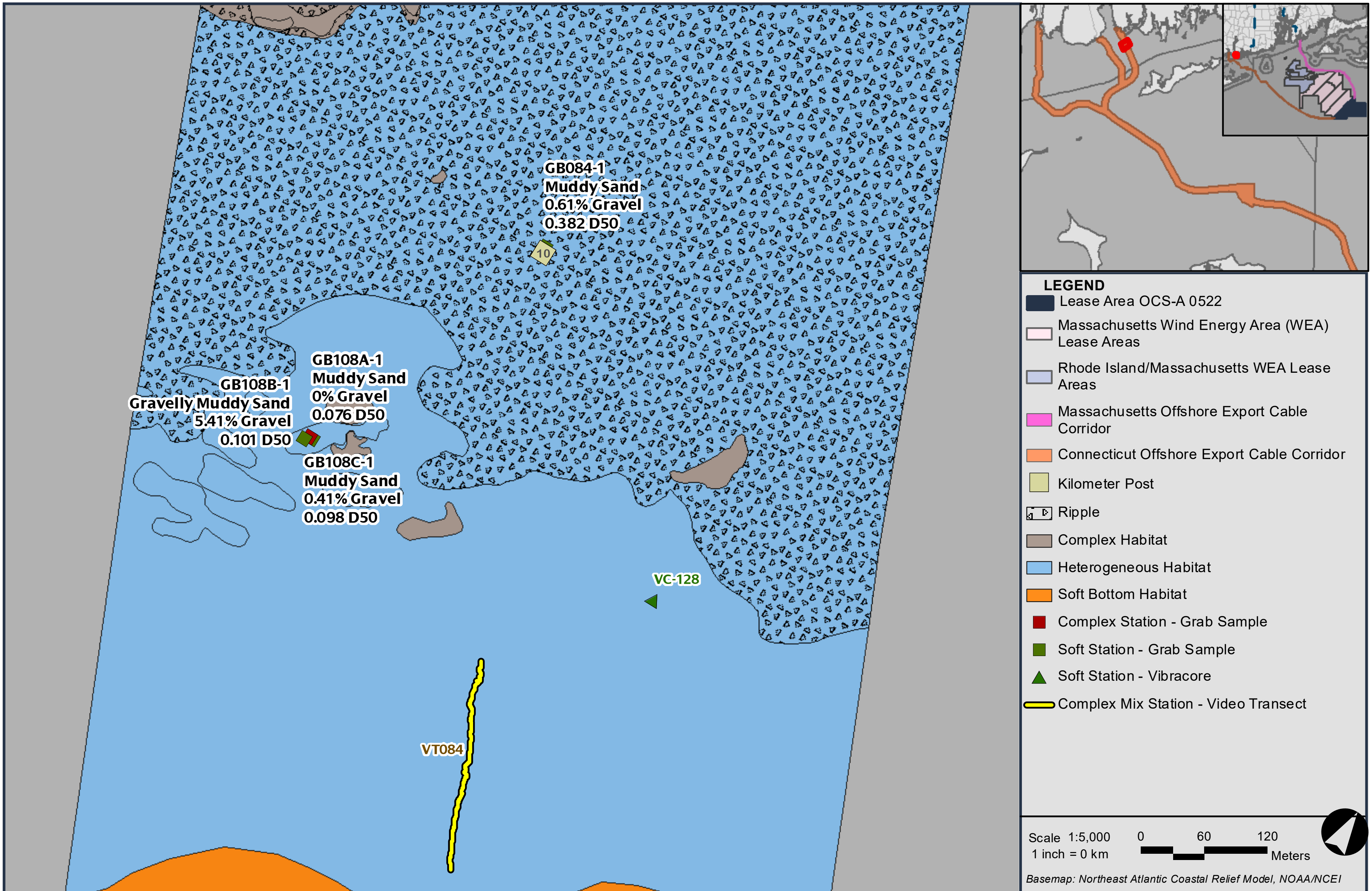
VINEYARD NORTHEAST

VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

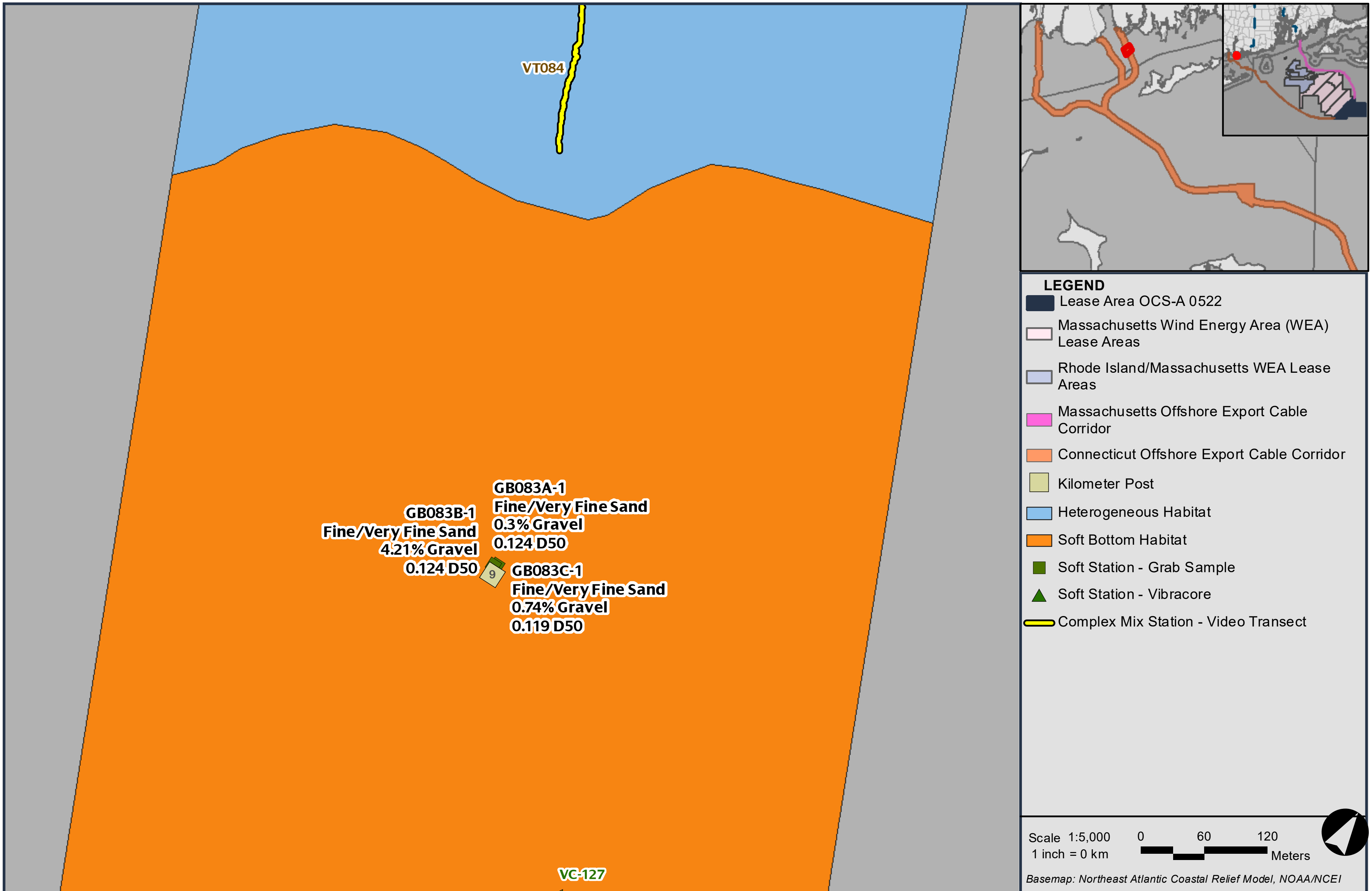
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

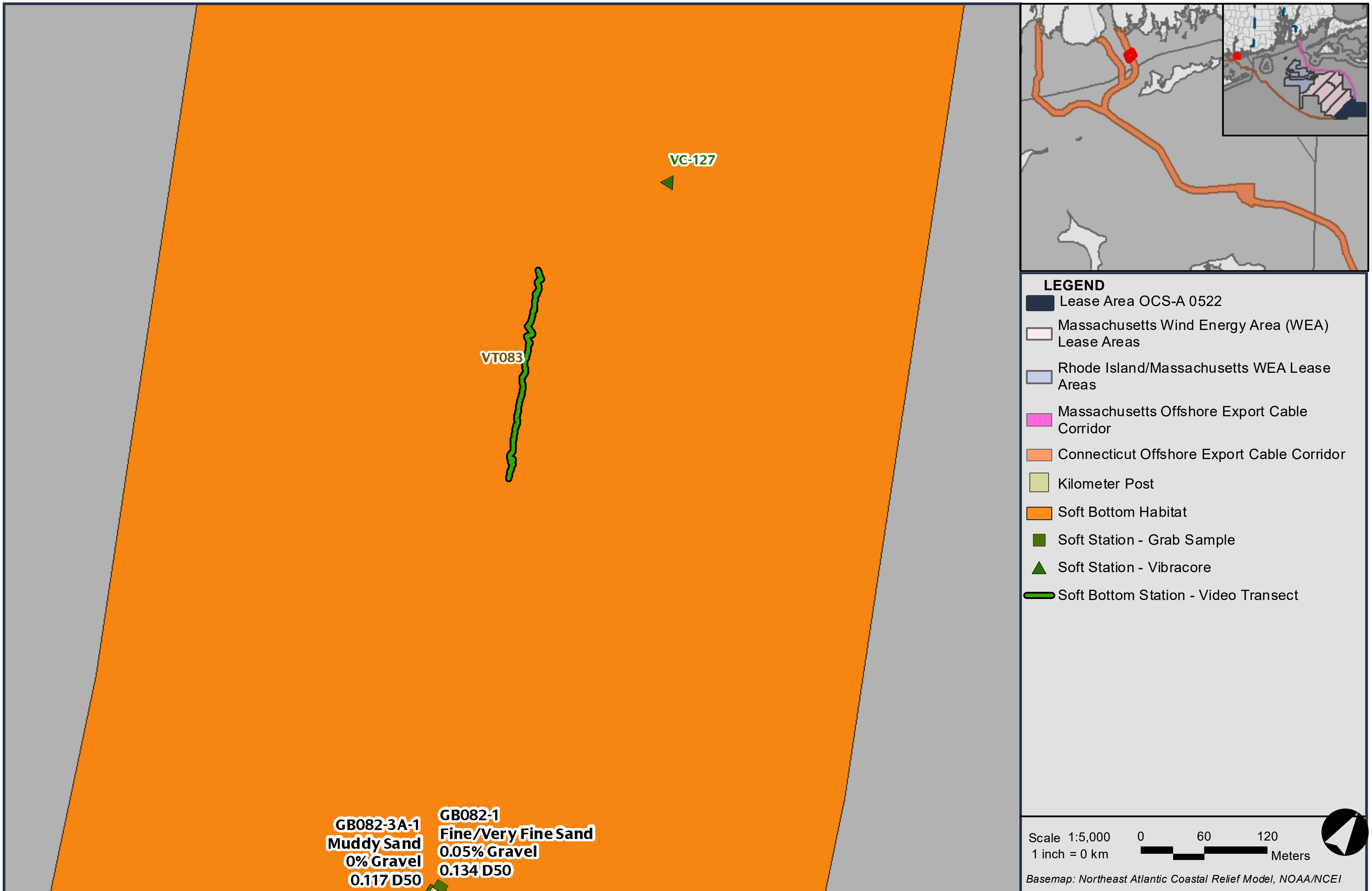
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

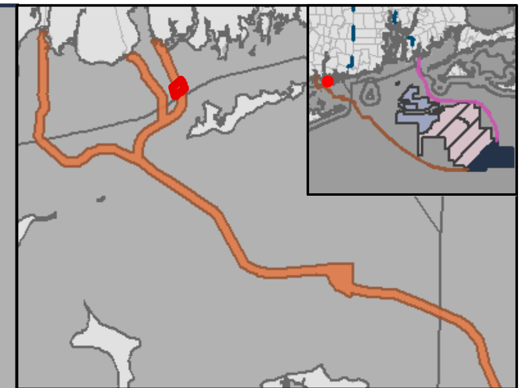
VINEYARD NORTHEAST

VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



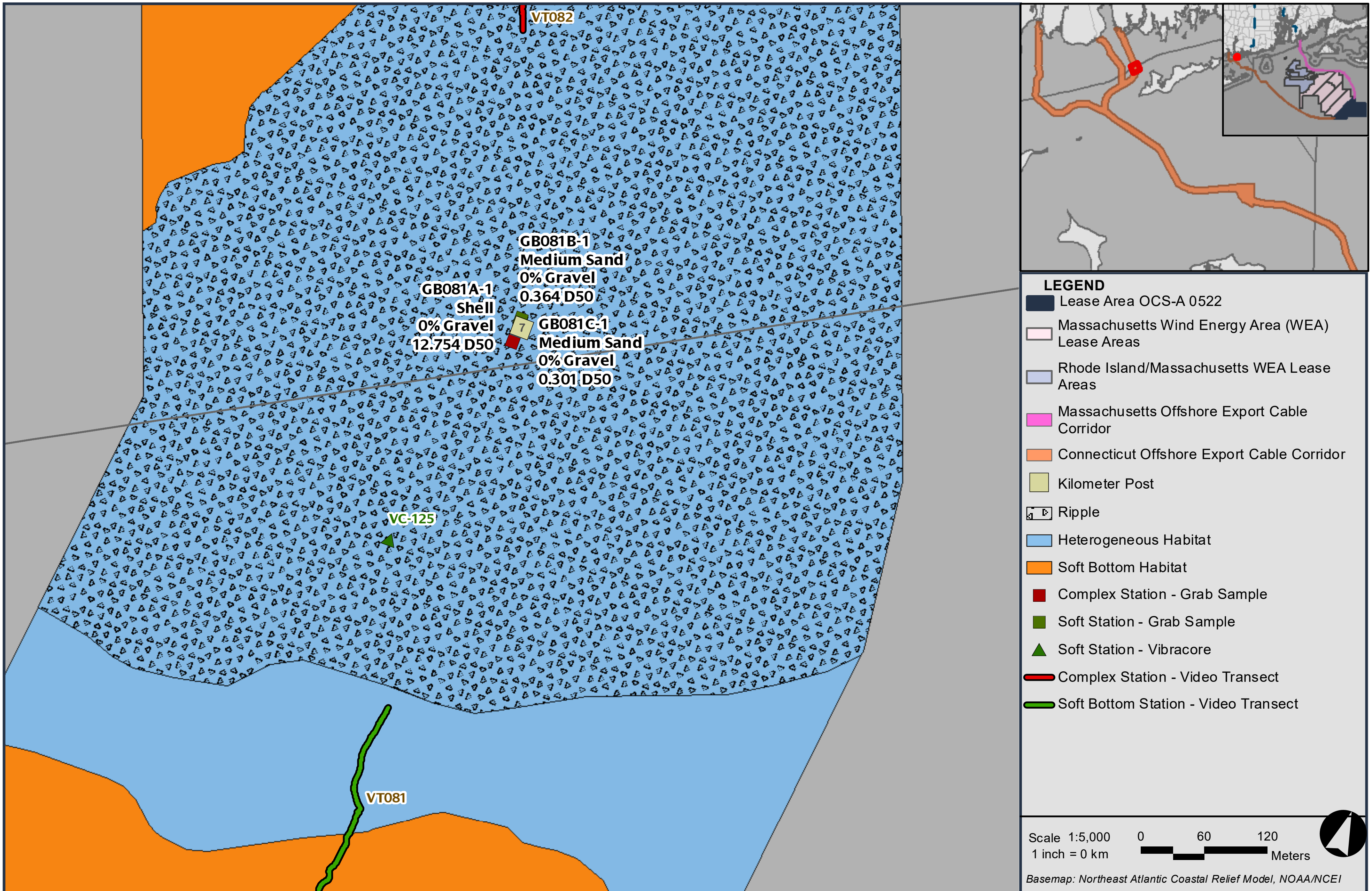
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Ripple
Heterogeneous Habitat
Soft Bottom Habitat
Soft Station - Grab Sample
Soft Station - Vibracore
Complex Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Heterogeneous Habitat
- Soft Bottom Habitat
- Complex Station - Grab Sample
- Soft Station - Grab Sample
- Soft Station - Vibracore
- Complex Station - Video Transect
- Soft Bottom Station - Video Transect

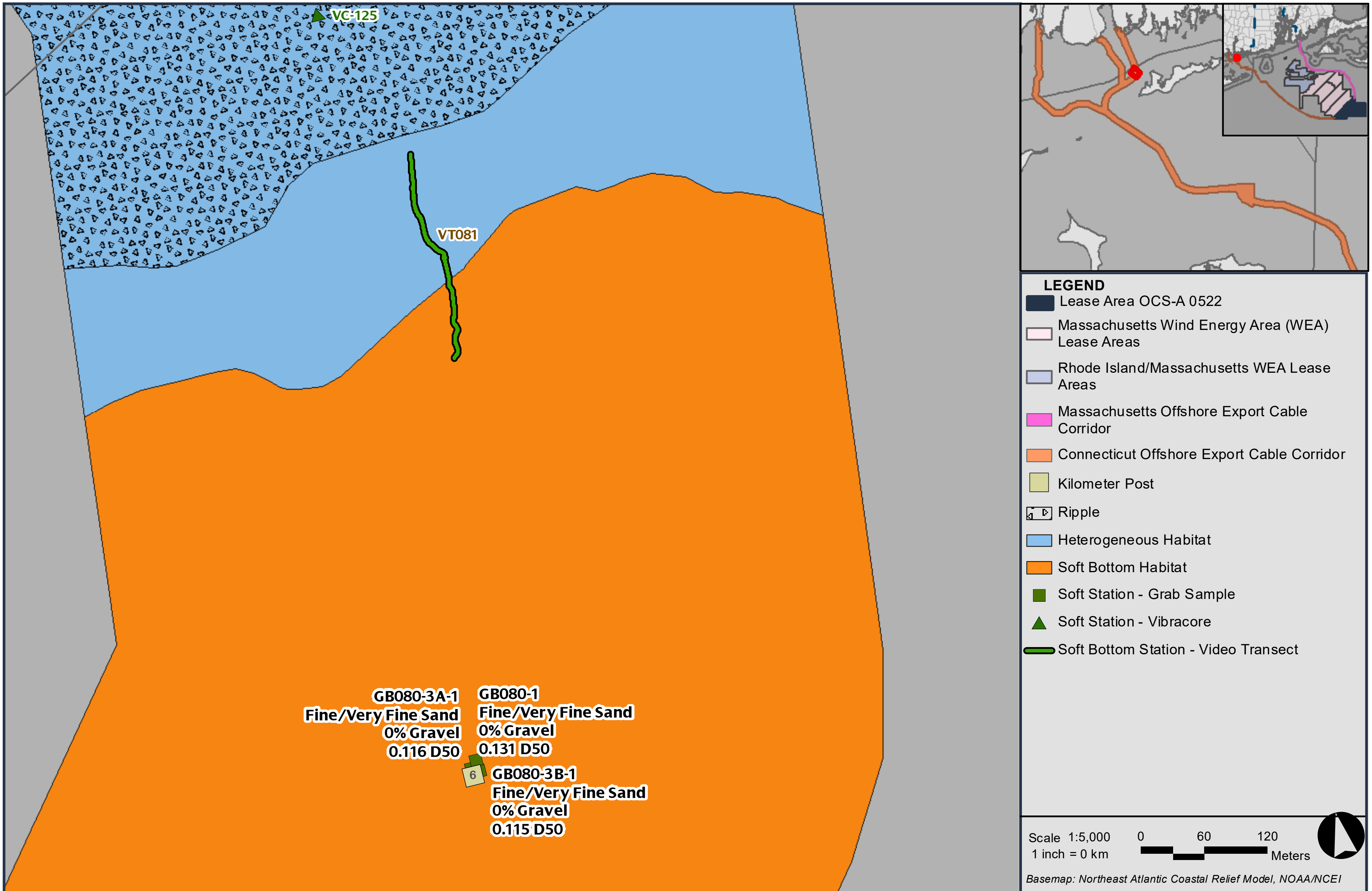
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

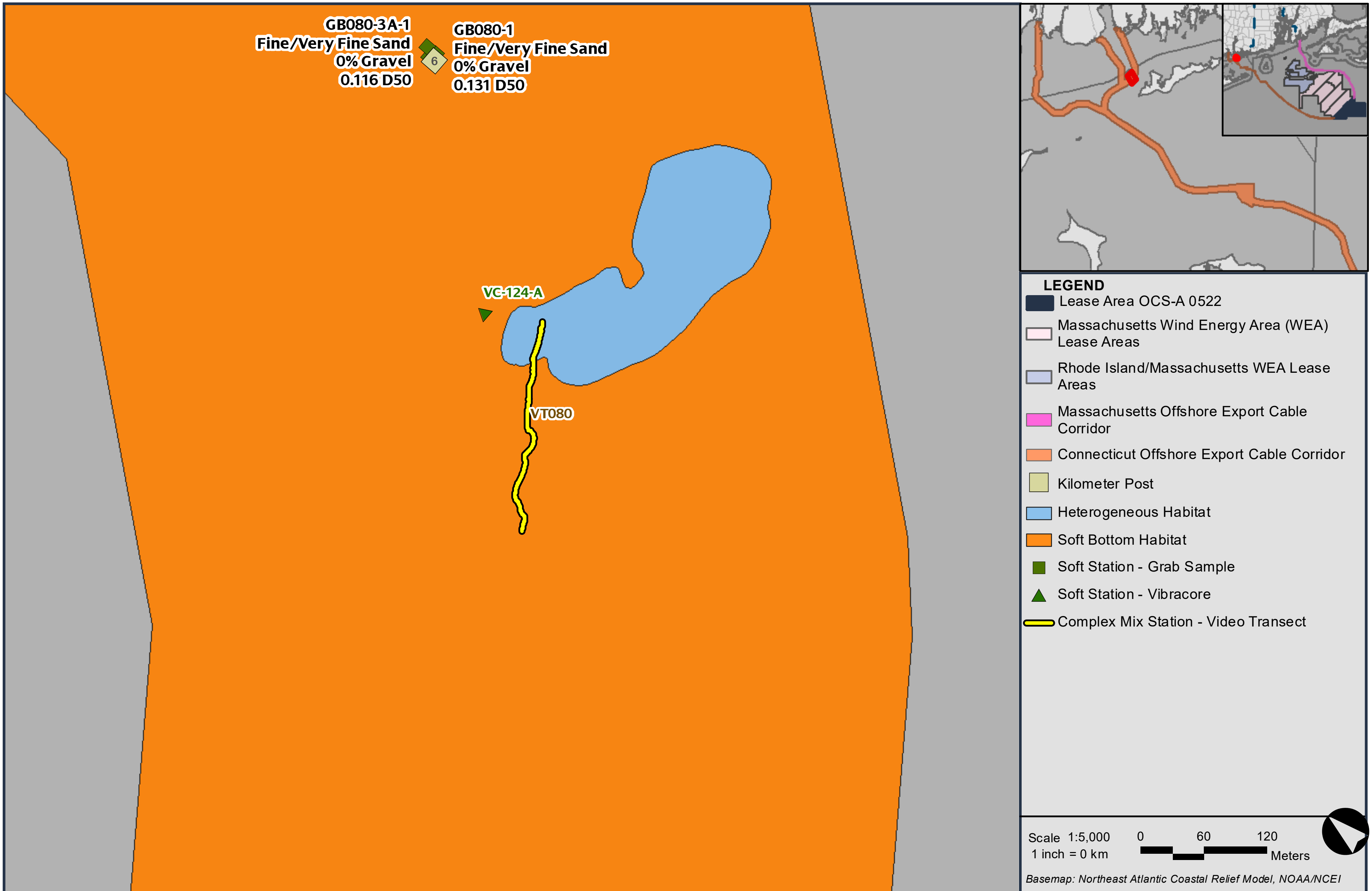
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



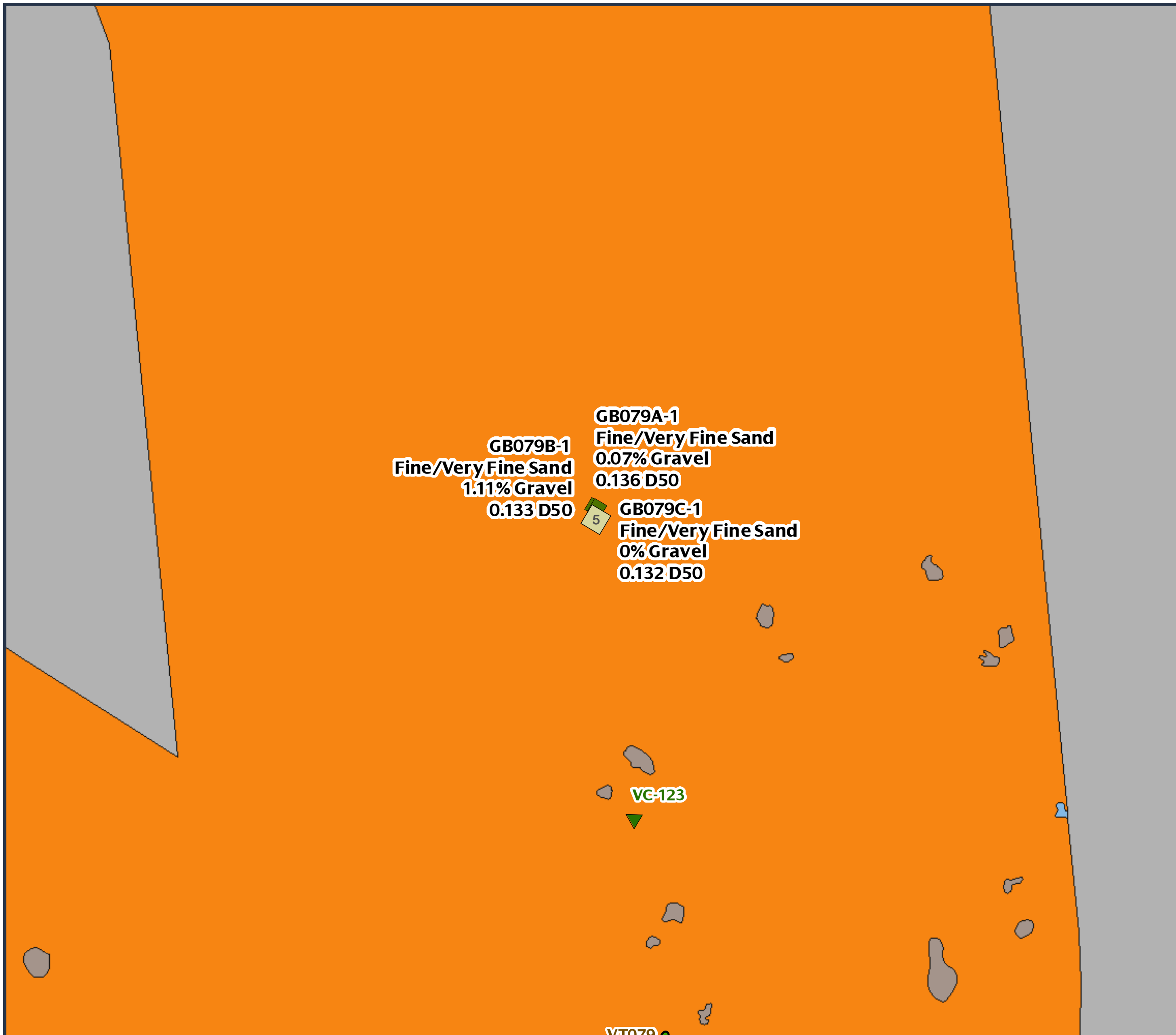
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Heterogeneous Habitat
Soft Bottom Habitat
Soft Station - Grab Sample
Soft Station - Vibracore
Complex Mix Station - Video Transect

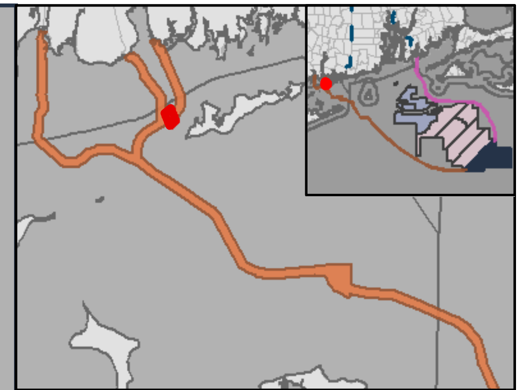
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

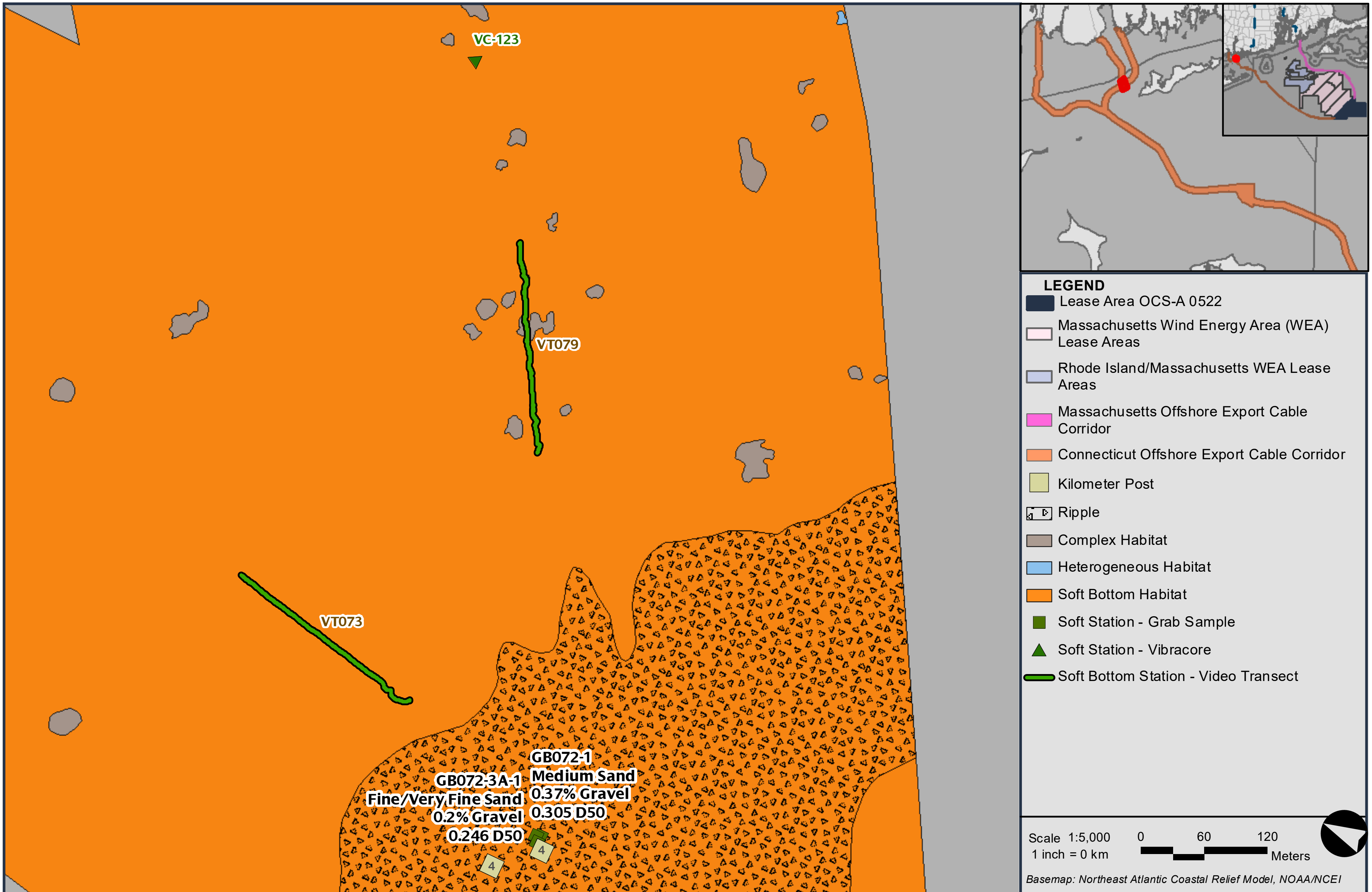
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

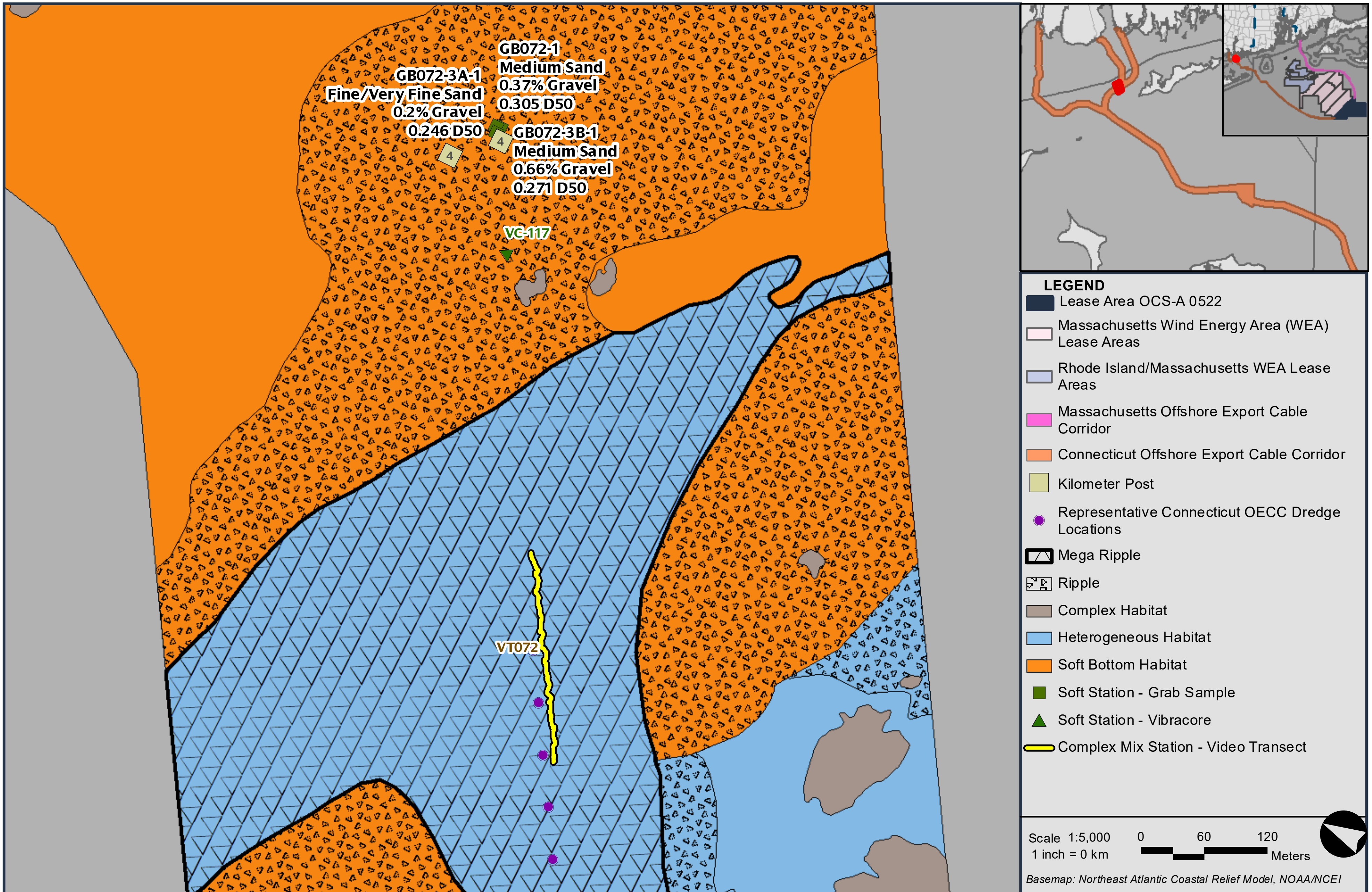
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



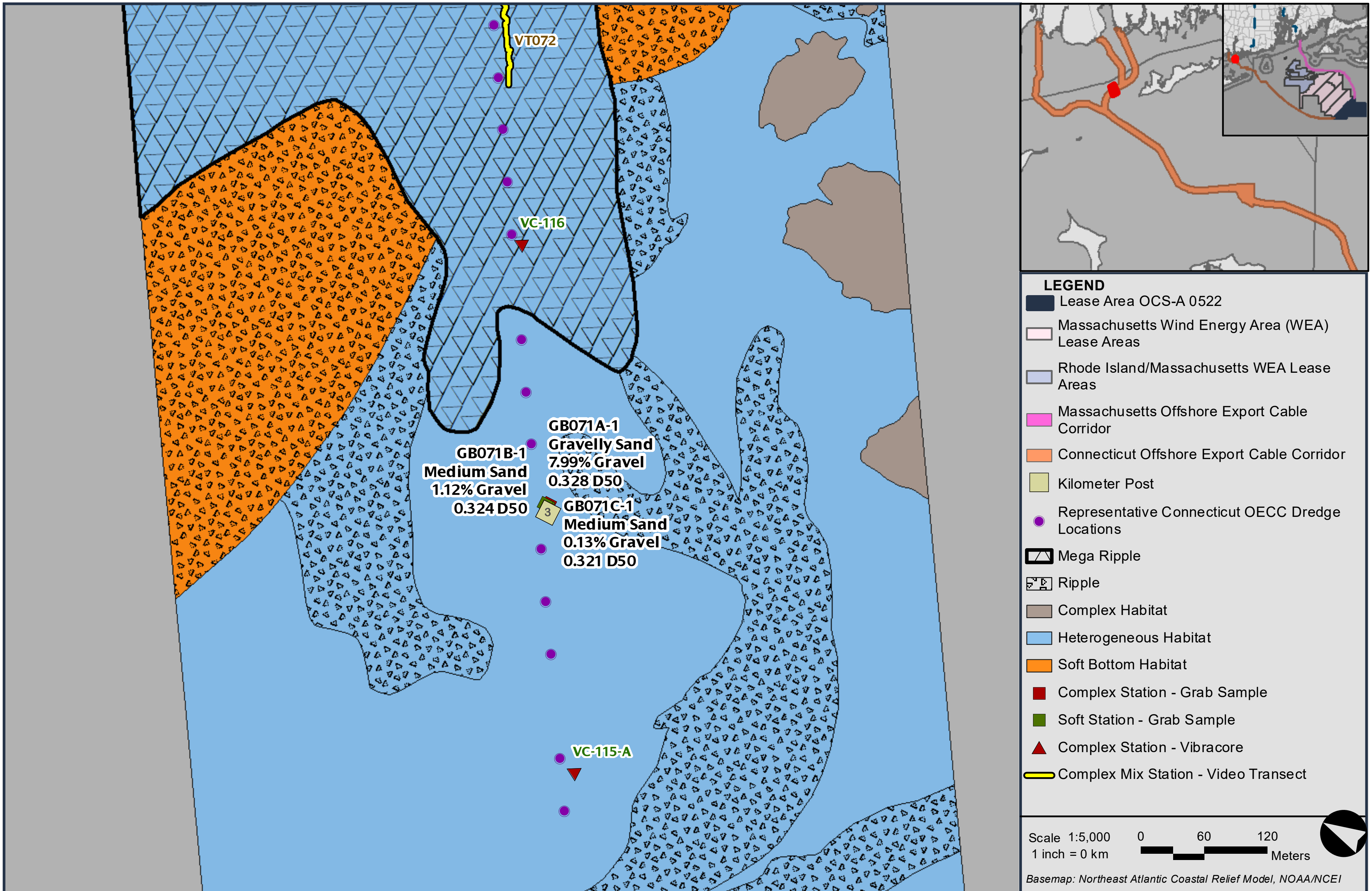
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



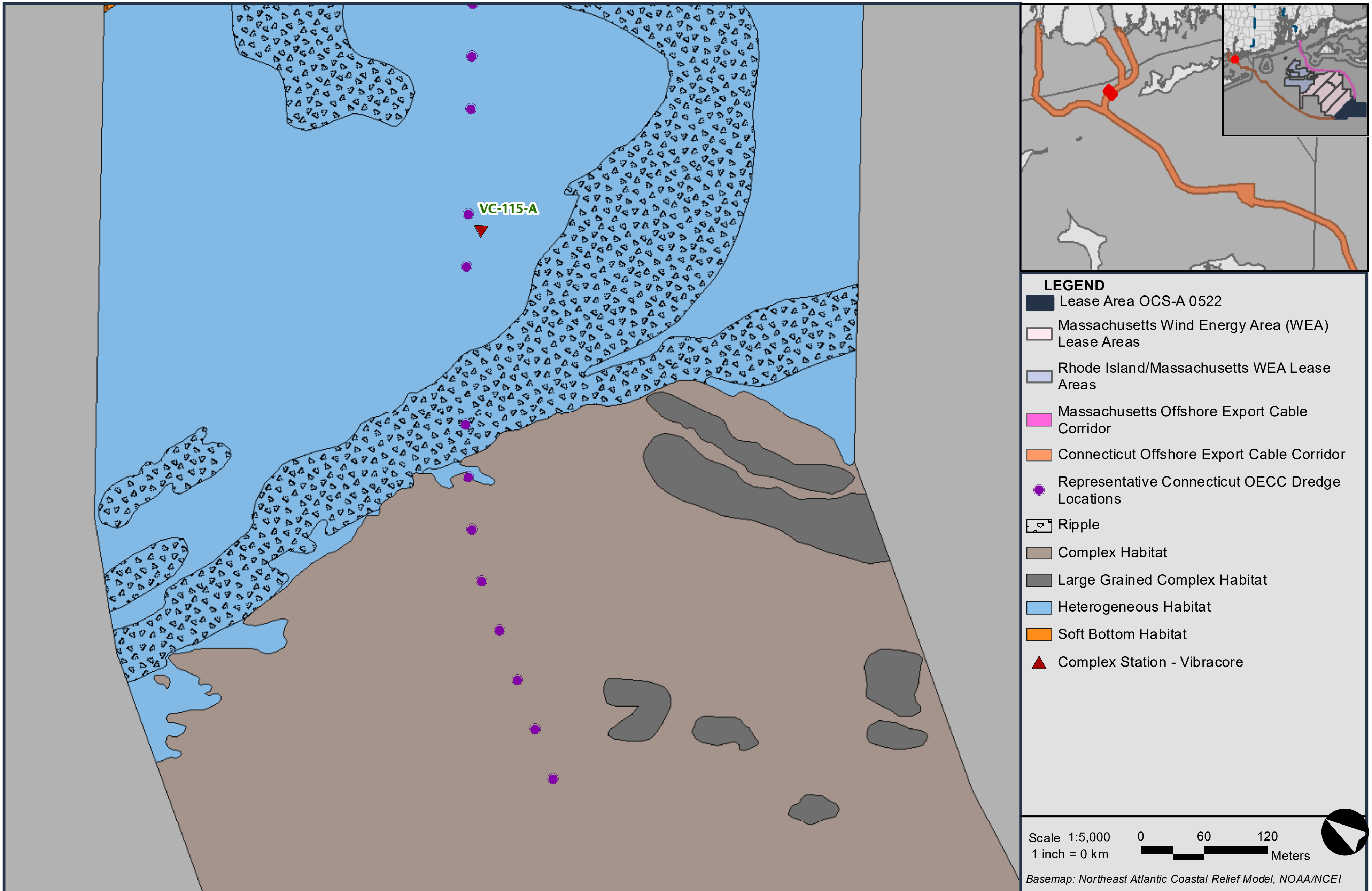
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



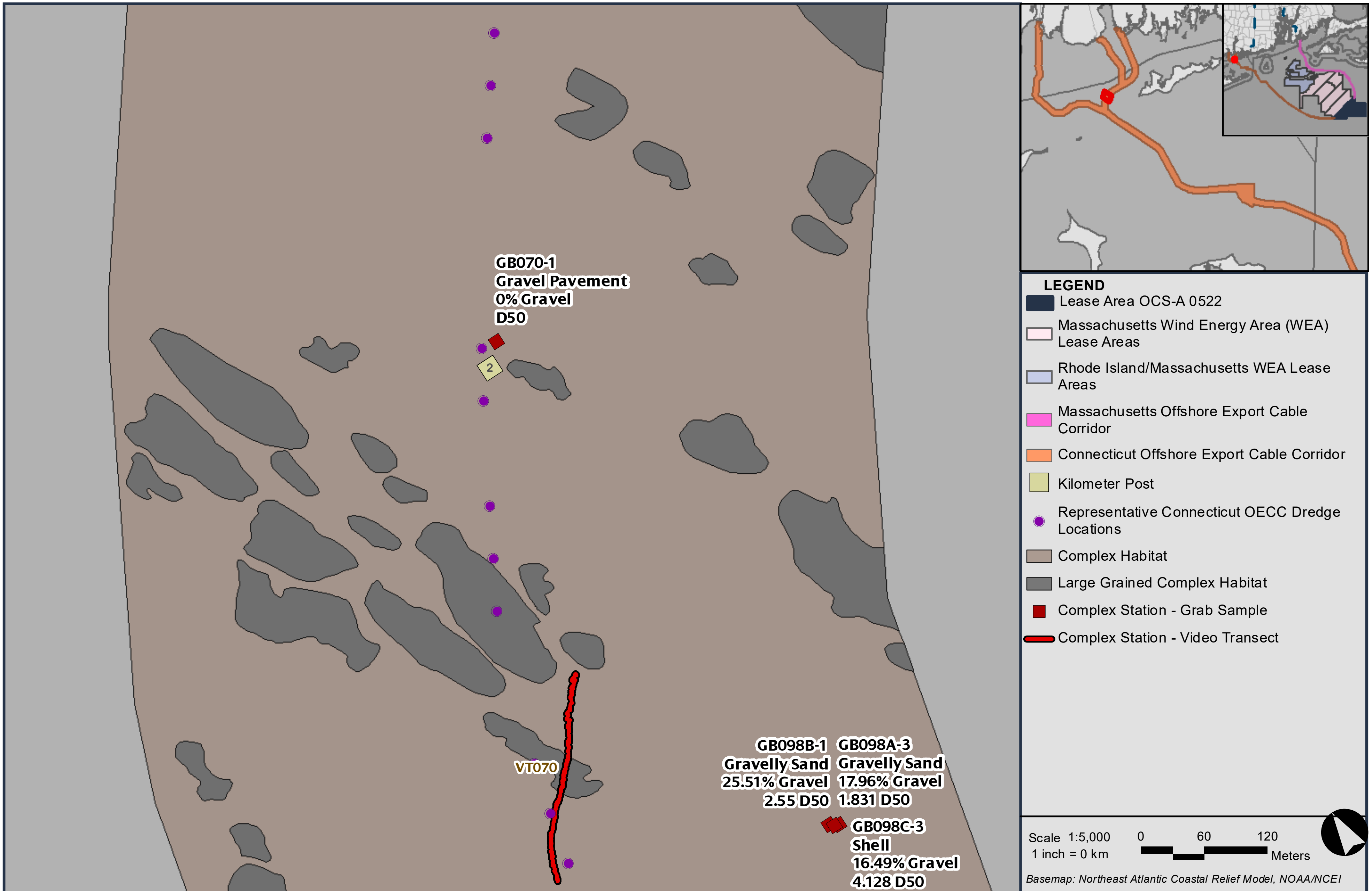
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



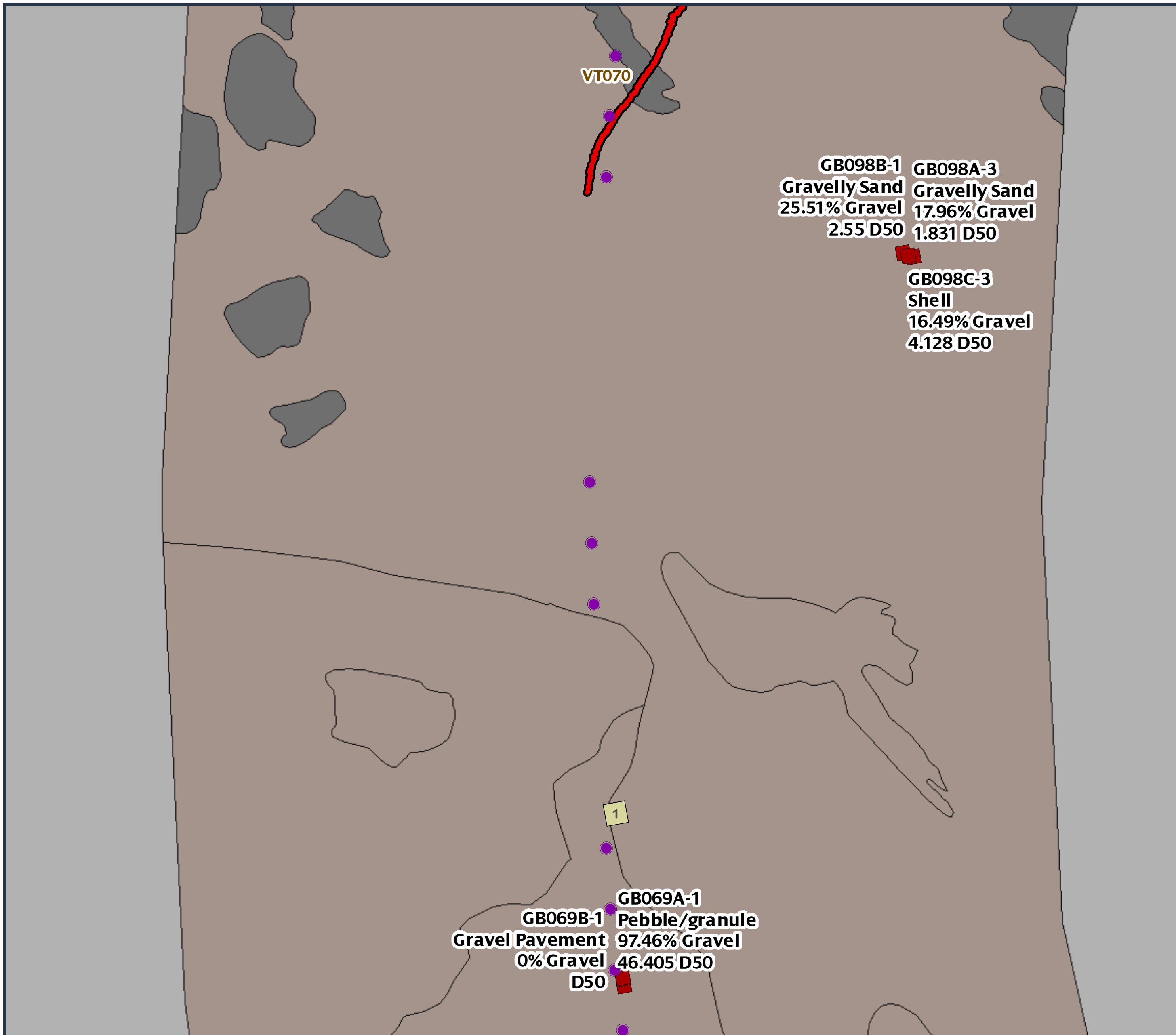
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

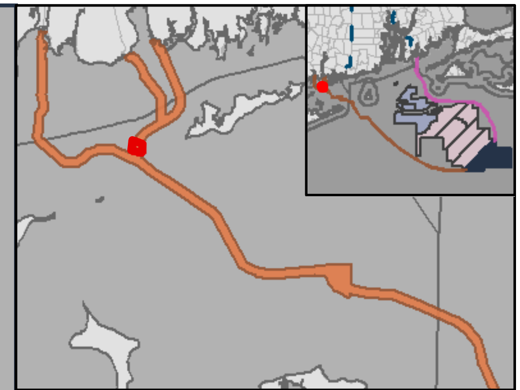
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Complex Habitat
- Large Grained Complex Habitat
- Complex Station - Grab Sample
- Complex Station - Video Transect

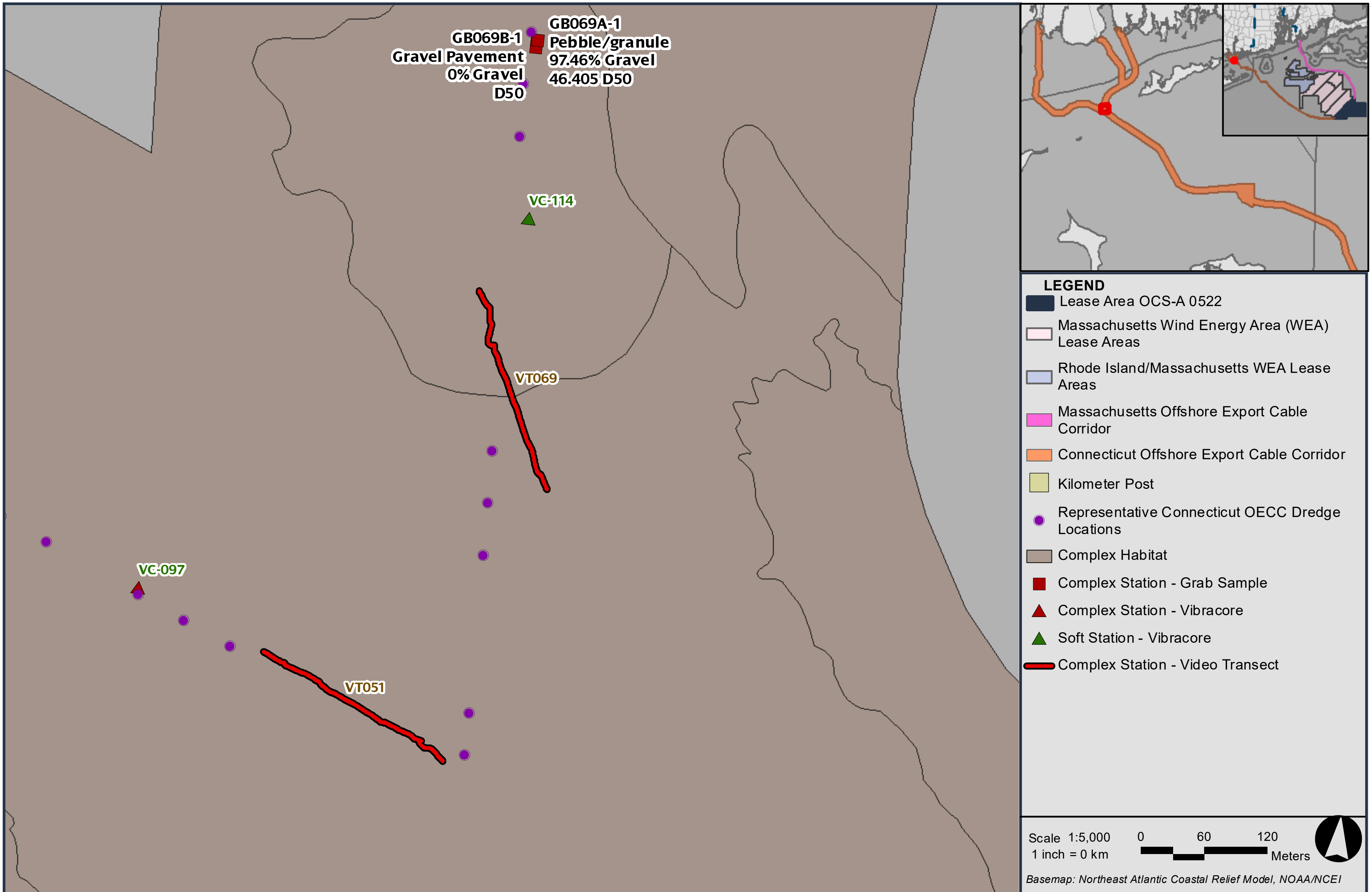
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

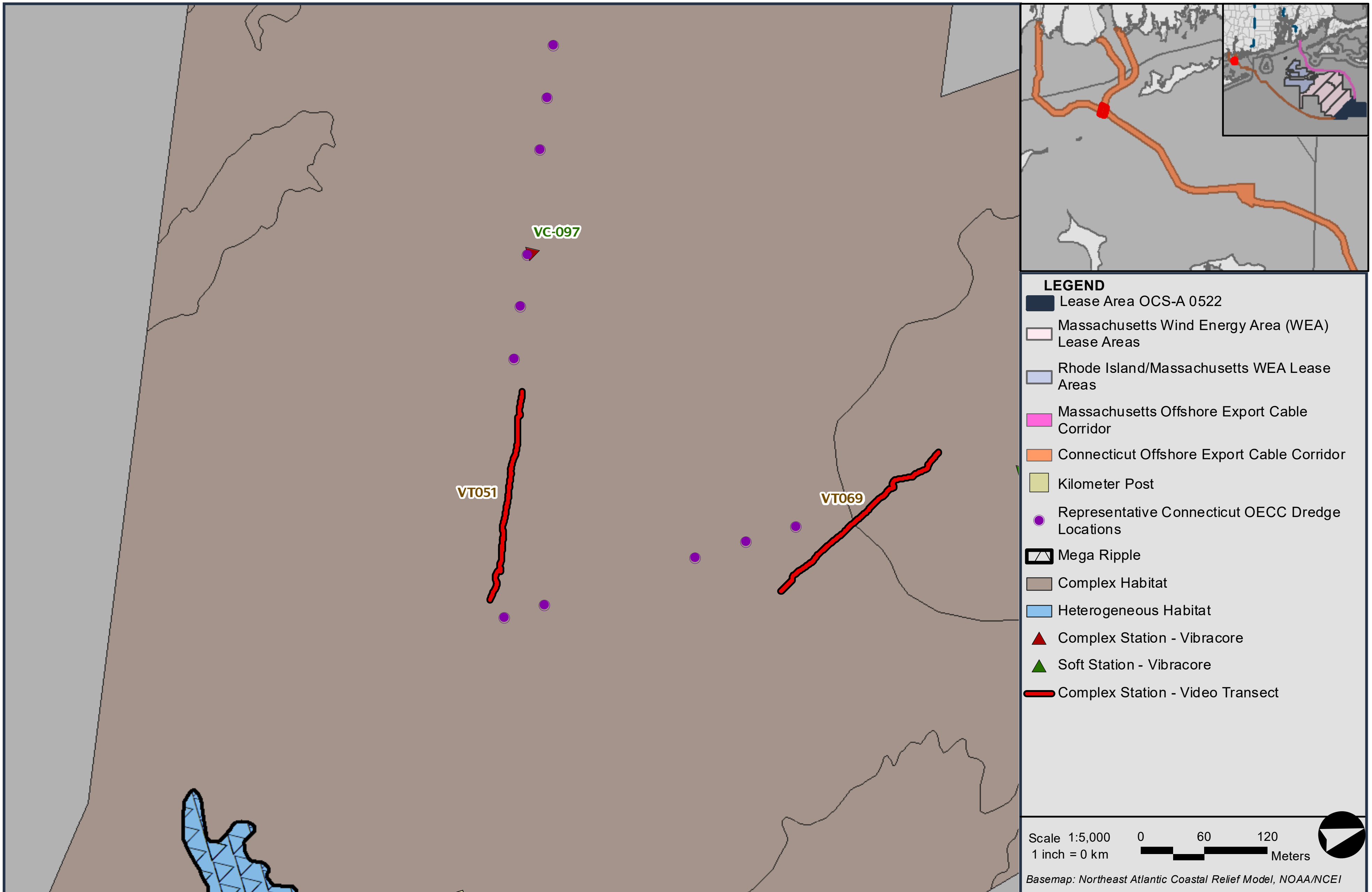
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

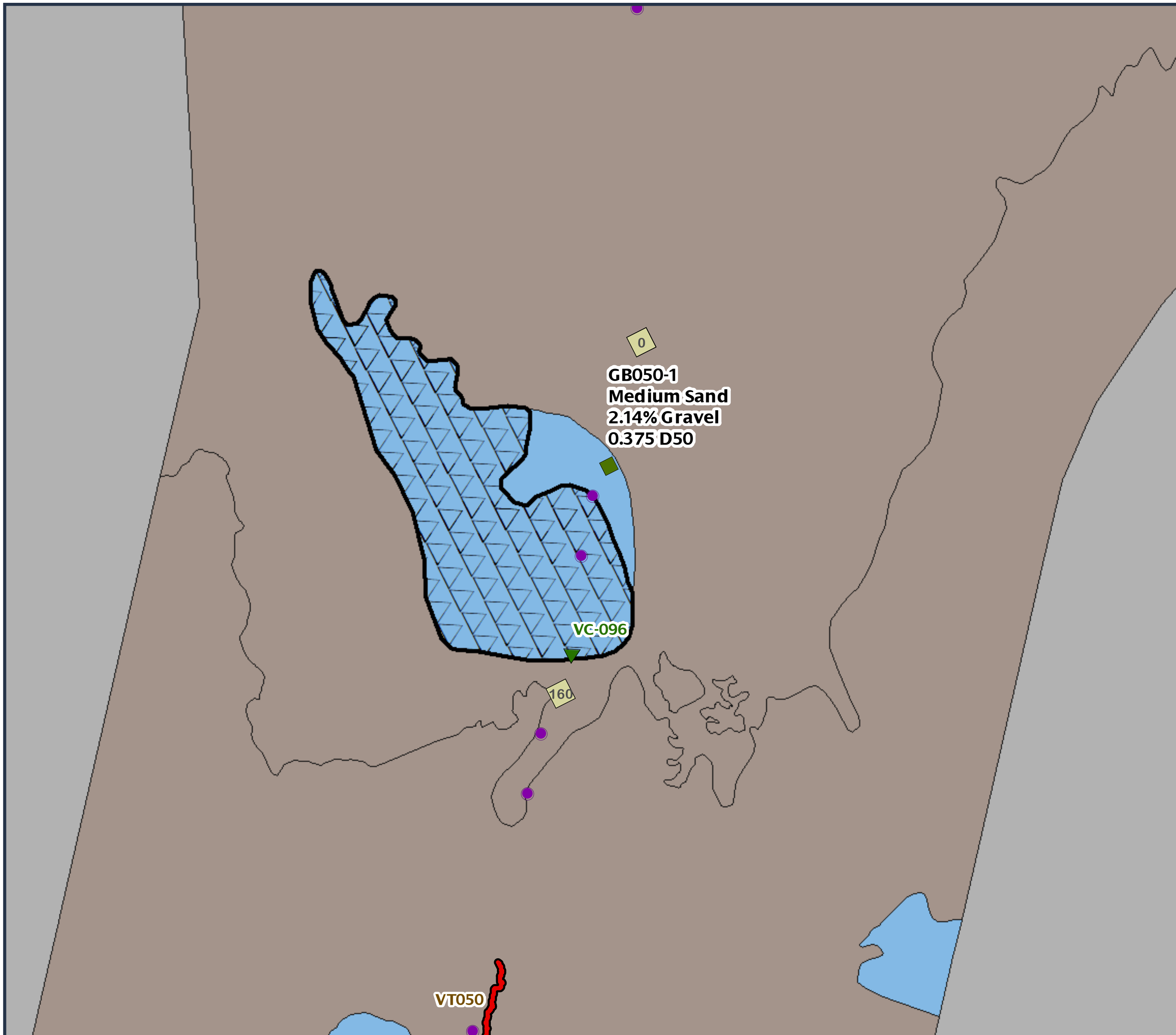
VINEYARD NORTHEAST

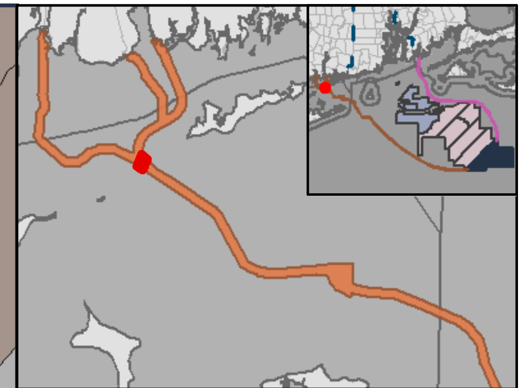
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

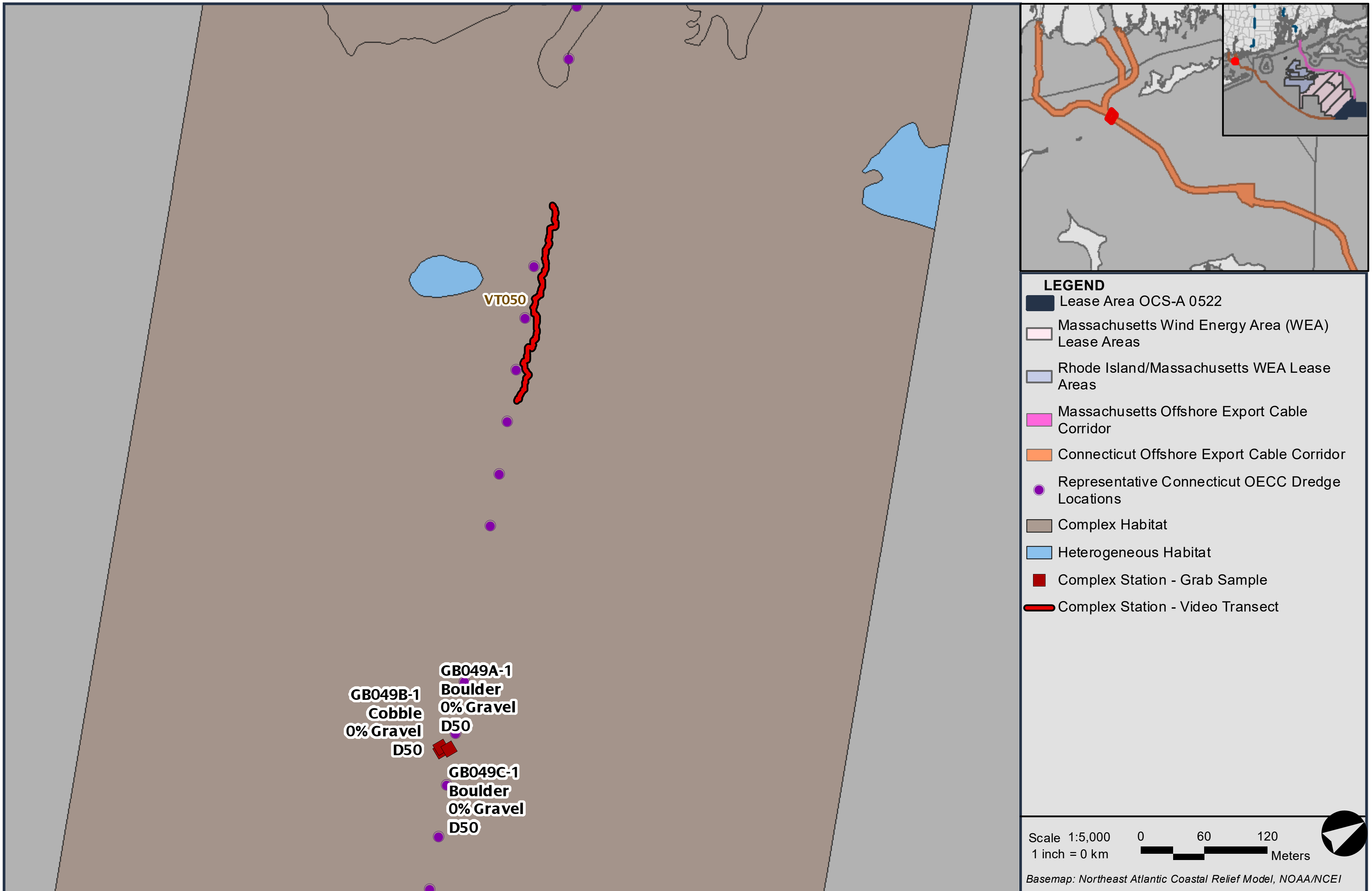
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Mega Ripple
- Complex Habitat
- Heterogeneous Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore
- Complex Station - Video Transect

Scale 1:5,000
1 inch = 0 km

0 60 120
Meters

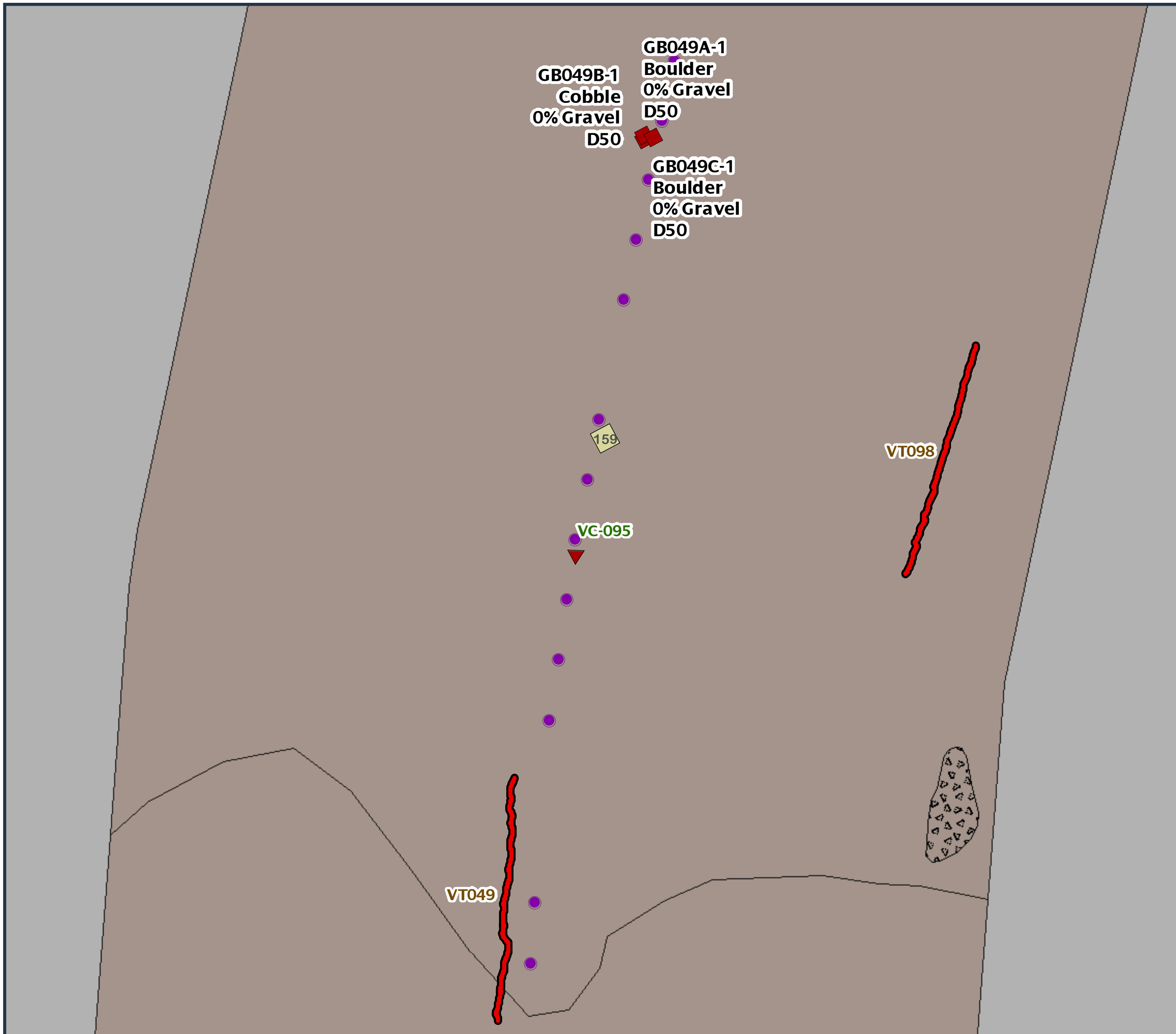
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

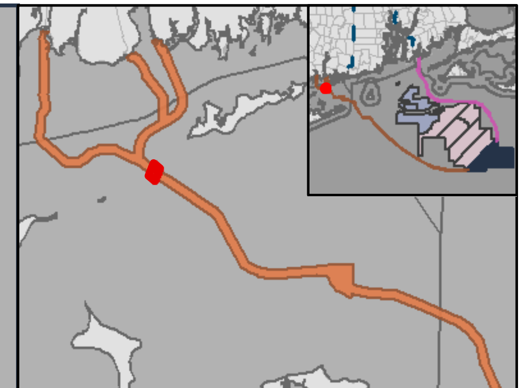
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Ripple
- Complex Habitat
- Complex Station - Grab Sample
- Complex Station - Vibracore
- Complex Station - Video Transect

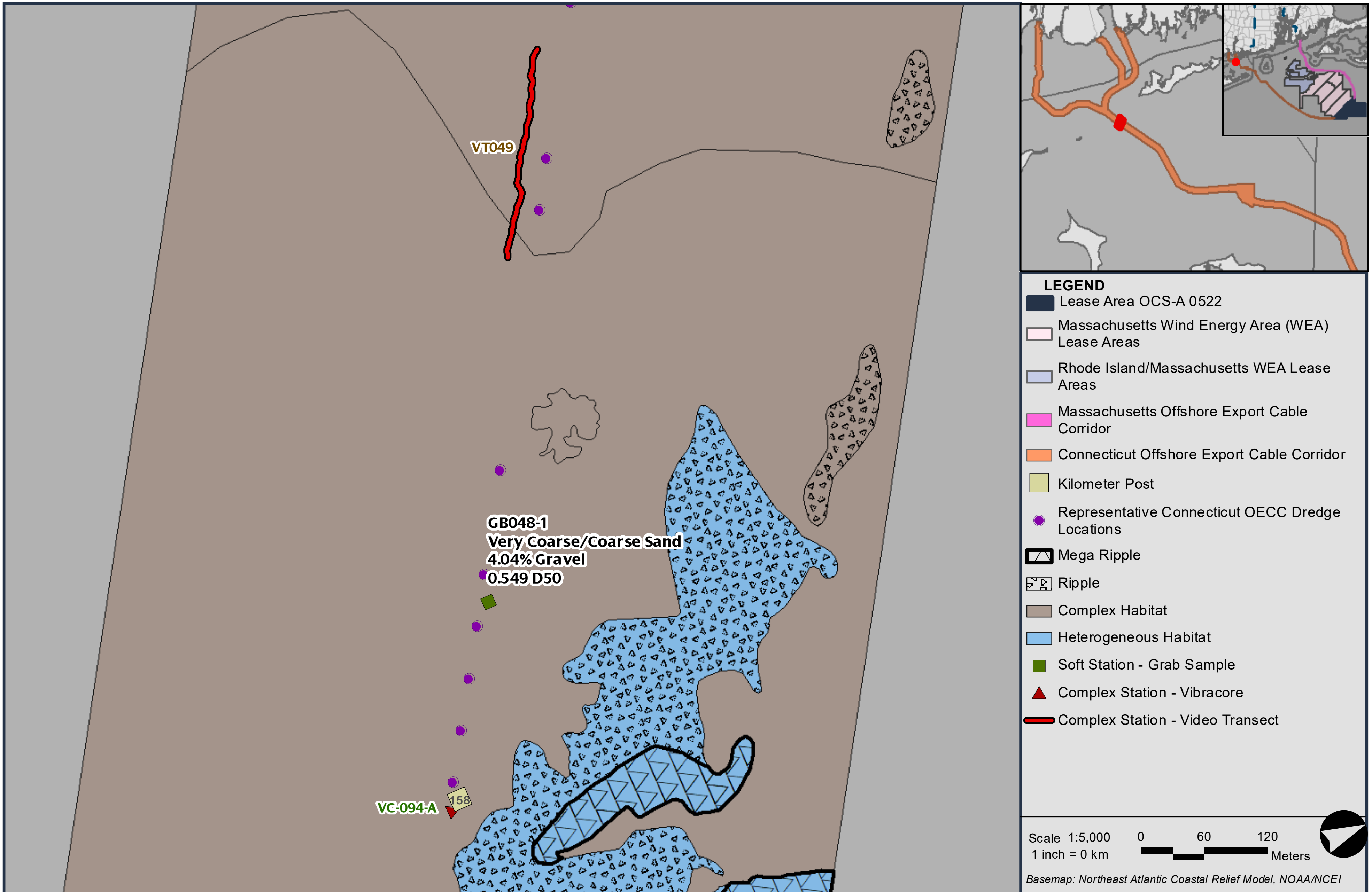
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

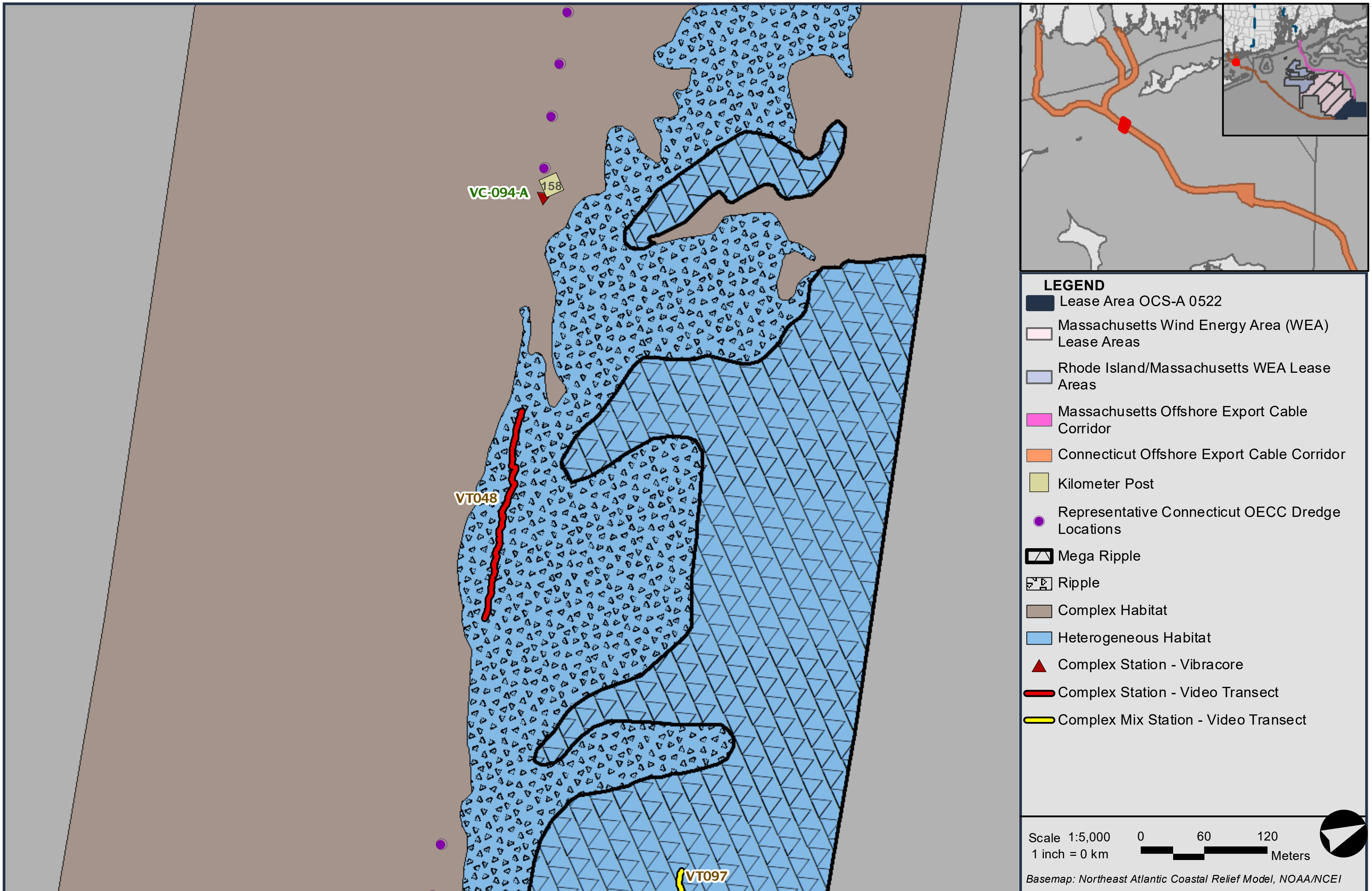
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Mega Ripple
- Ripple
- Complex Habitat
- Heterogeneous Habitat
- Soft Station - Grab Sample
- Complex Station - Vibracore
- Complex Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

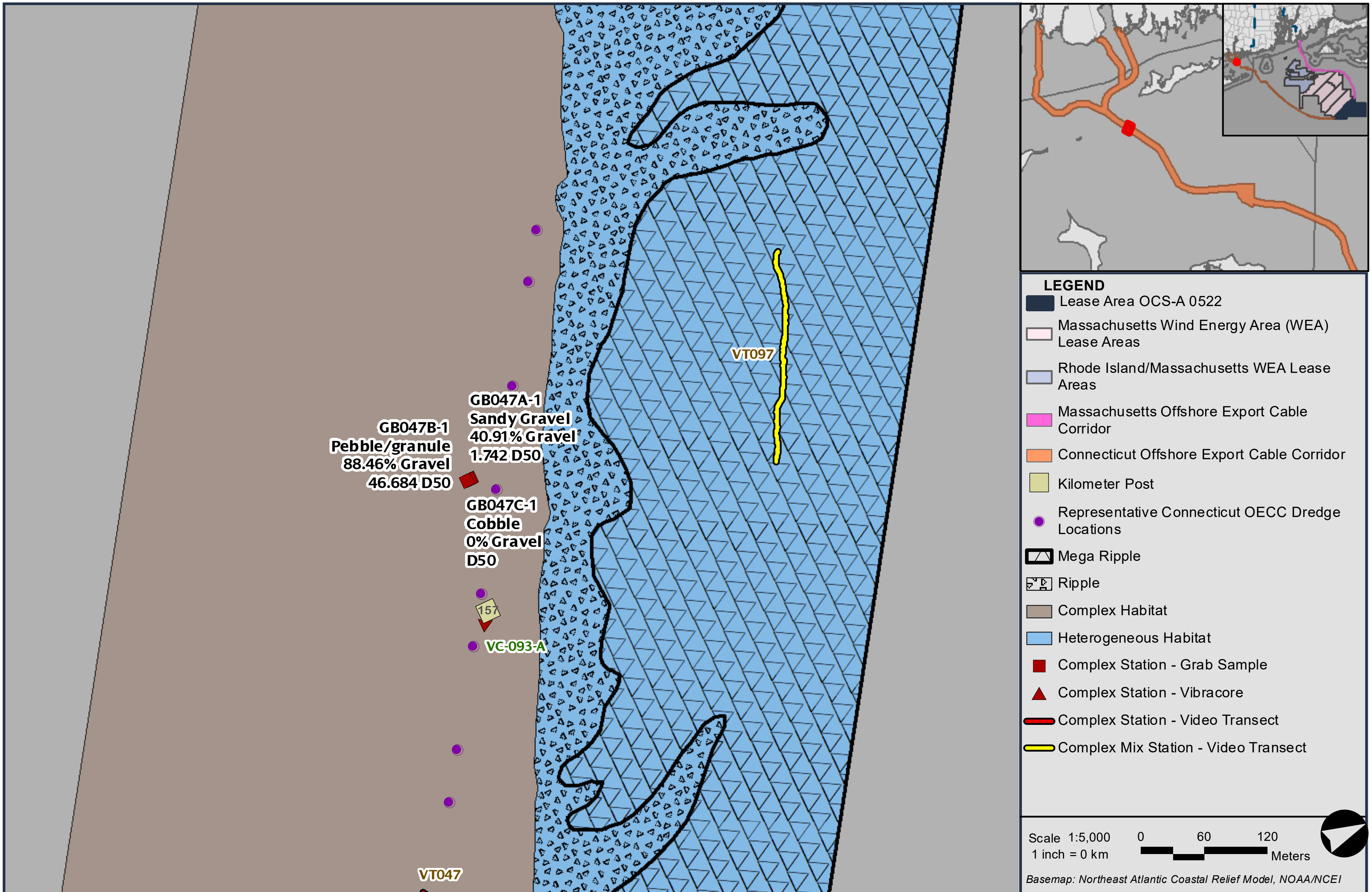
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



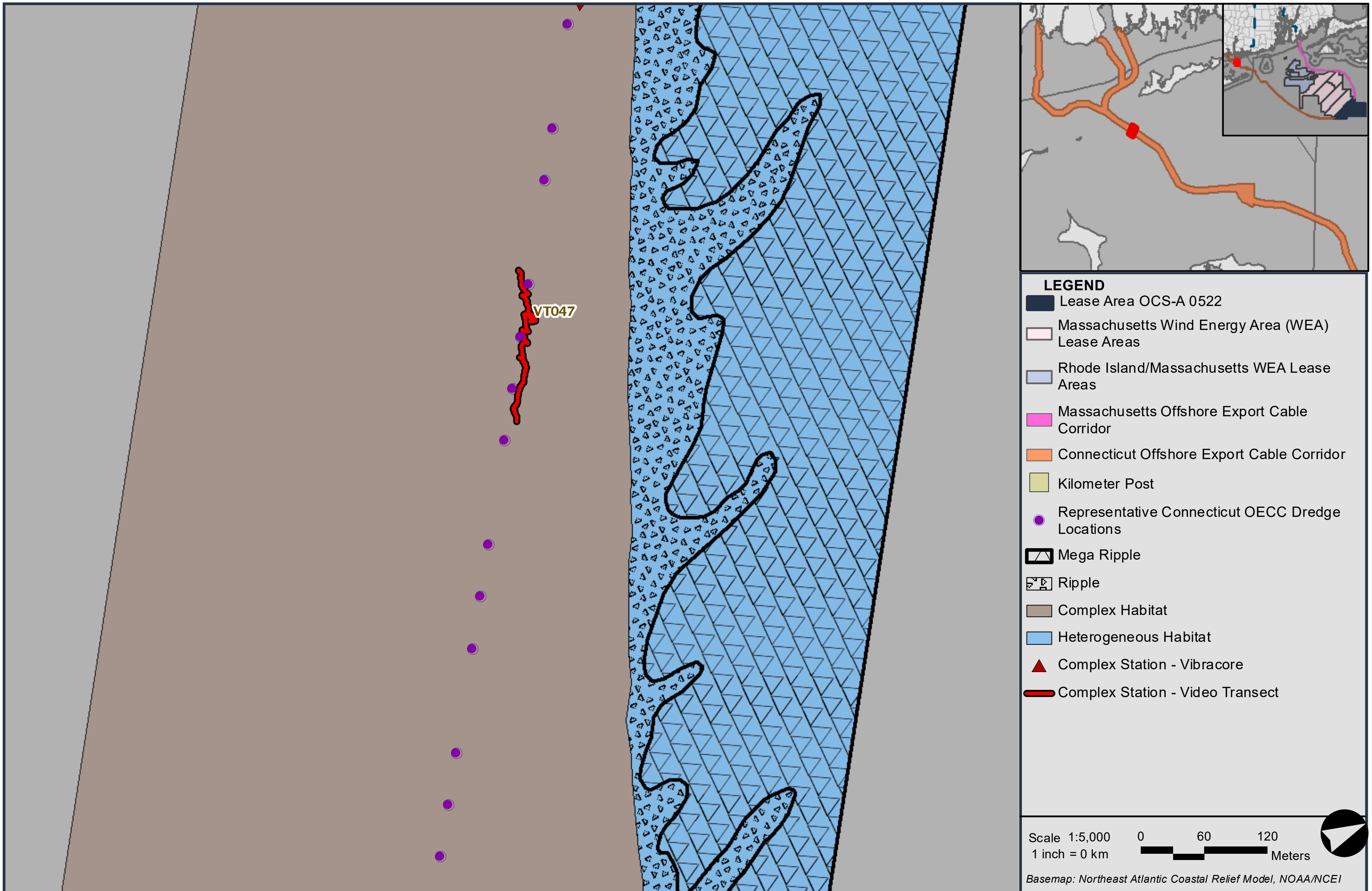
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

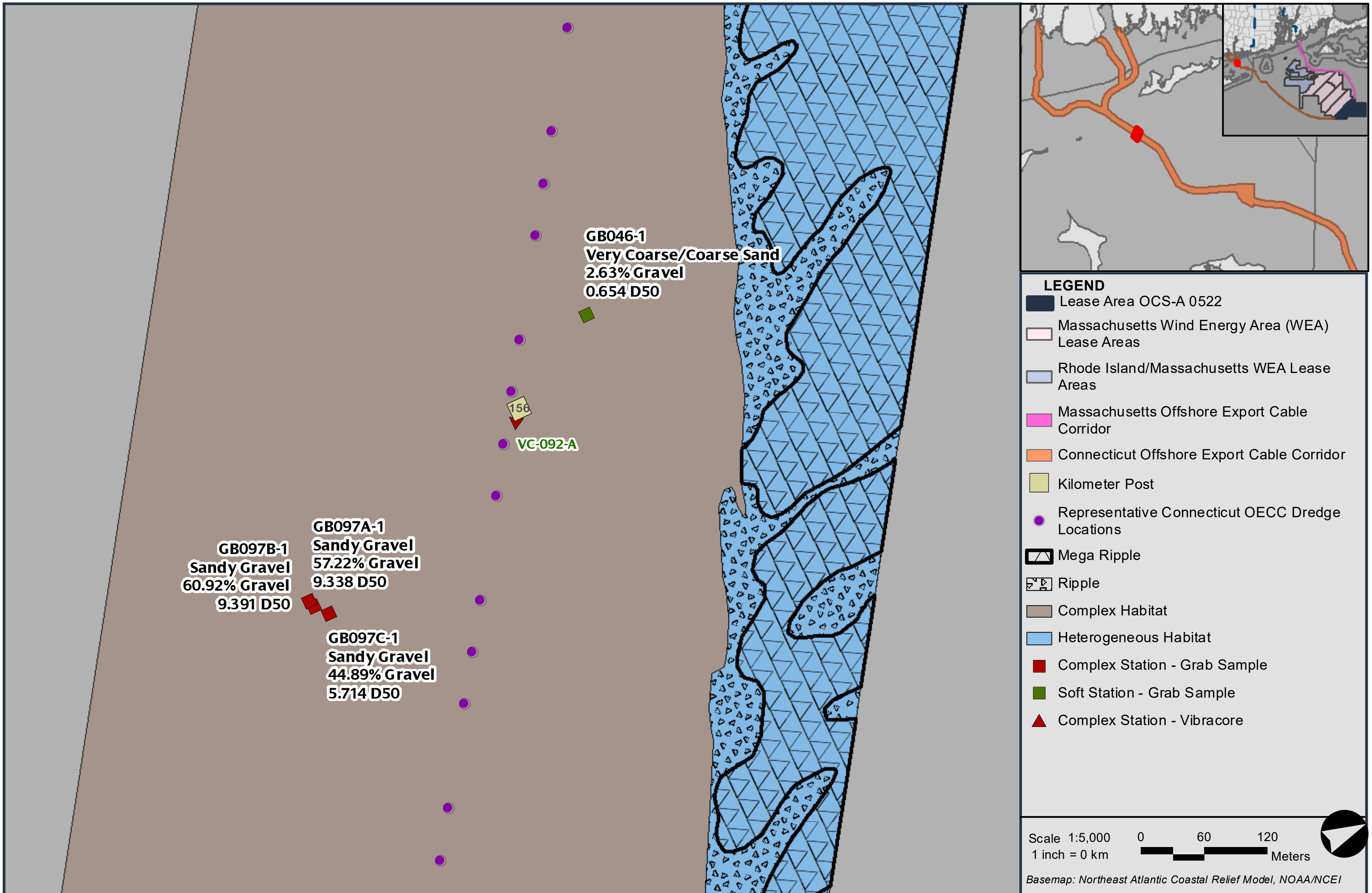
VINEYARD NORTHEAST
VINEYARD OFFSHORE



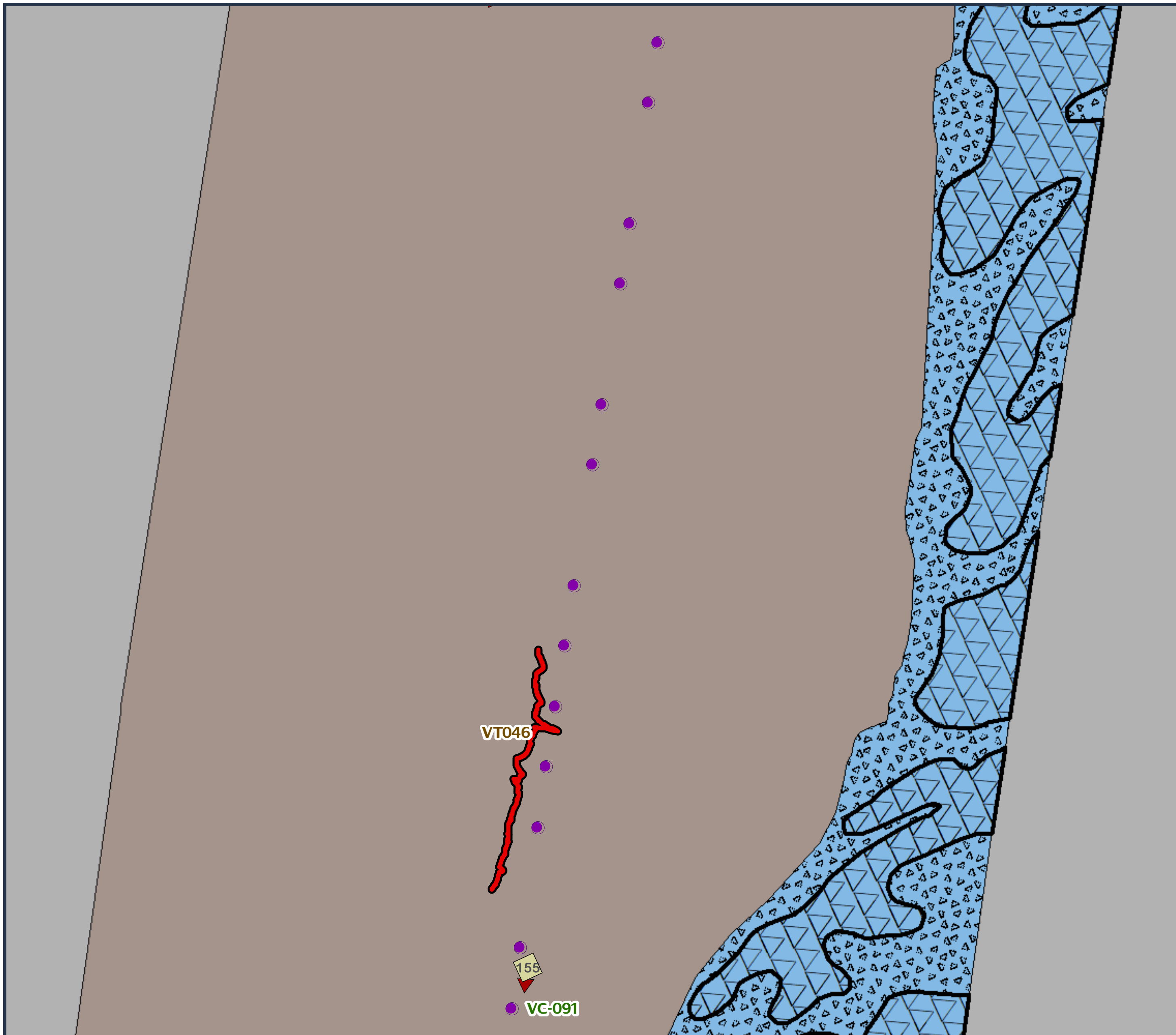
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

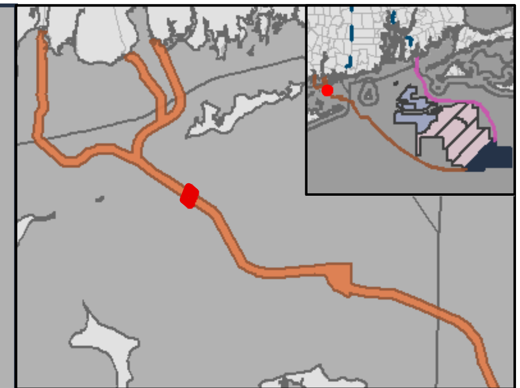
VINEYARD NORTHEAST

VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Mega Ripple
- Ripple
- Complex Habitat
- Heterogeneous Habitat
- Complex Station - Grab Sample
- Complex Station - Vibracore
- Complex Station - Video Transect

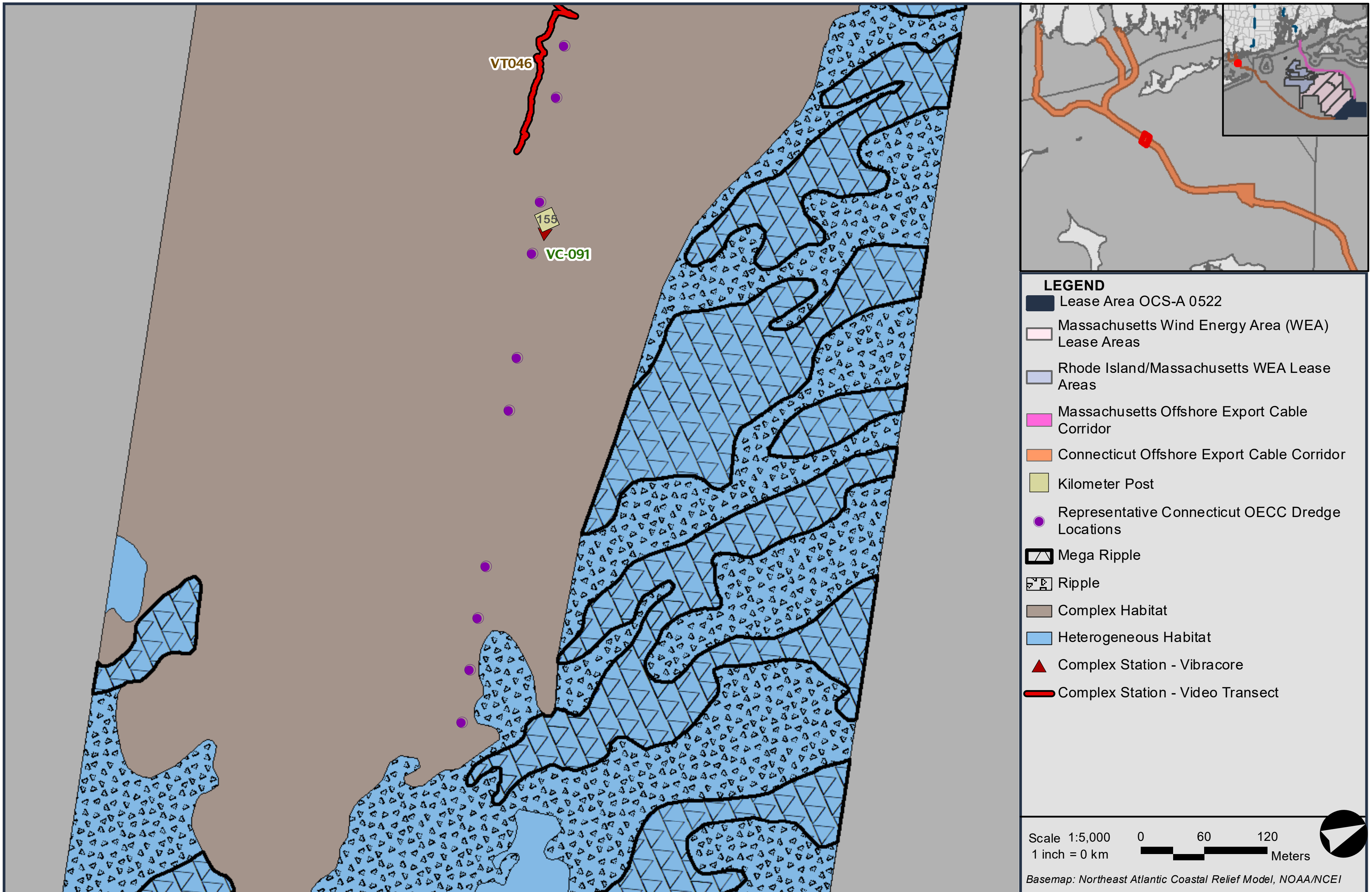
Scale 1:5,000
1 inch = 0 km

0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

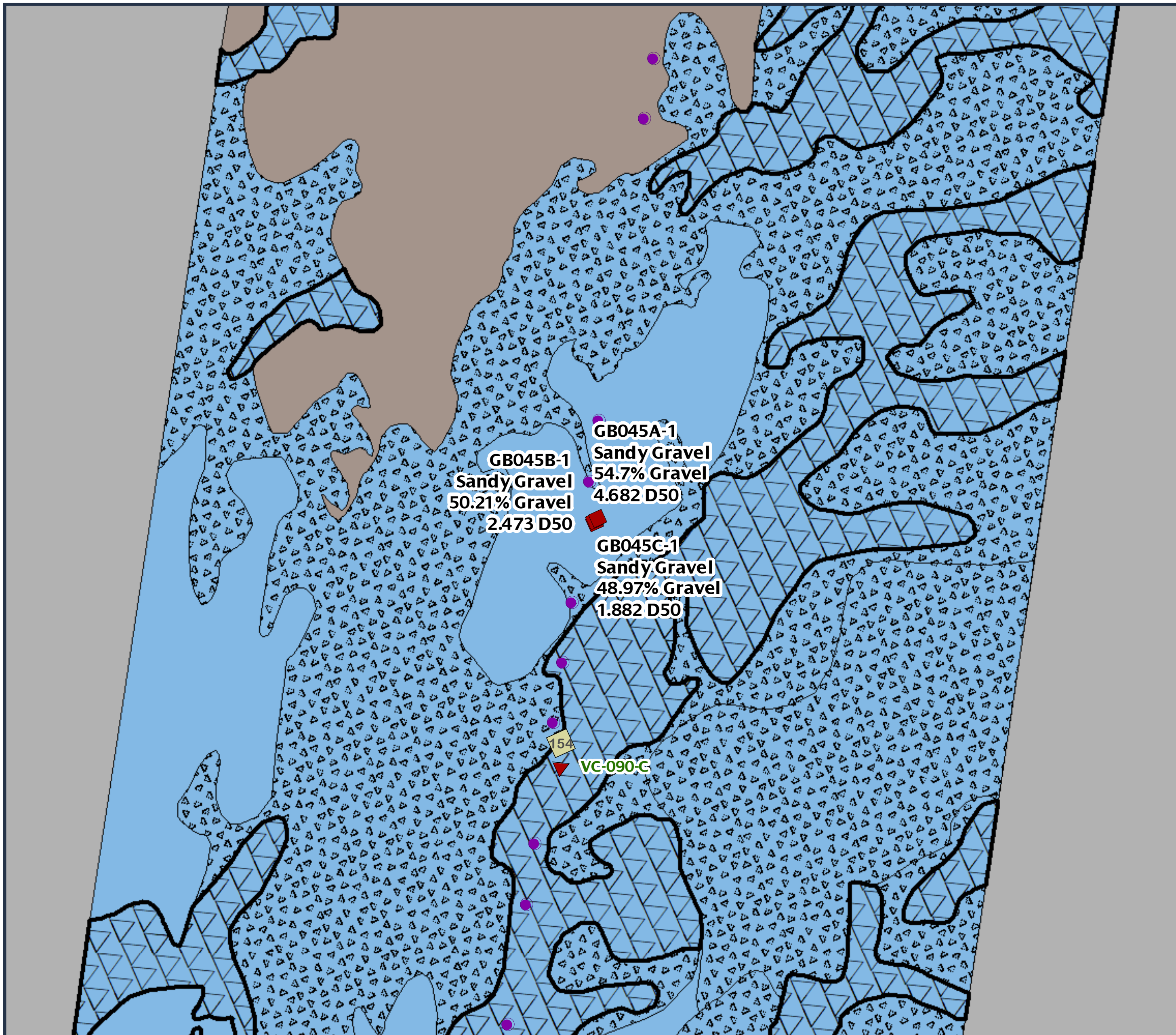
VINEYARD NORTHEAST
VINEYARD OFFSHORE

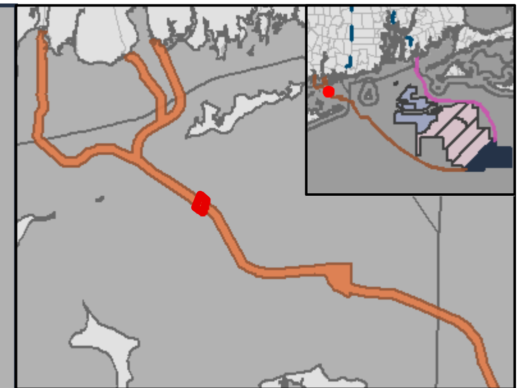


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Mega Ripple
- Ripple
- Complex Habitat
- Heterogeneous Habitat
- Complex Station - Grab Sample
- Complex Station - Vibracore

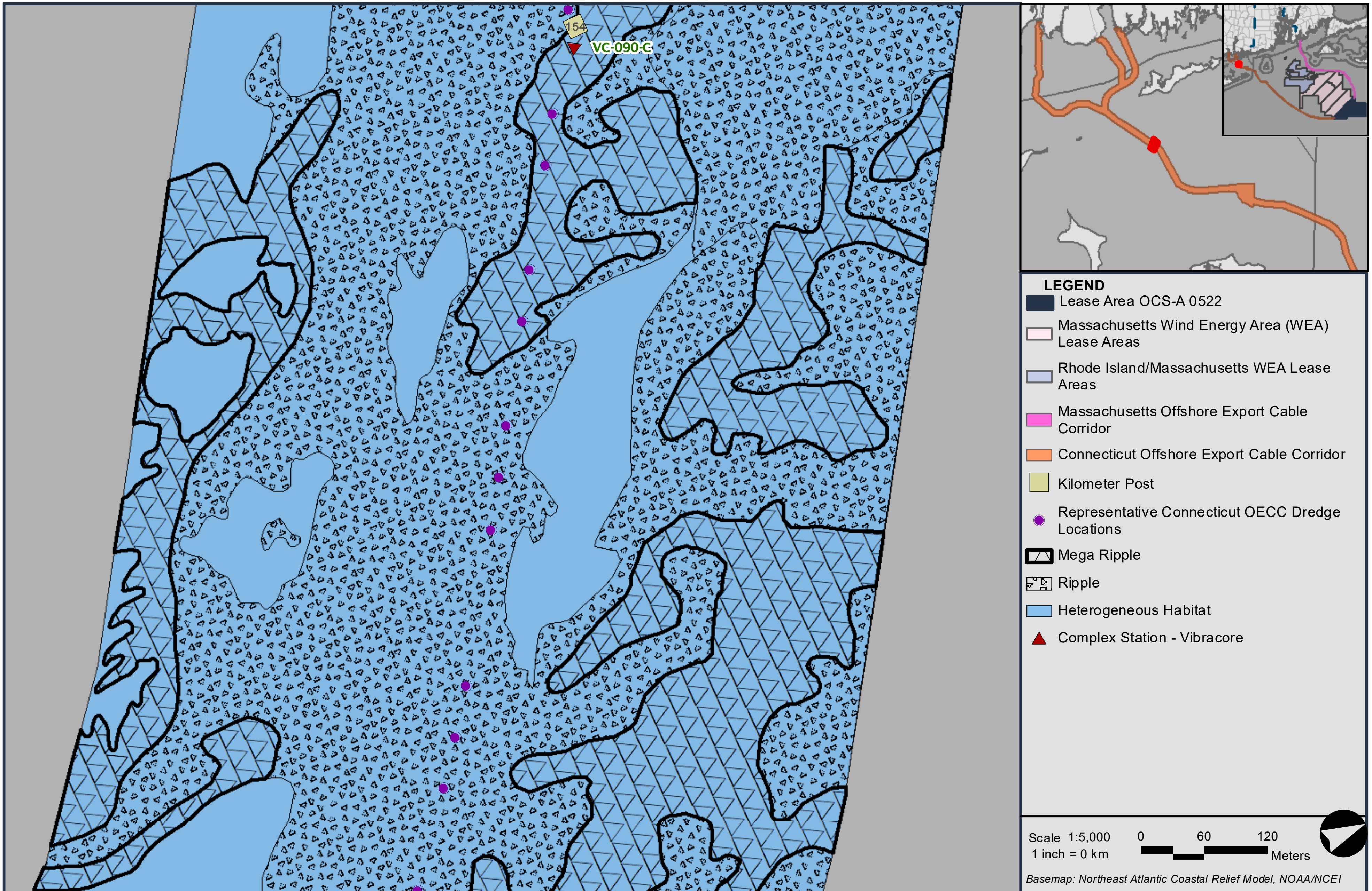
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

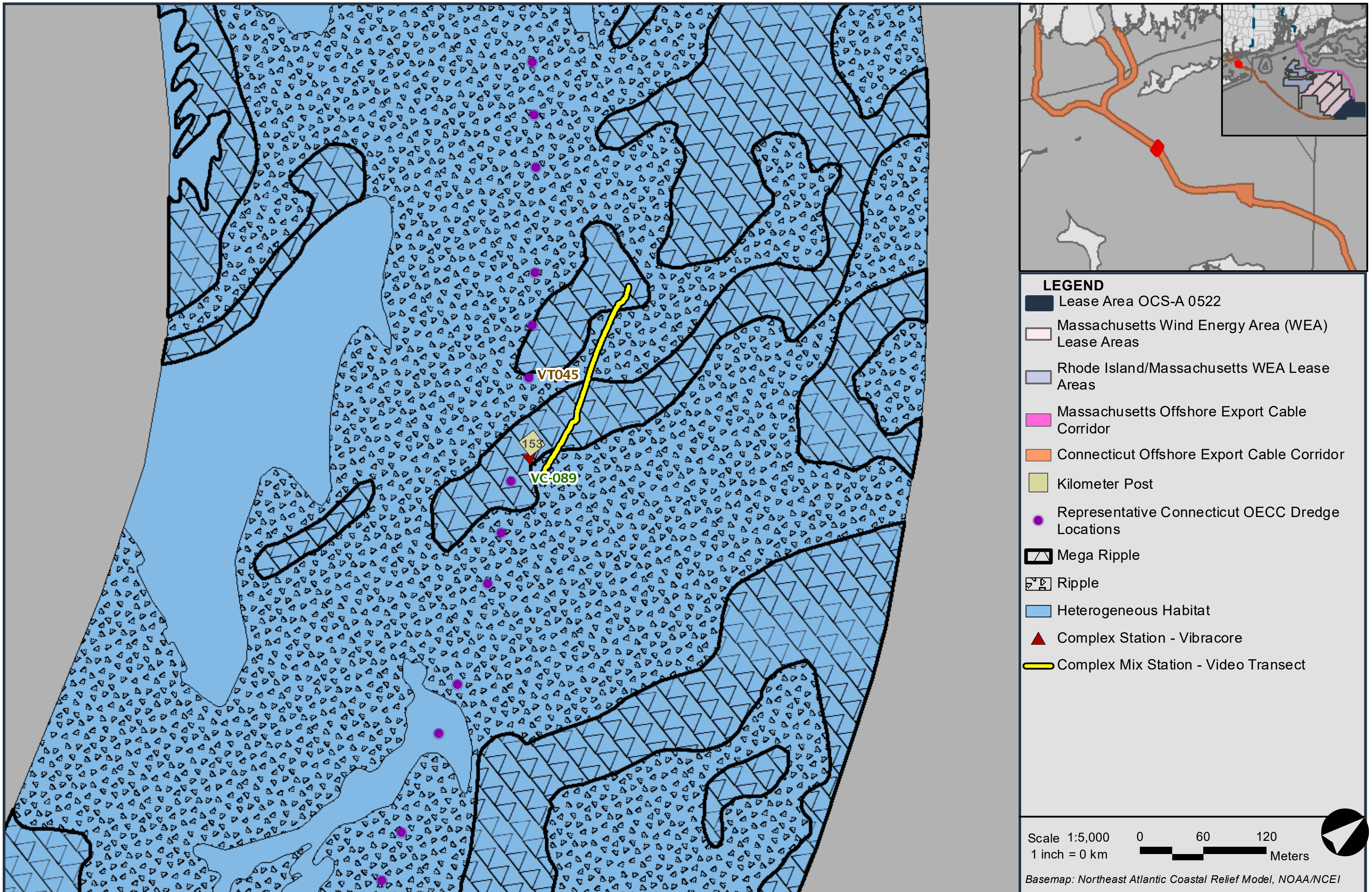
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

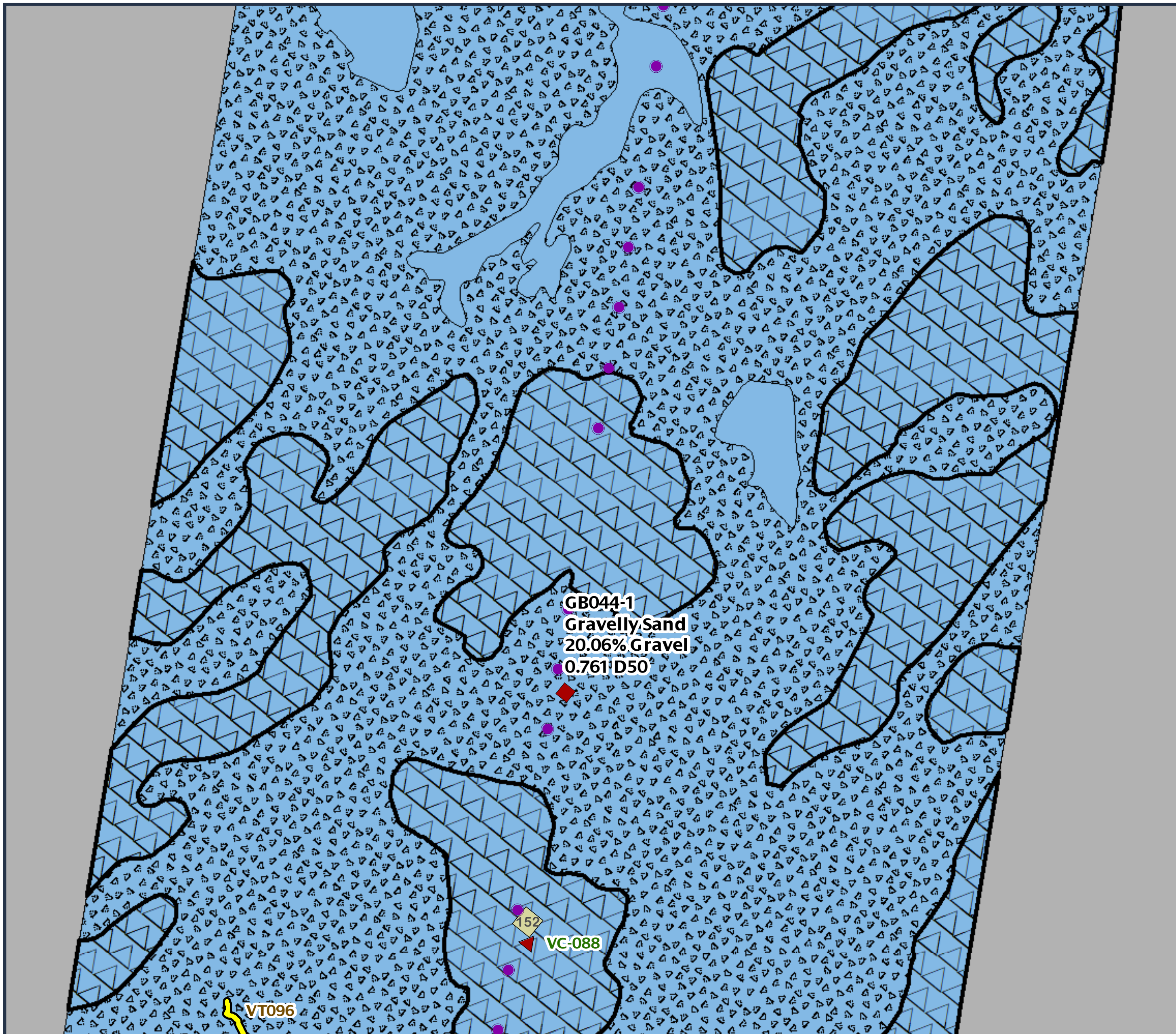
VINEYARD NORTHEAST

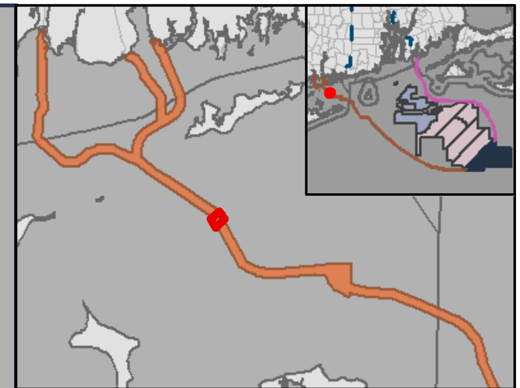
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

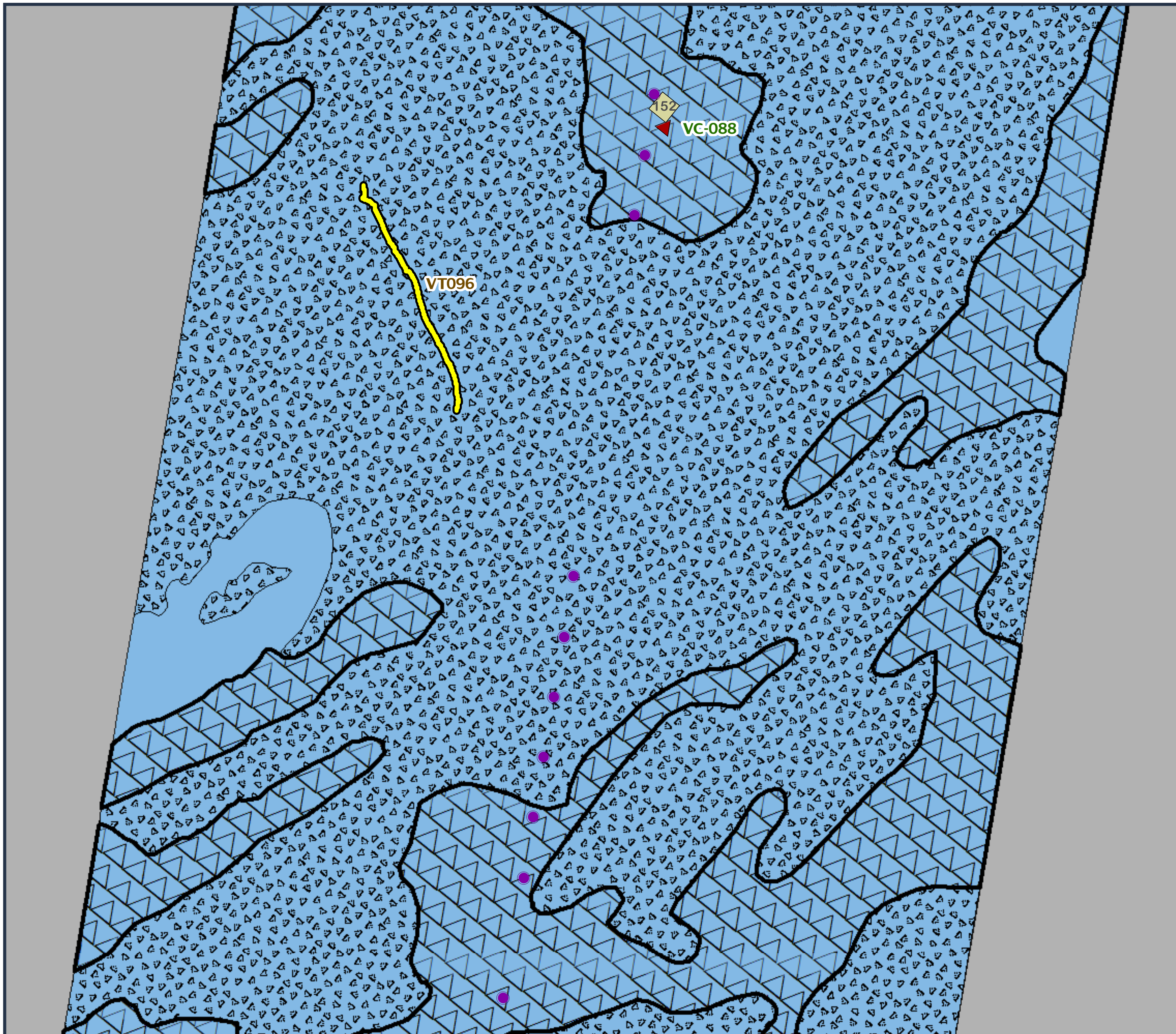
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Mega Ripple
- Ripple
- Heterogeneous Habitat
- Complex Station - Grab Sample
- Complex Station - Vibracore
- Complex Mix Station - Video Transect

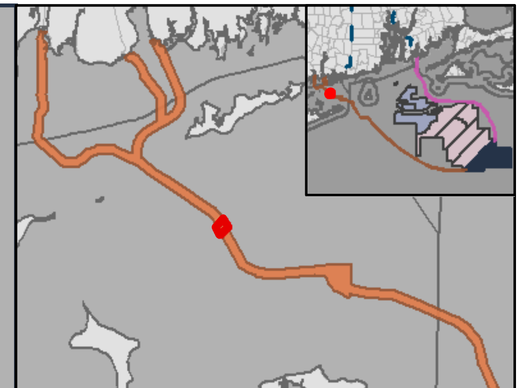
Scale 1:5,000
1 inch = 0 km

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Mega Ripple
- Ripple
- Heterogeneous Habitat
- Complex Station - Vibracore
- Complex Mix Station - Video Transect

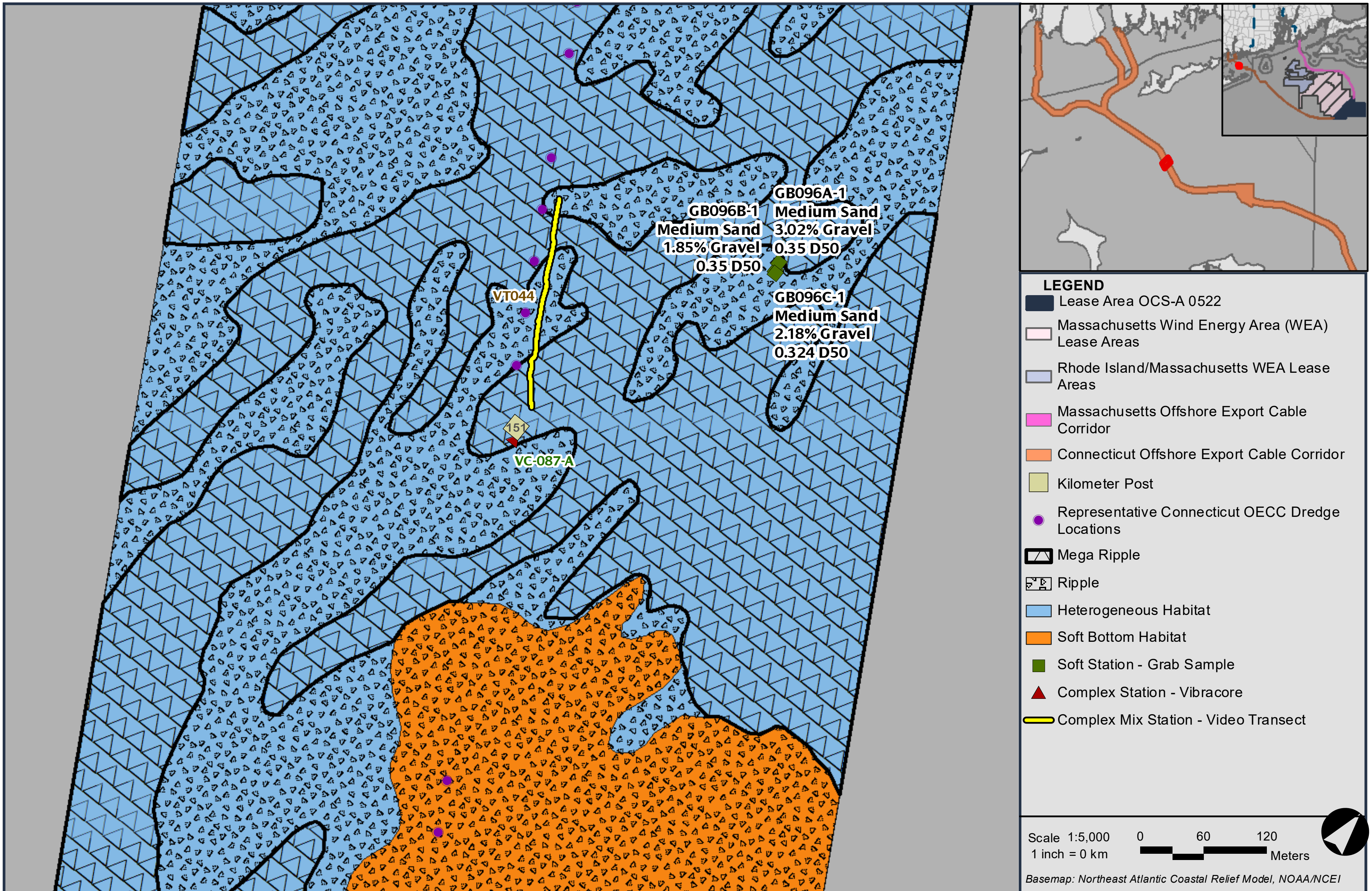
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

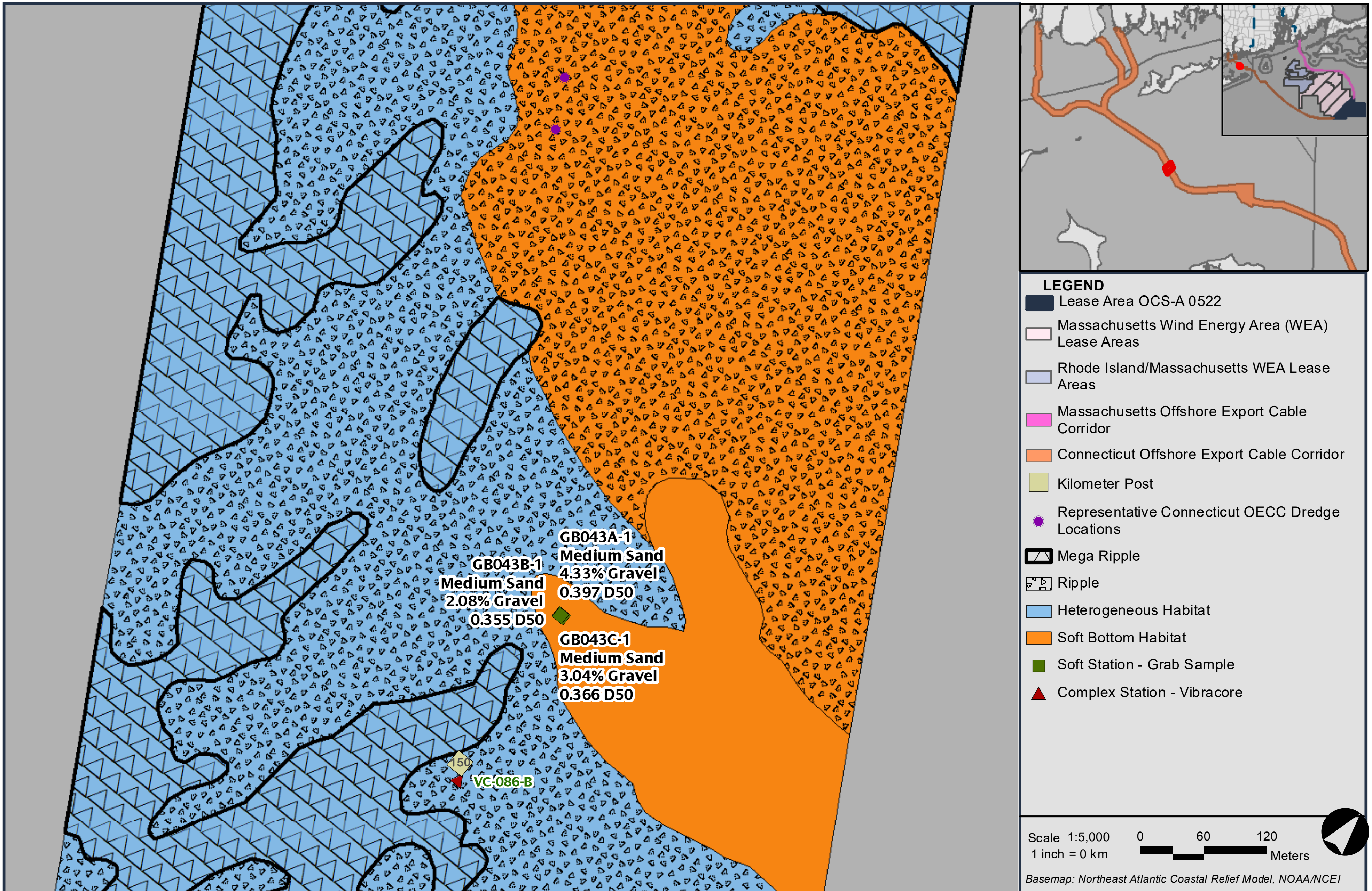
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



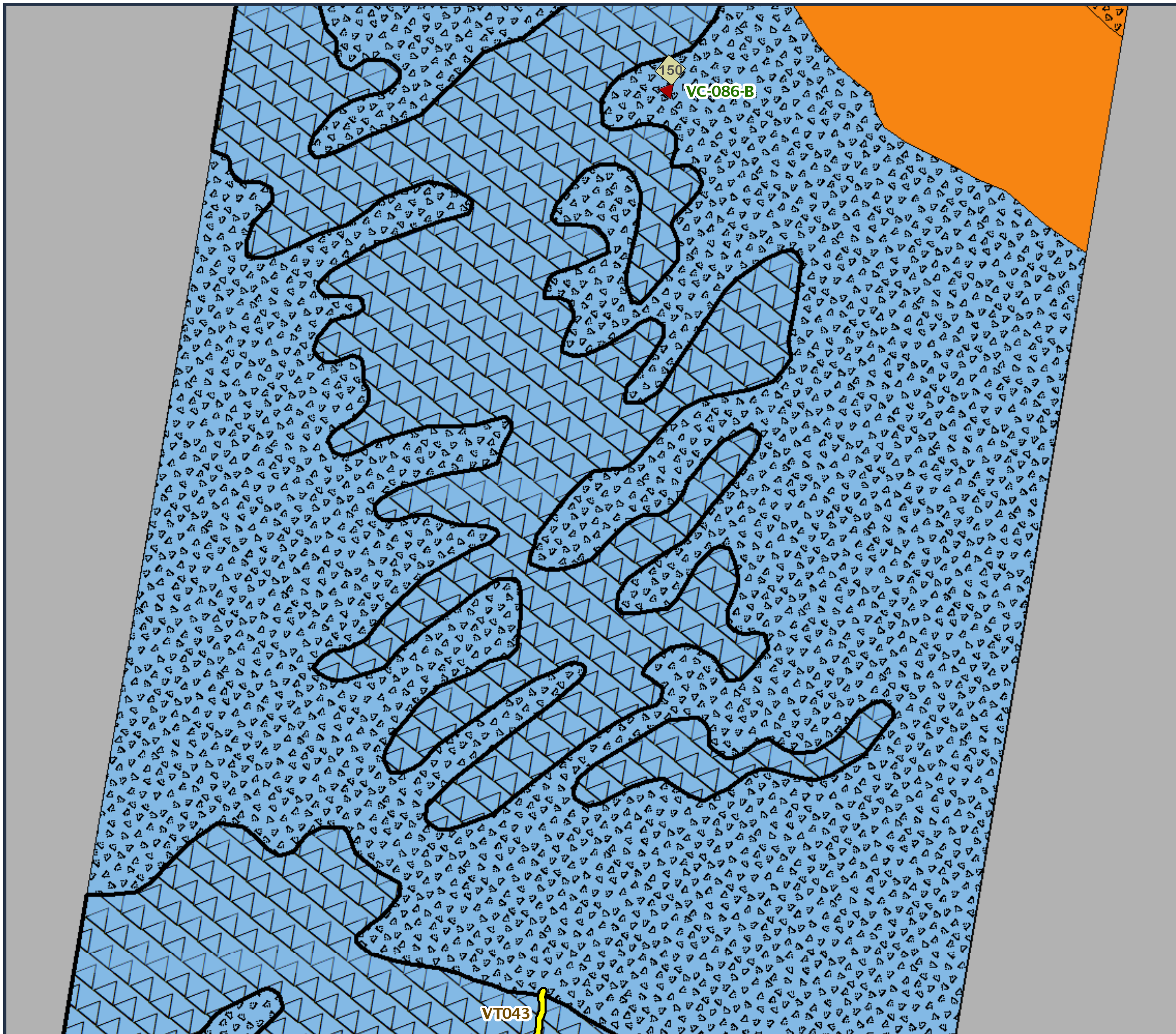
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

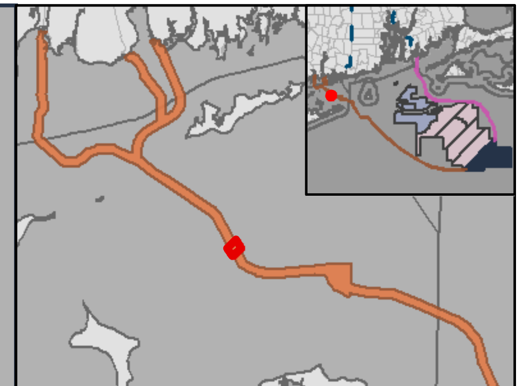
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Mega Ripple
- Ripple
- Heterogeneous Habitat
- Soft Bottom Habitat
- Complex Station - Vibracore
- Complex Mix Station - Video Transect

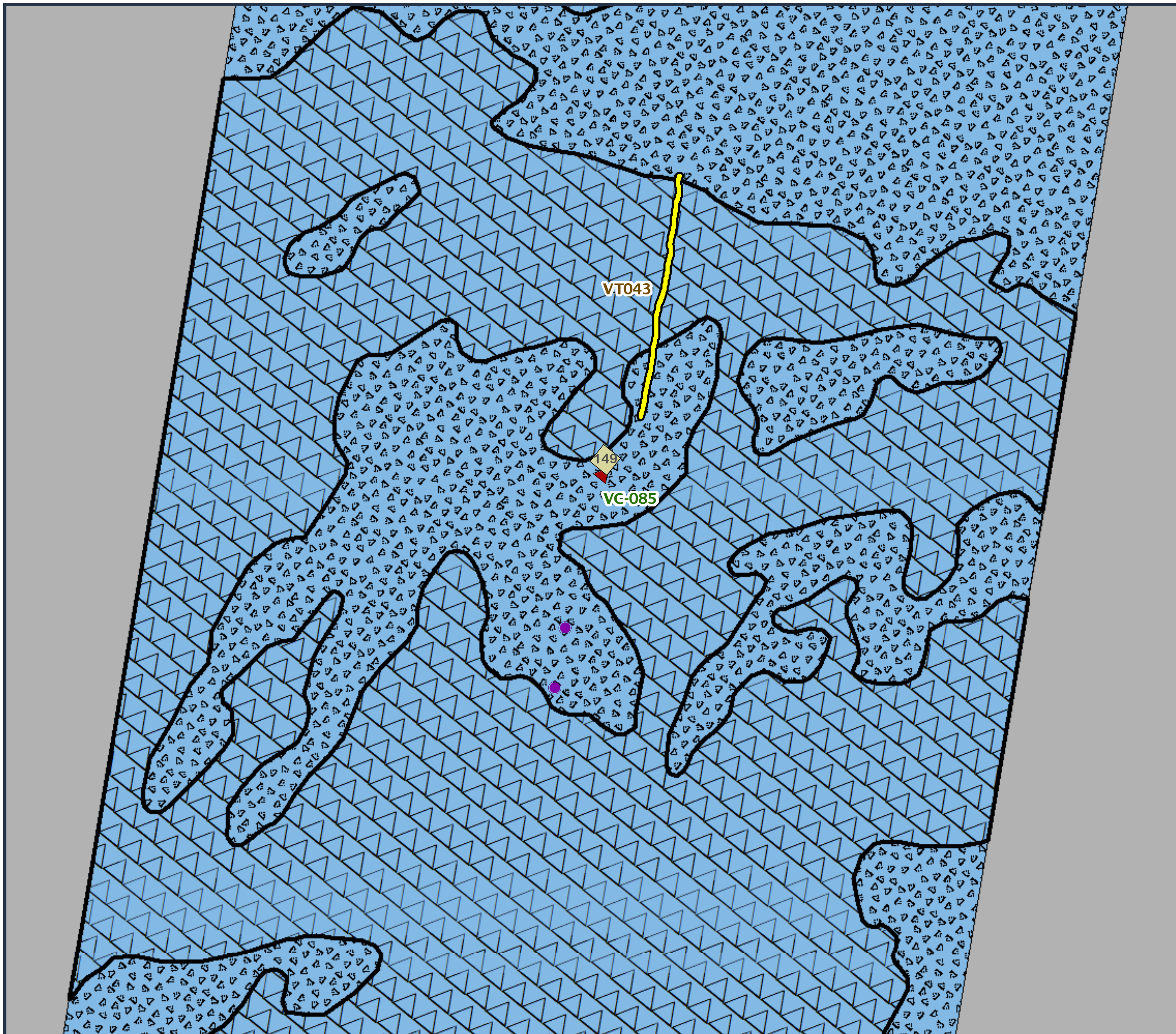
Scale 1:5,000
1 inch = 0 km

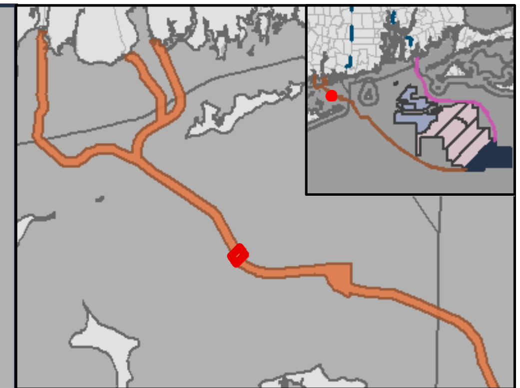
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Mega Ripple
- Ripple
- Heterogeneous Habitat
- Complex Station - Vibracore
- Complex Mix Station - Video Transect

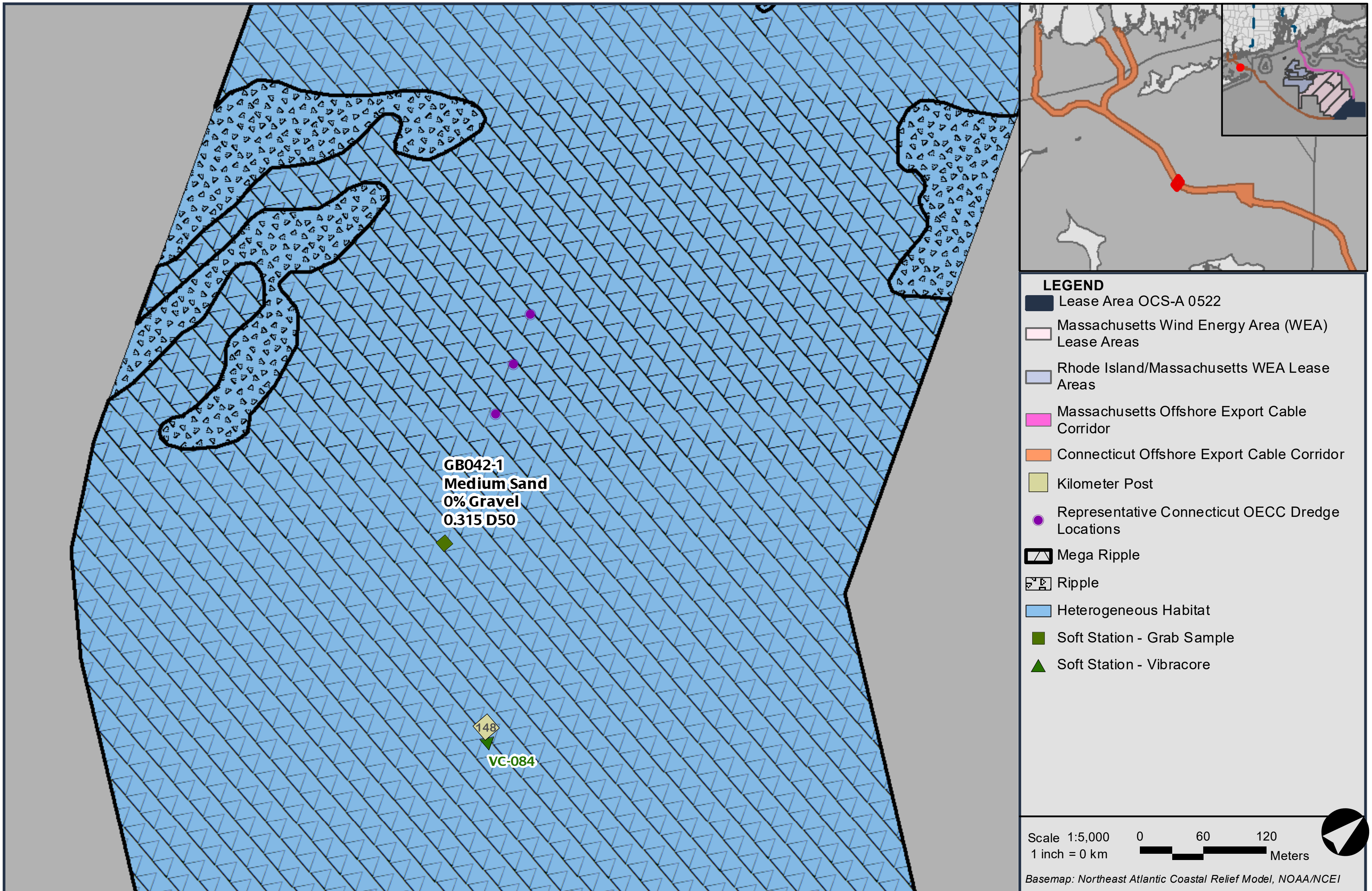
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

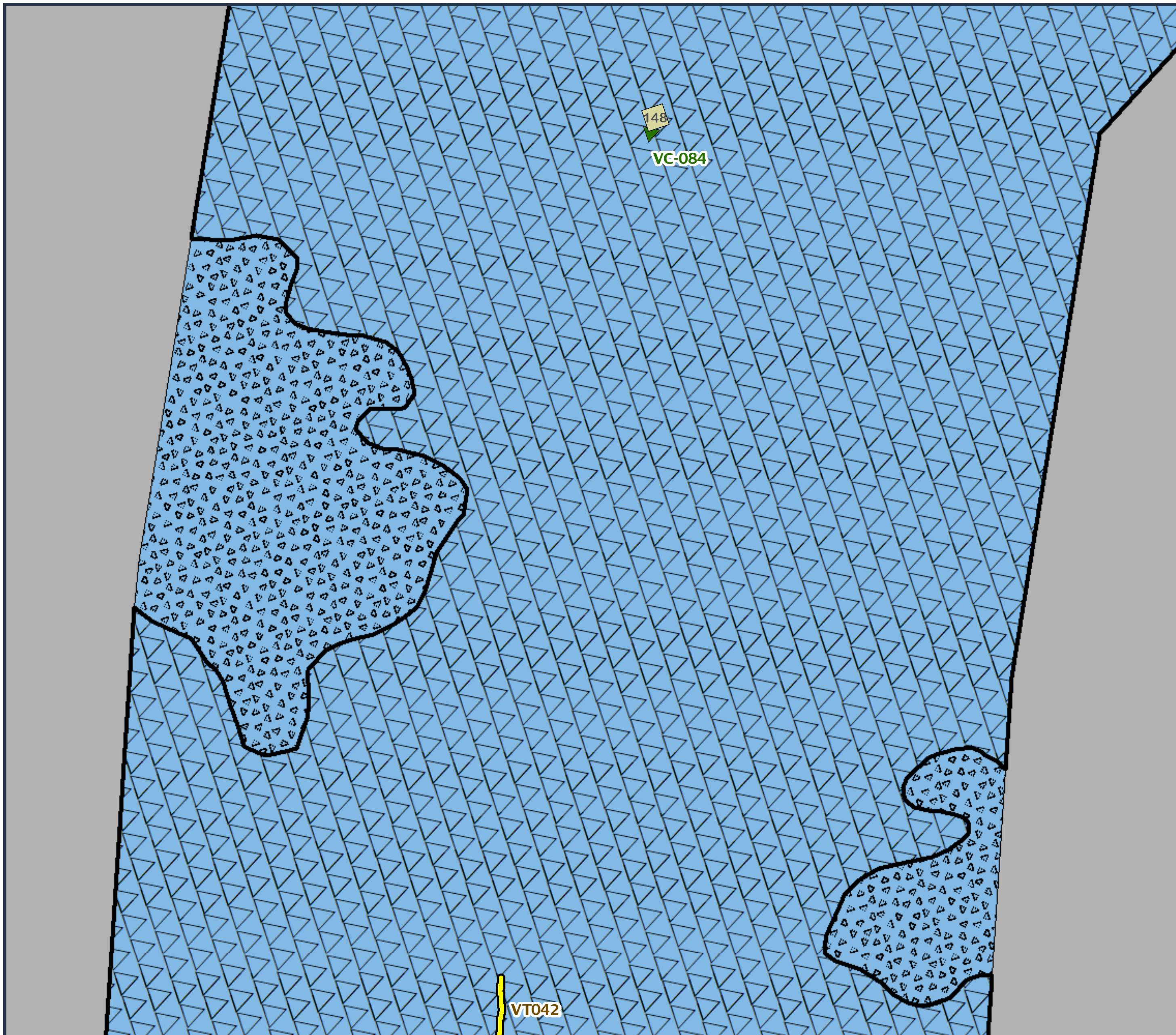
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

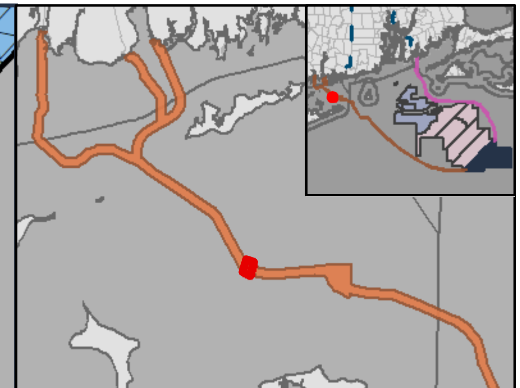
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Mega Ripple
- Ripple
- Heterogeneous Habitat
- Soft Station - Vibracore
- Complex Mix Station - Video Transect

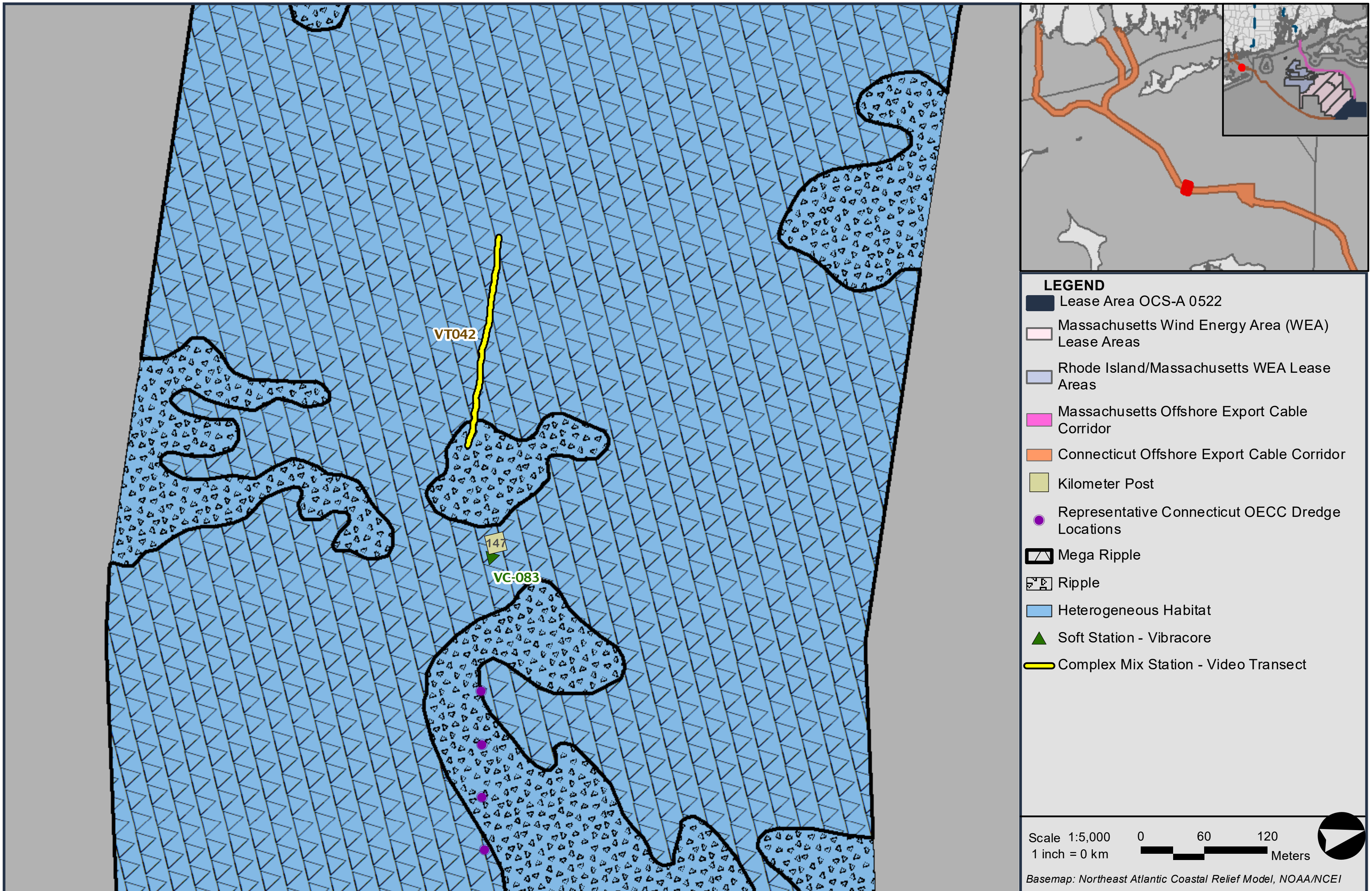
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

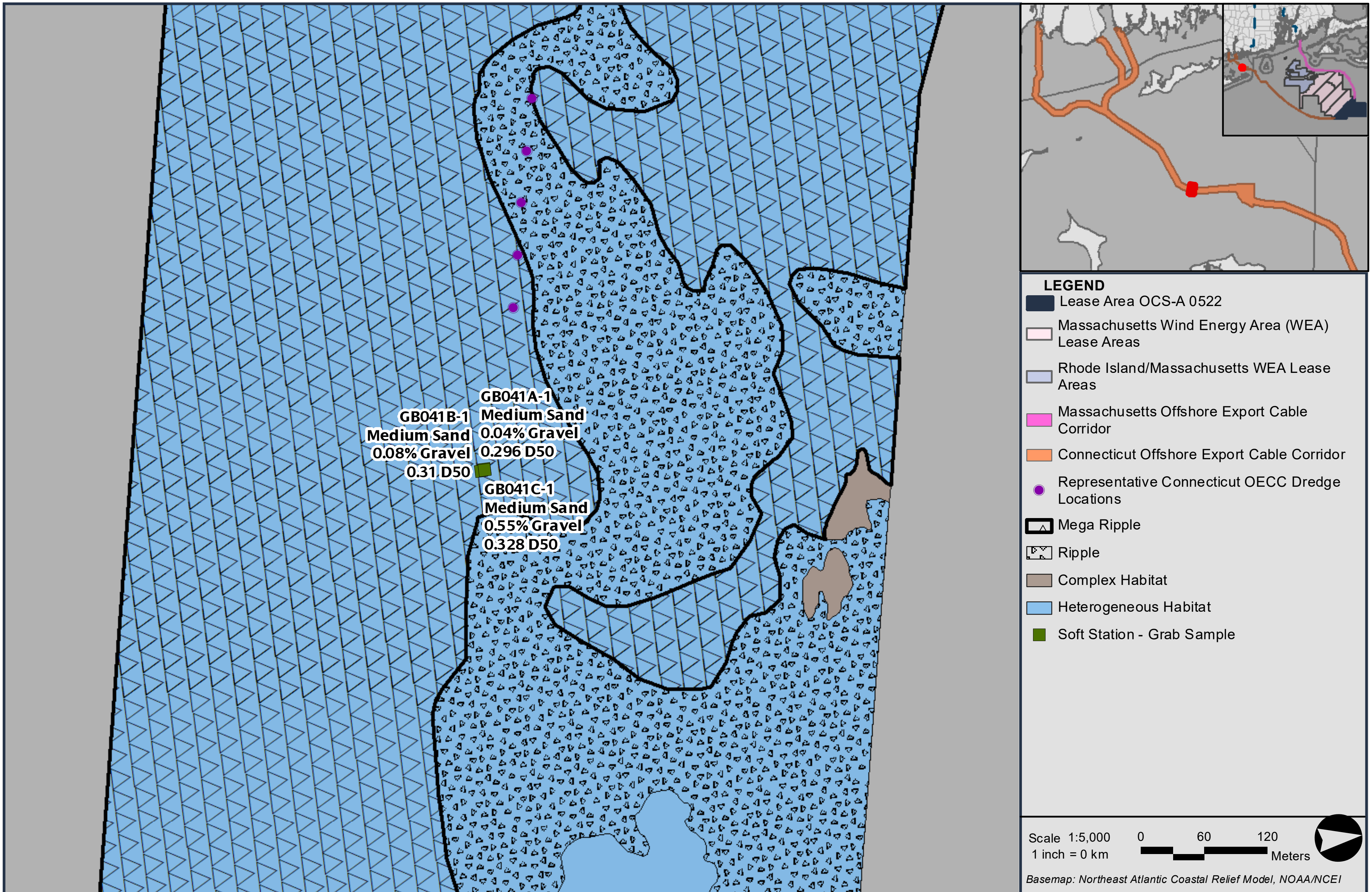
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



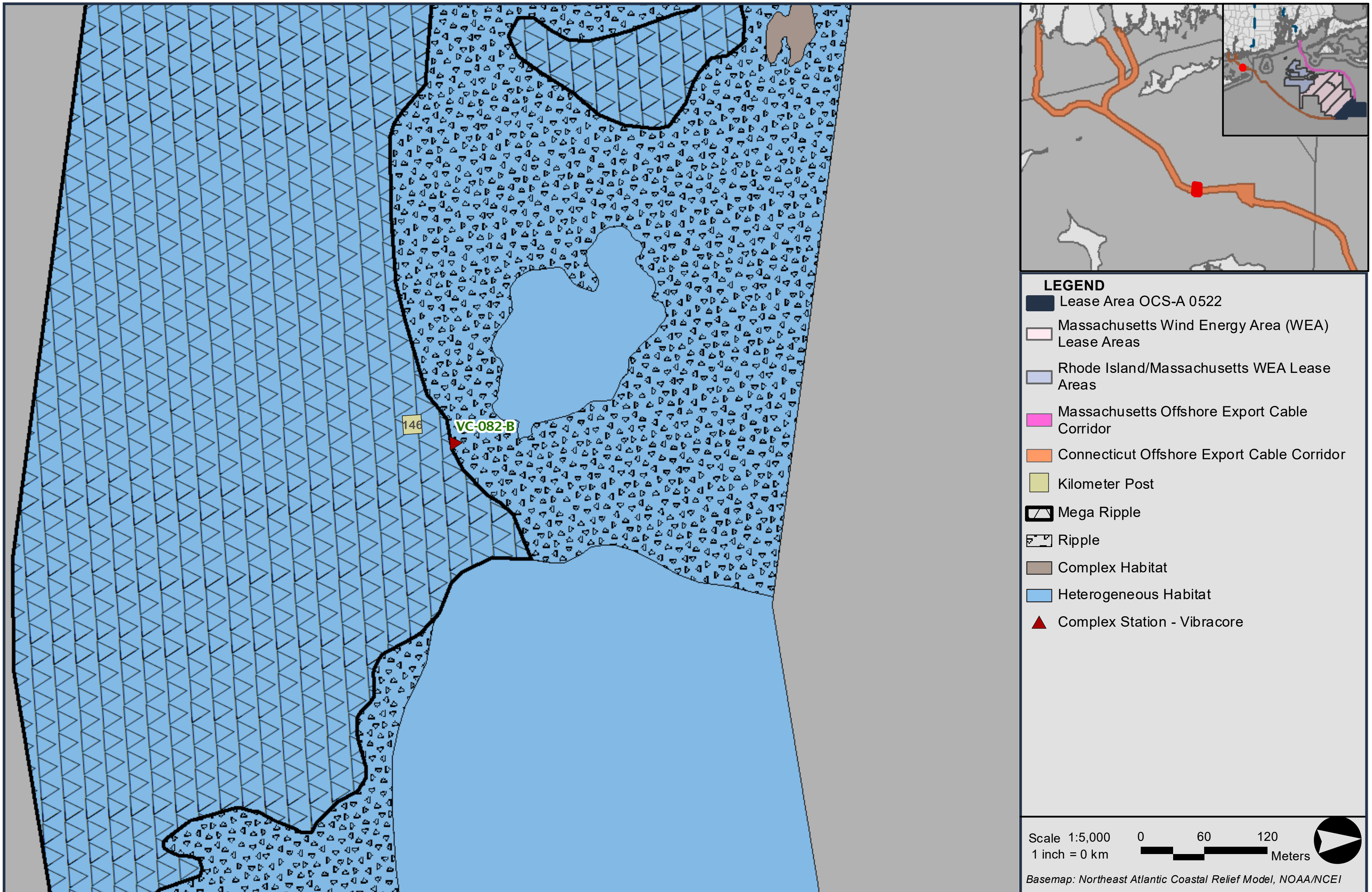
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



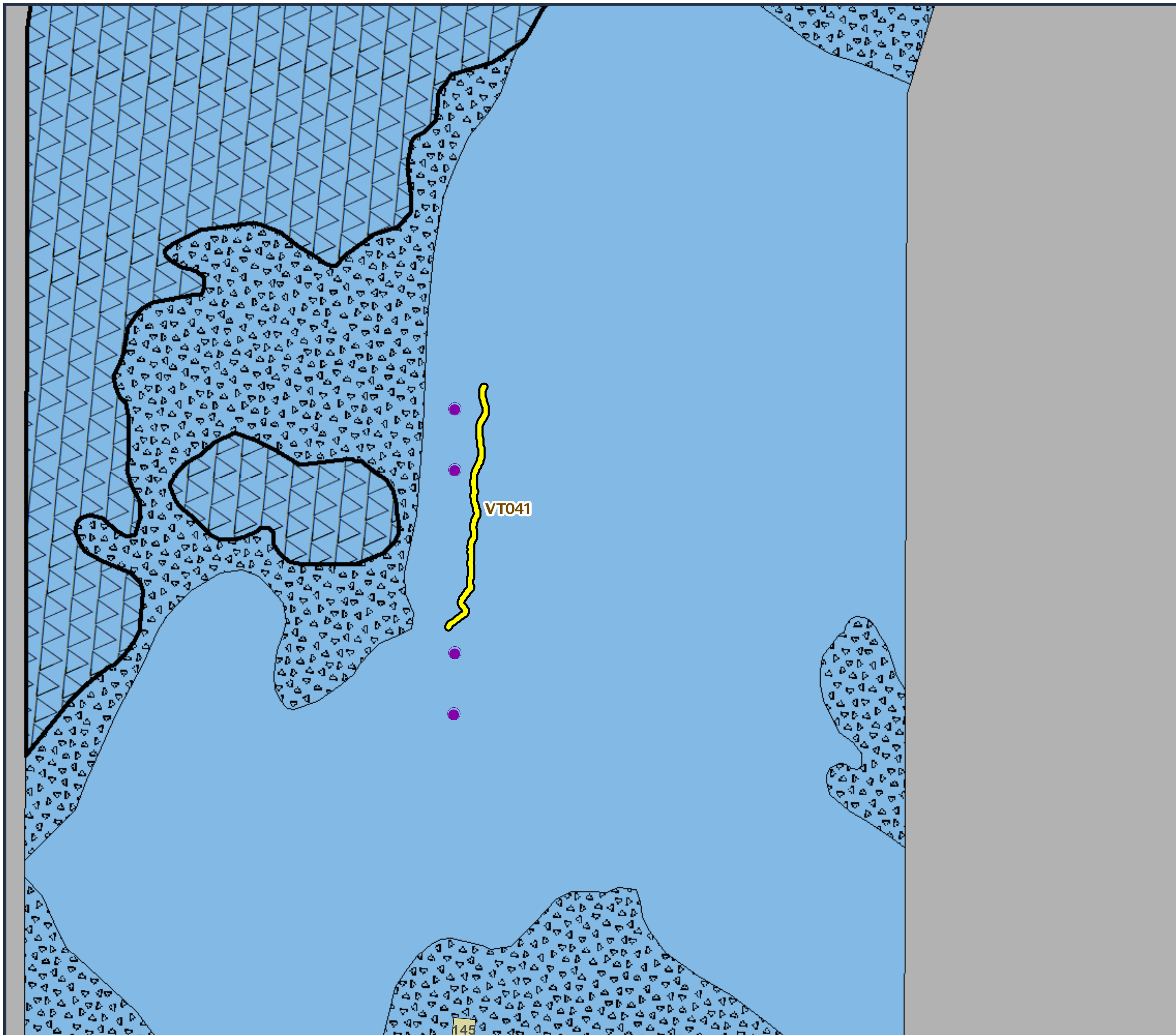
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

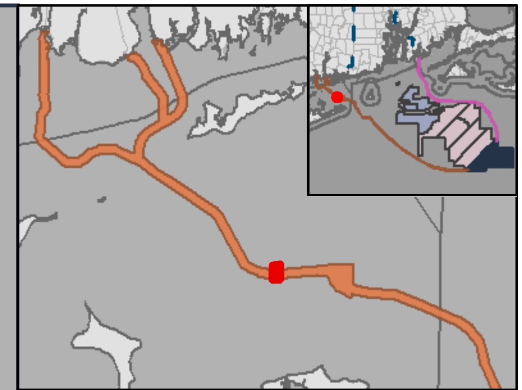
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Mega Ripple
- Ripple
- Complex Habitat
- Heterogeneous Habitat
- Complex Mix Station - Video Transect

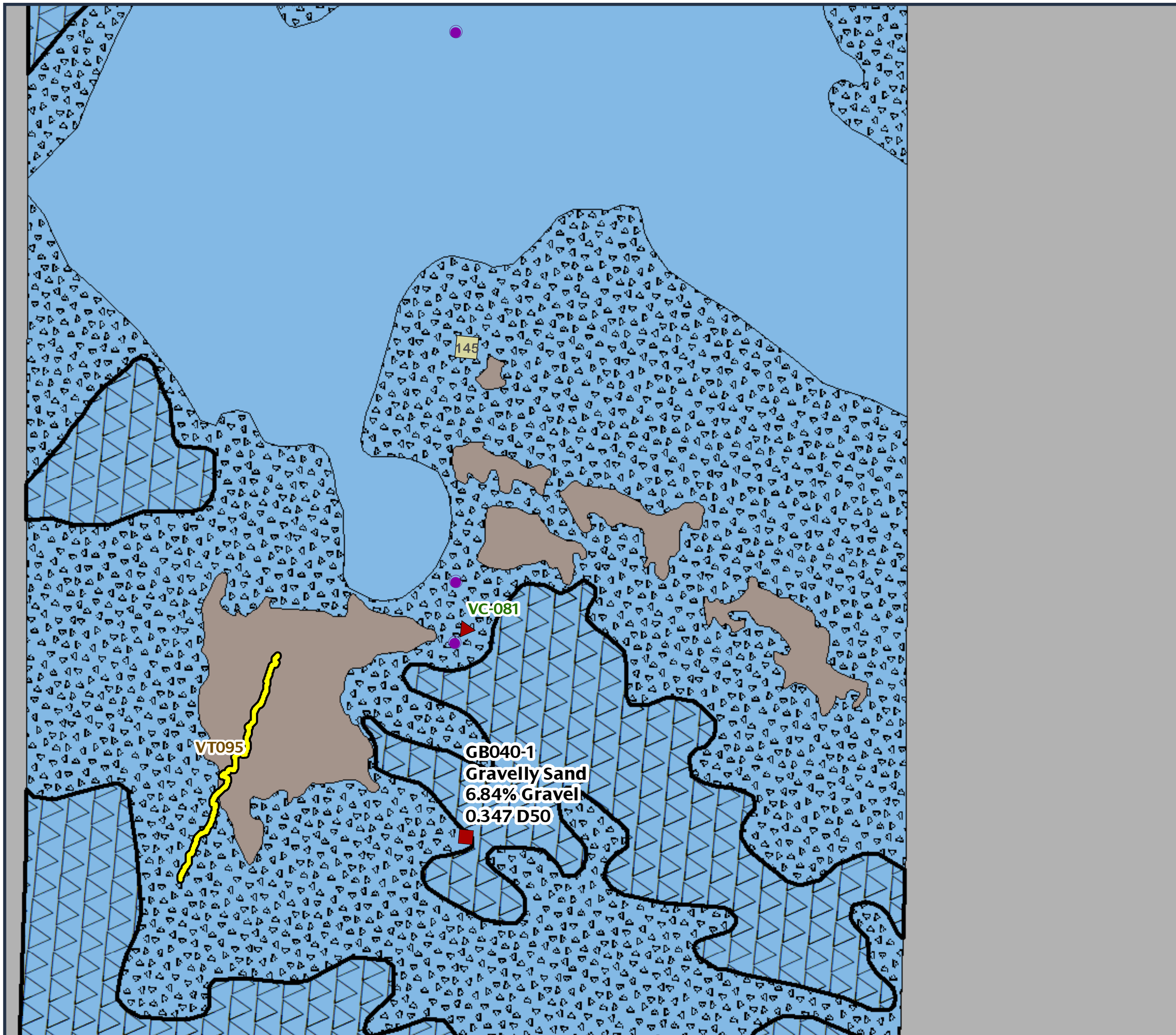
Scale 1:5,000
1 inch = 0 km

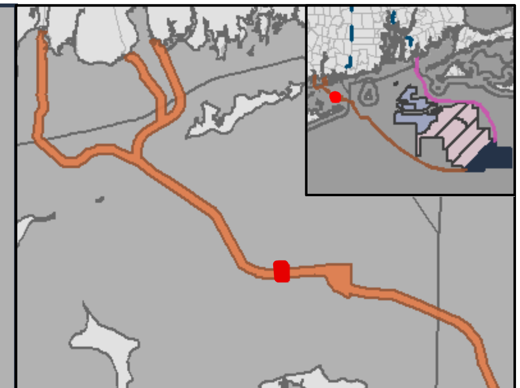
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





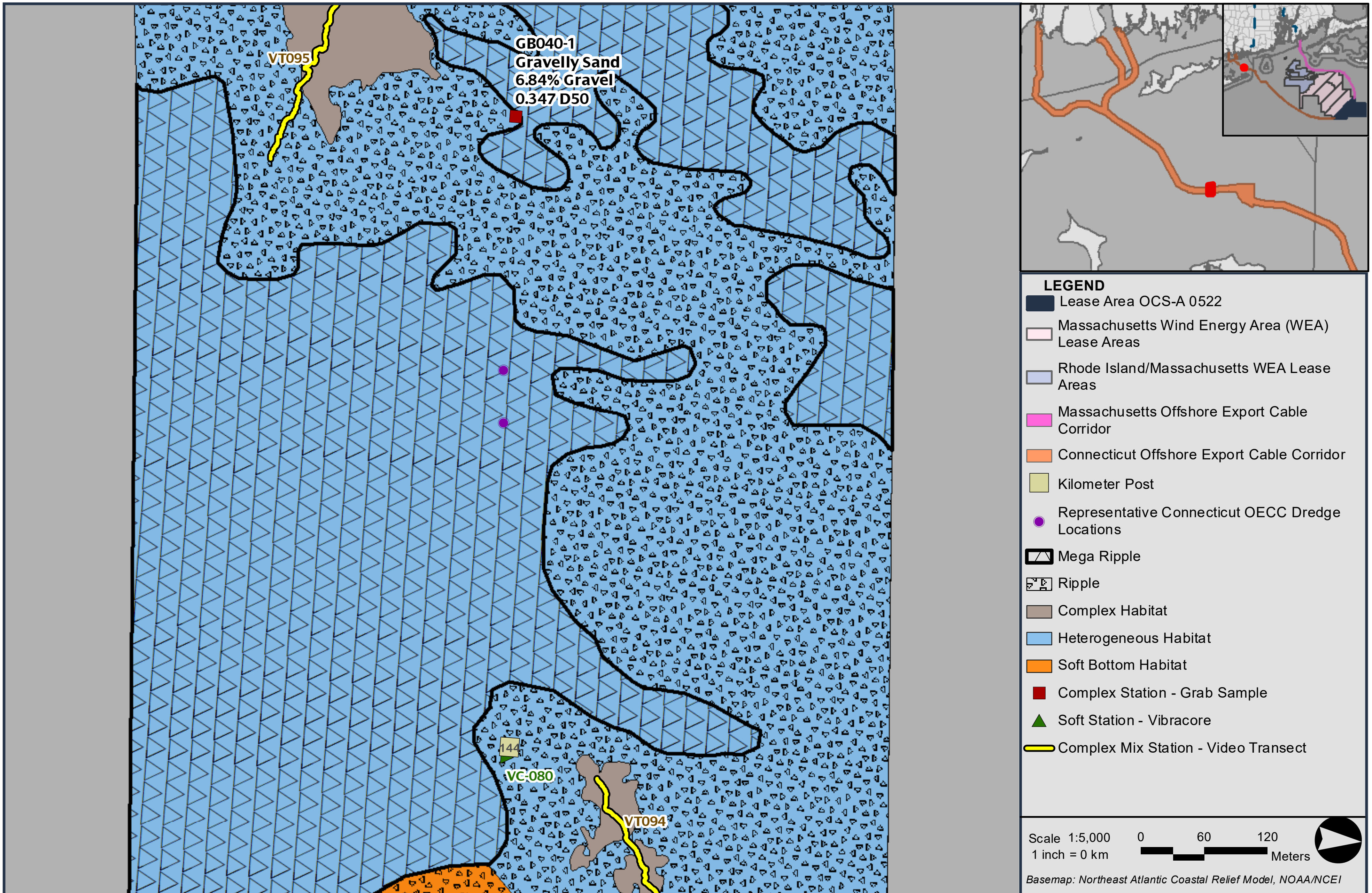
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Mega Ripple
- Ripple
- Complex Habitat
- Heterogeneous Habitat
- Complex Station - Grab Sample
- Complex Station - Vibracore
- Complex Mix Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

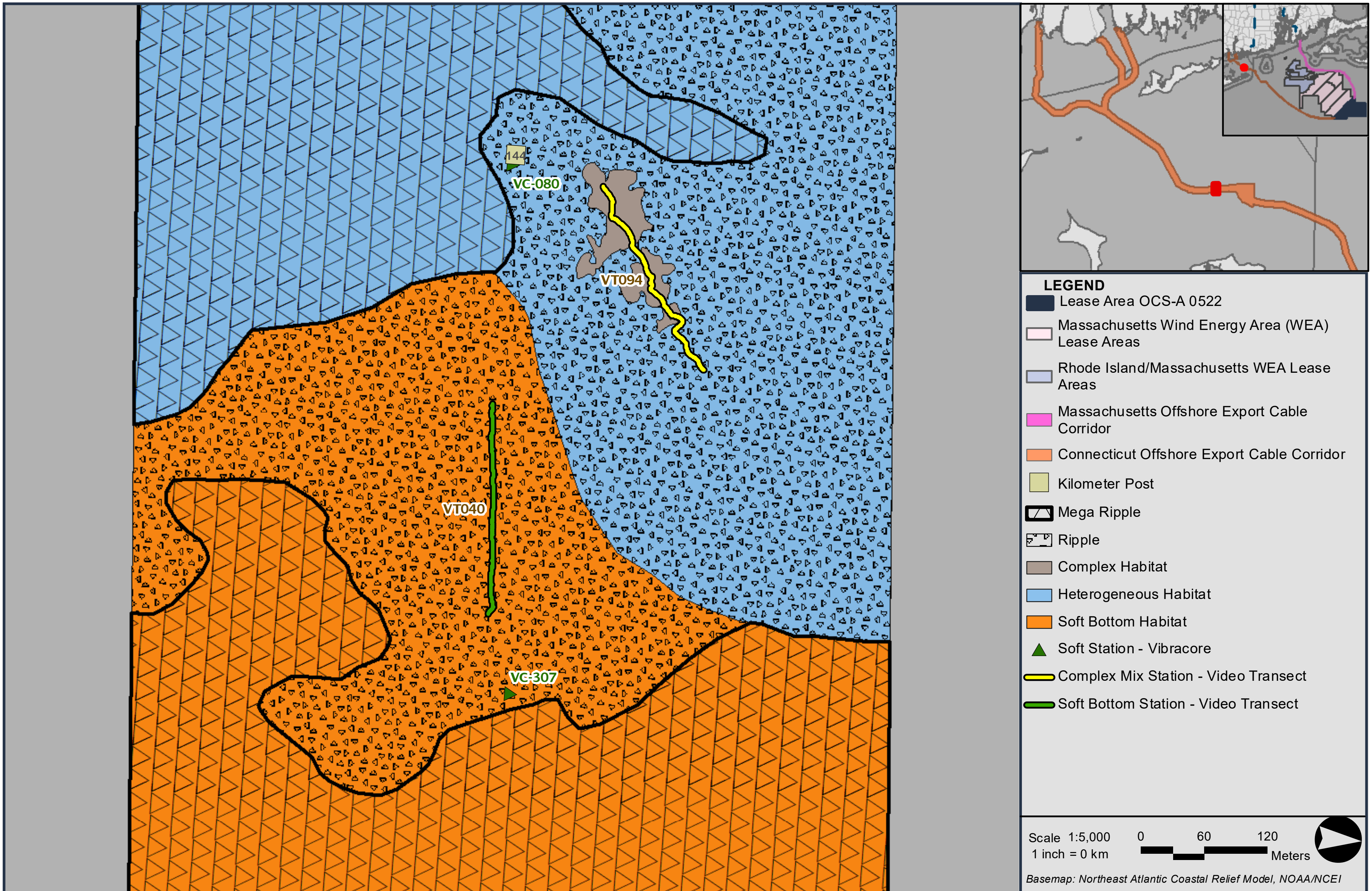
VINEYARD NORTHEAST
VINEYARD OFFSHORE



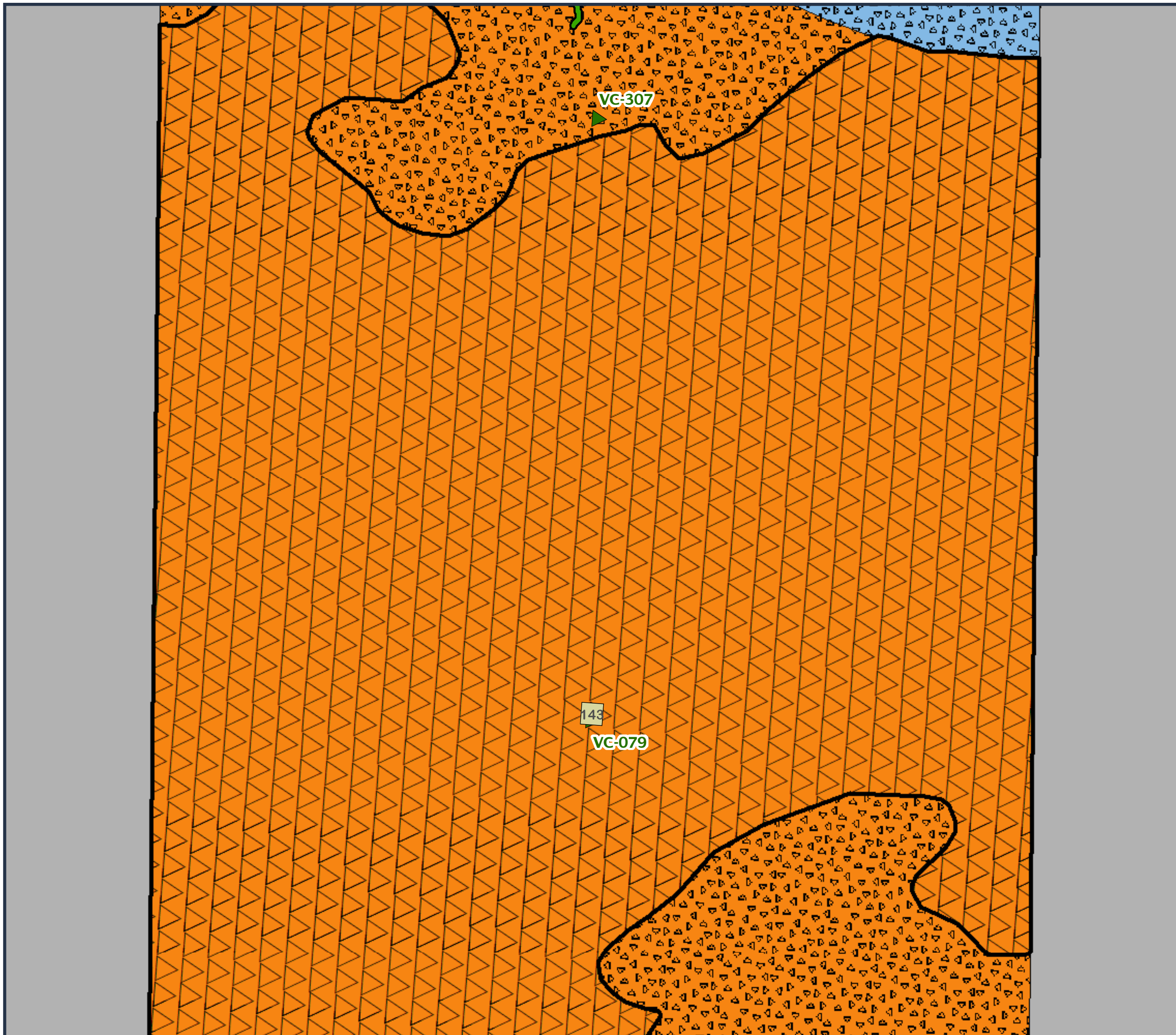
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

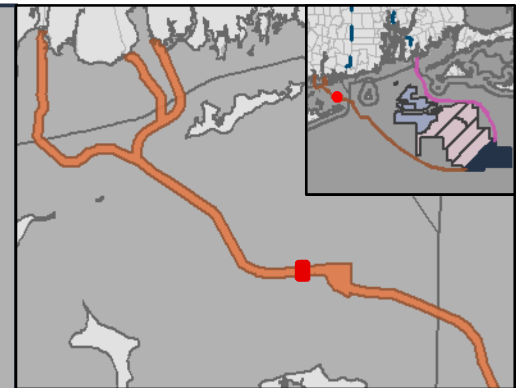
VINEYARD NORTHEAST

VINEYARD OFFSHORE



144
VC-080
VT094
VT040
VC-307
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Mega Ripple
Ripple
Complex Habitat
Heterogeneous Habitat
Soft Bottom Habitat
Soft Station - Vibracore
Complex Mix Station - Video Transect
Soft Bottom Station - Video Transect
Scale 1:5,000
1 inch = 0 km
0
60
120
Meters
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI





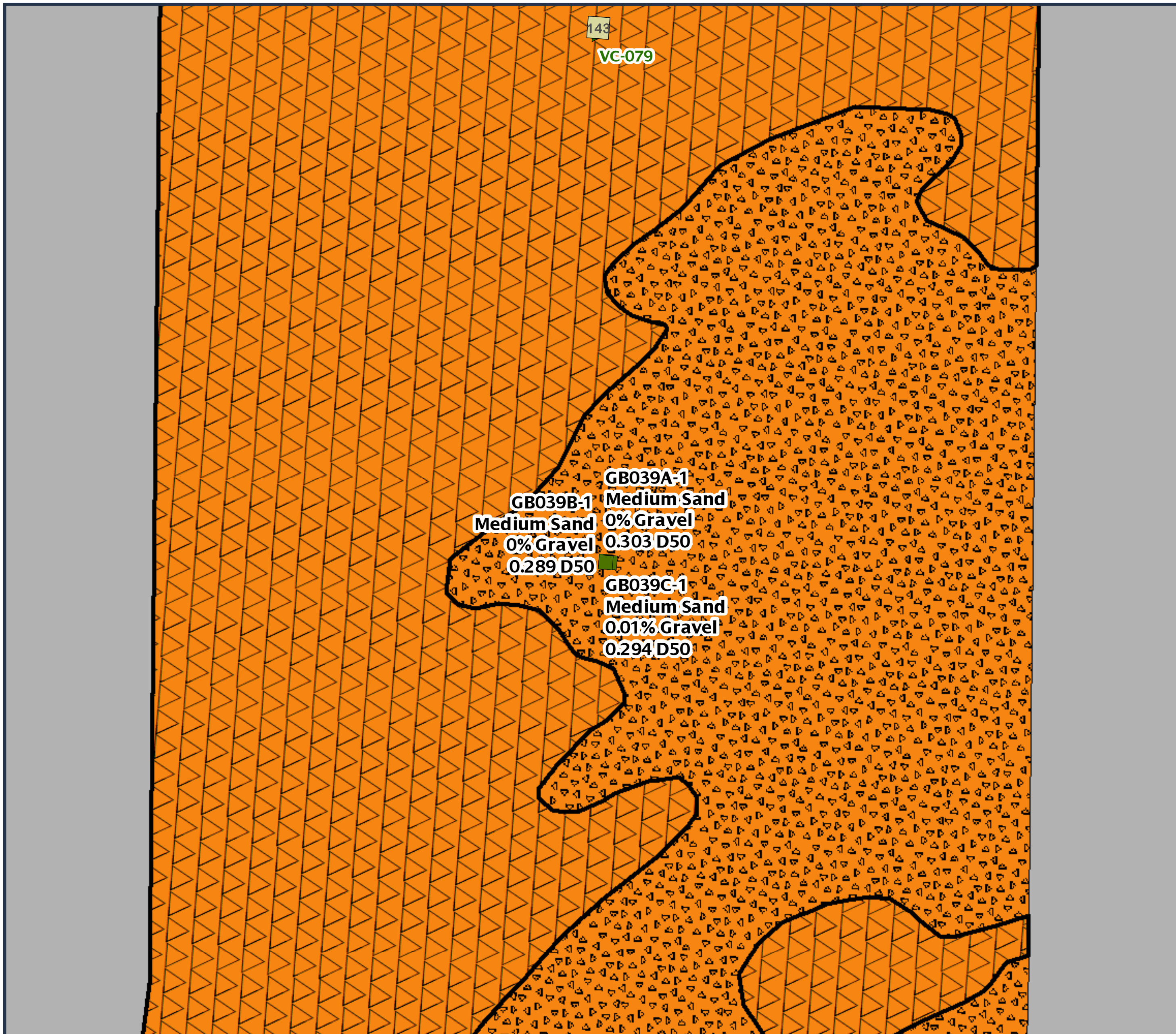
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Mega Ripple
Ripple
Heterogeneous Habitat
Soft Bottom Habitat
Soft Station - Vibracore
Soft Bottom Station - Video Transect

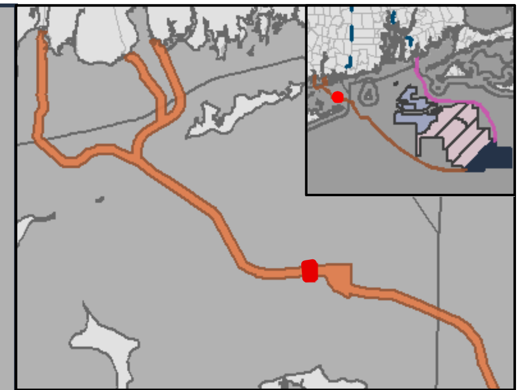
Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





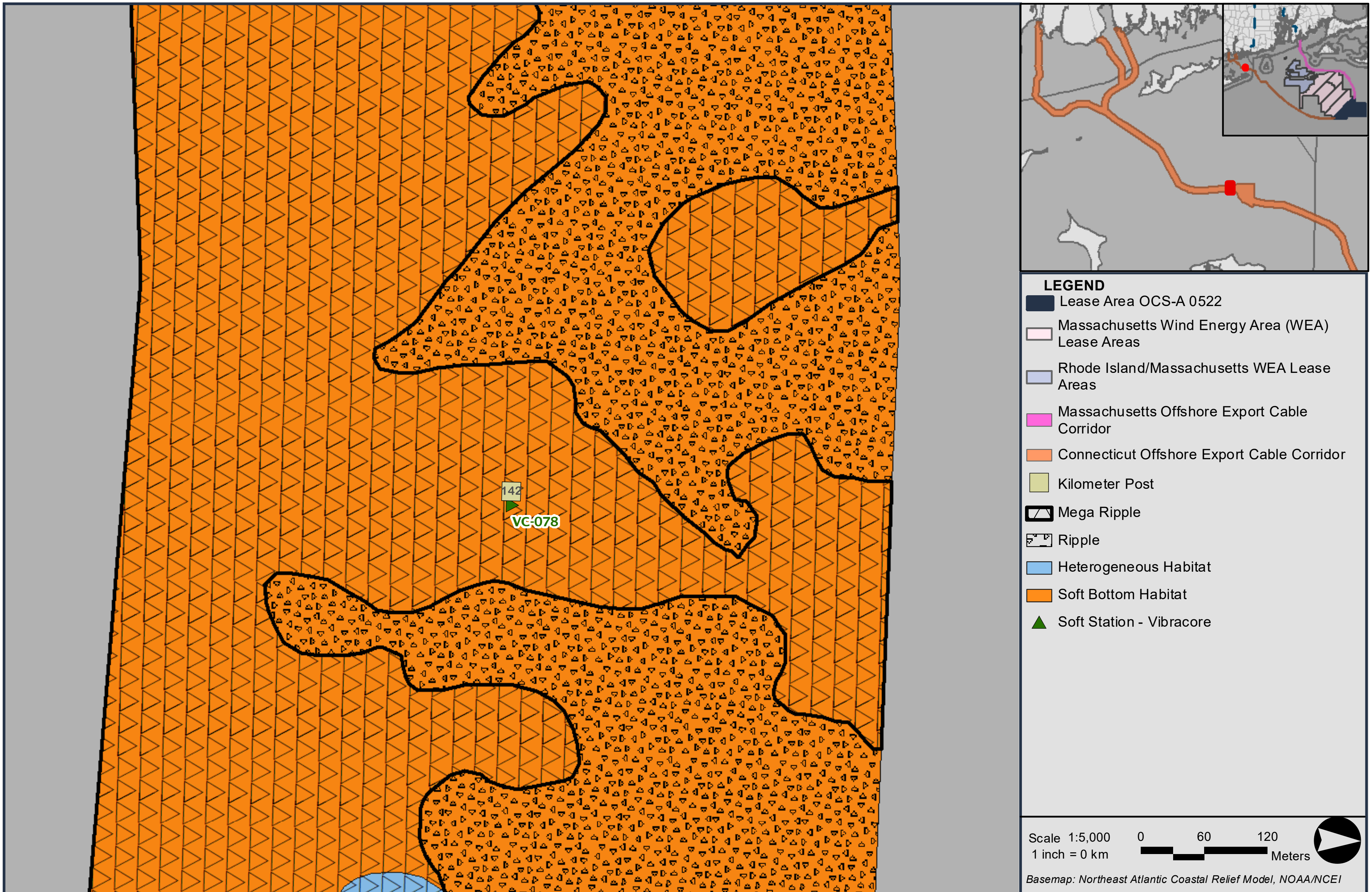
LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Mega Ripple
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

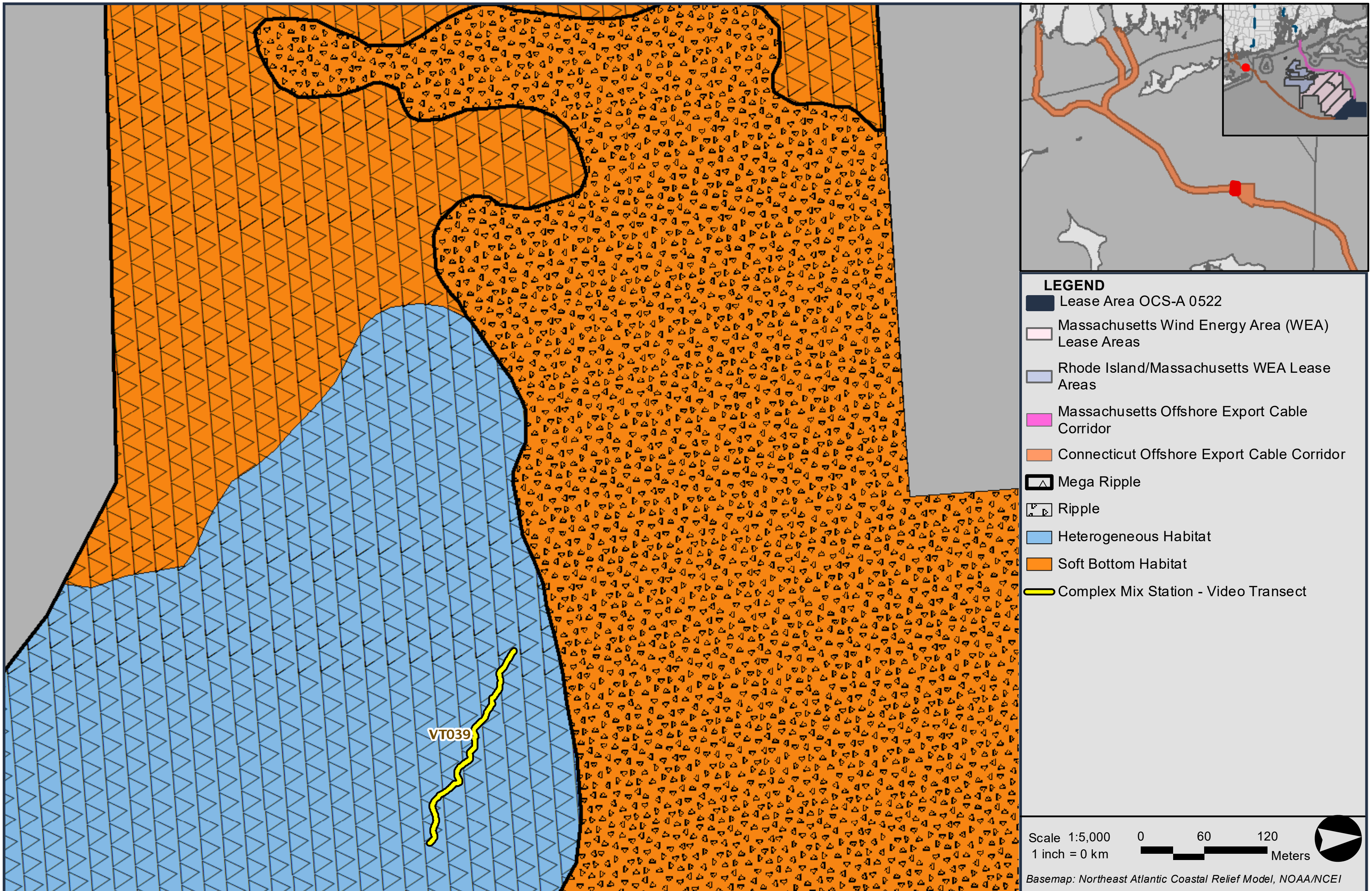
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

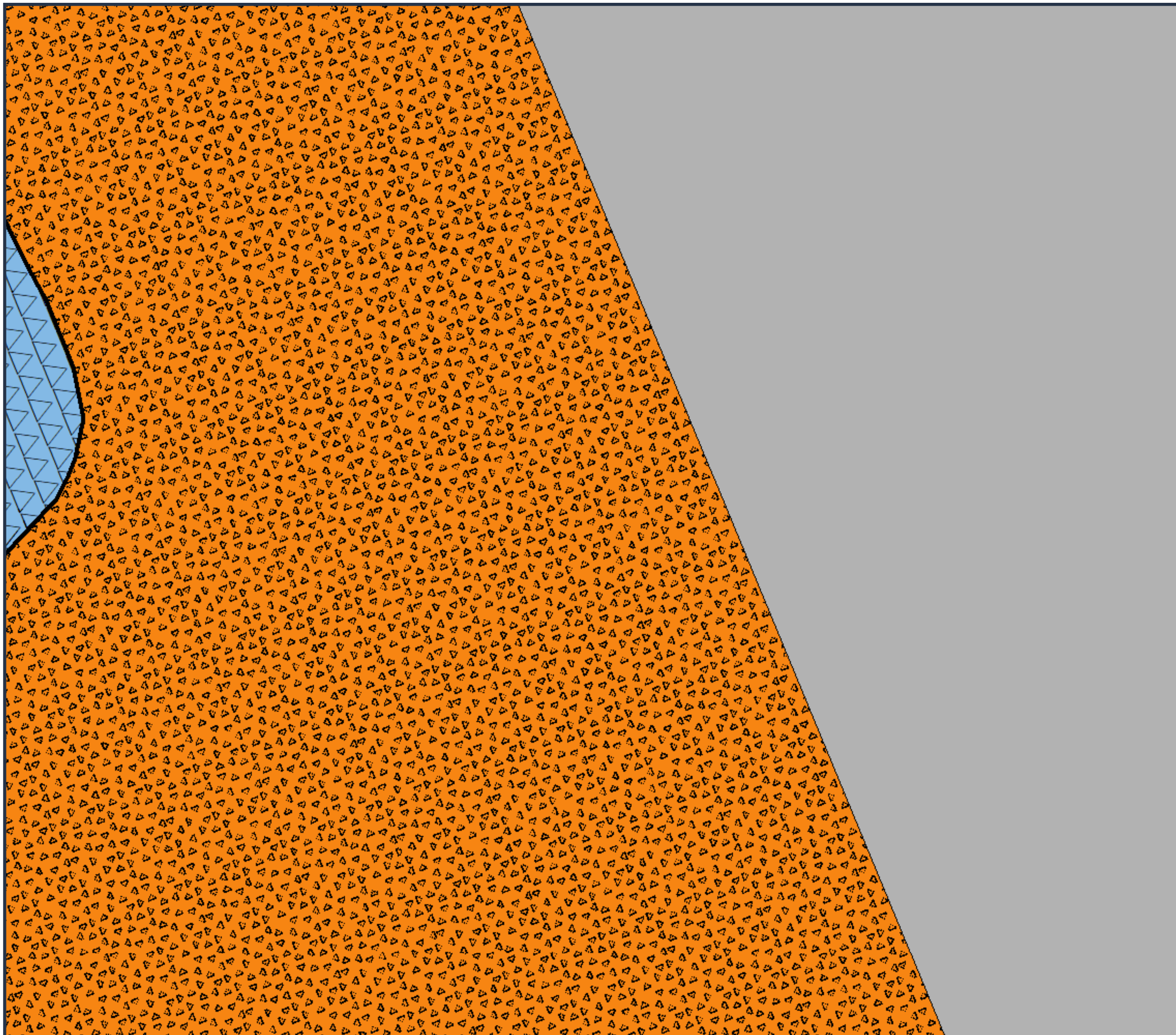


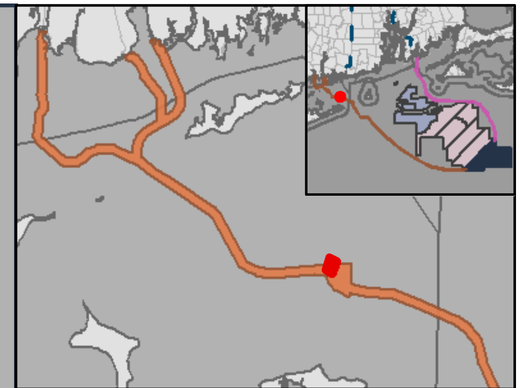
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



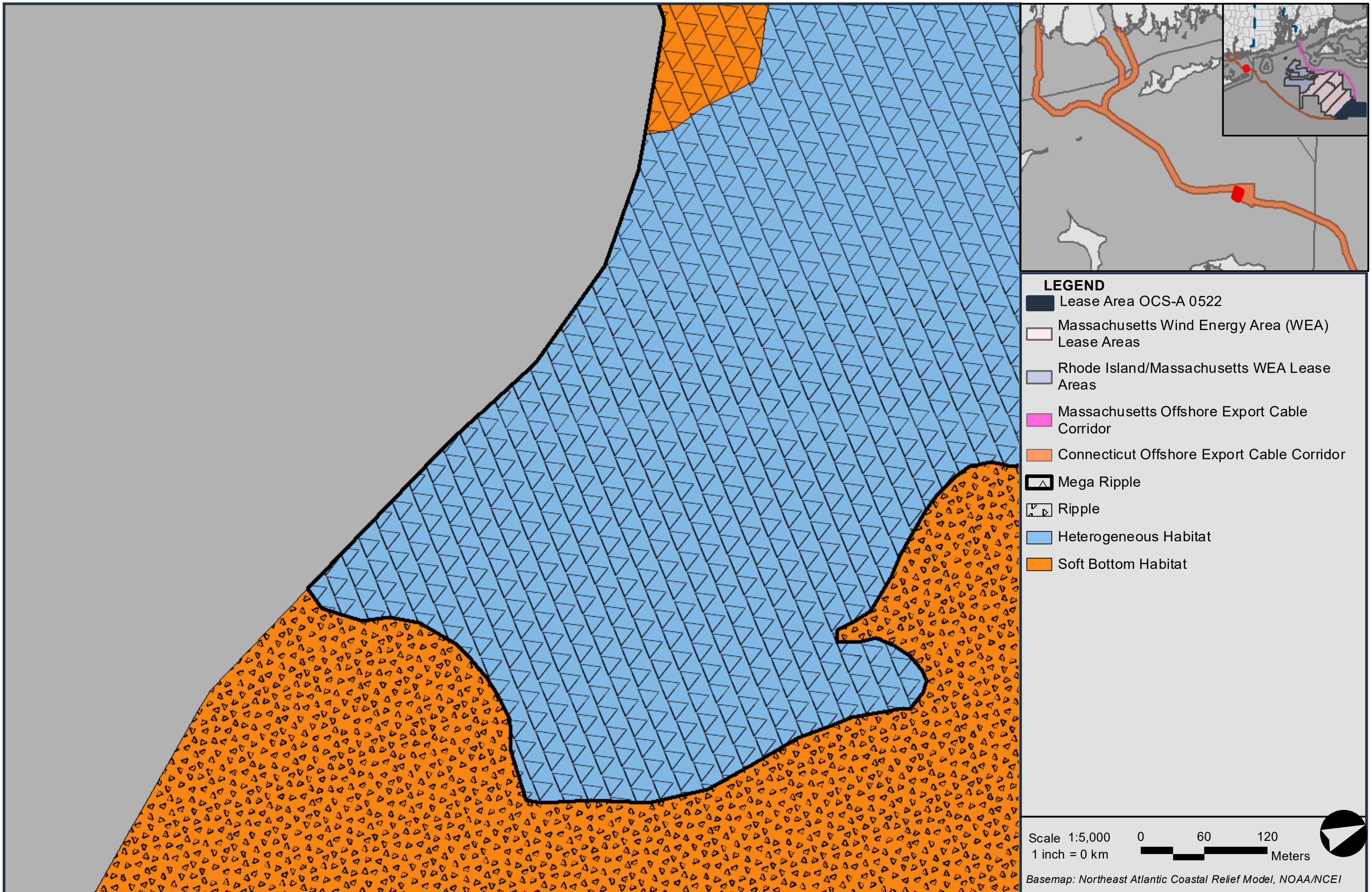
VINEYARD NORTHEAST





VINEYARD NORTHEAST

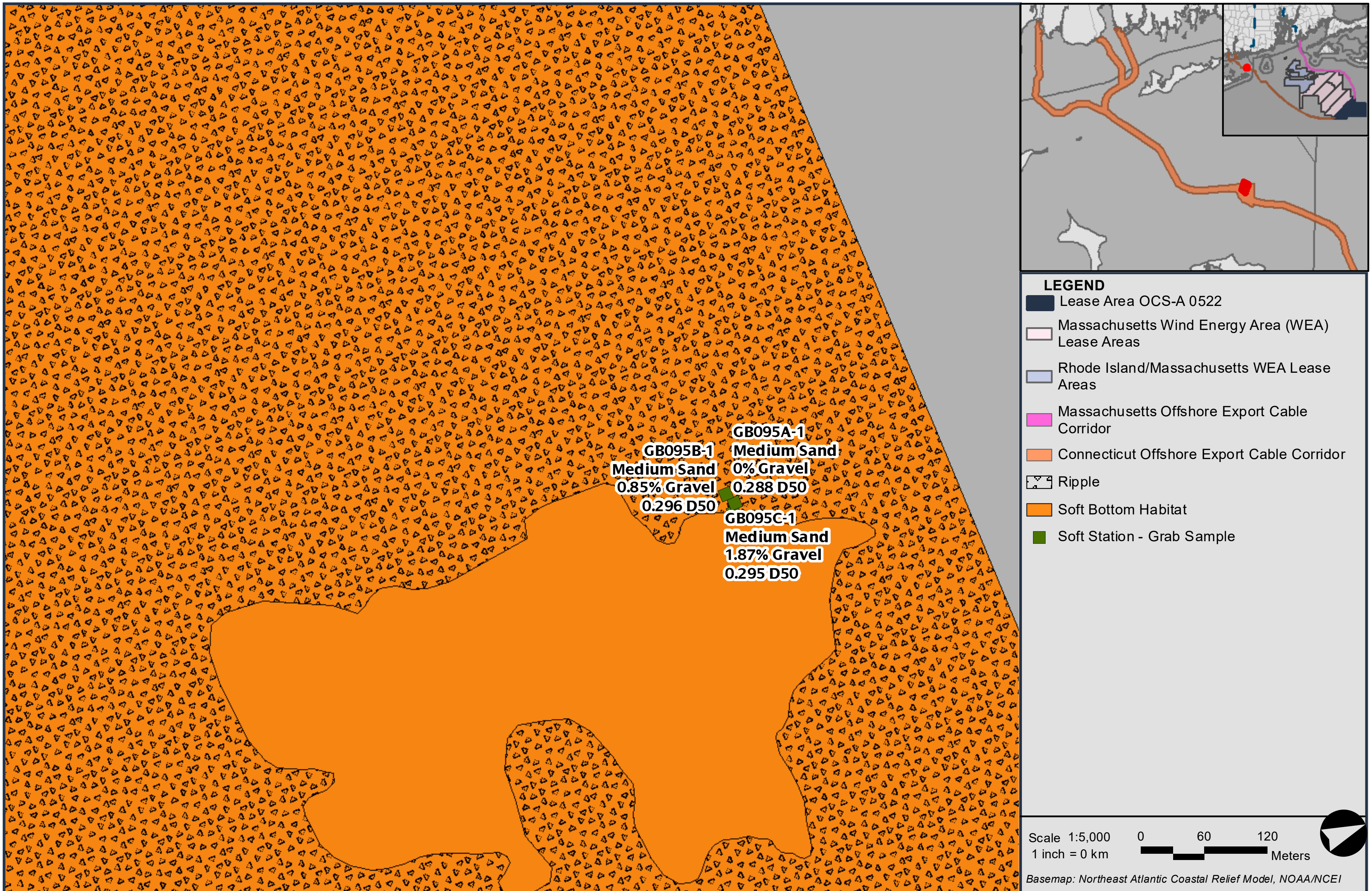
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

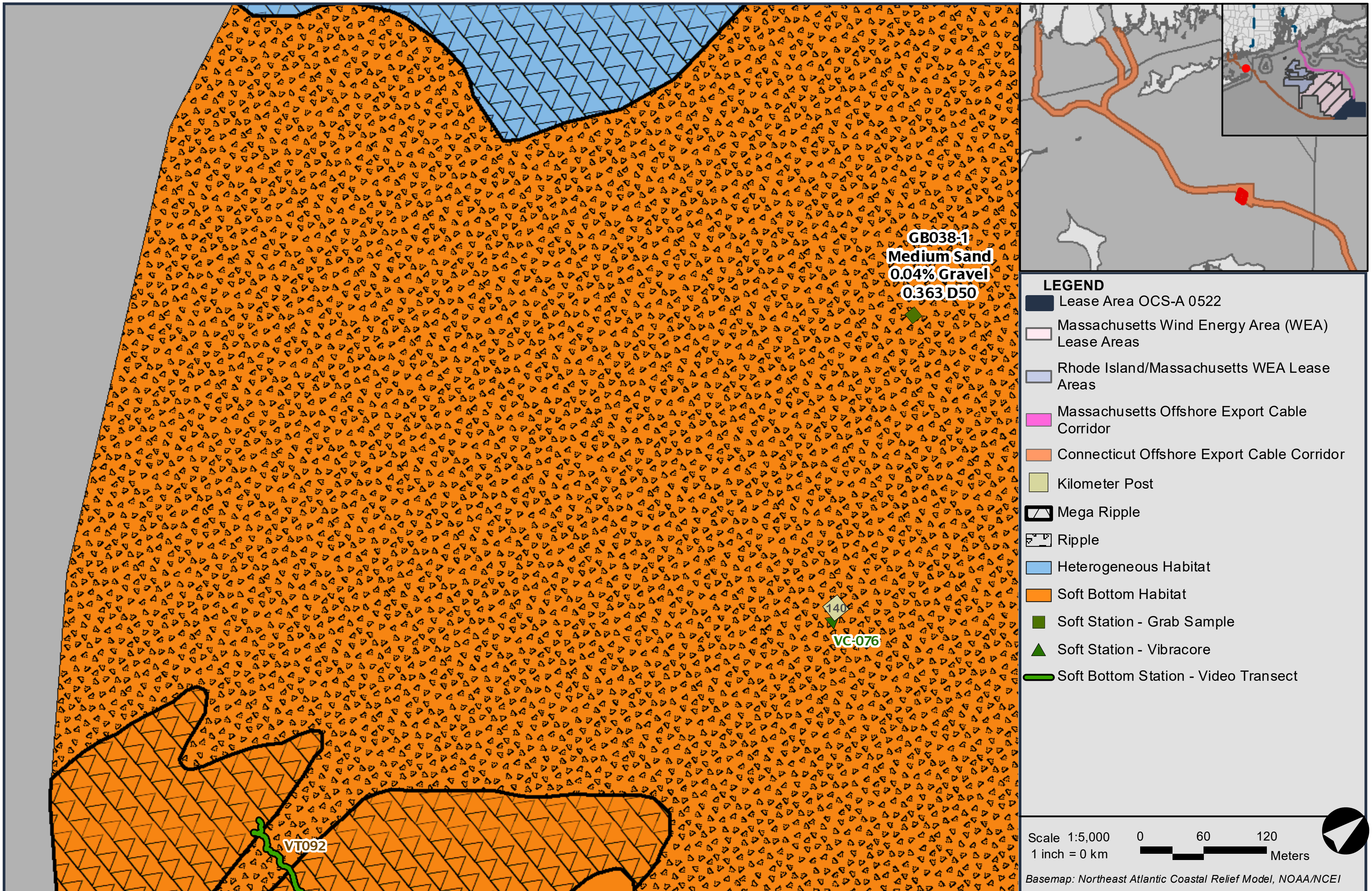
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

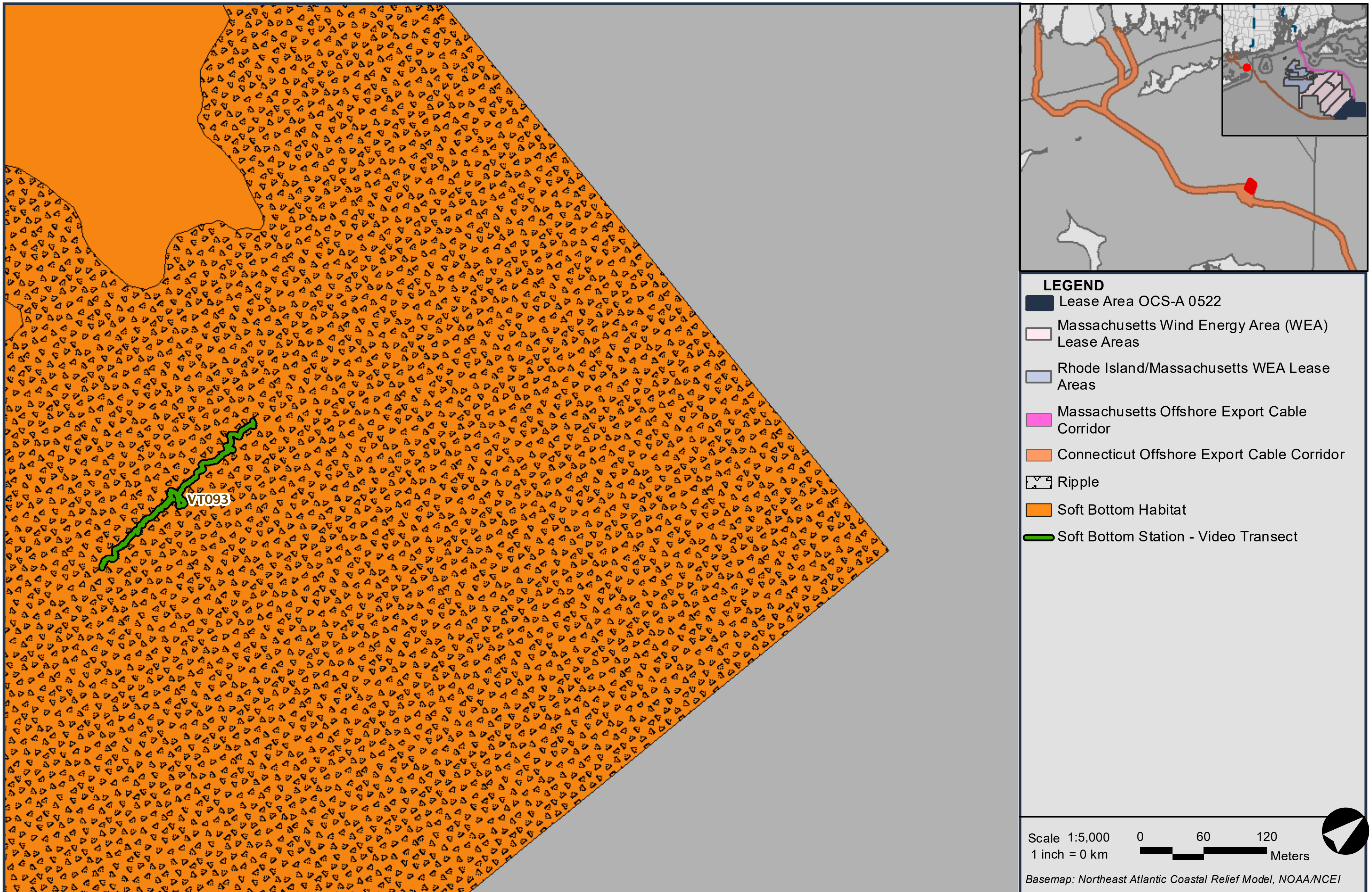
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

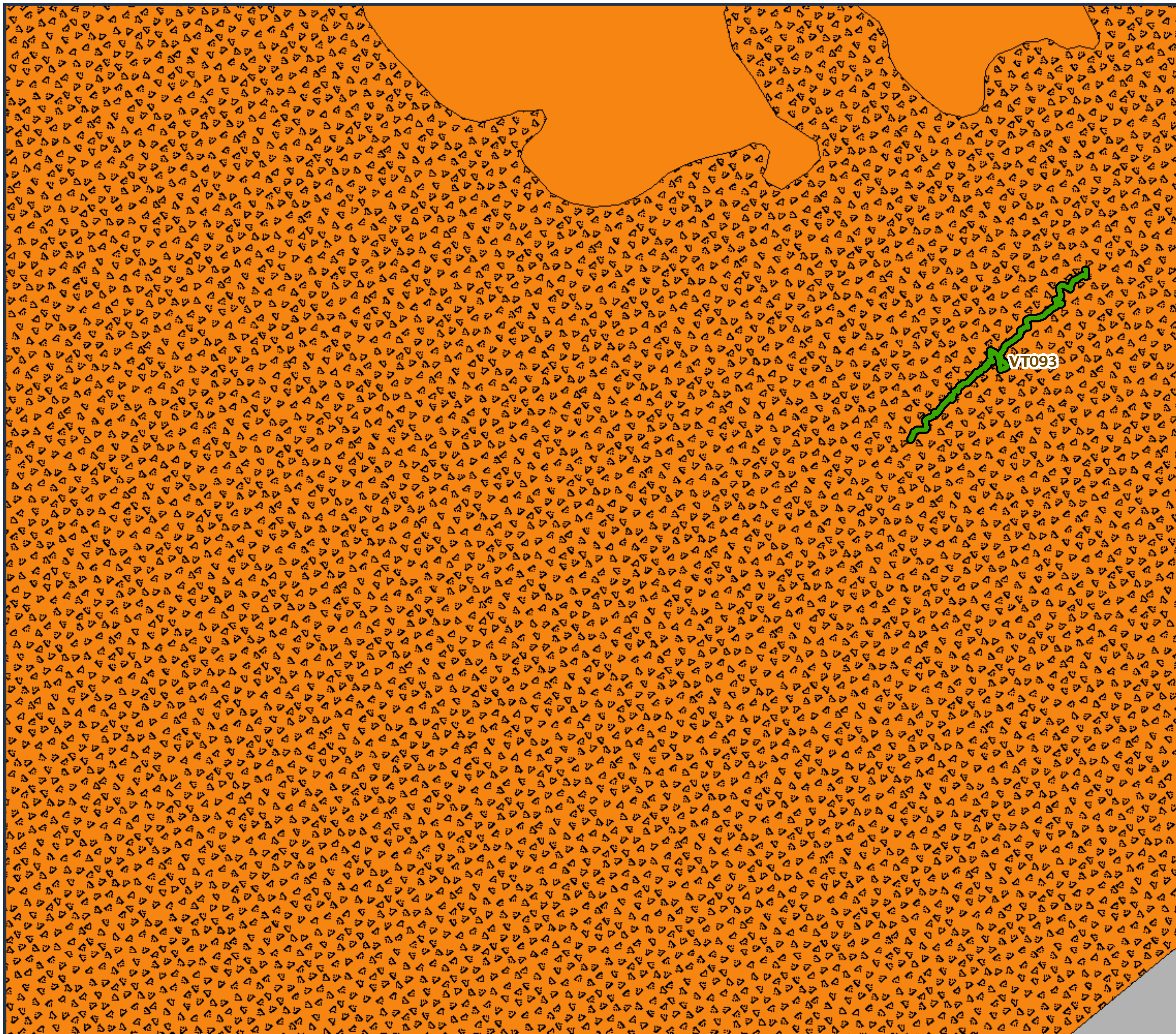
VINEYARD OFFSHORE

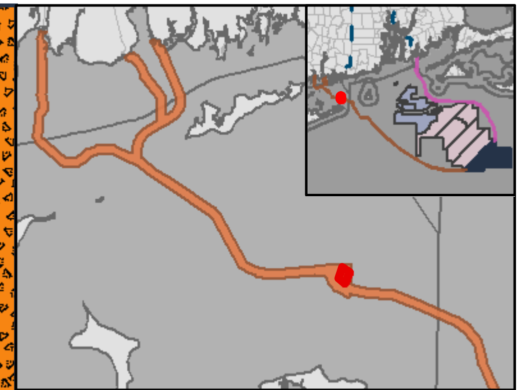


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Ripple
- Soft Bottom Habitat
- Soft Bottom Station - Video Transect

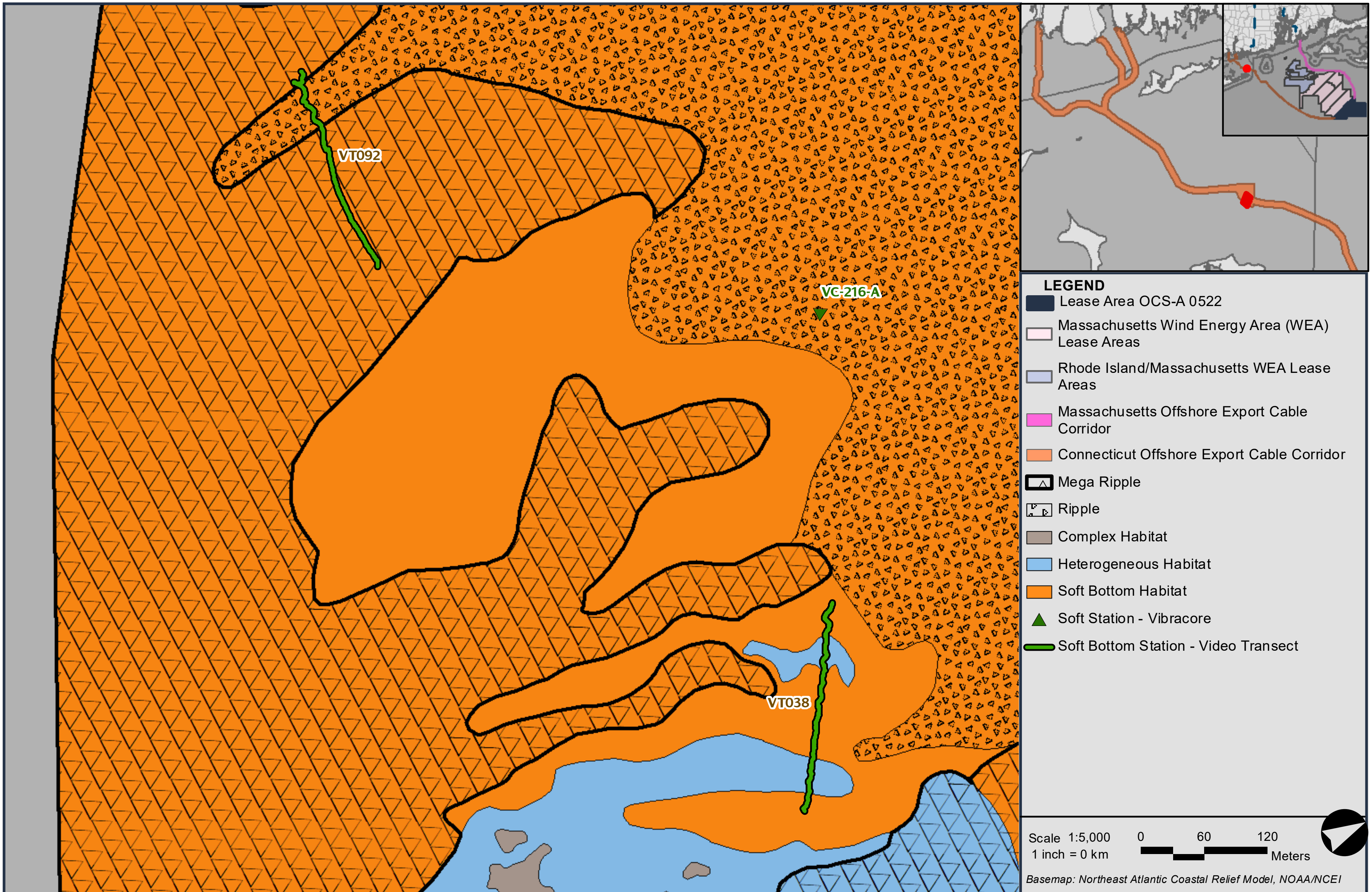
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

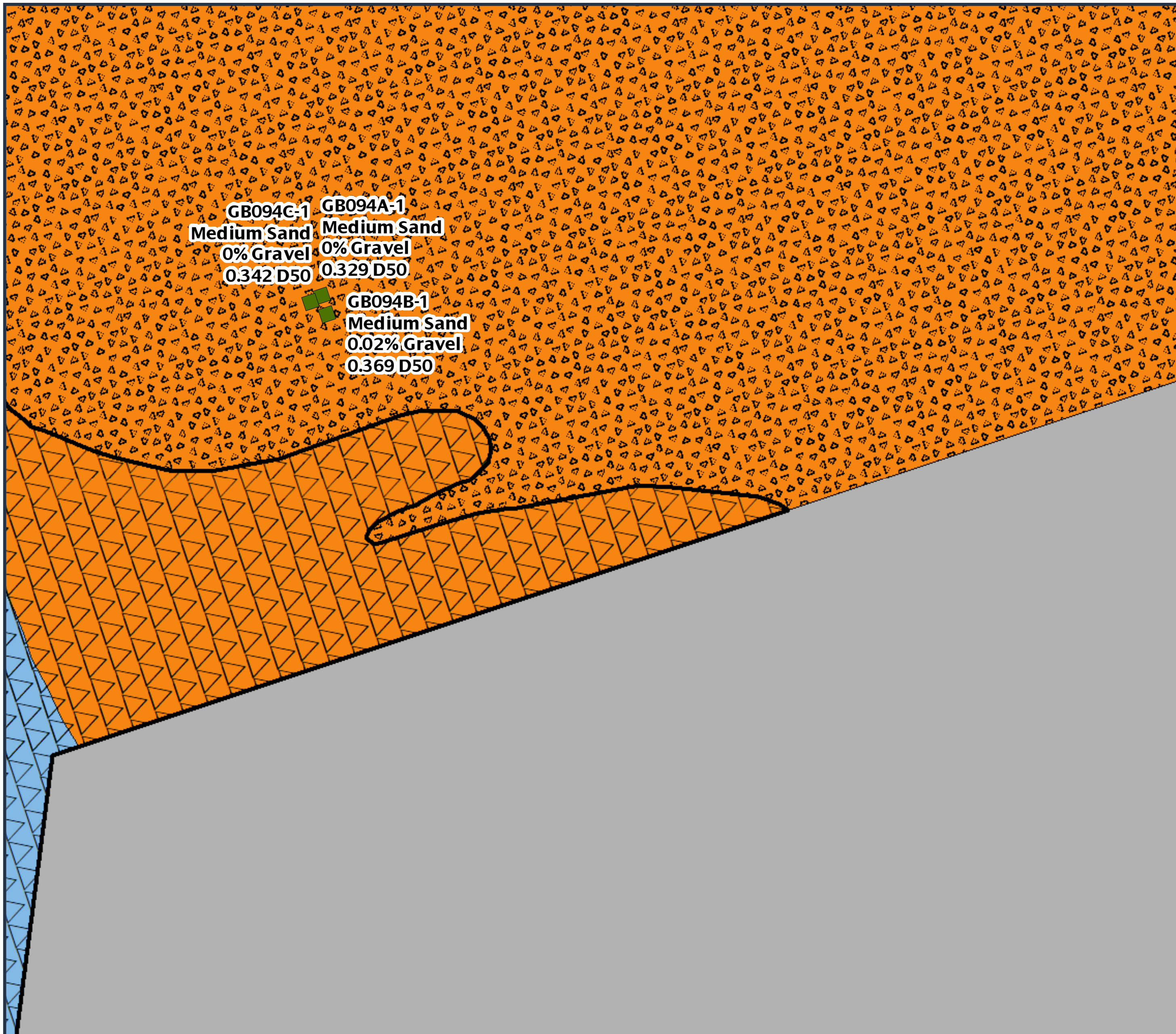
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

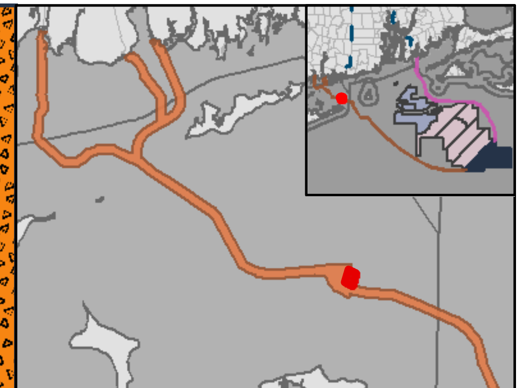
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

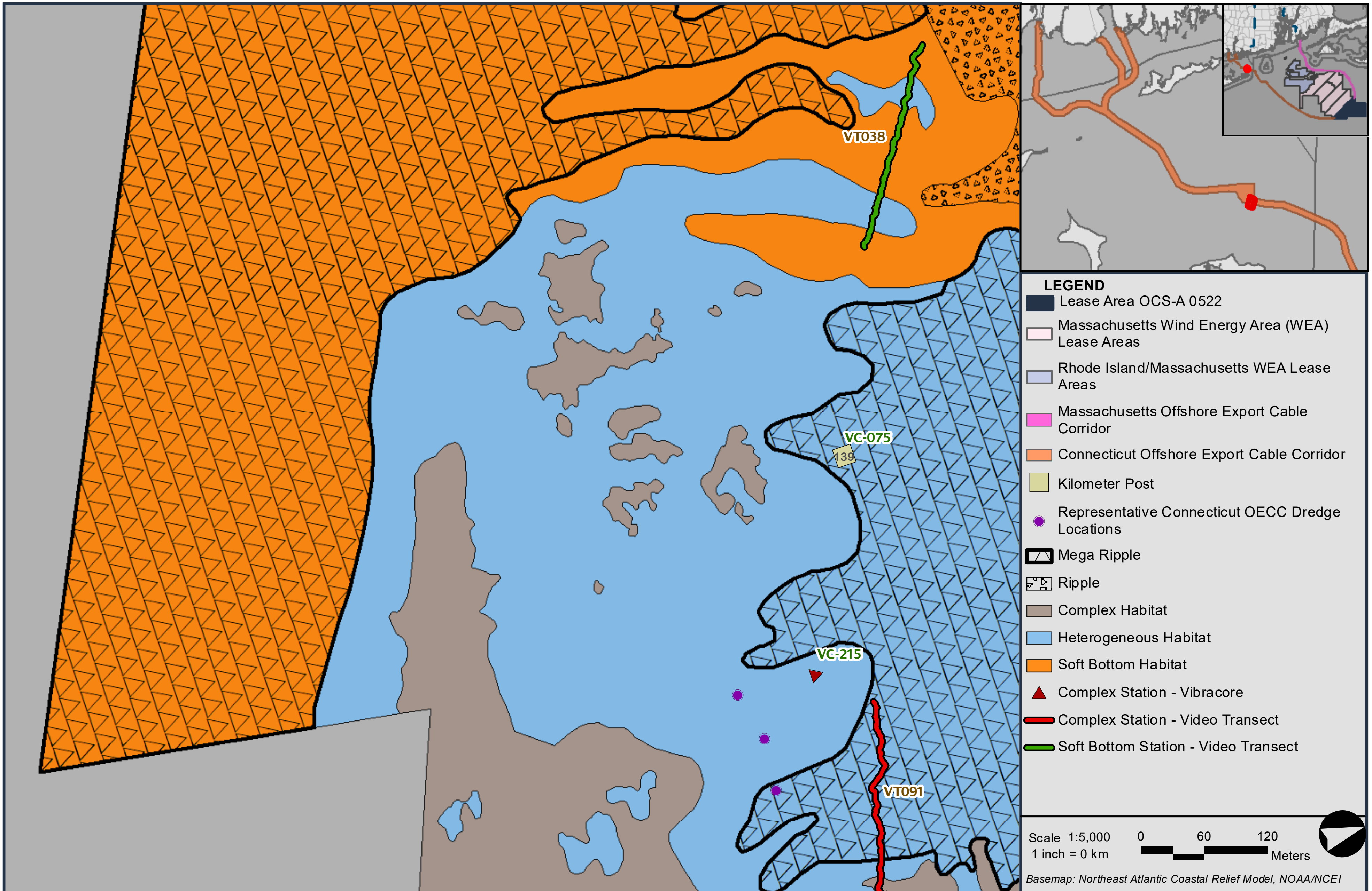
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Mega Ripple
- Ripple
- Heterogeneous Habitat
- Soft Bottom Habitat
- Soft Station - Grab Sample

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

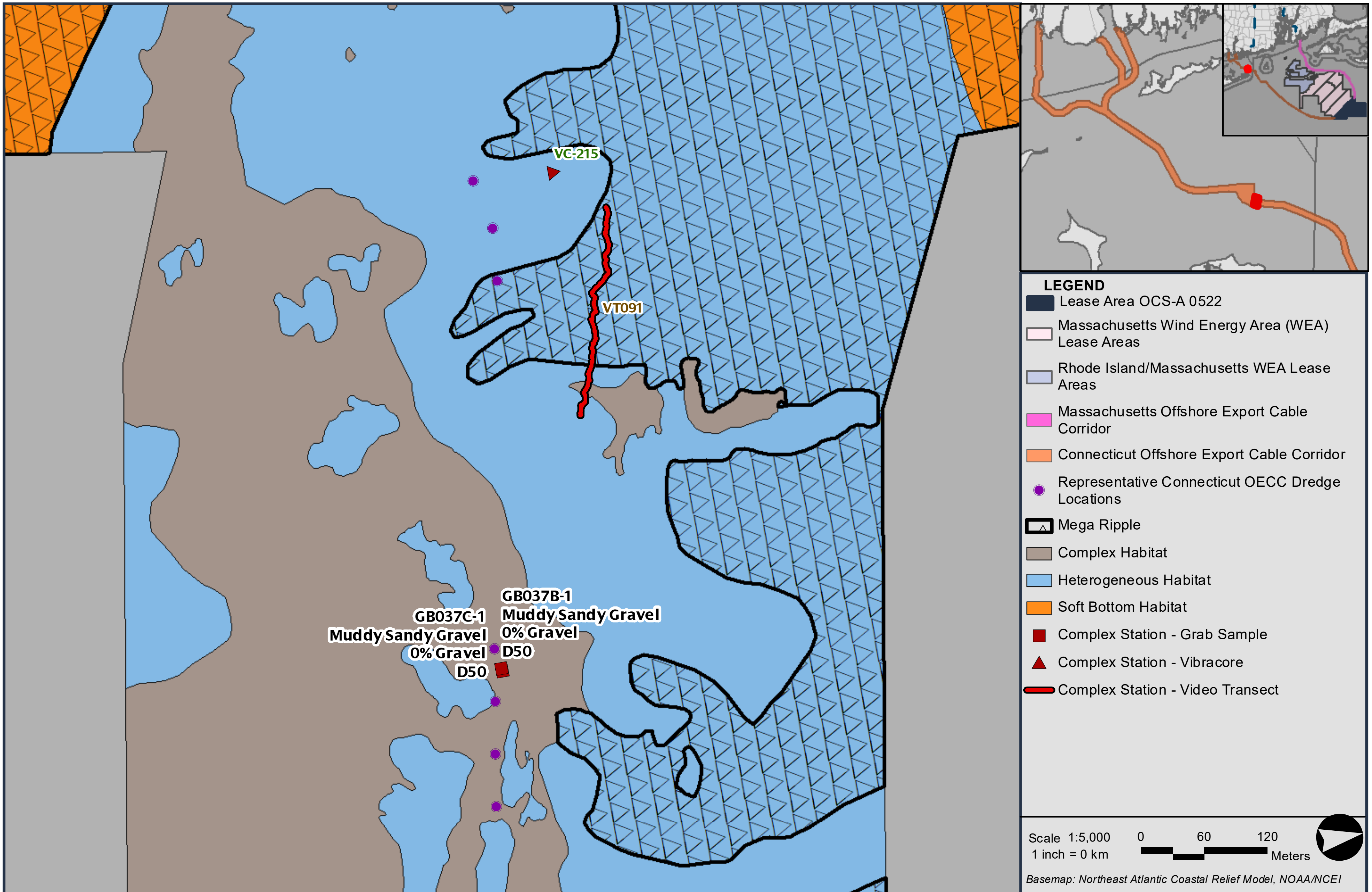
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



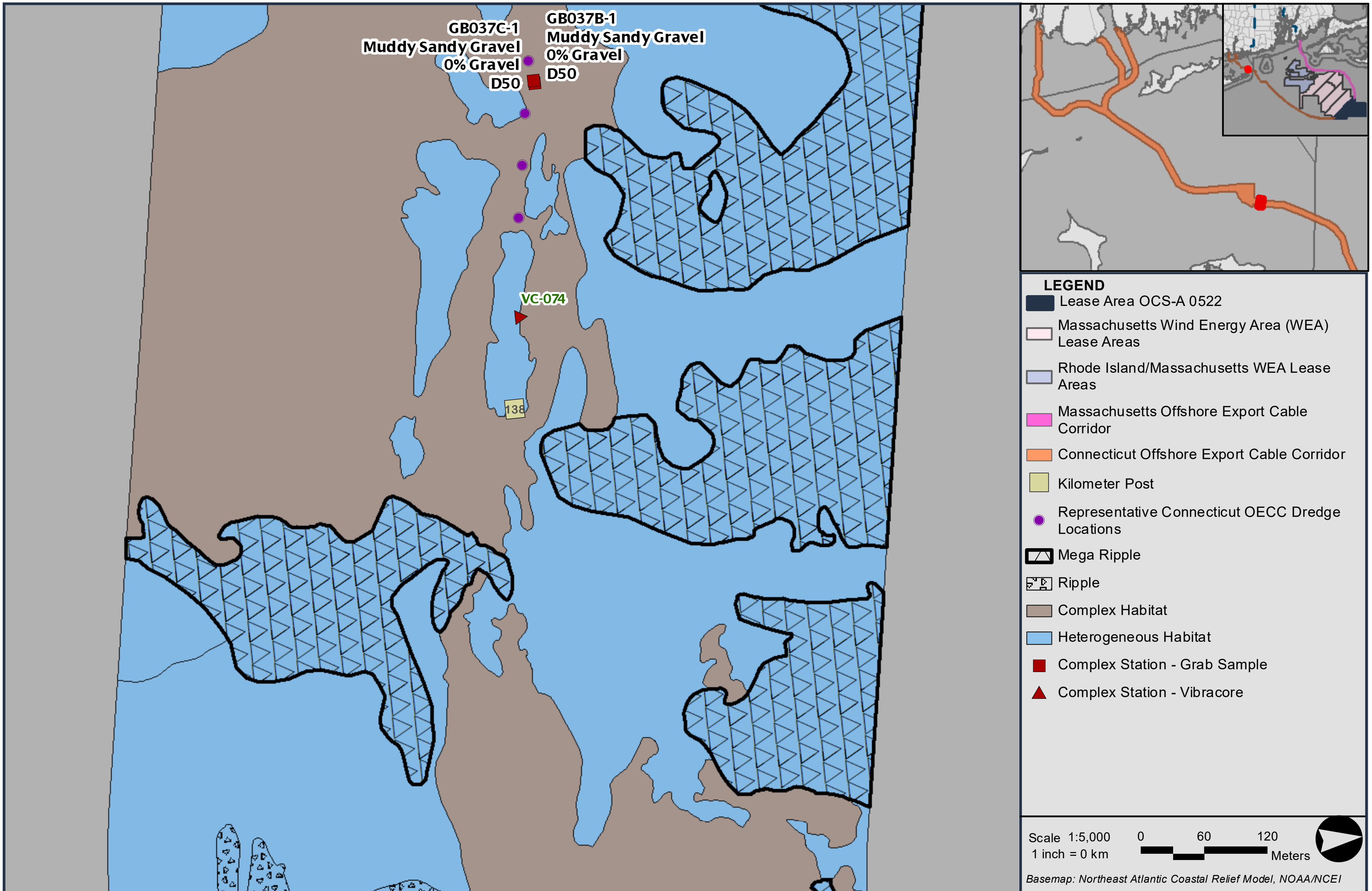
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

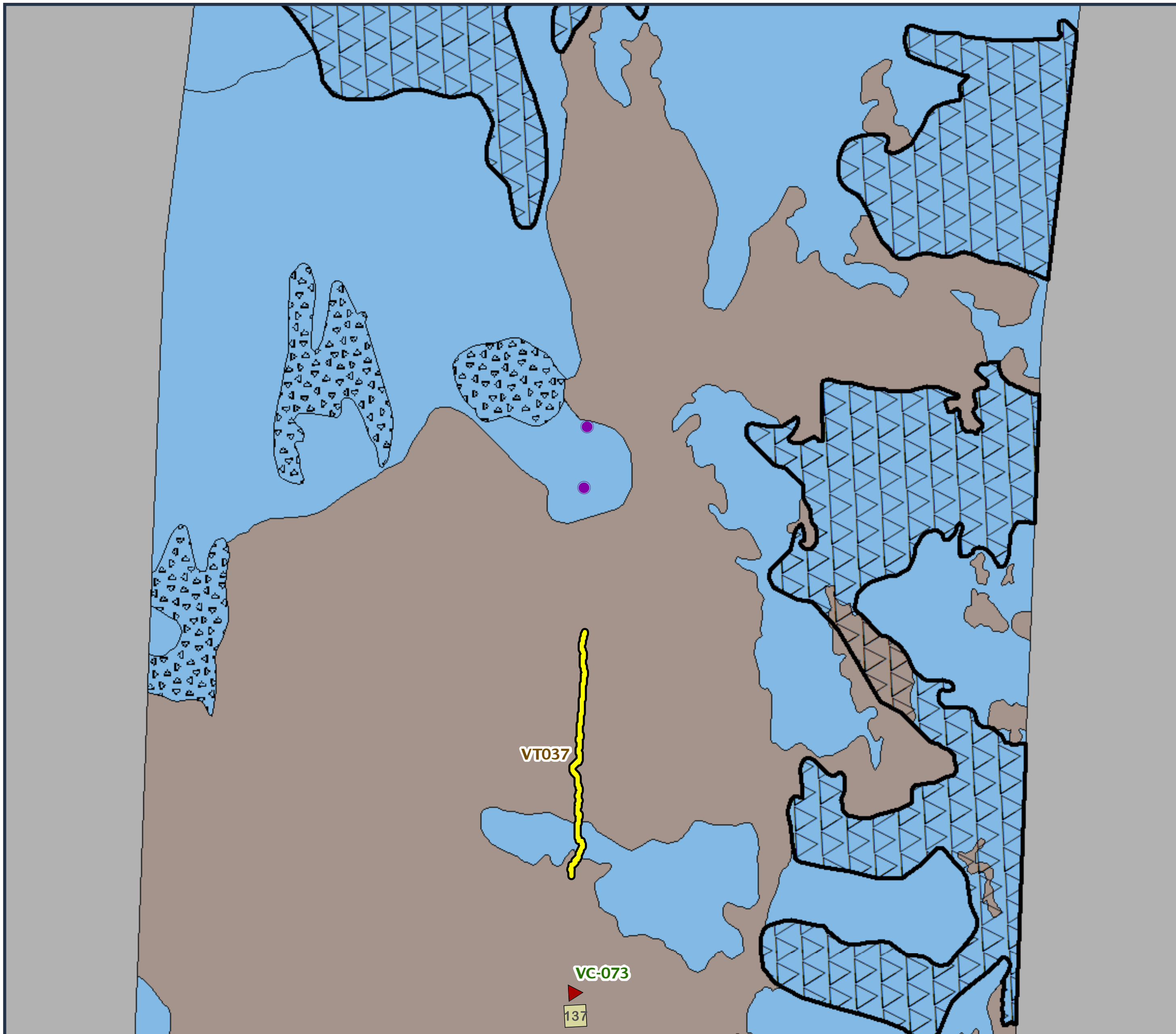
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Mega Ripple
- Ripple
- Complex Habitat
- Heterogeneous Habitat
- Complex Station - Grab Sample
- Complex Station - Vibracore

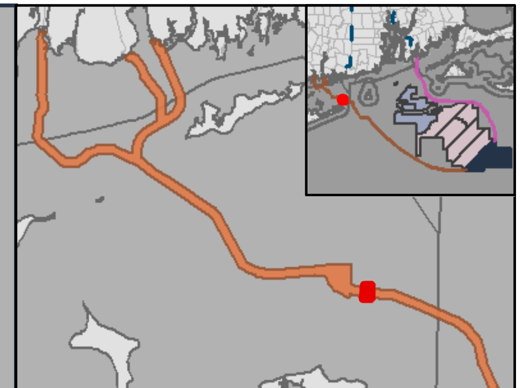
Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

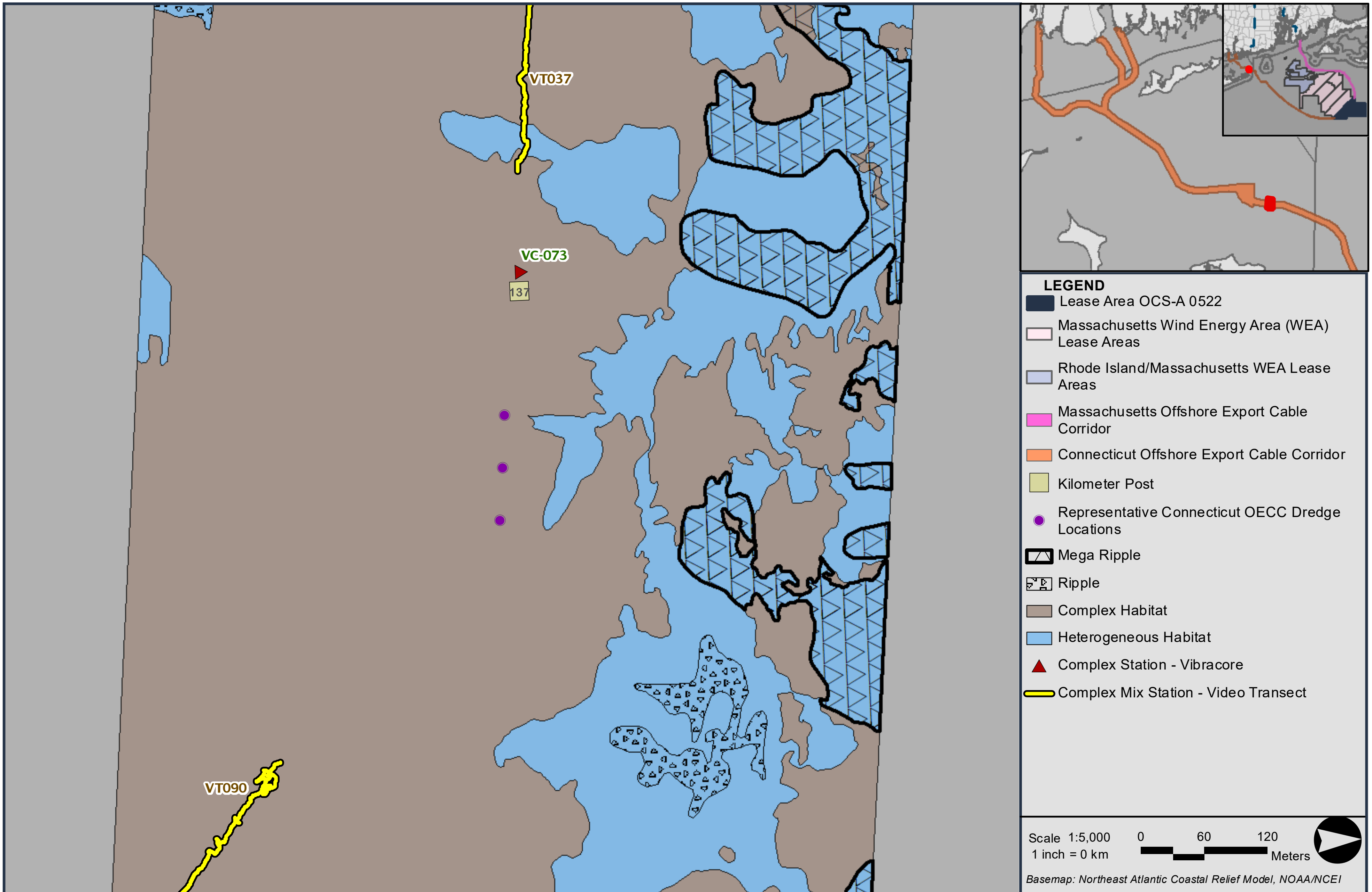
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Mega Ripple
- Ripple
- Complex Habitat
- Heterogeneous Habitat
- Complex Station - Vibracore
- Complex Mix Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

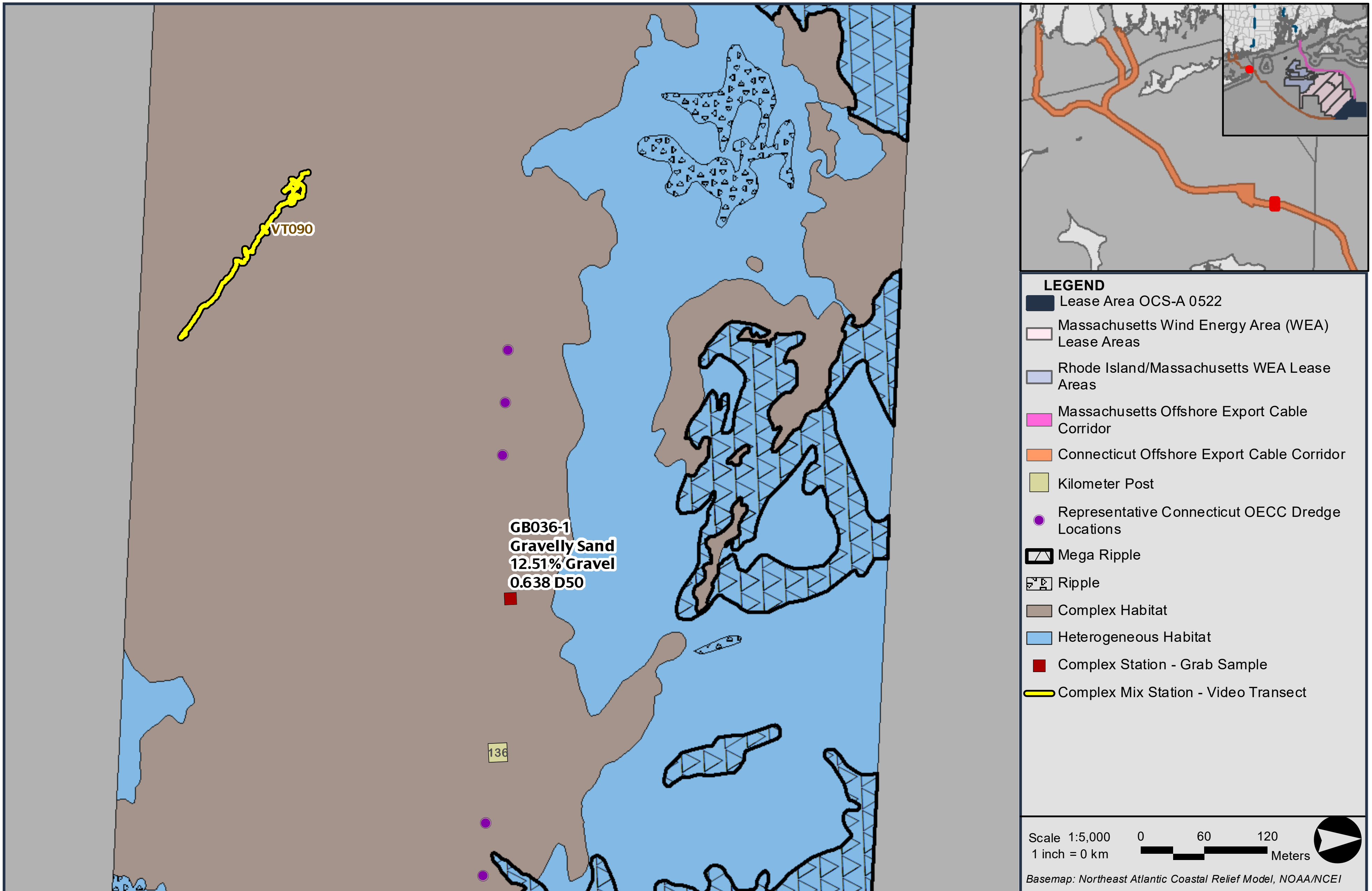
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE

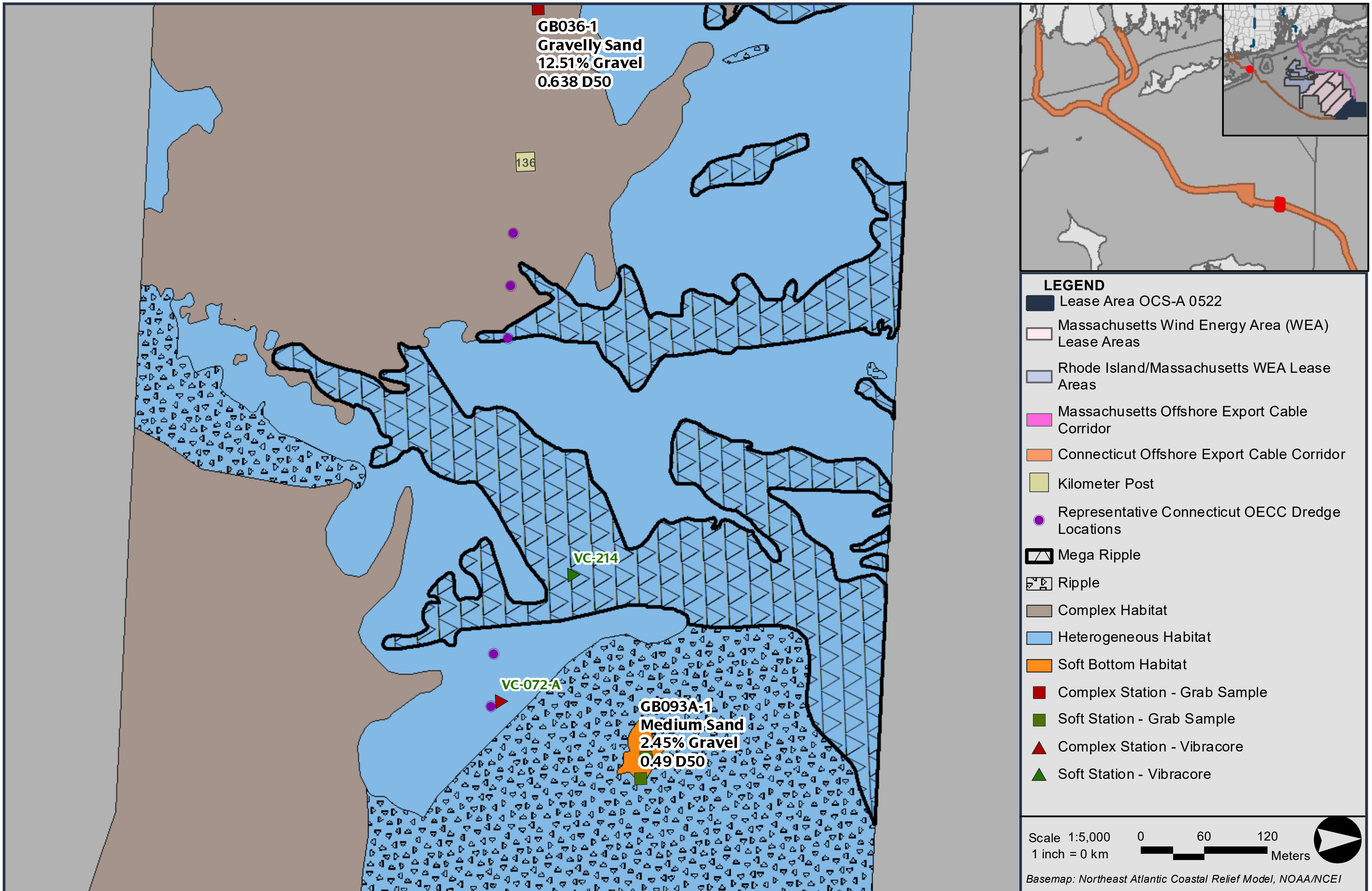


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC



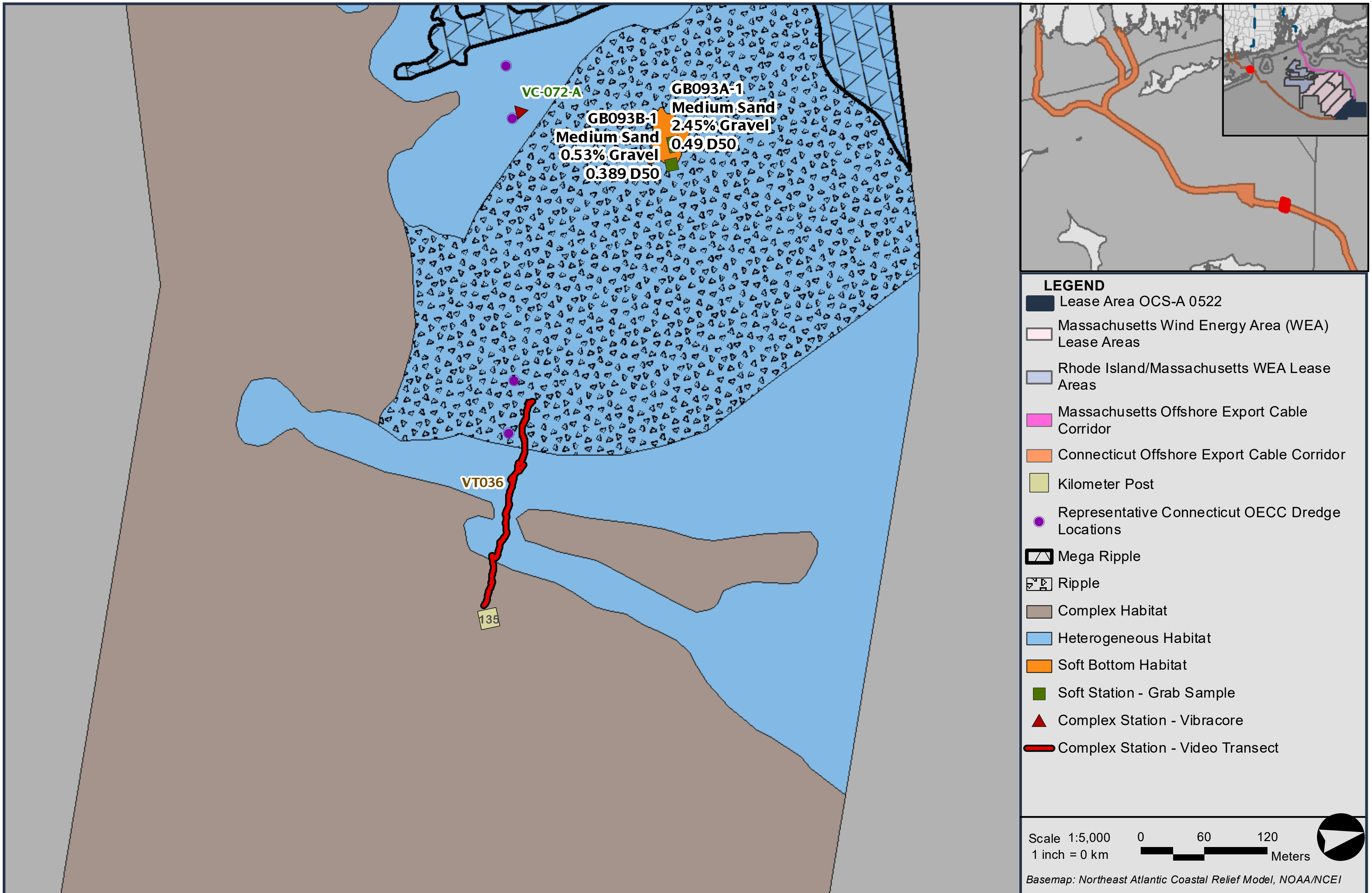
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE

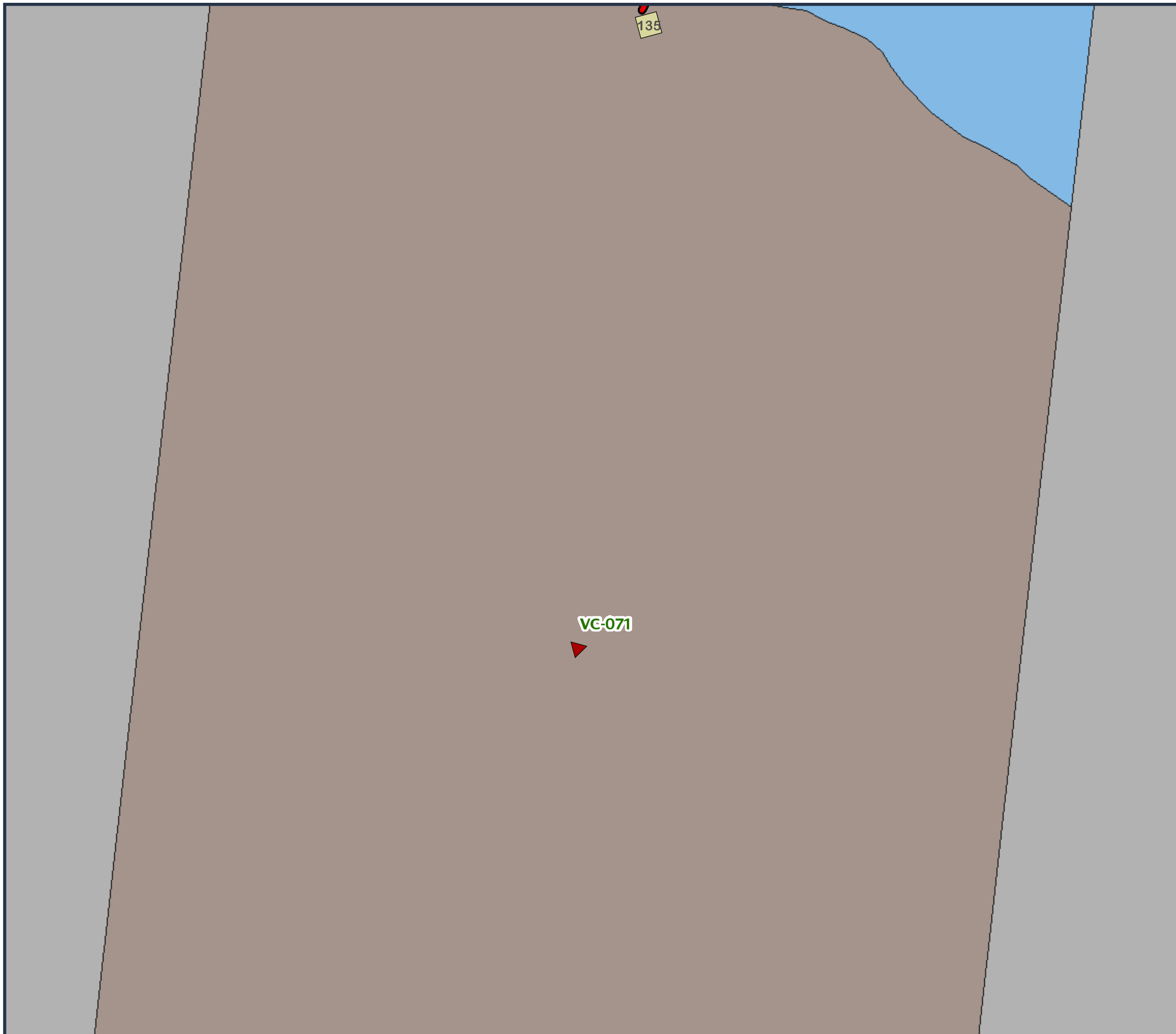


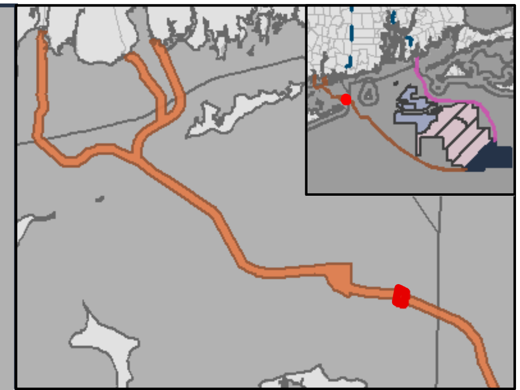
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Complex Station - Grab Sample
- Complex Station - Vibracore
- Complex Station - Video Transect

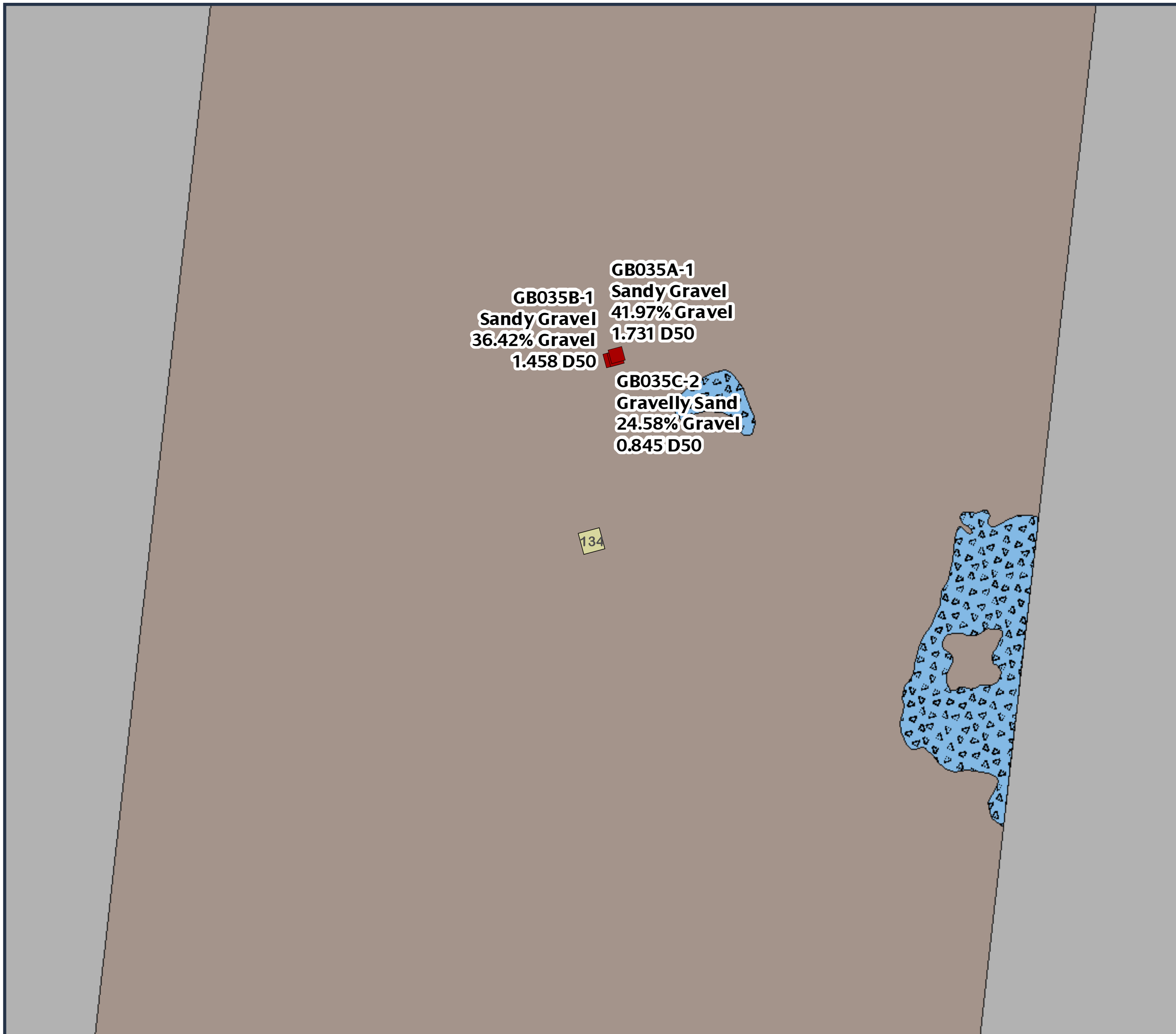
Scale 1:5,000
1 inch = 0 km

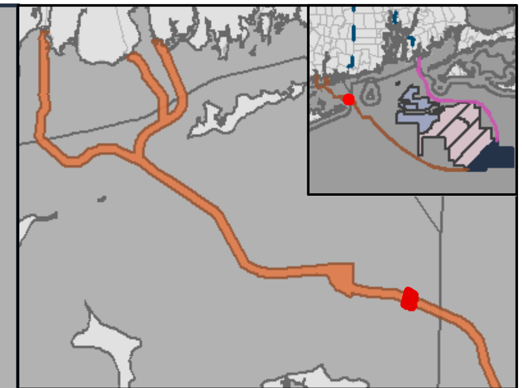
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Complex Habitat
- Heterogeneous Habitat
- Complex Station - Grab Sample

Scale 1:5,000
1 inch = 0 km

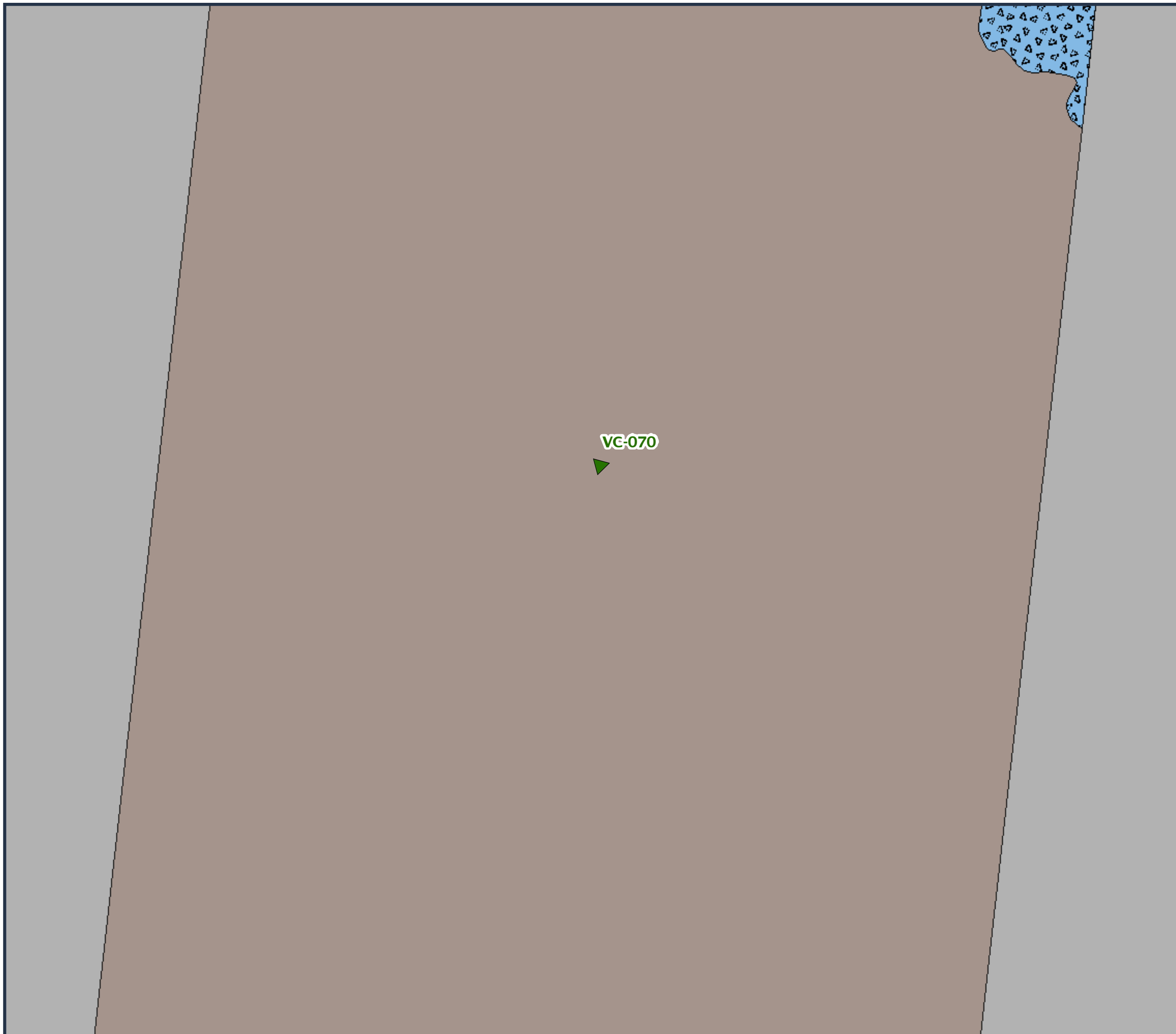
0 60 120 Meters

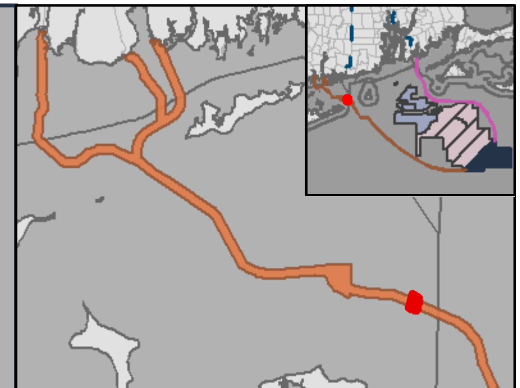
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Complex Habitat
- Heterogeneous Habitat
- Soft Station - Vibracore

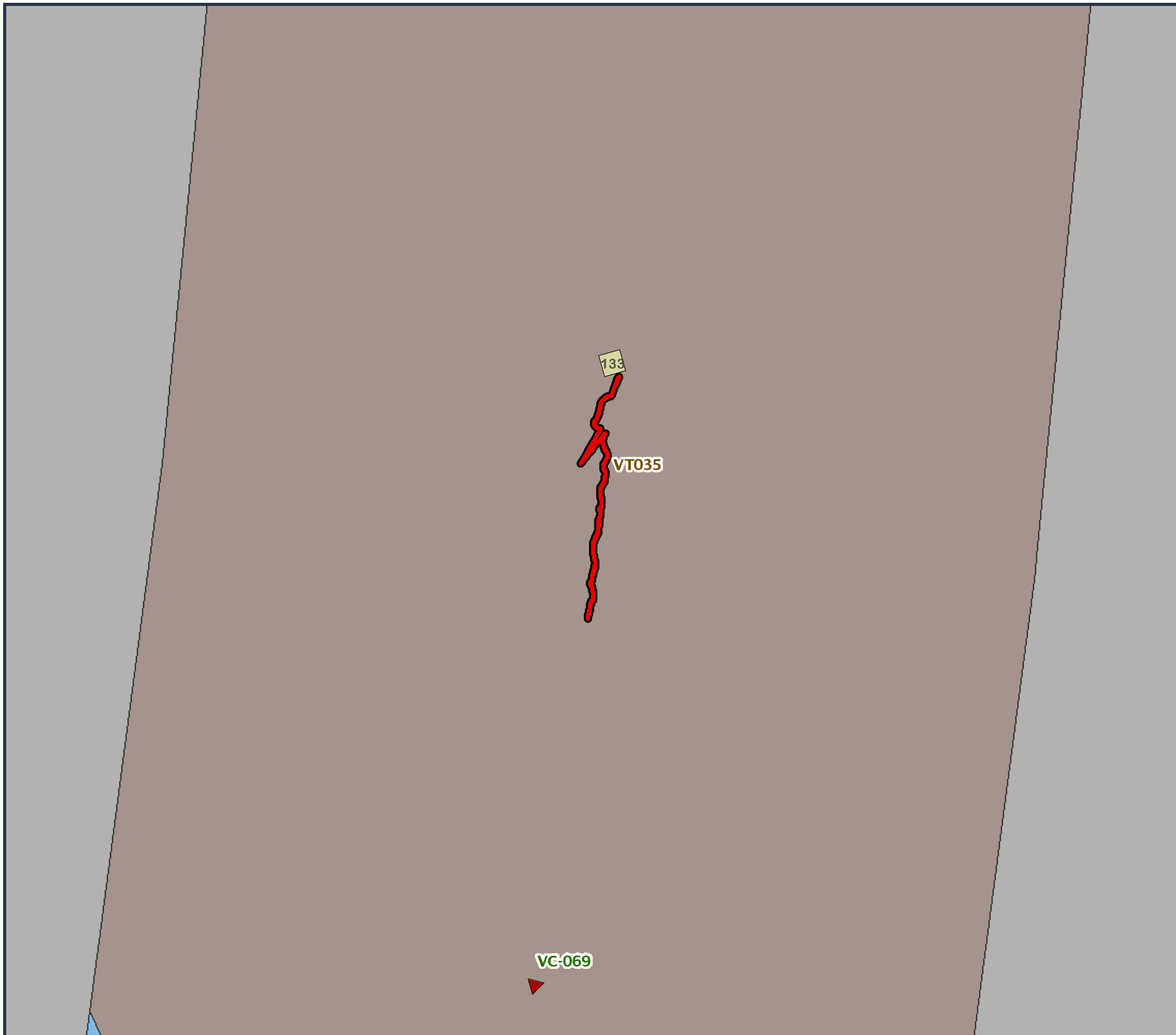
Scale 1:5,000
1 inch = 0 km

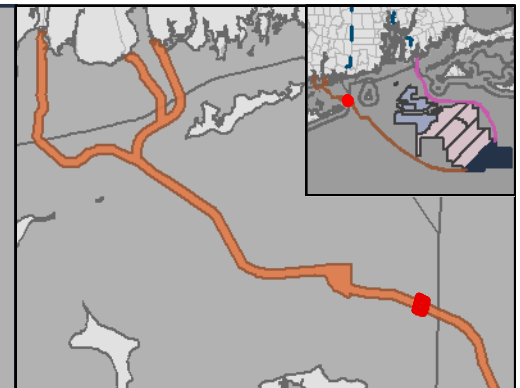
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Complex Habitat
- Heterogeneous Habitat
- Complex Station - Vibracore
- Complex Station - Video Transect

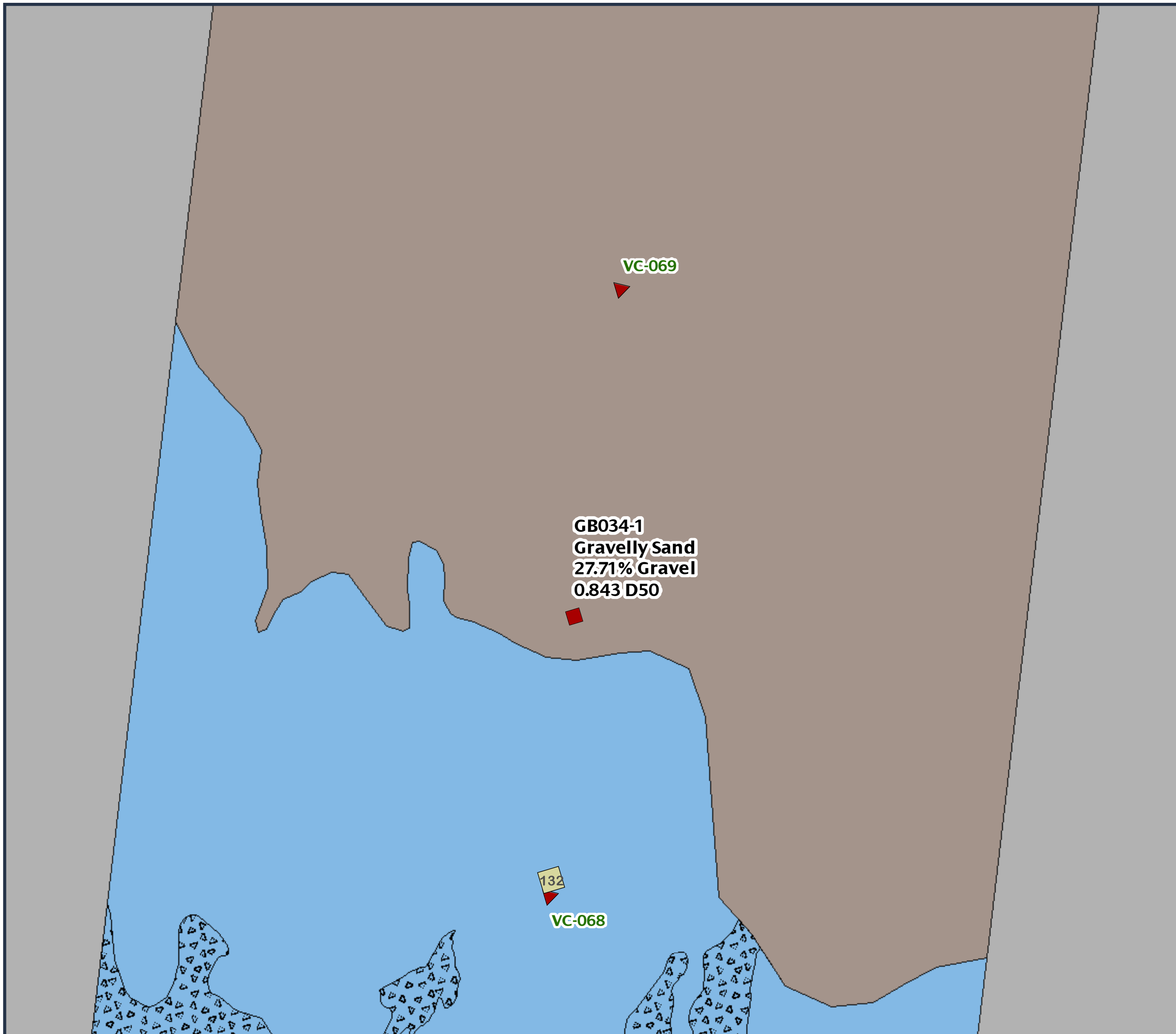
Scale 1:5,000
1 inch = 0 km

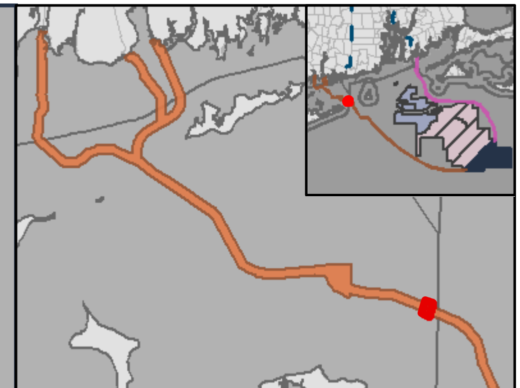
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





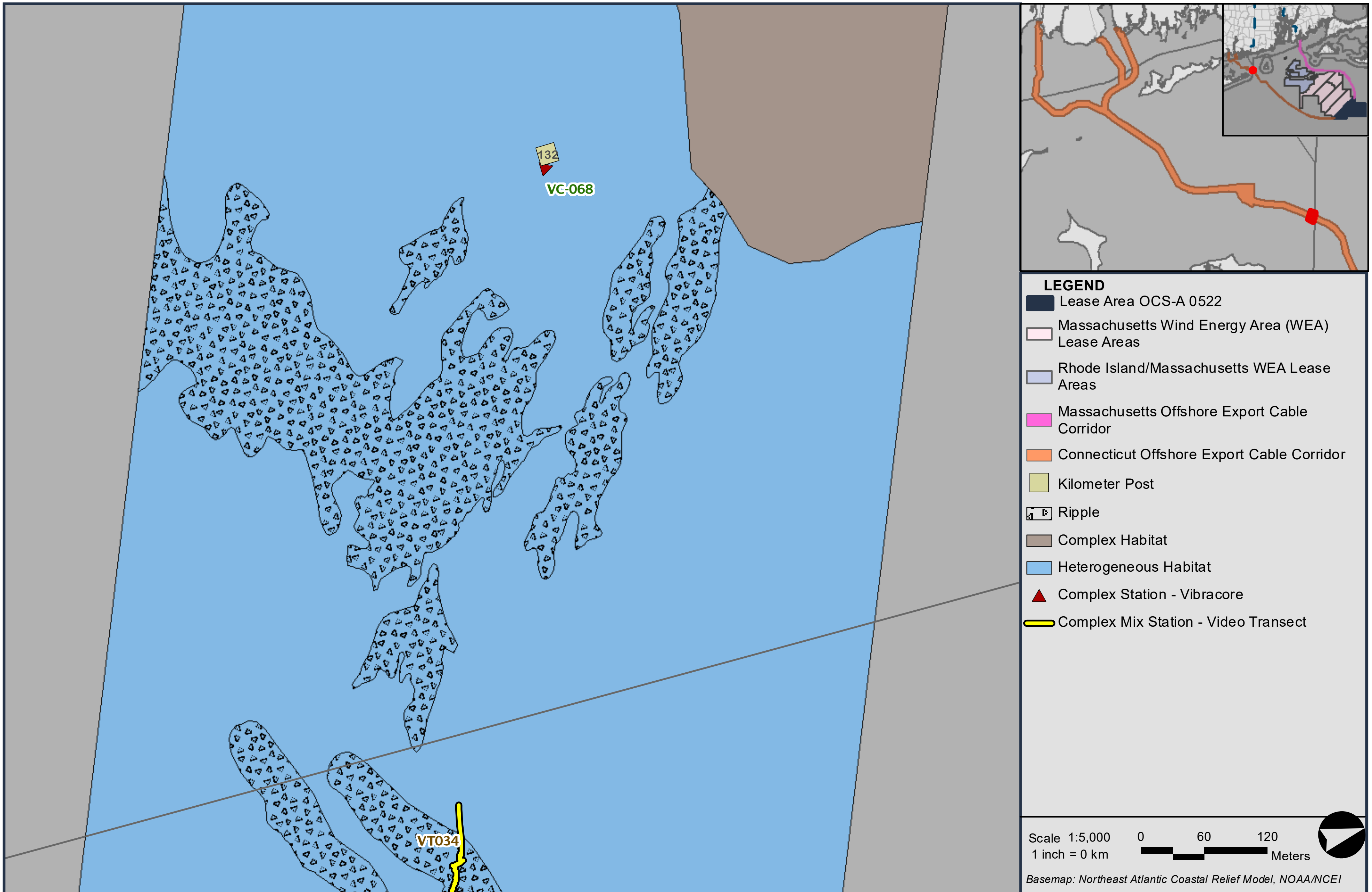
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Ripple
Complex Habitat
Heterogeneous Habitat
Complex Station - Grab Sample
Complex Station - Vibracore

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

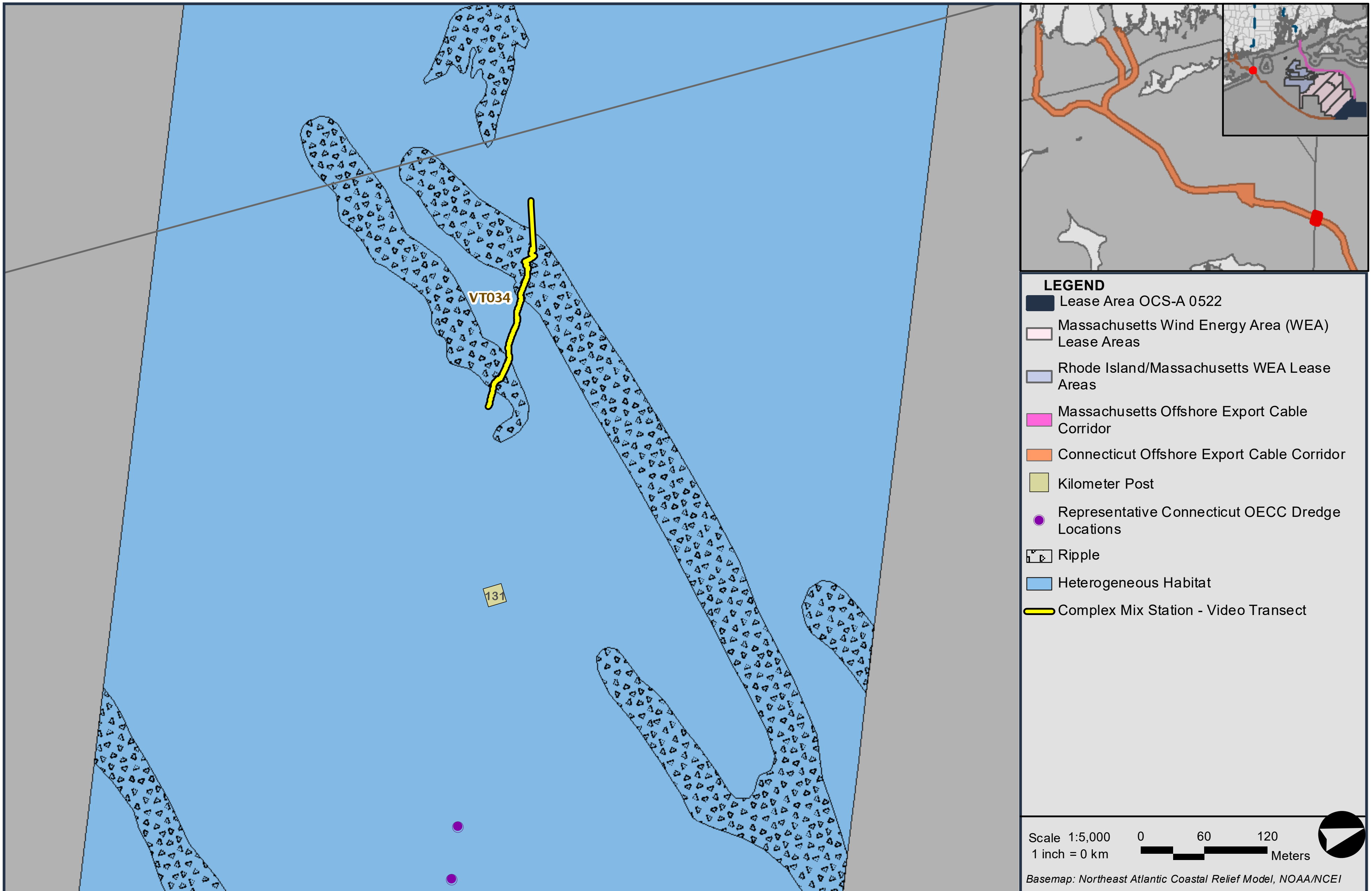
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

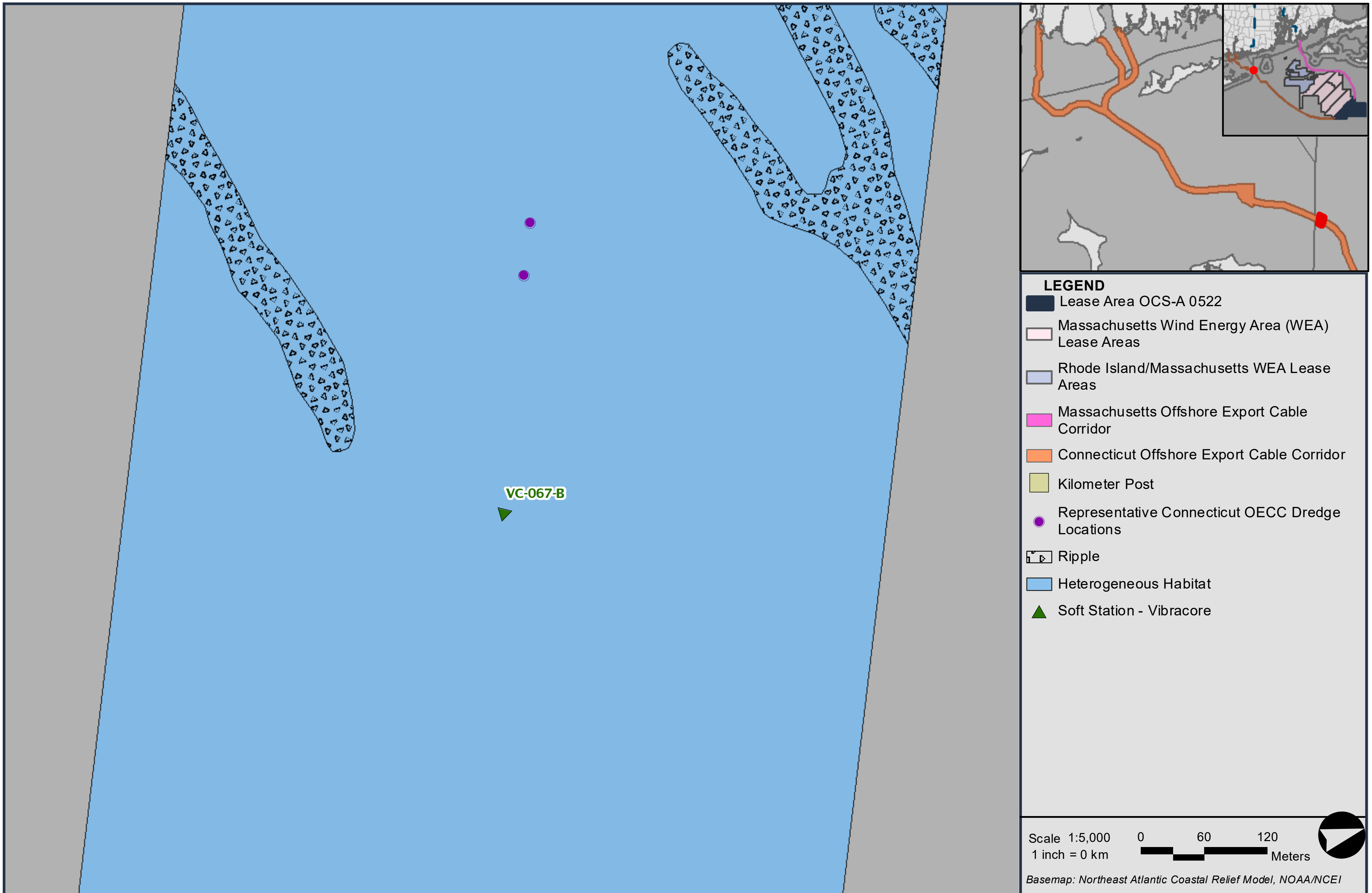
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

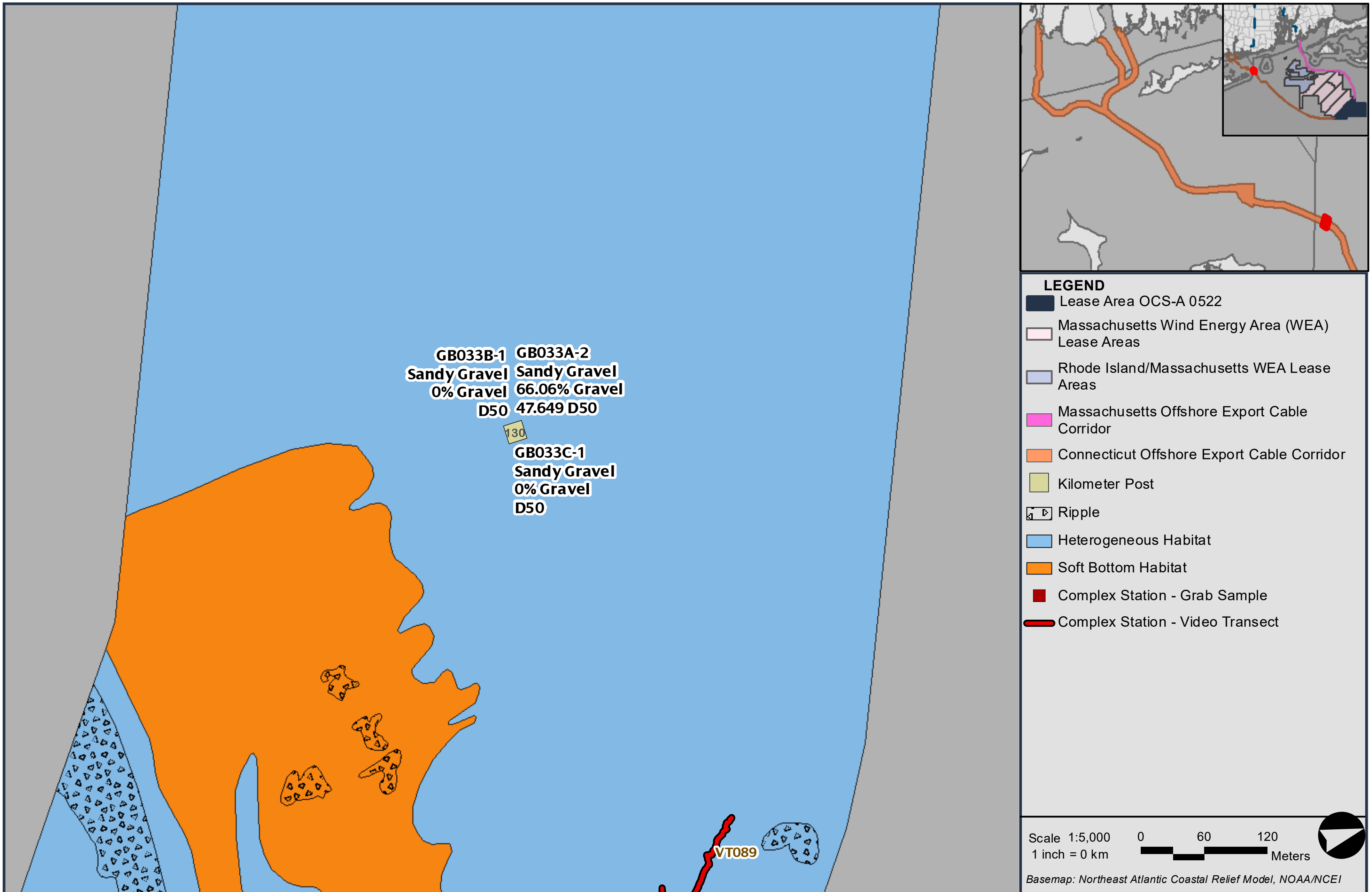
VINEYARD NORTHEAST

VINEYARD OFFSHORE



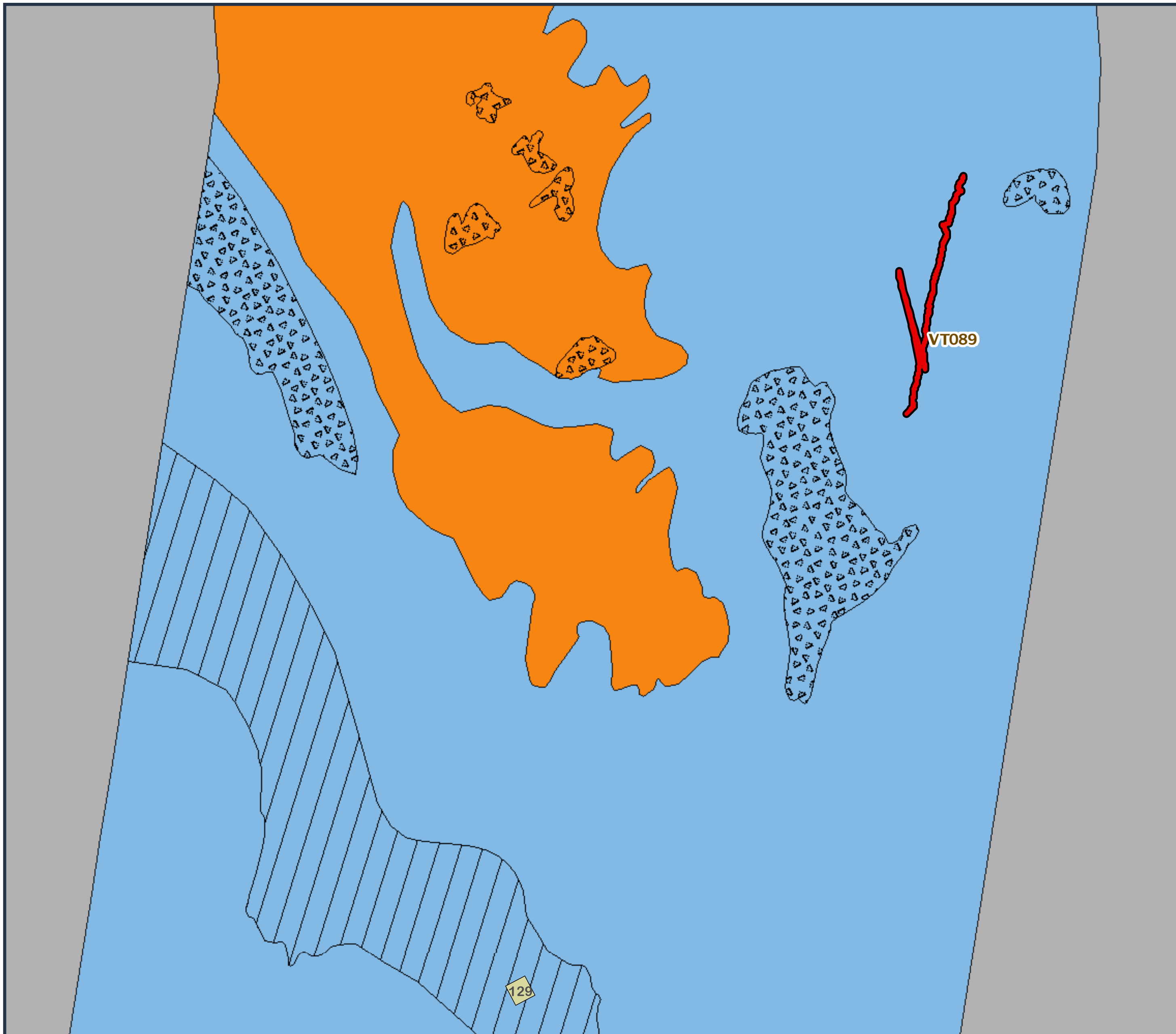
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

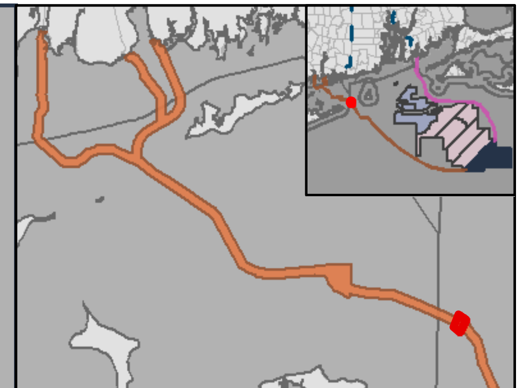
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





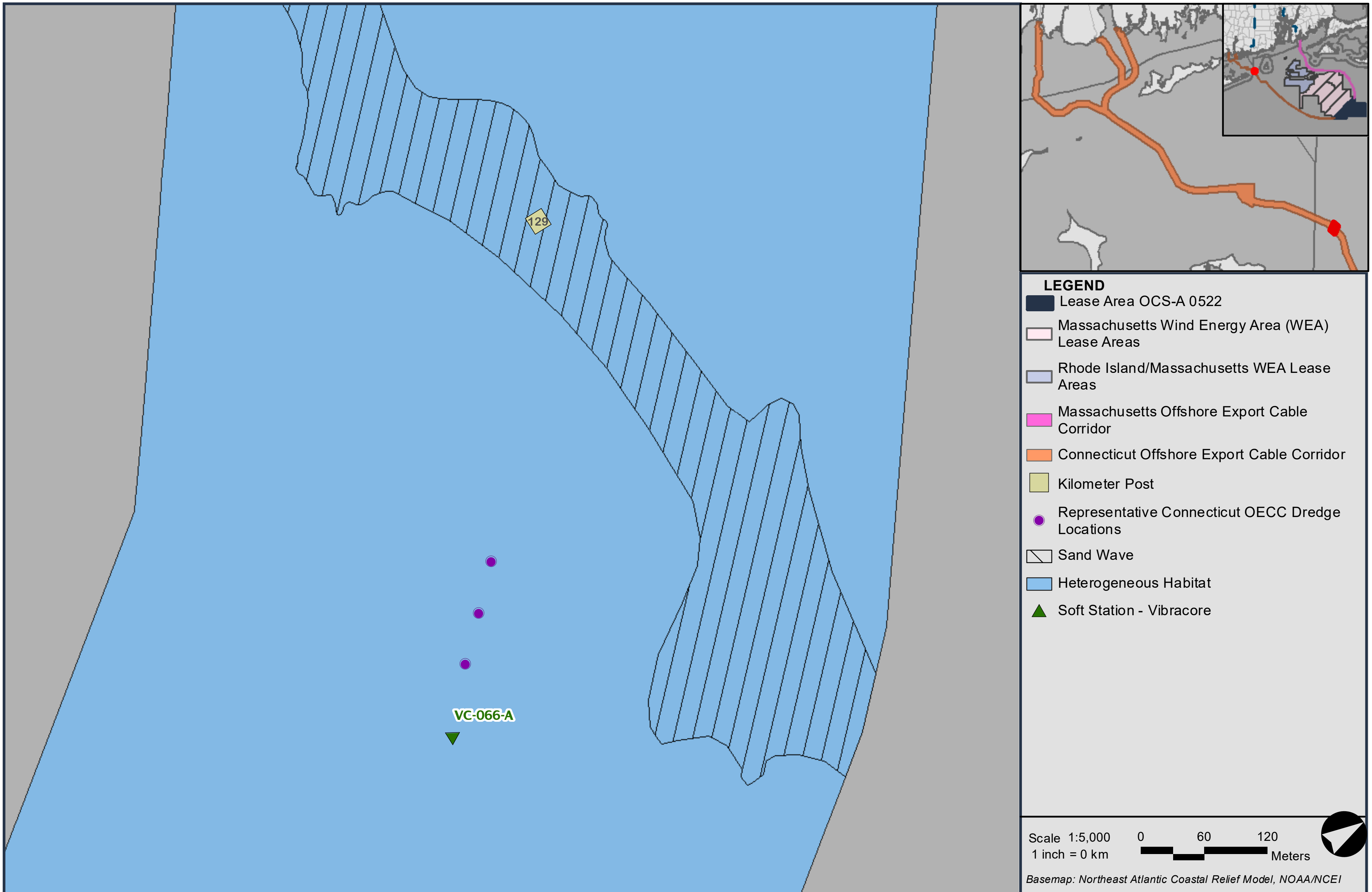
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Ripple
Sand Wave
Heterogeneous Habitat
Soft Bottom Habitat
Complex Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

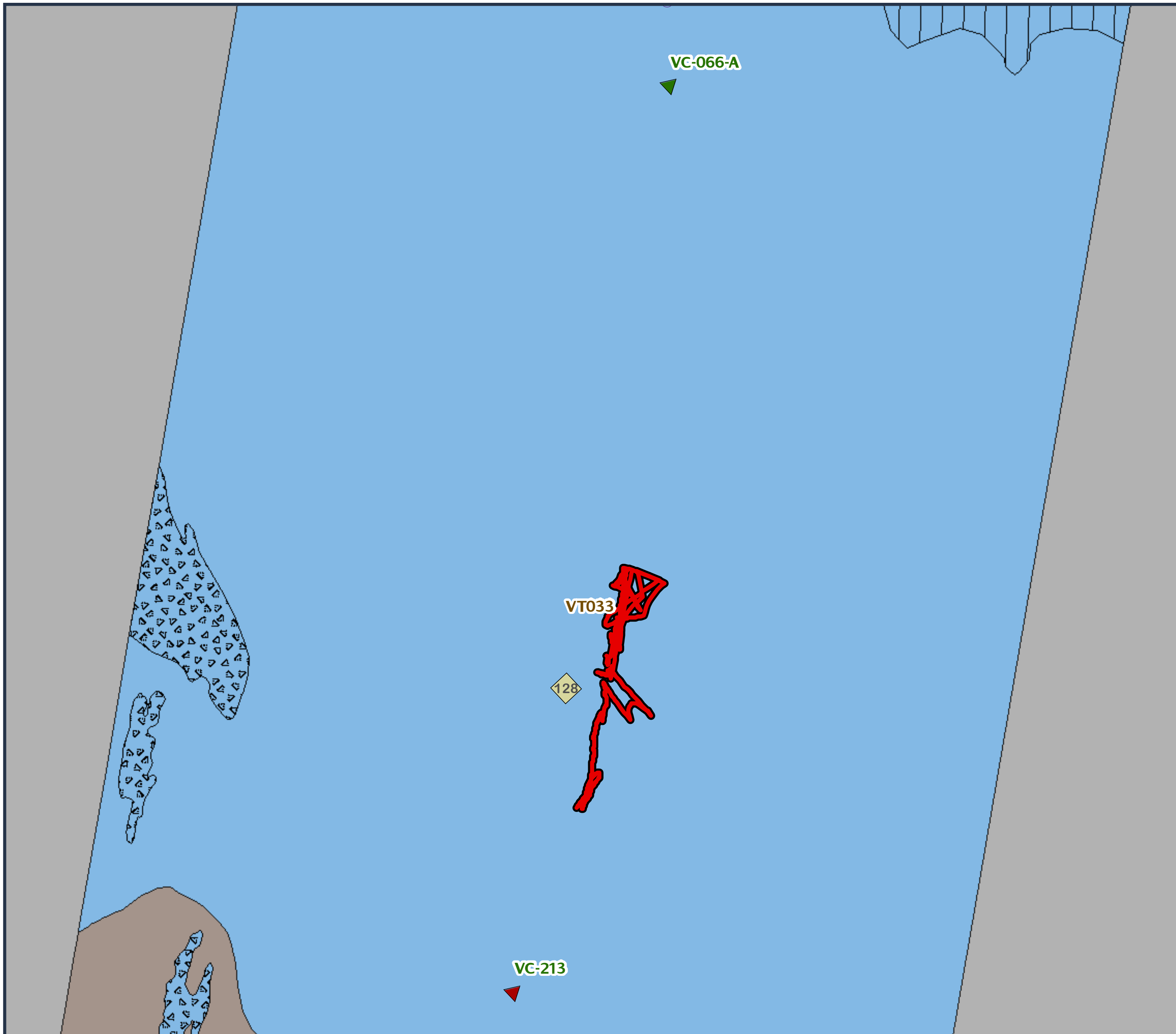
VINEYARD NORTHEAST
VINEYARD OFFSHORE

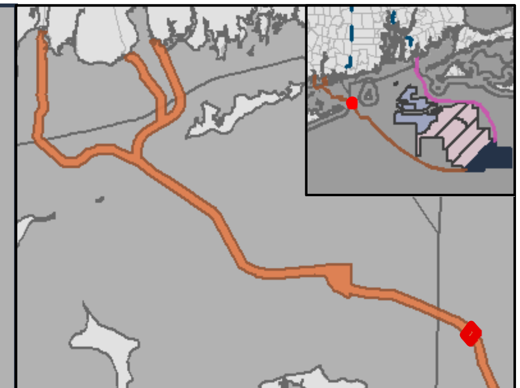


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





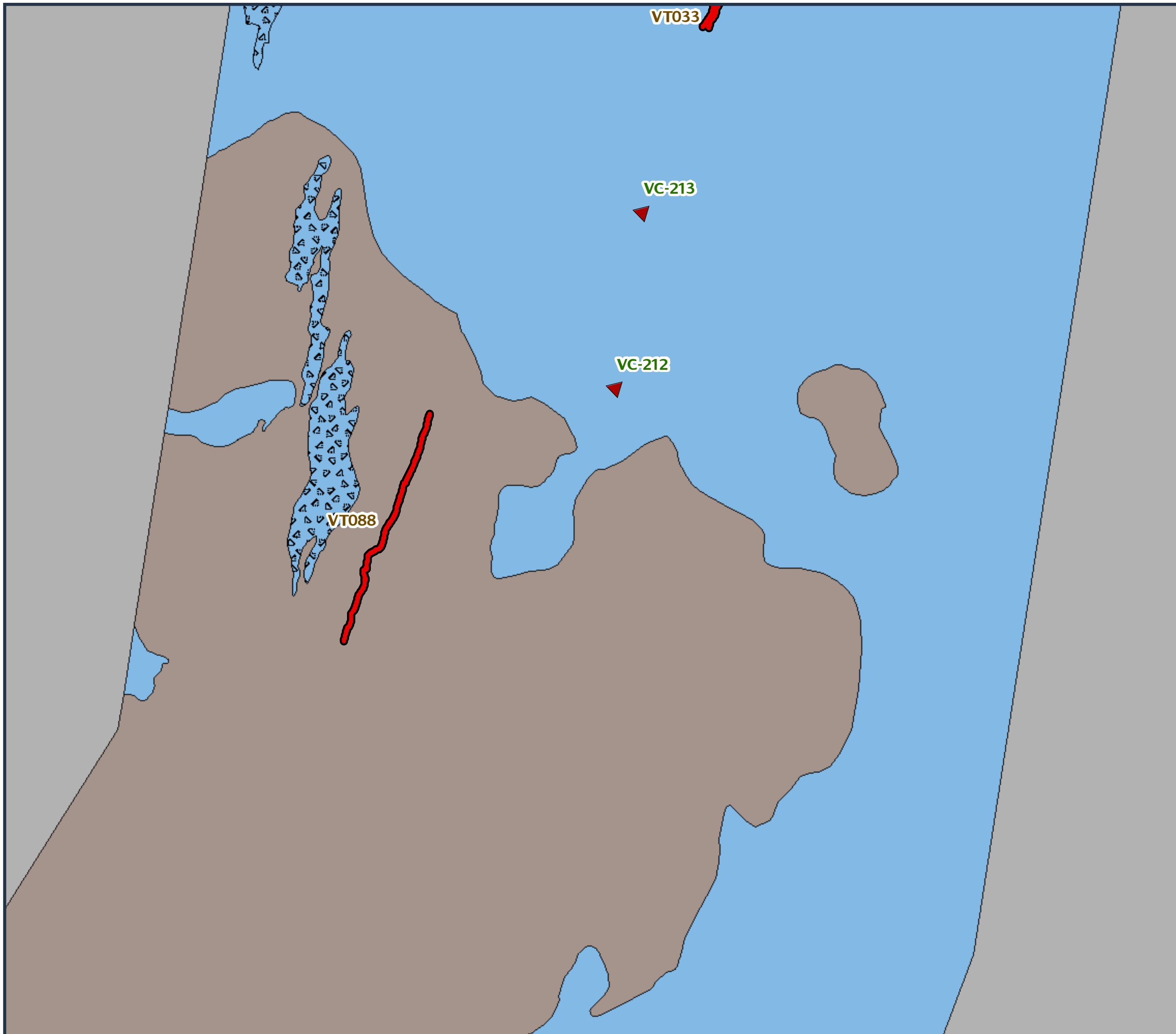
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Ripple
- Sand Wave
- Complex Habitat
- Heterogeneous Habitat
- Complex Station - Vibracore
- Soft Station - Vibracore
- Complex Station - Video Transect

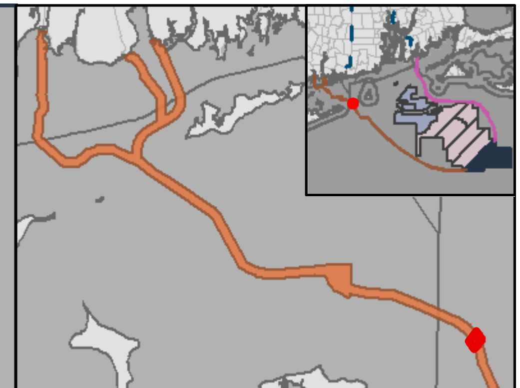
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Ripple
- Complex Habitat
- Heterogeneous Habitat
- Complex Station - Vibracore
- Complex Station - Video Transect

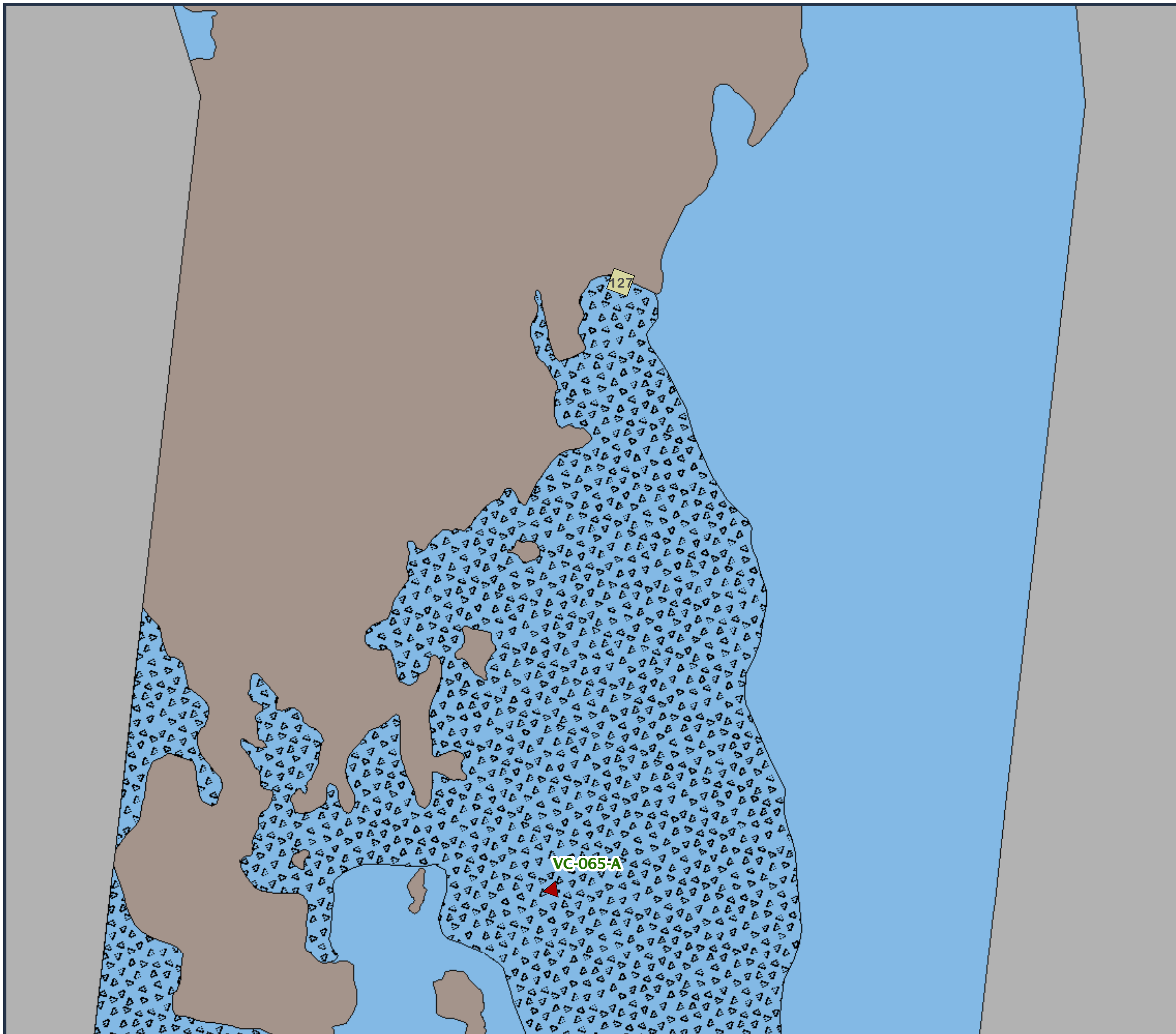
Scale 1:5,000
1 inch = 0 km

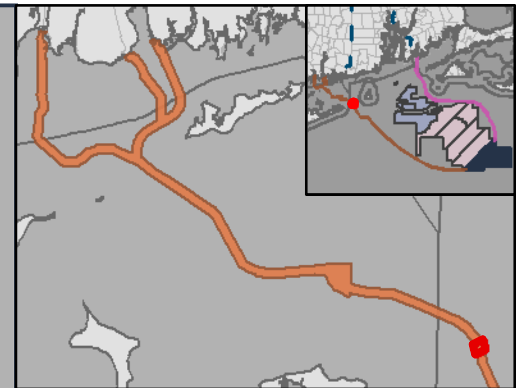
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

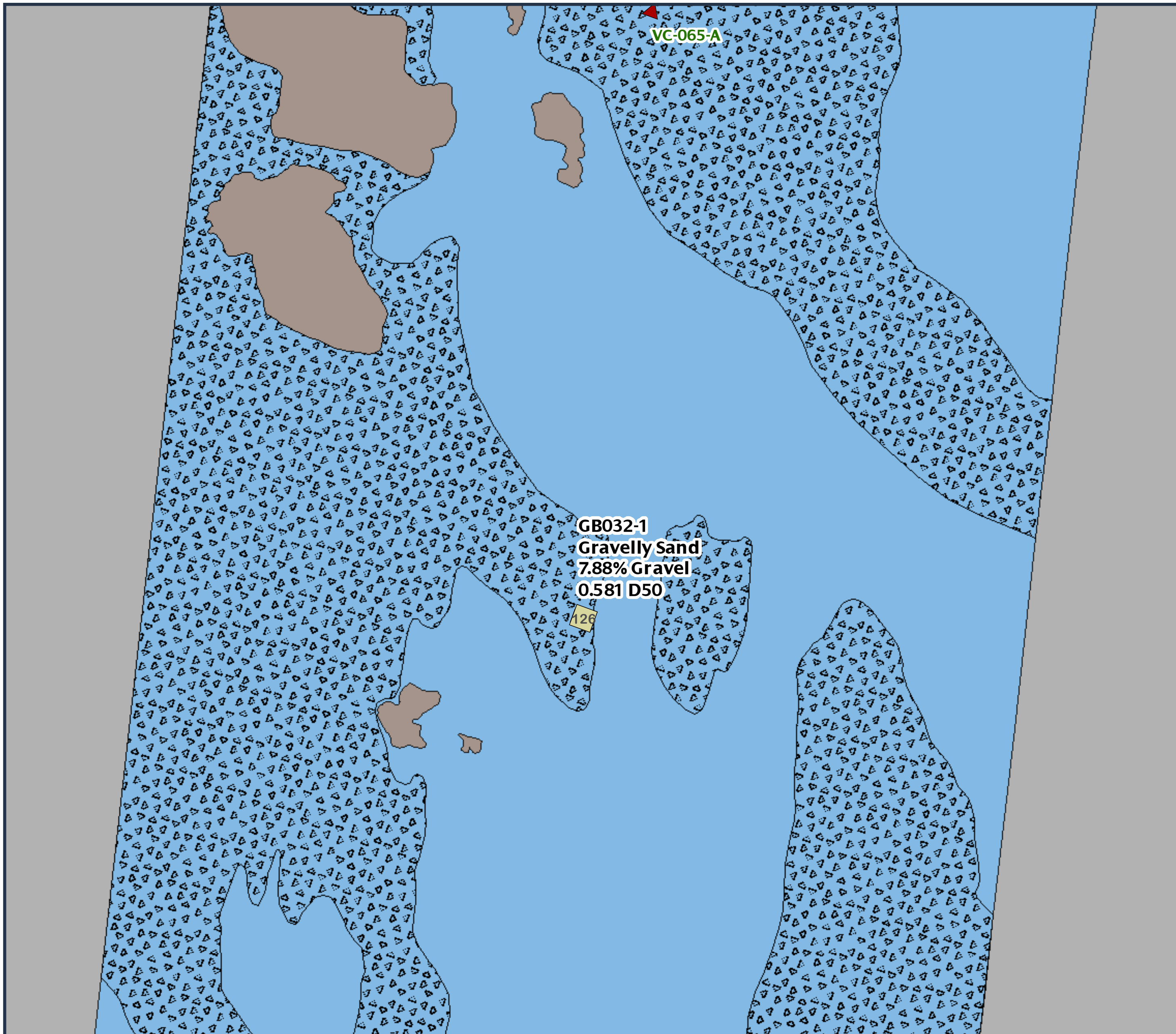
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Complex Habitat
- Heterogeneous Habitat
- Complex Station - Vibracore

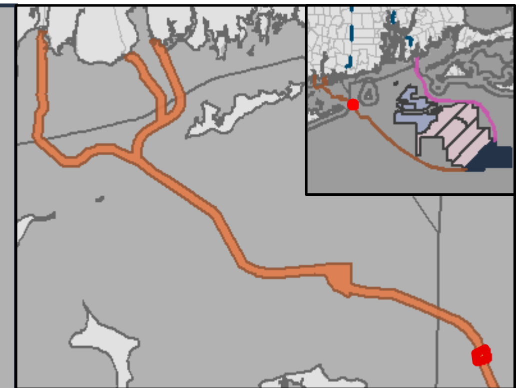
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Complex Habitat
- Heterogeneous Habitat
- Complex Station - Grab Sample
- Complex Station - Vibracore

Scale 1:5,000
1 inch = 0 km

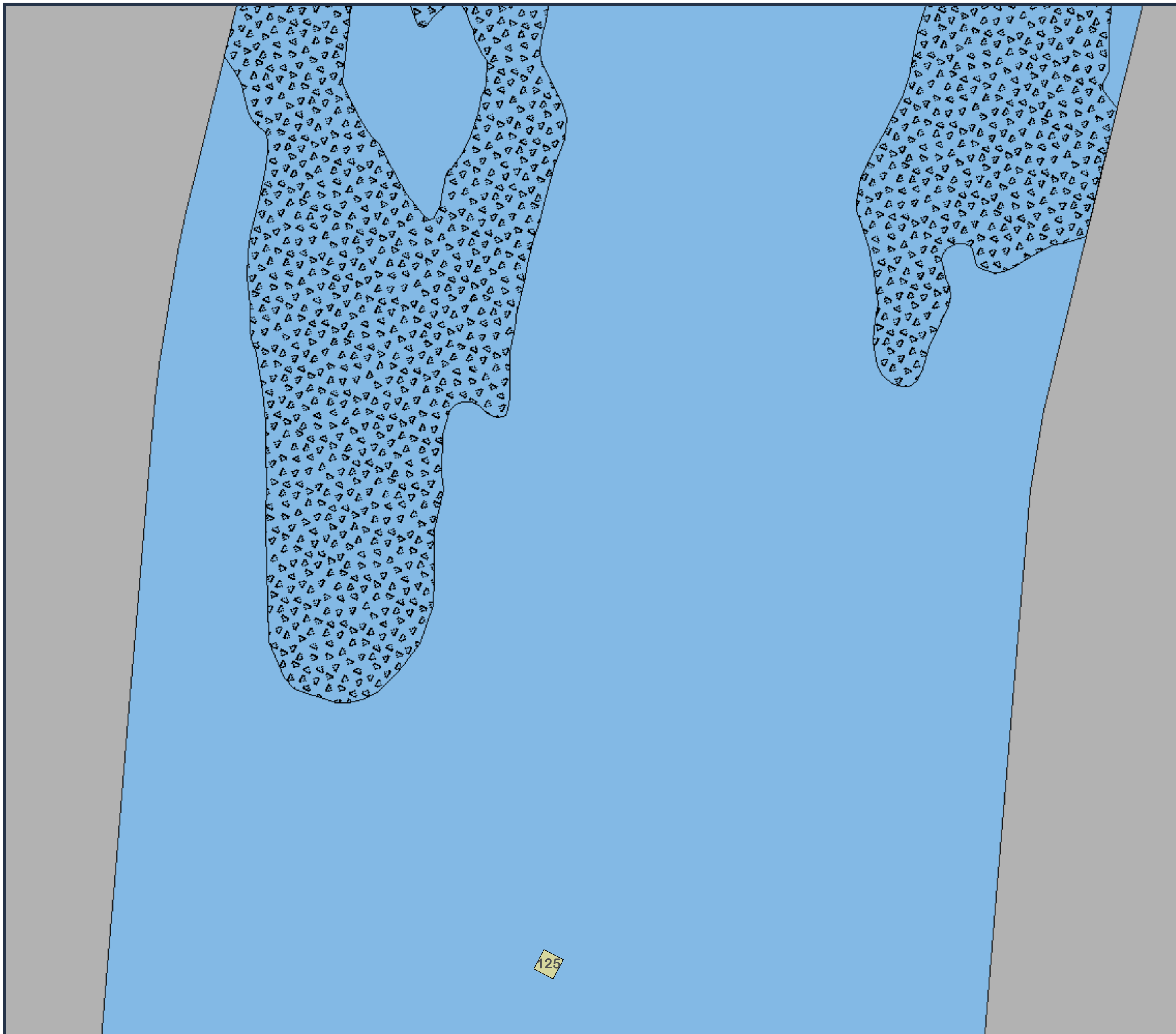
0 60 120 Meters

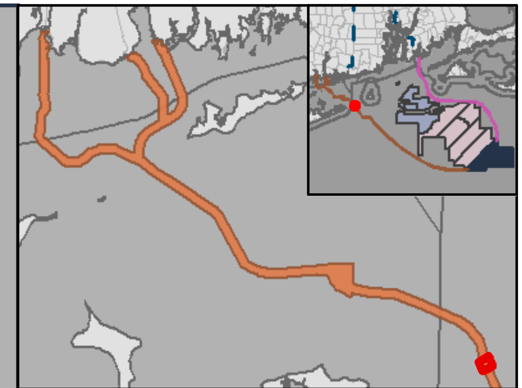
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Heterogeneous Habitat

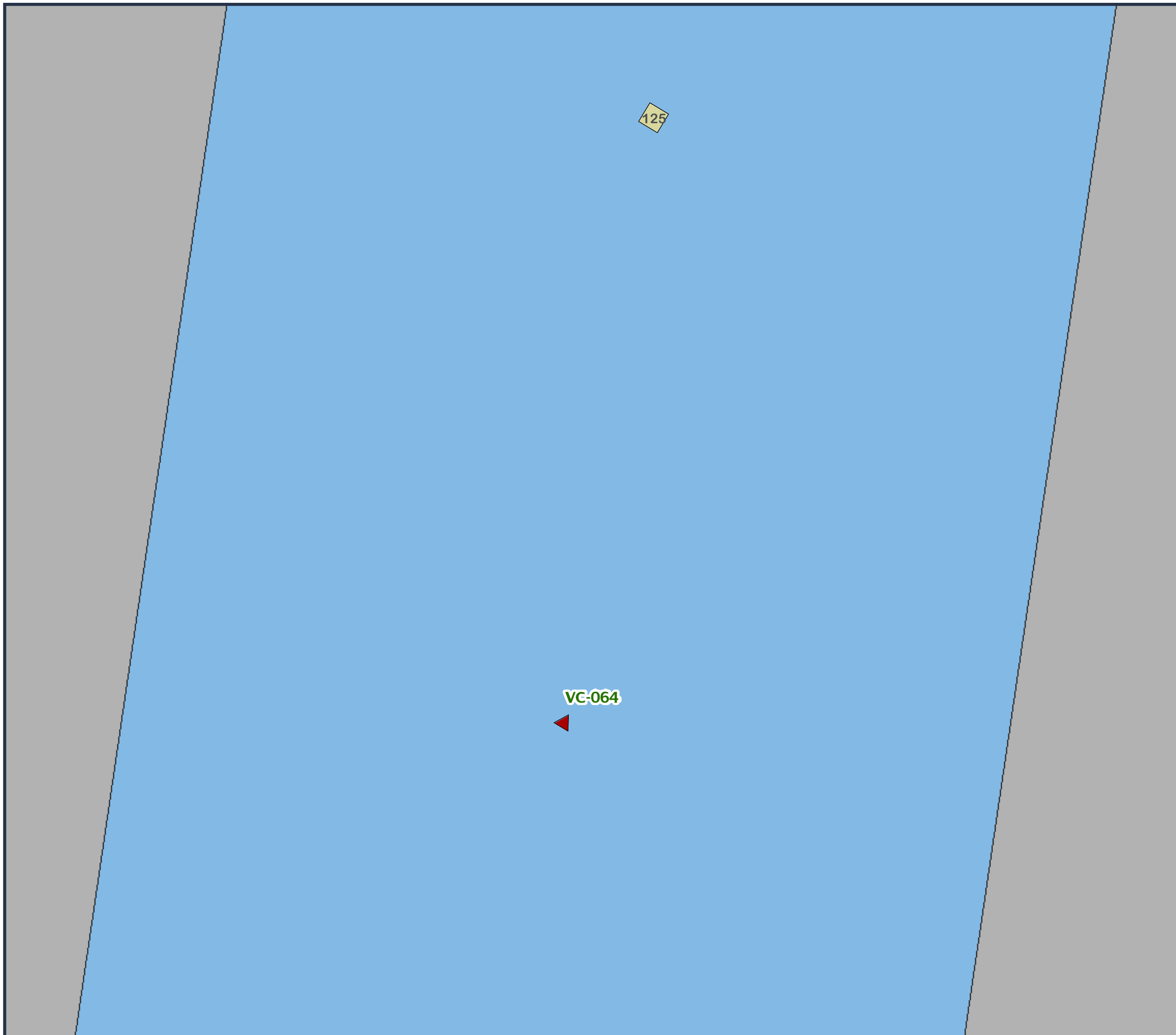
Scale 1:5,000
1 inch = 0 km

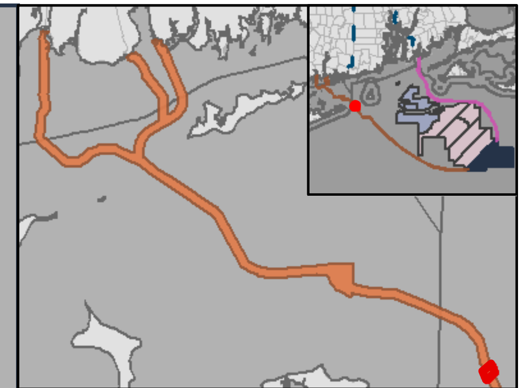
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Complex Station - Vibracore

Scale 1:5,000
1 inch = 0 km

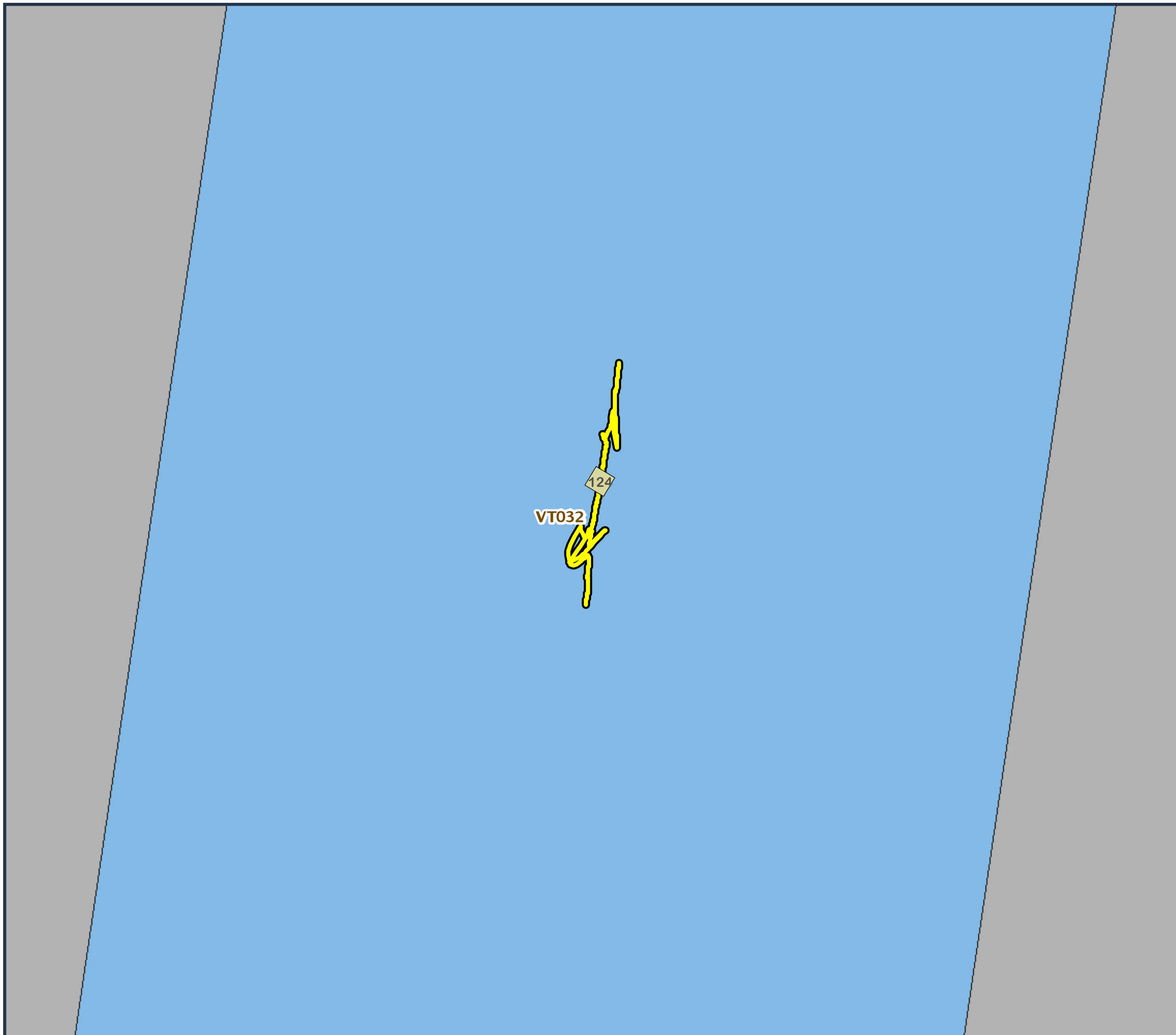
0 60 120 Meters

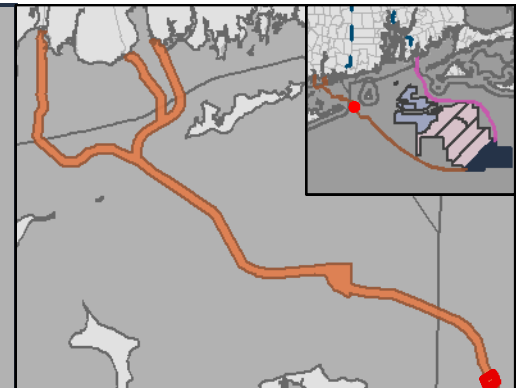
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

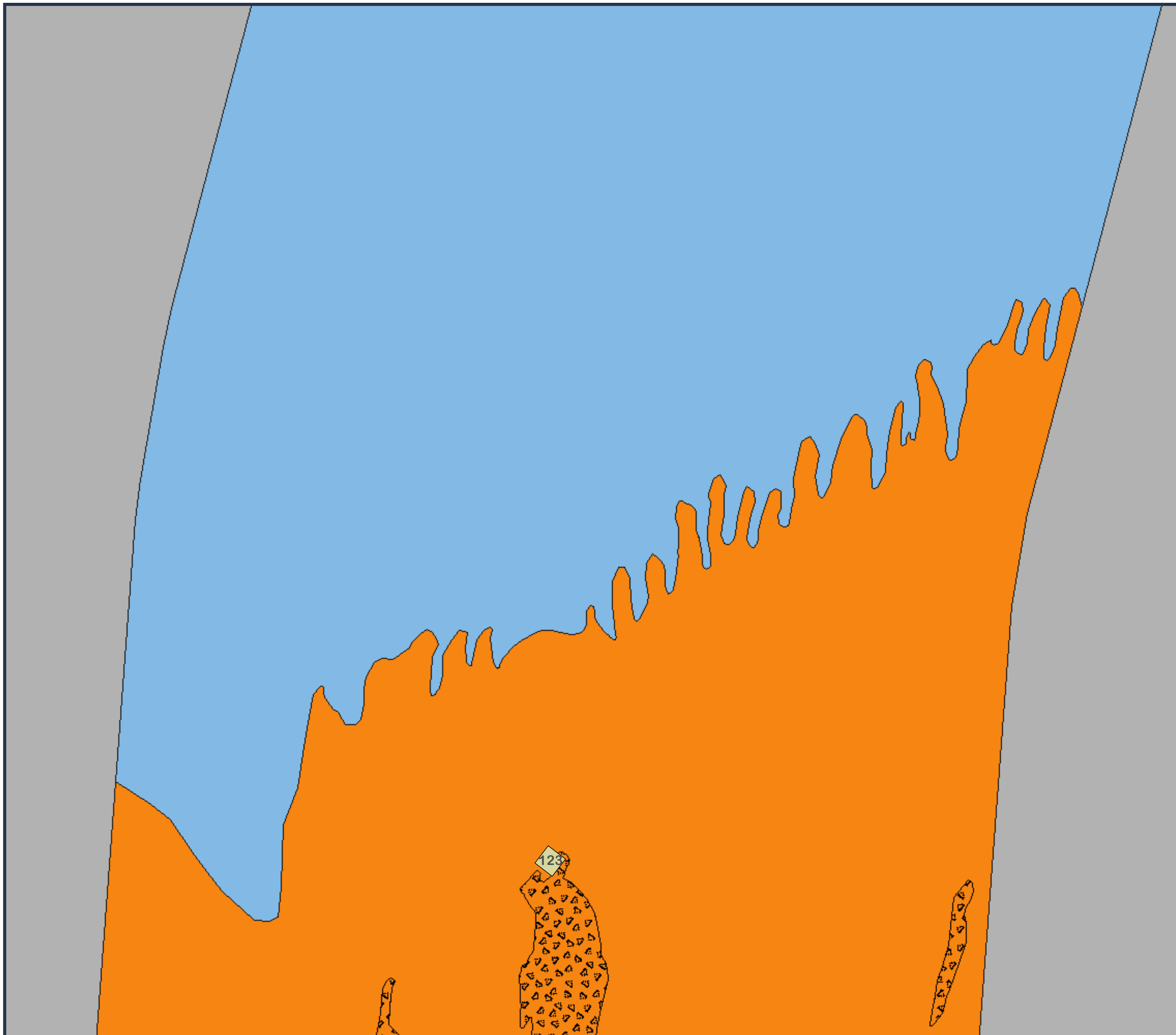
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Heterogeneous Habitat
- Complex Mix Station - Video Transect

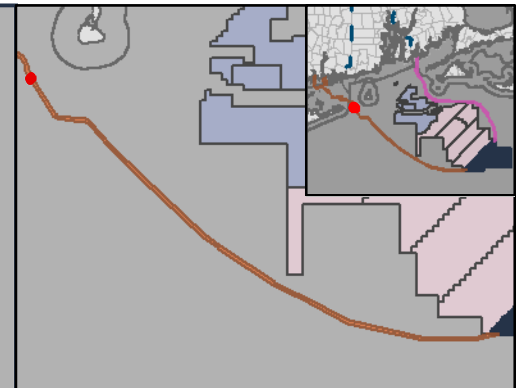
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Heterogeneous Habitat
- Soft Bottom Habitat

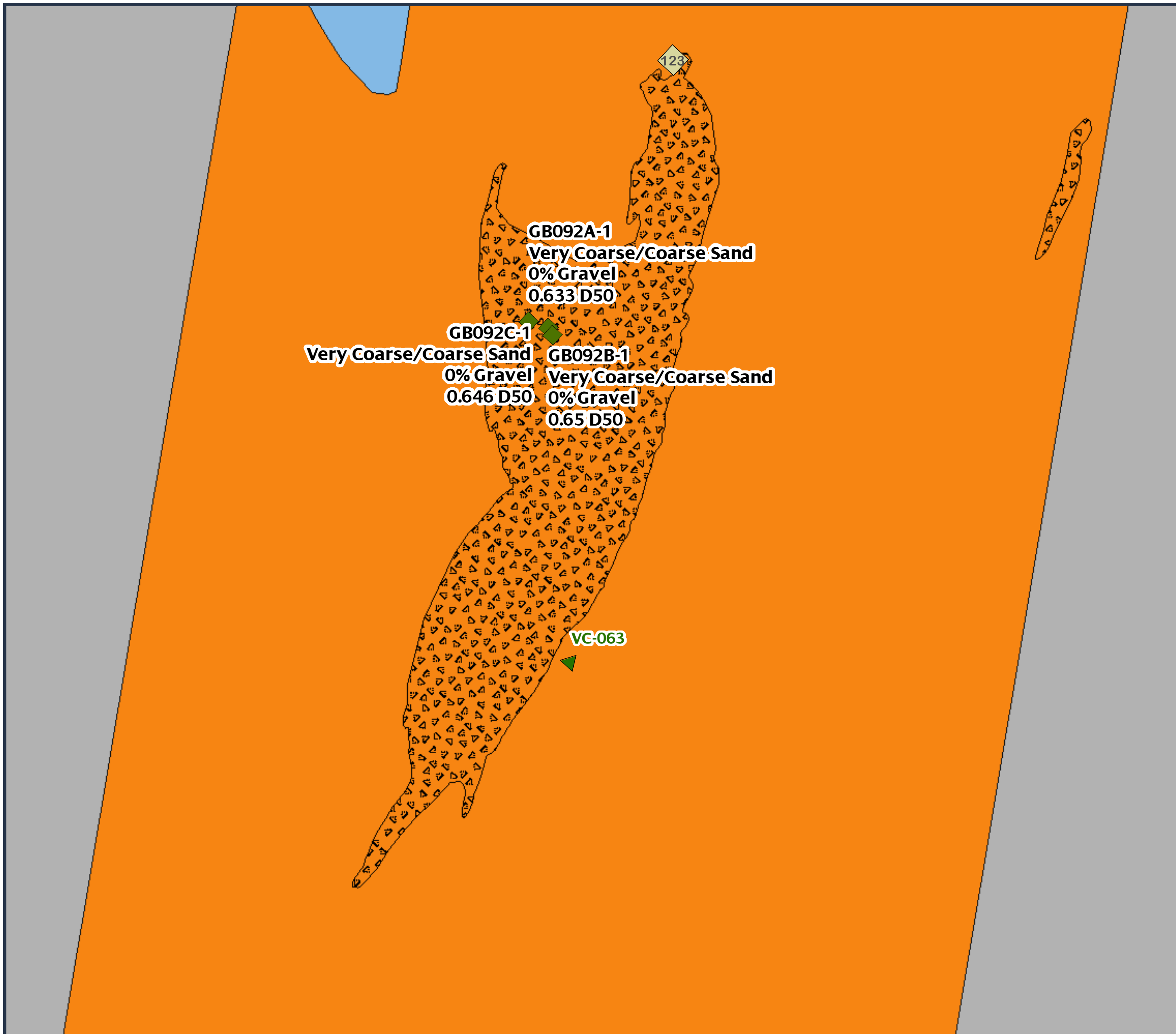
Scale 1:5,000
1 inch = 0 km

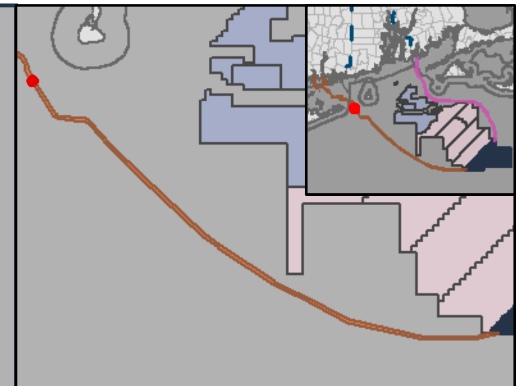
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





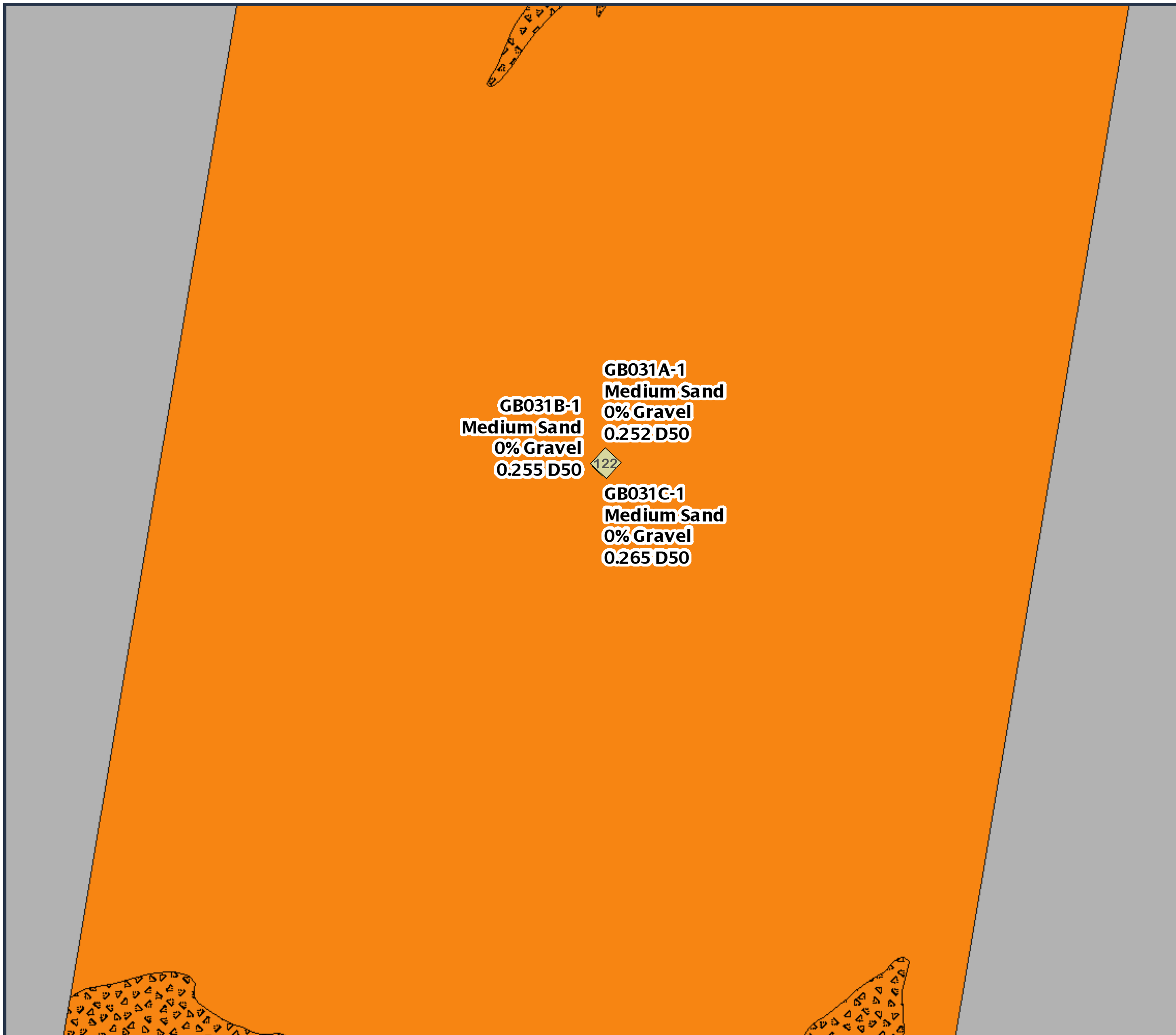
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Heterogeneous Habitat
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore

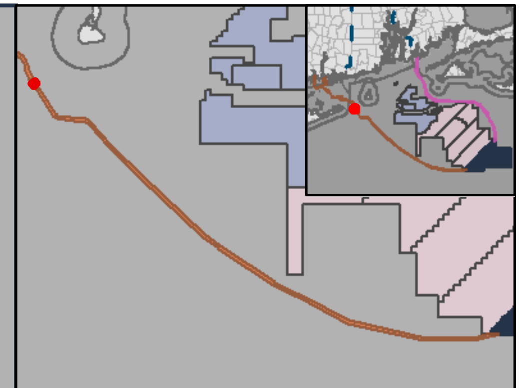
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

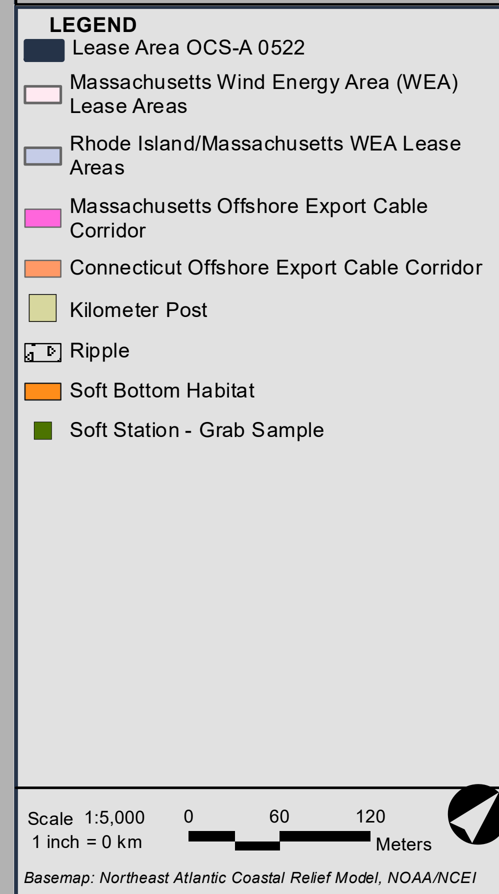
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE

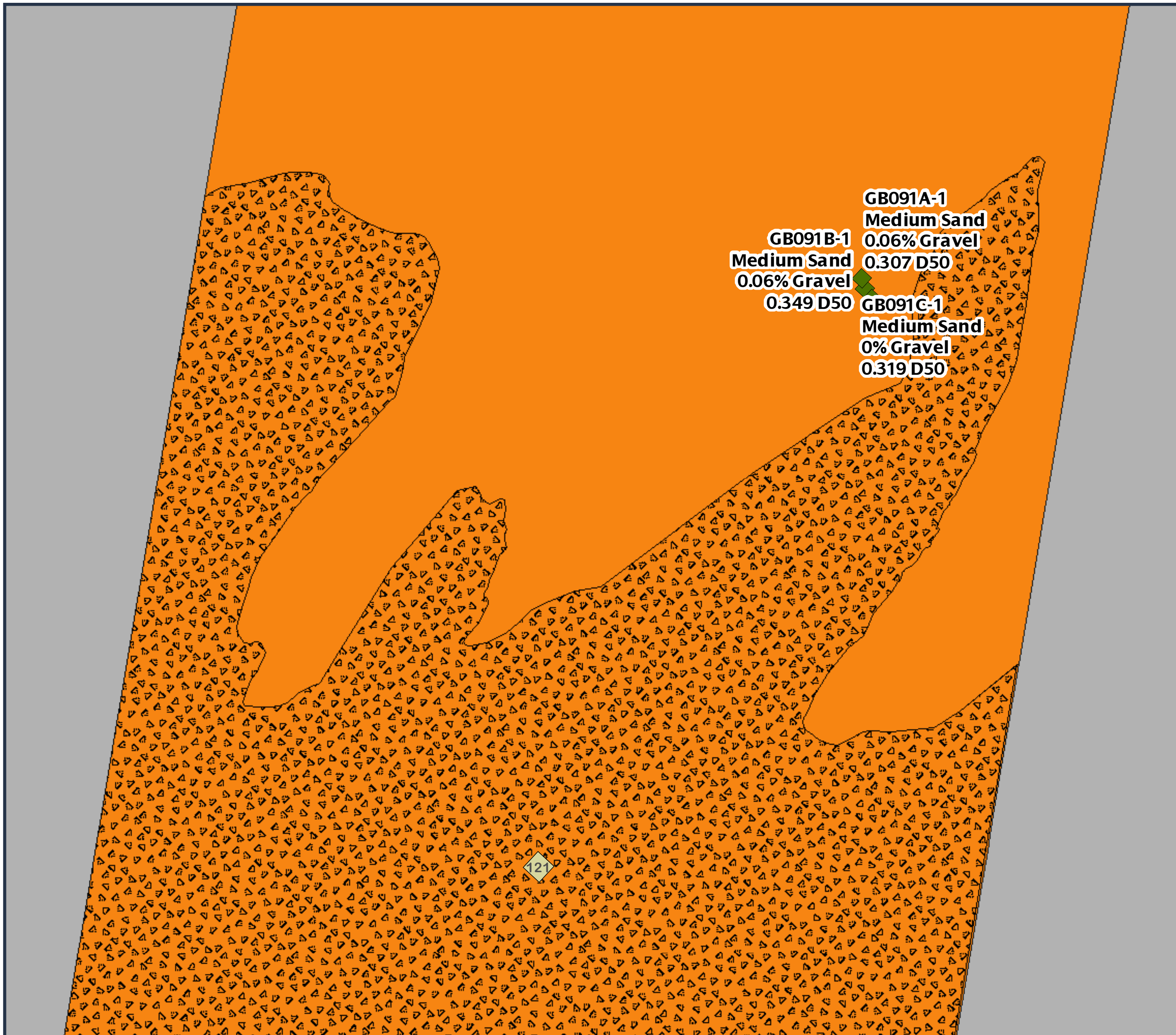


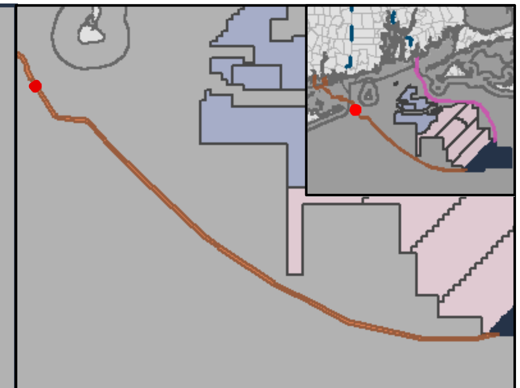




Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

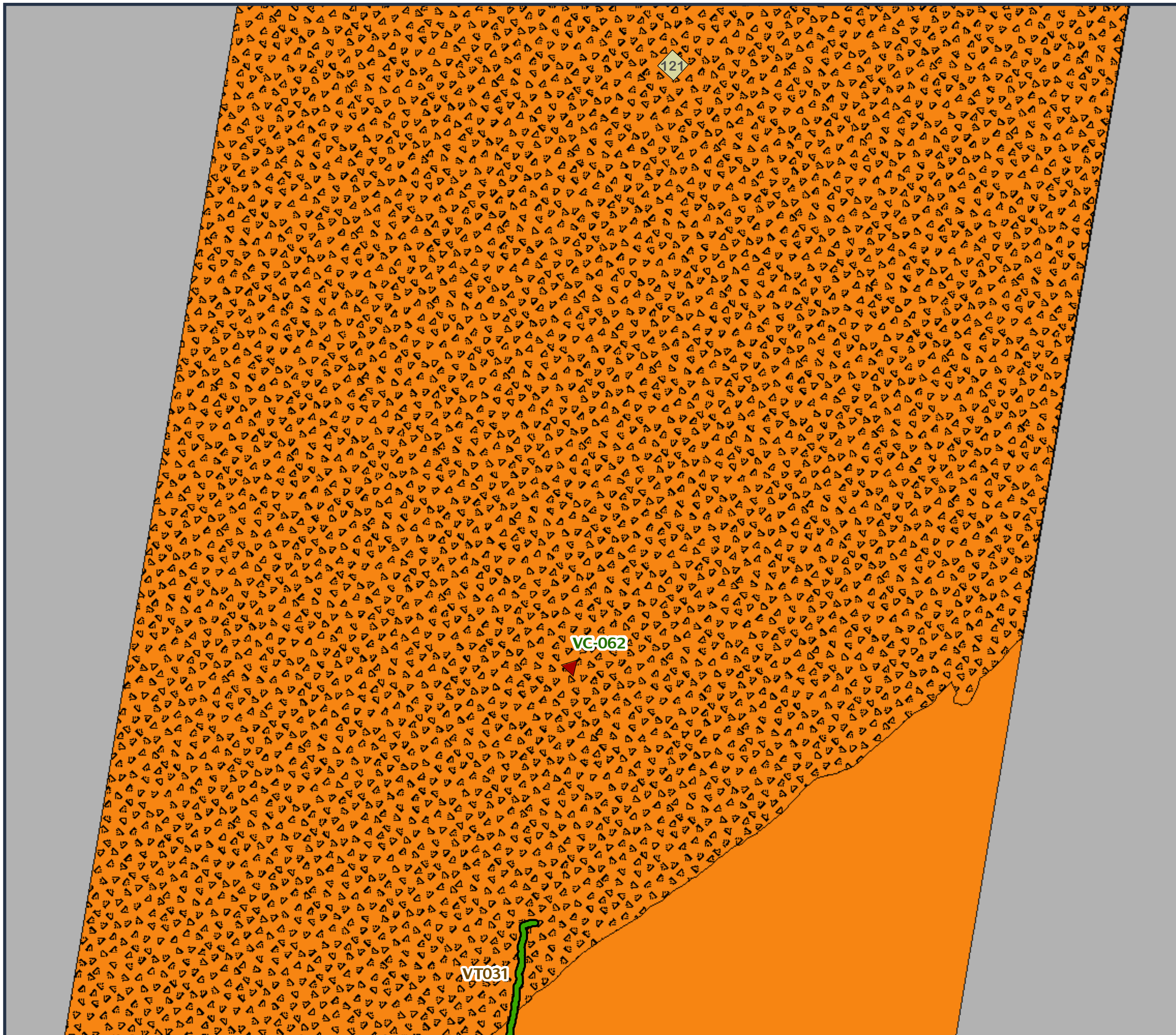
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample

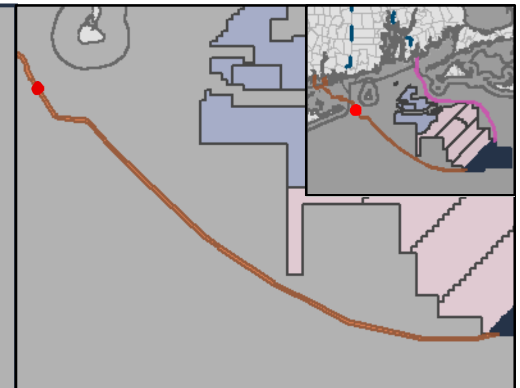
Scale 1:5,000
1 inch = 0 km

0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Complex Station - Vibracore
- Soft Bottom Station - Video Transect

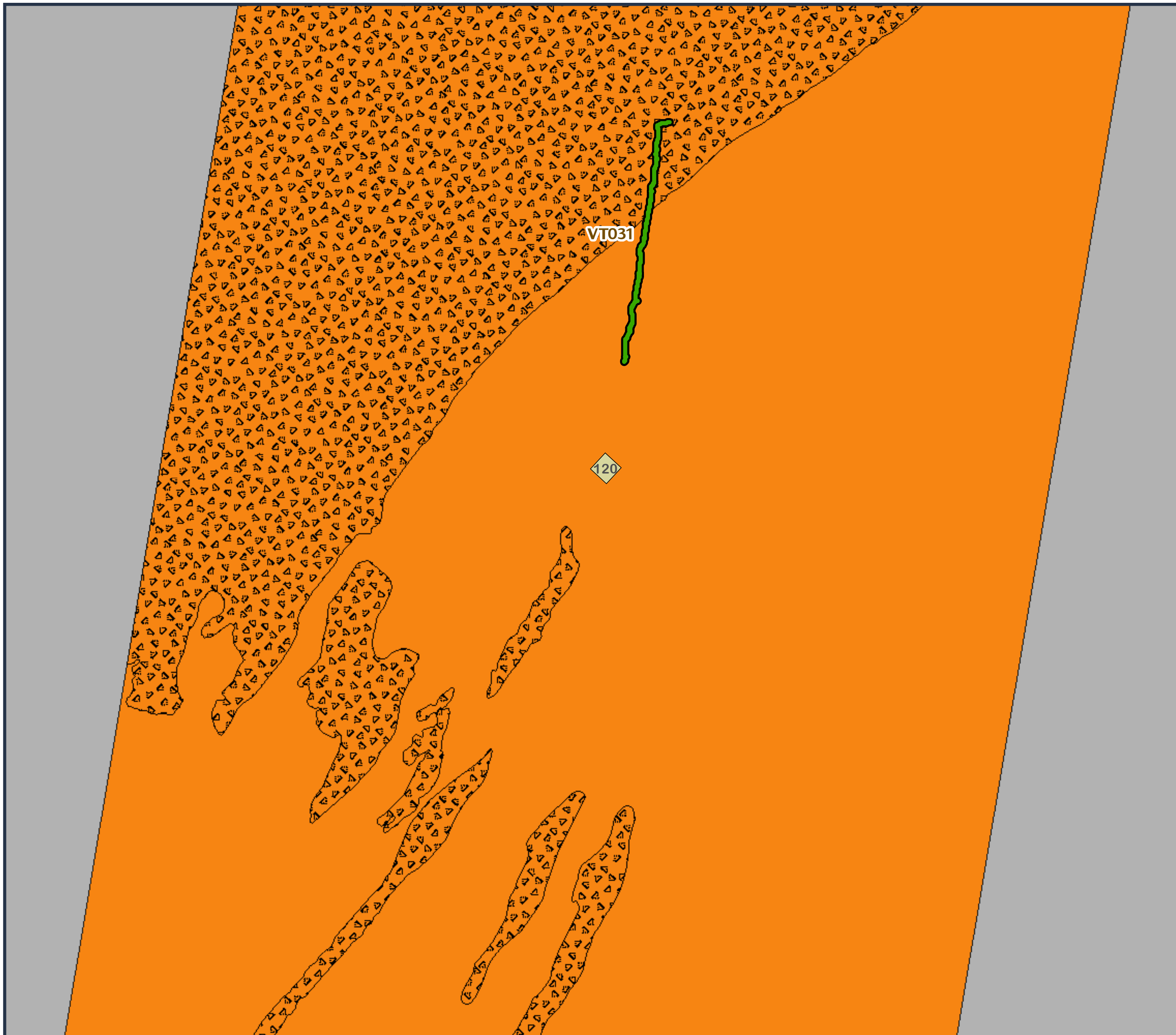
Scale 1:5,000
1 inch = 0 km

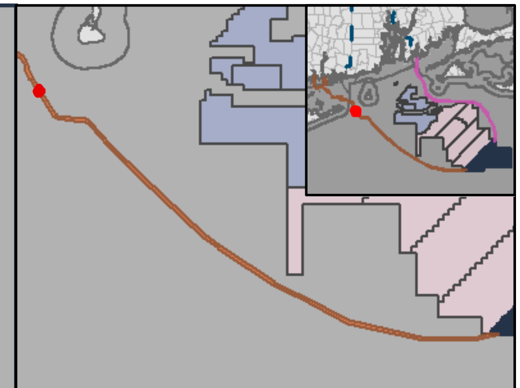
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





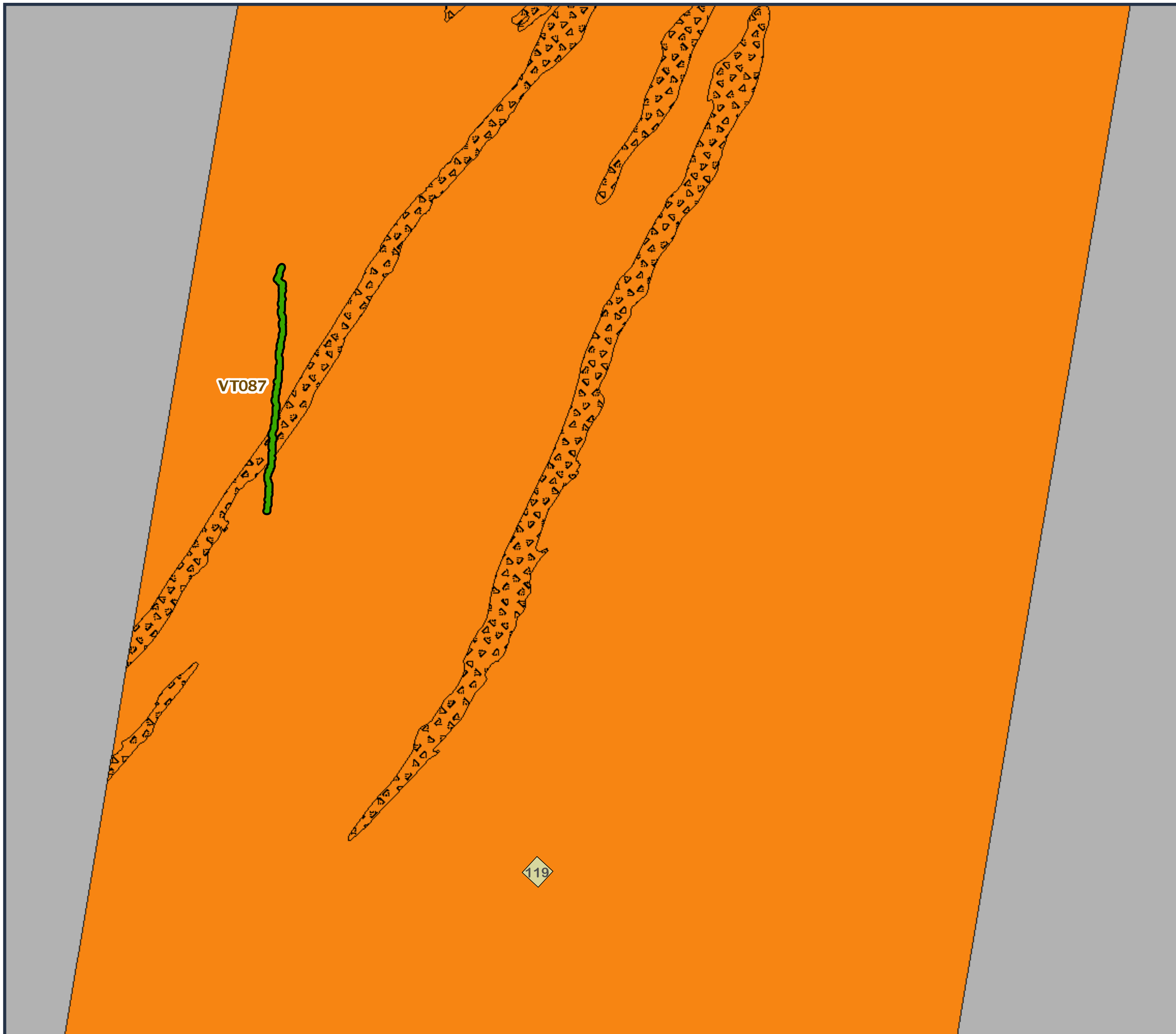
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Ripple
Soft Bottom Habitat
Soft Bottom Station - Video Transect

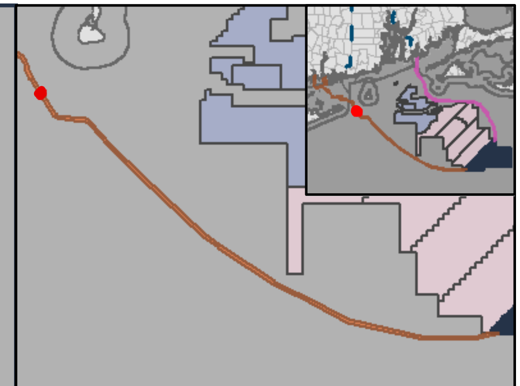
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





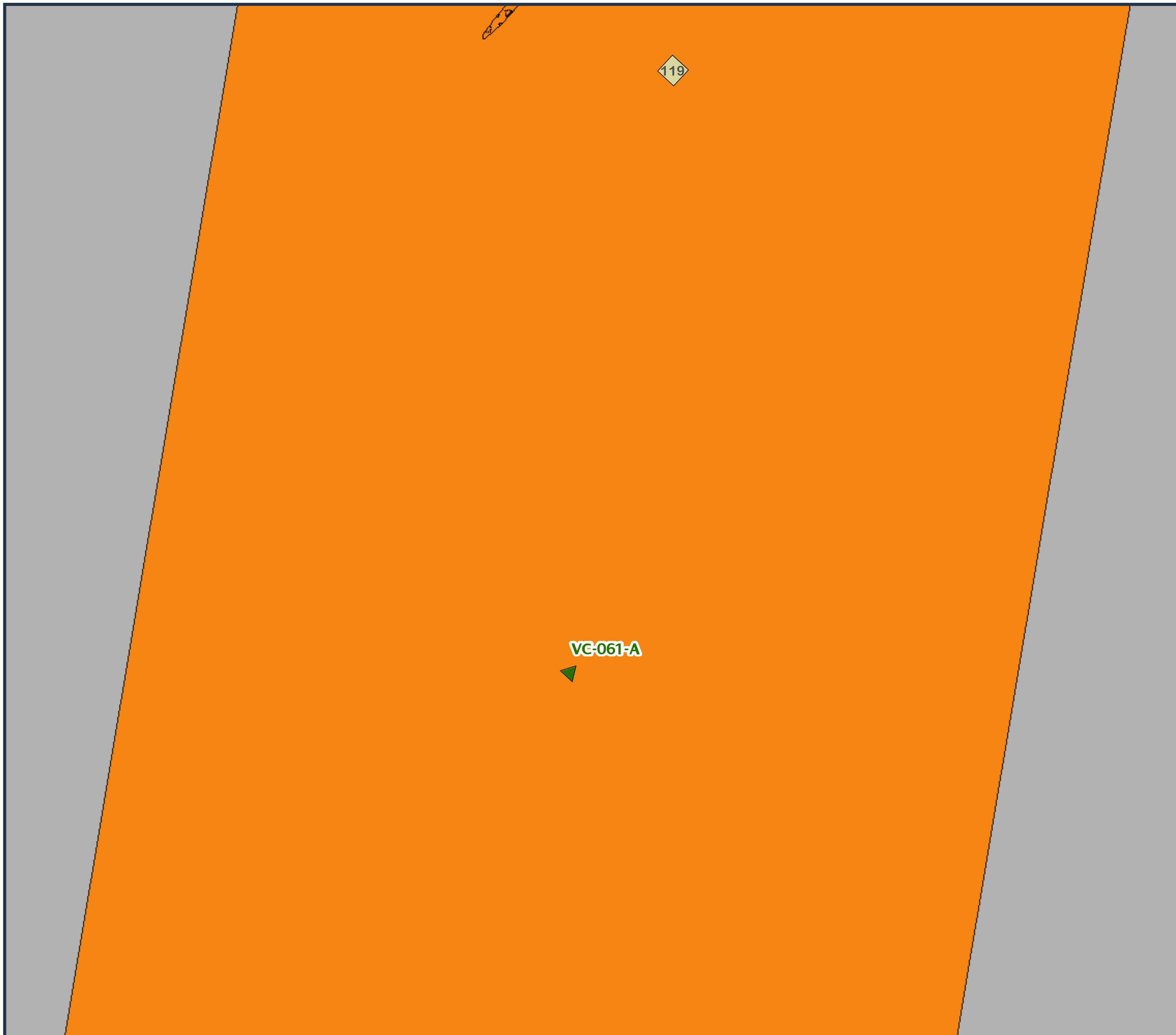
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Ripple
Soft Bottom Habitat
Soft Bottom Station - Video Transect

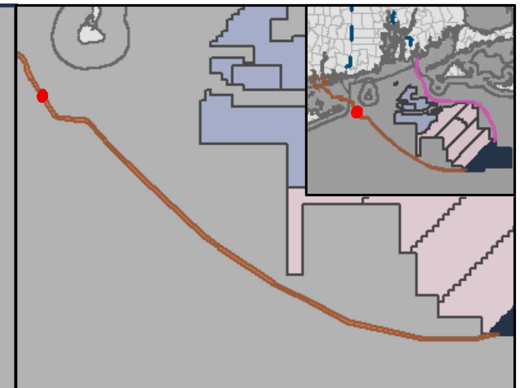
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Vibracore

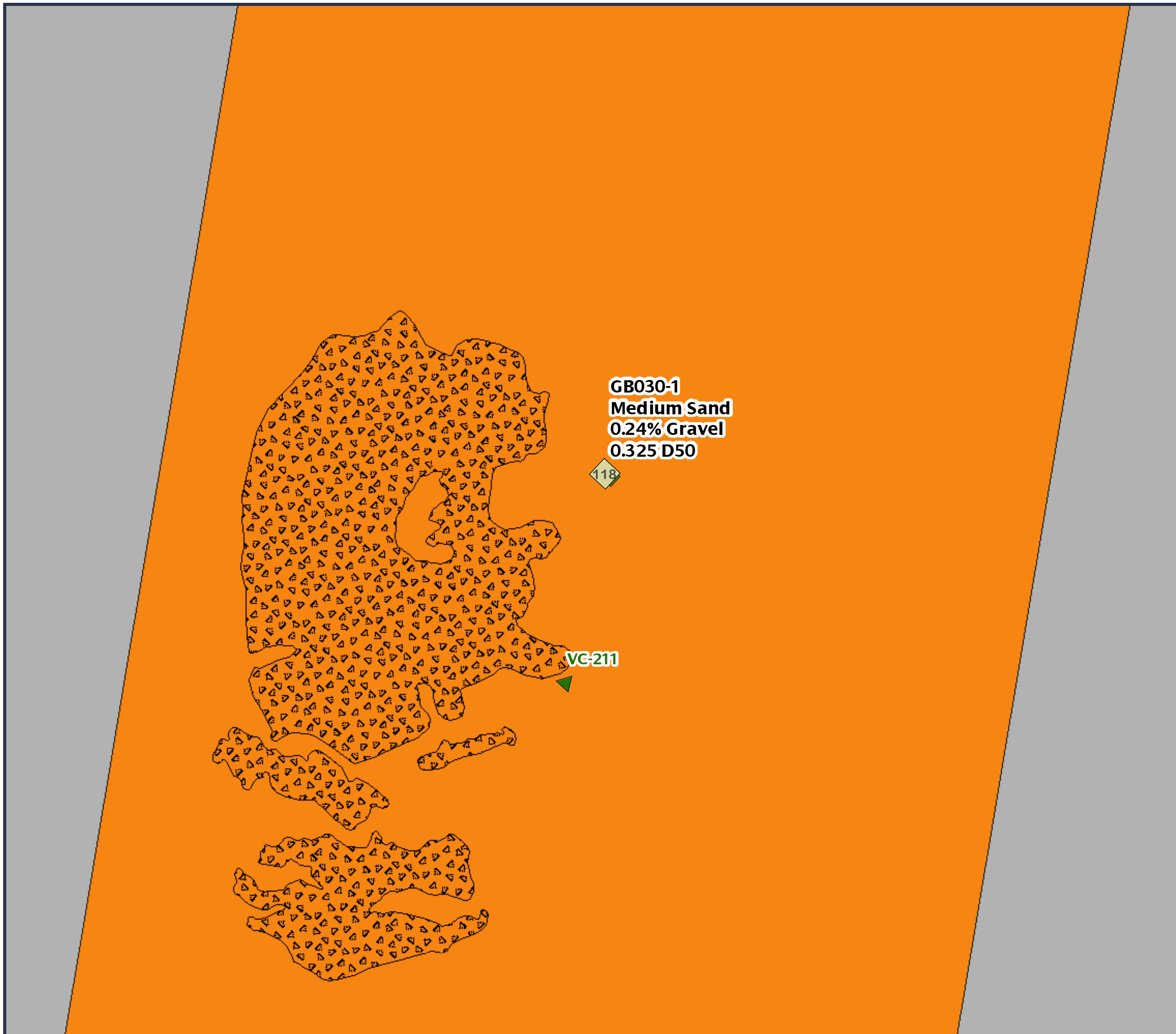
Scale 1:5,000
1 inch = 0 km

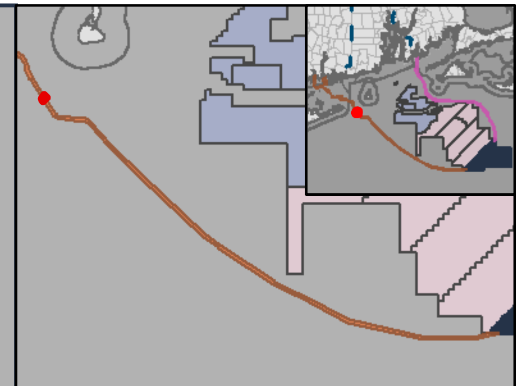
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore

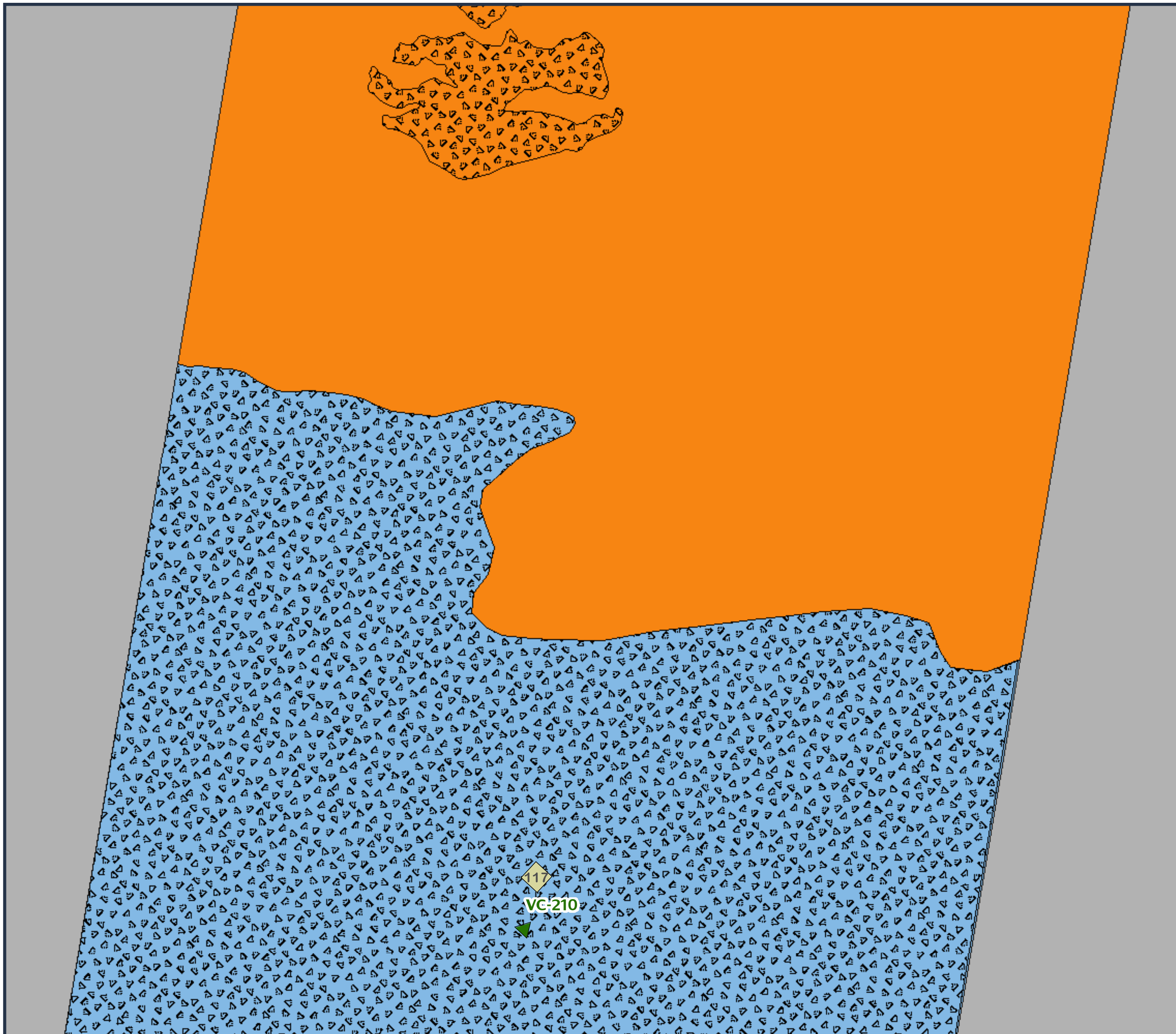
Scale 1:5,000
1 inch = 0 km

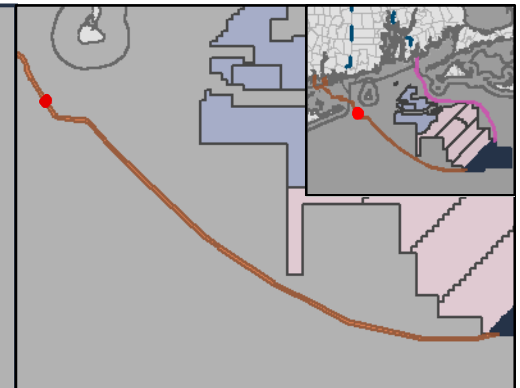
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





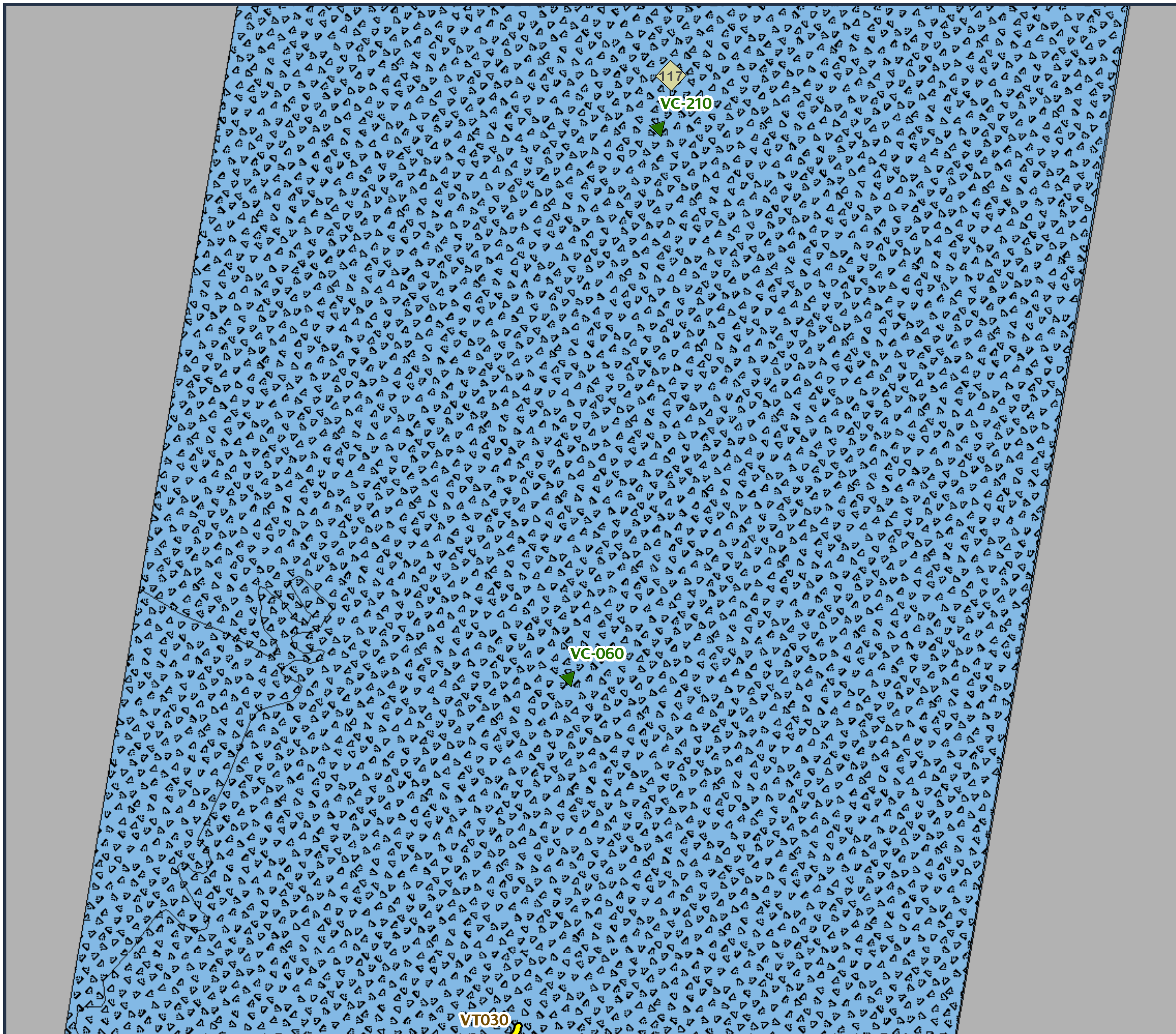
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Ripple
Heterogeneous Habitat
Soft Bottom Habitat
Soft Station - Vibracore

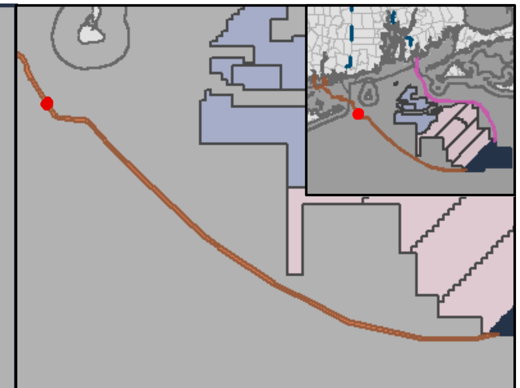
Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Heterogeneous Habitat
- Soft Station - Vibracore
- Complex Mix Station - Video Transect

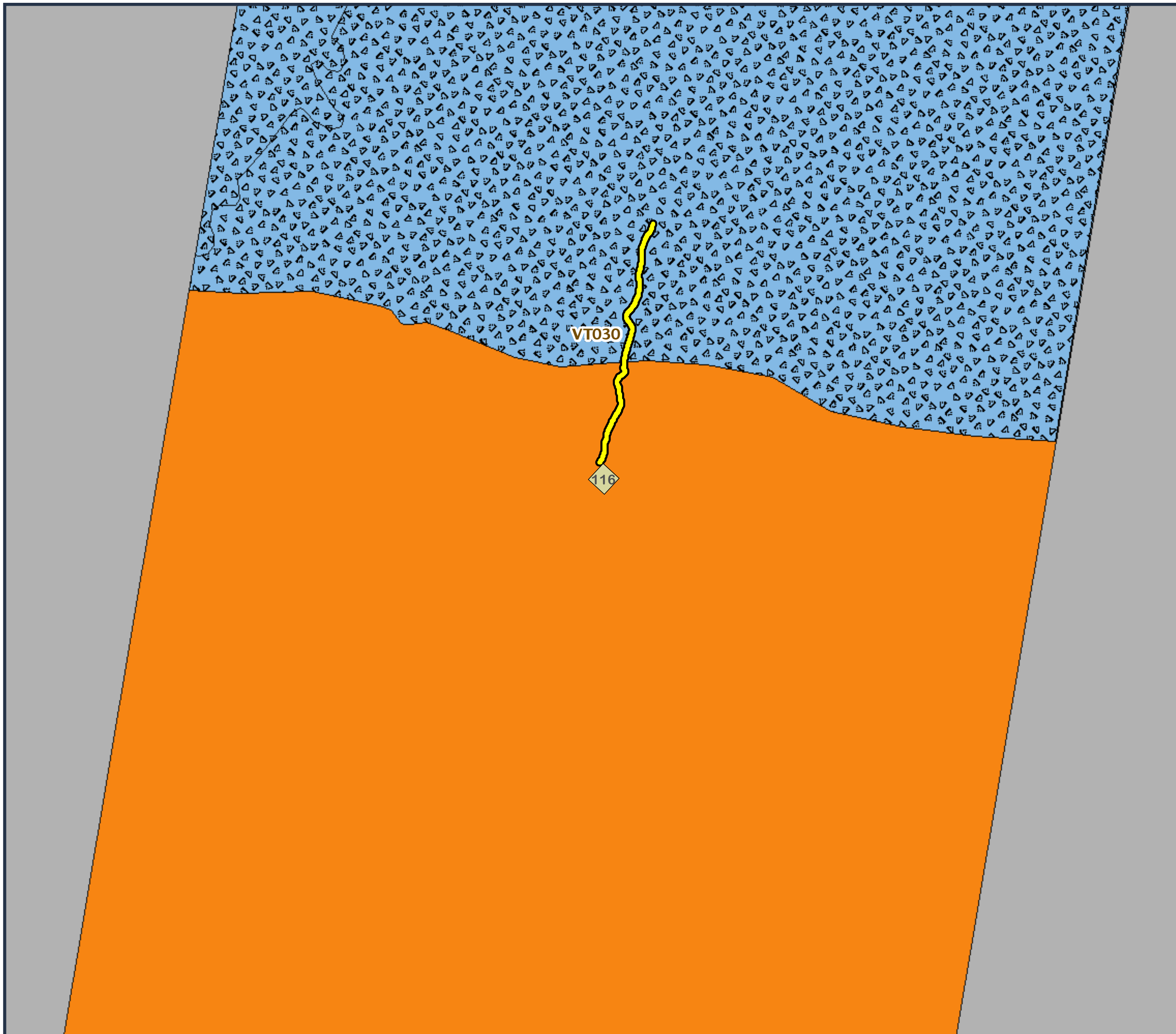
Scale 1:5,000
1 inch = 0 km

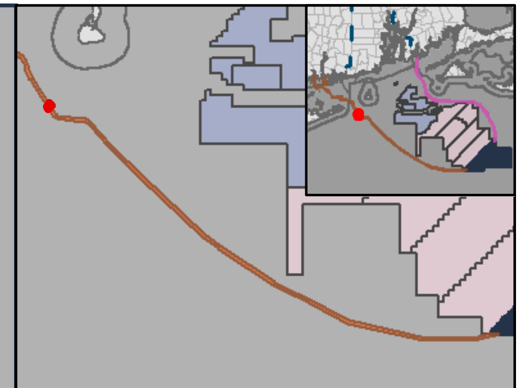
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Heterogeneous Habitat
- Soft Bottom Habitat
- Complex Mix Station - Video Transect

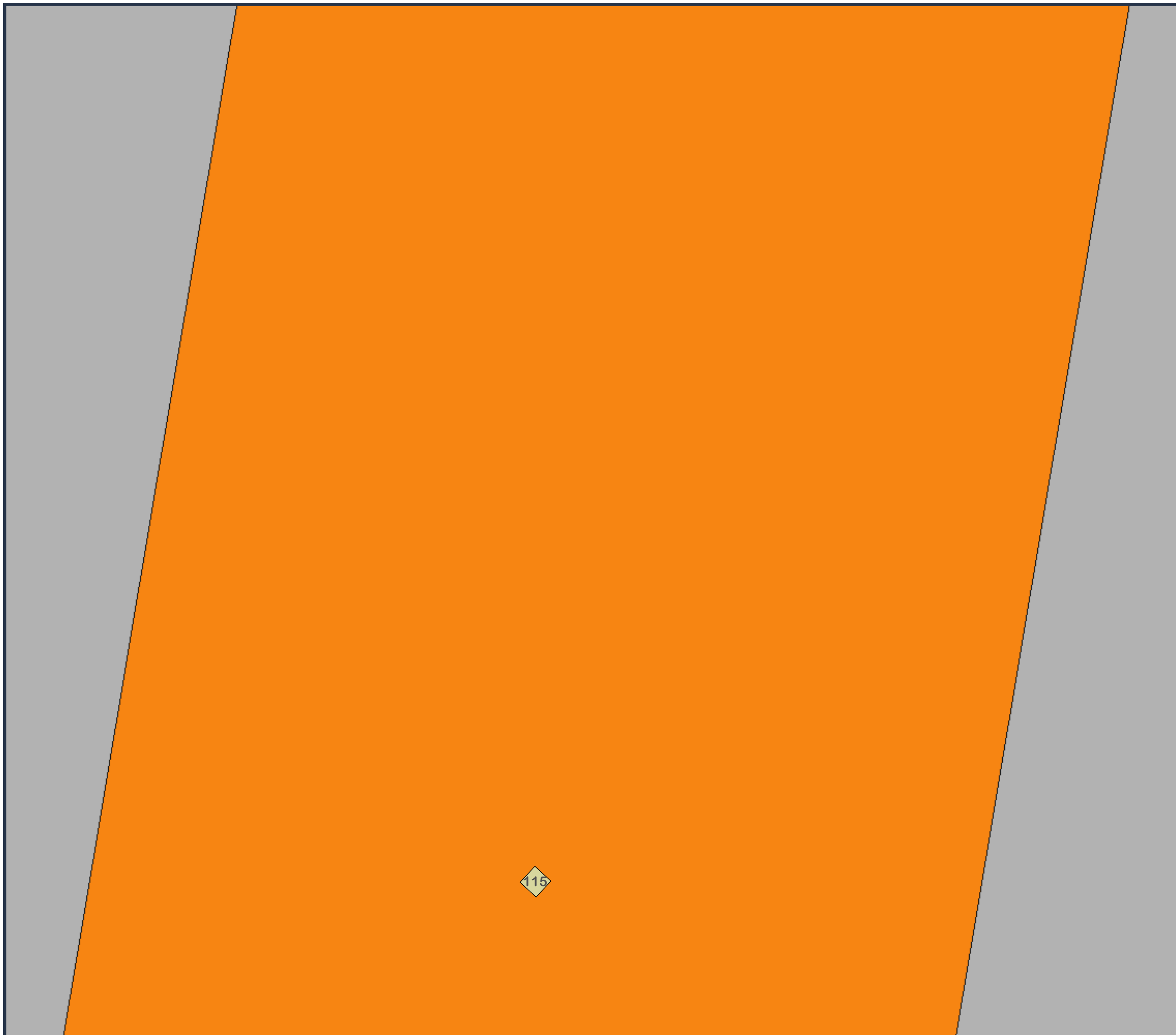
Scale 1:5,000
1 inch = 0 km

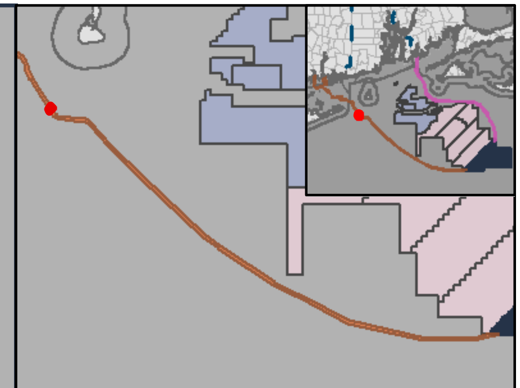
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





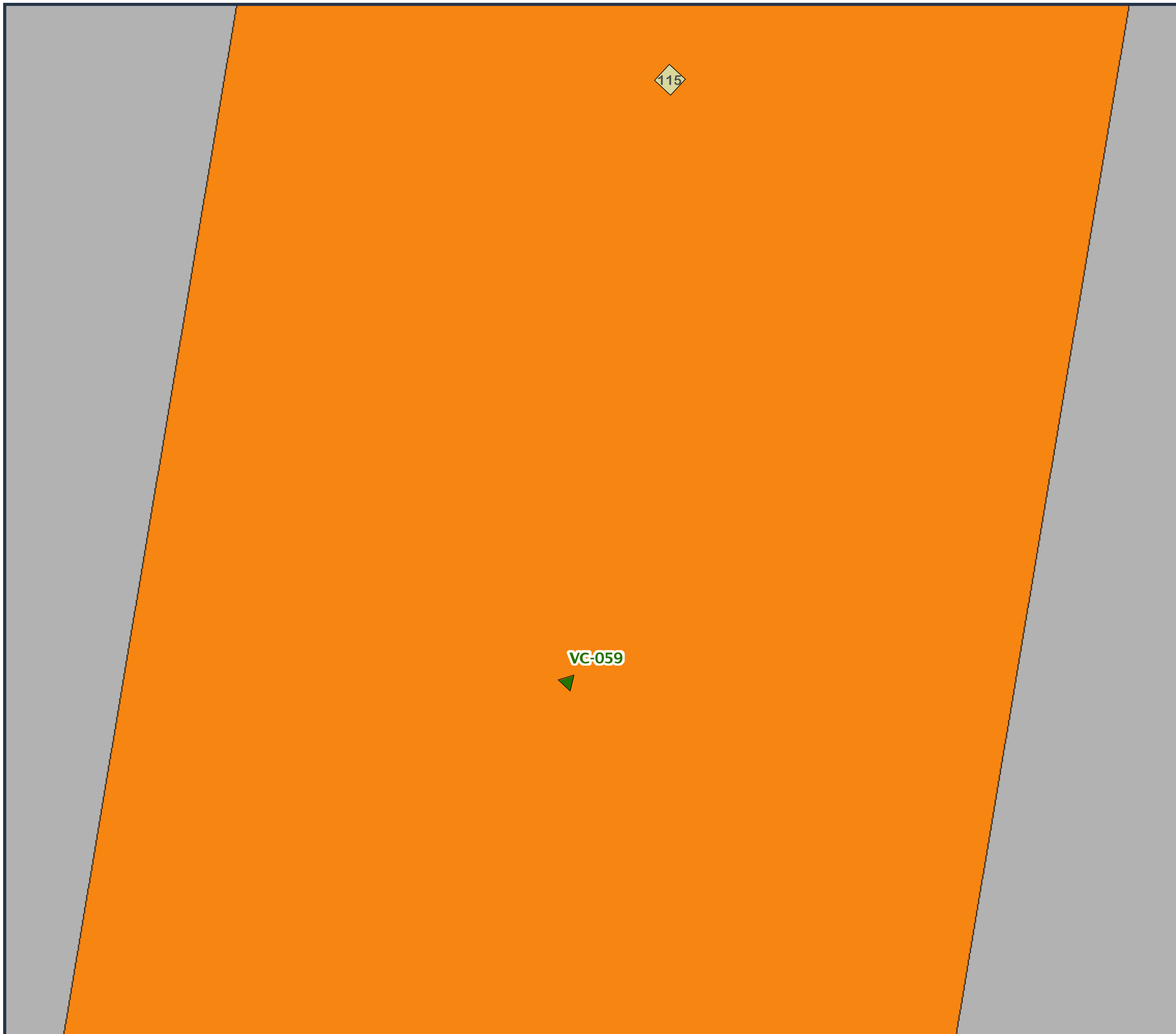
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat

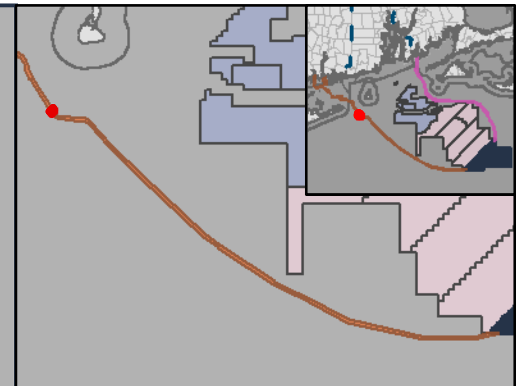
Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





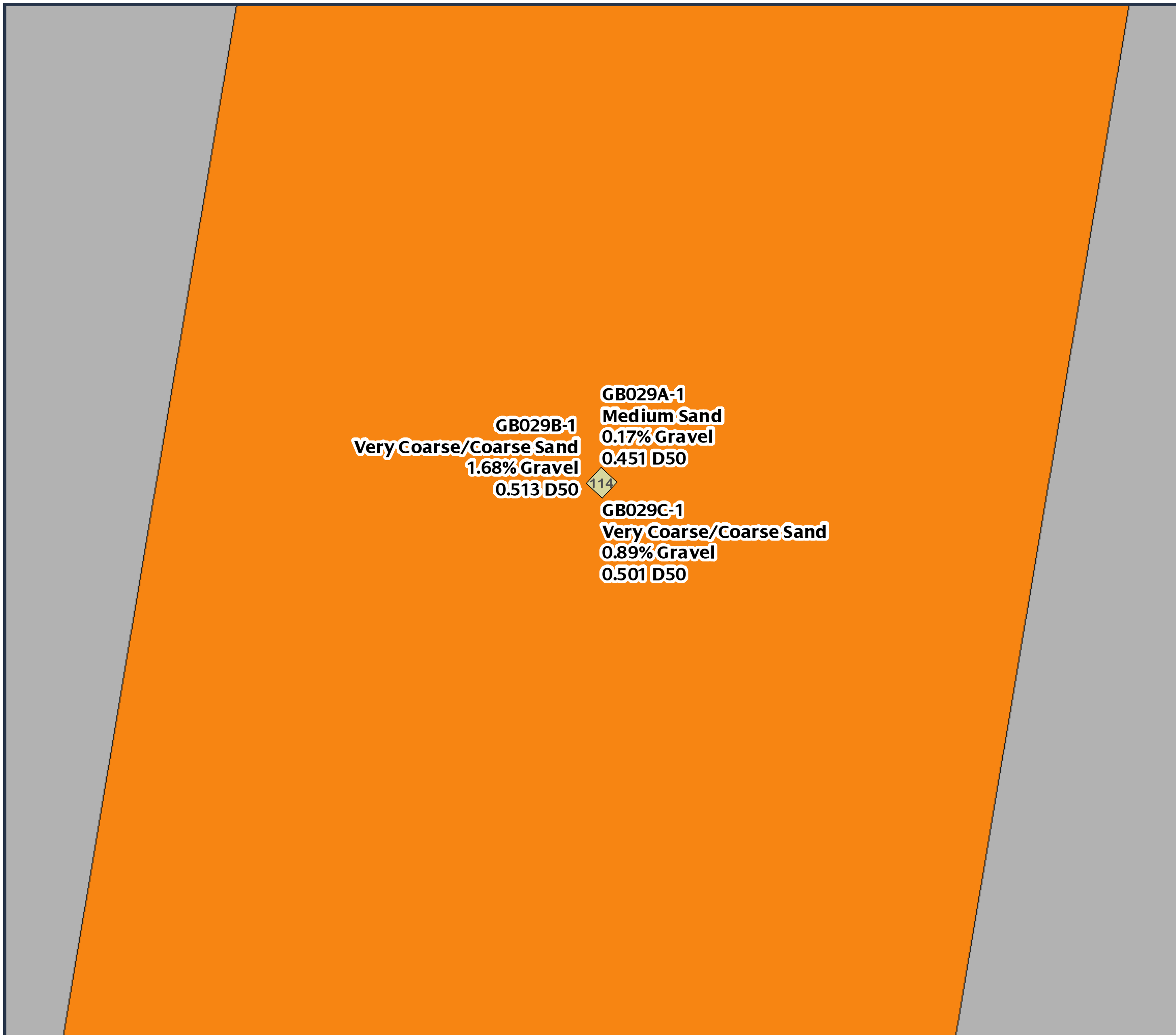
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Soft Station - Vibracore

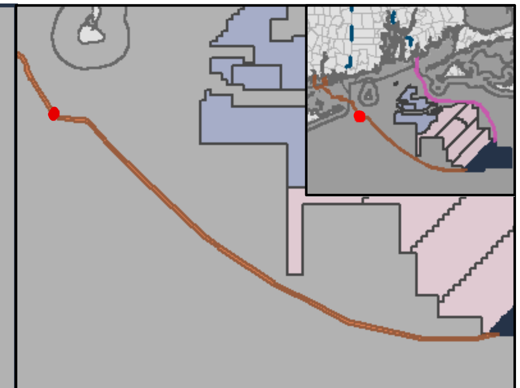
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





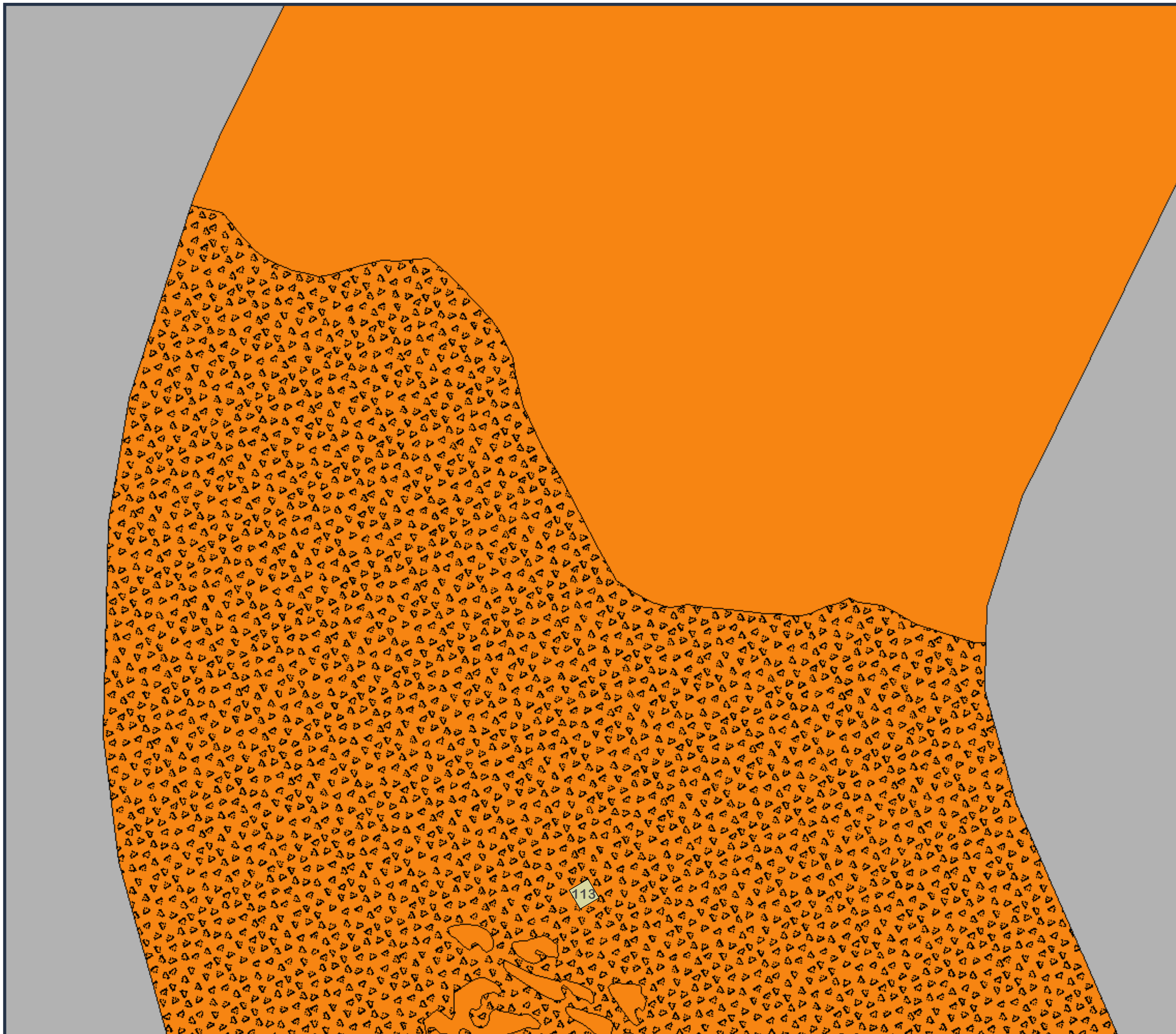
LEGEND

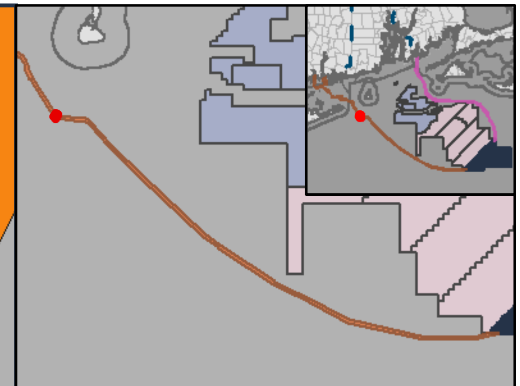
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC





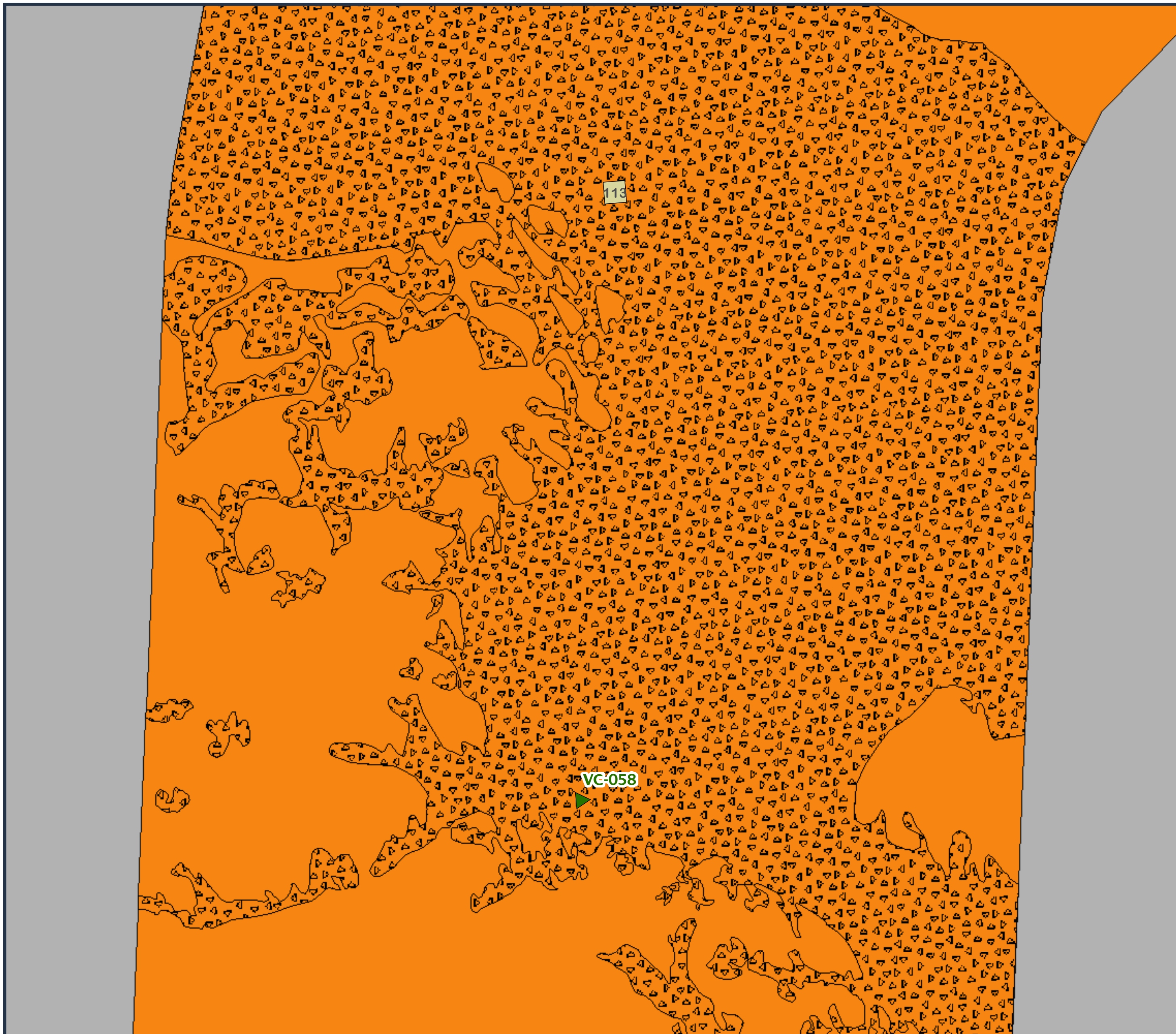
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Ripple
Soft Bottom Habitat

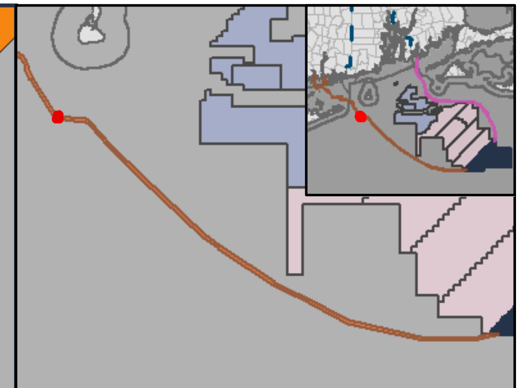
Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

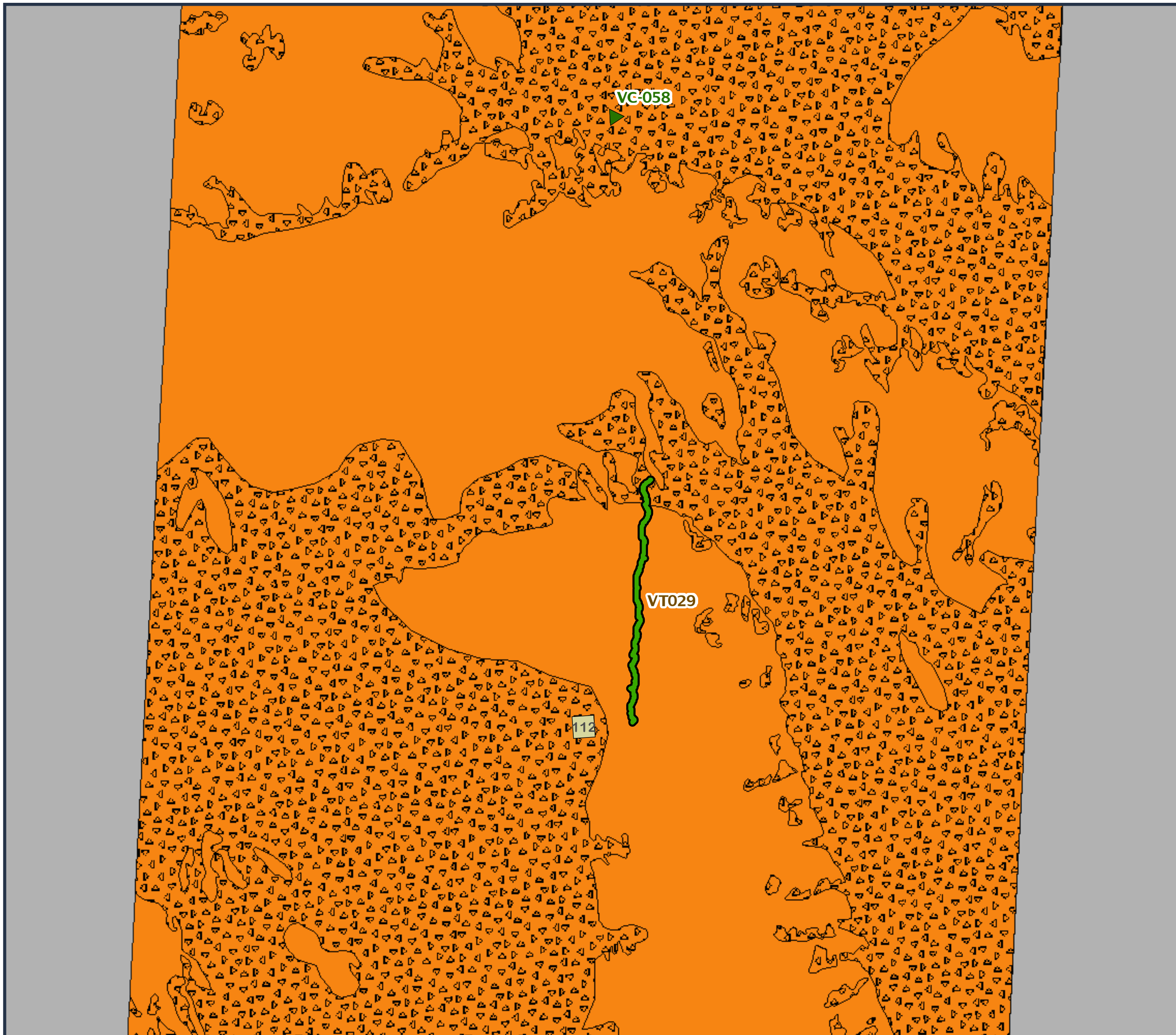
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Vibracore

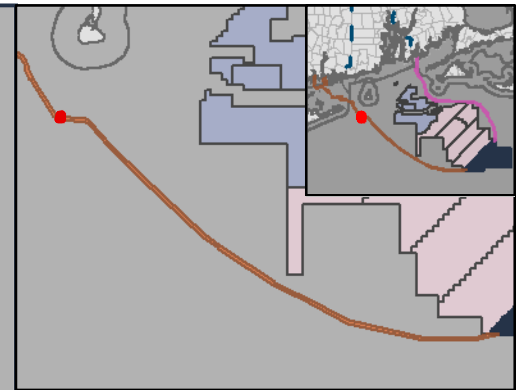
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

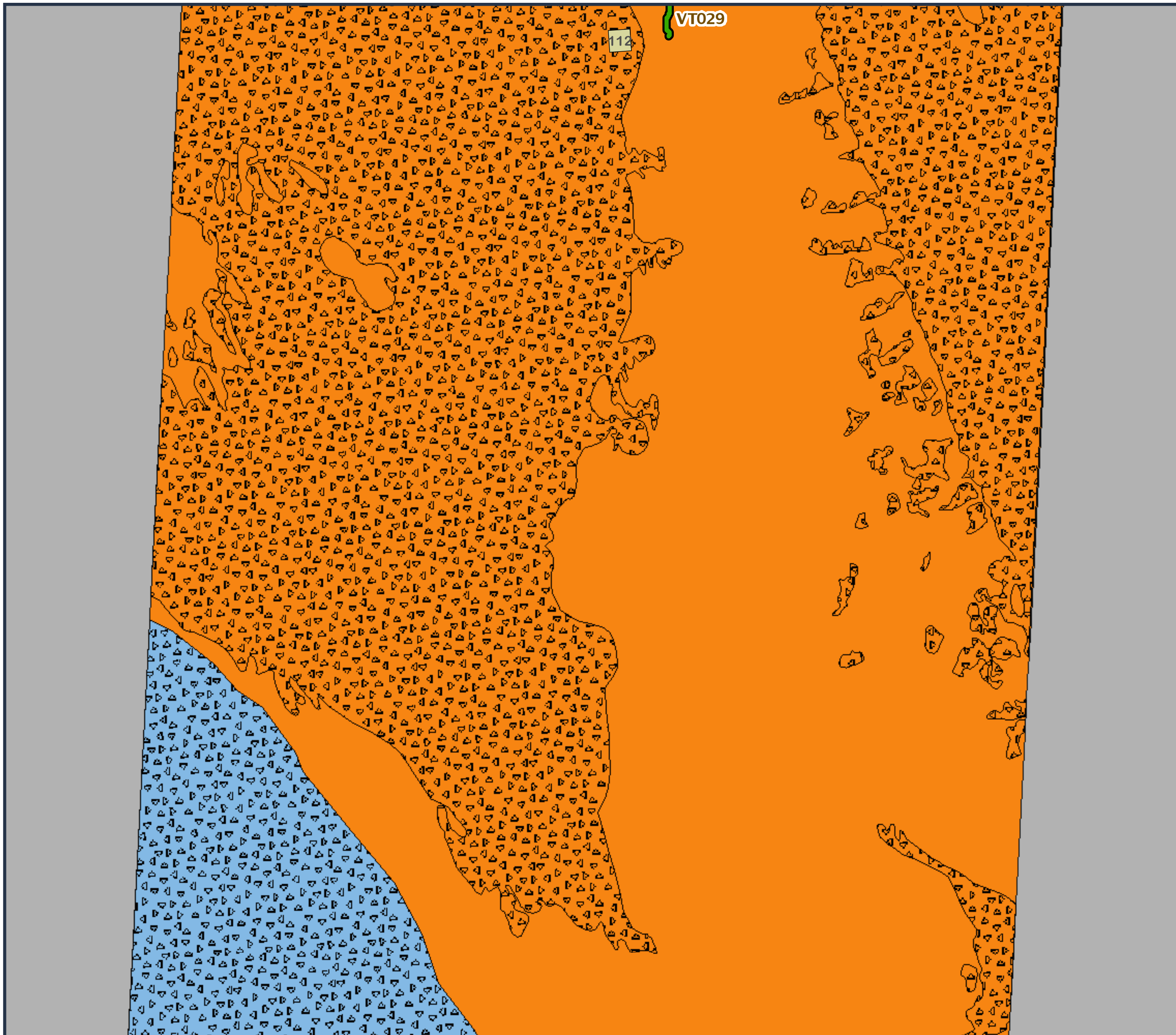
Scale 1:5,000
1 inch = 0 km

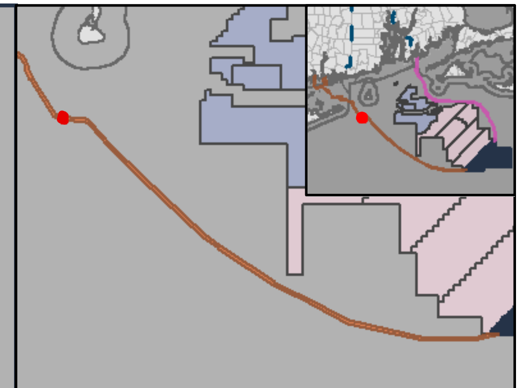
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





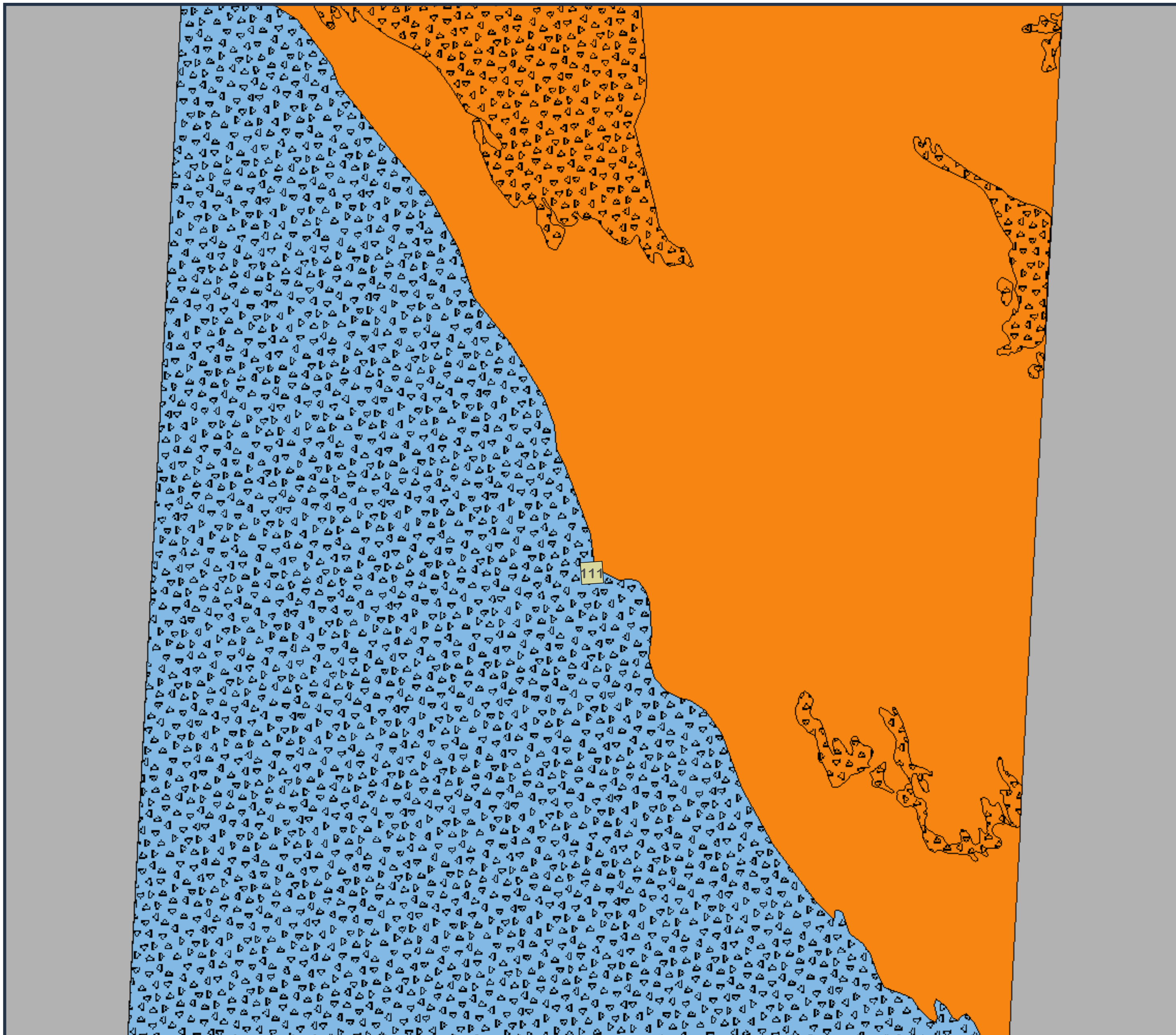
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Ripple
Heterogeneous Habitat
Soft Bottom Habitat
Soft Bottom Station - Video Transect

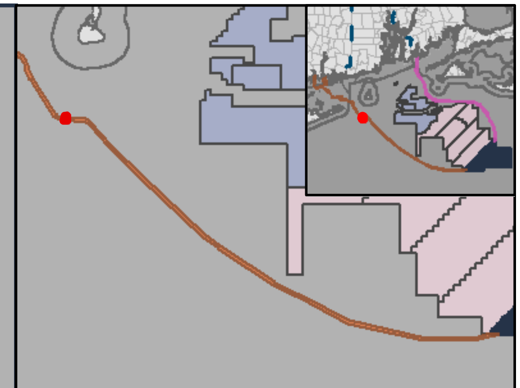
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





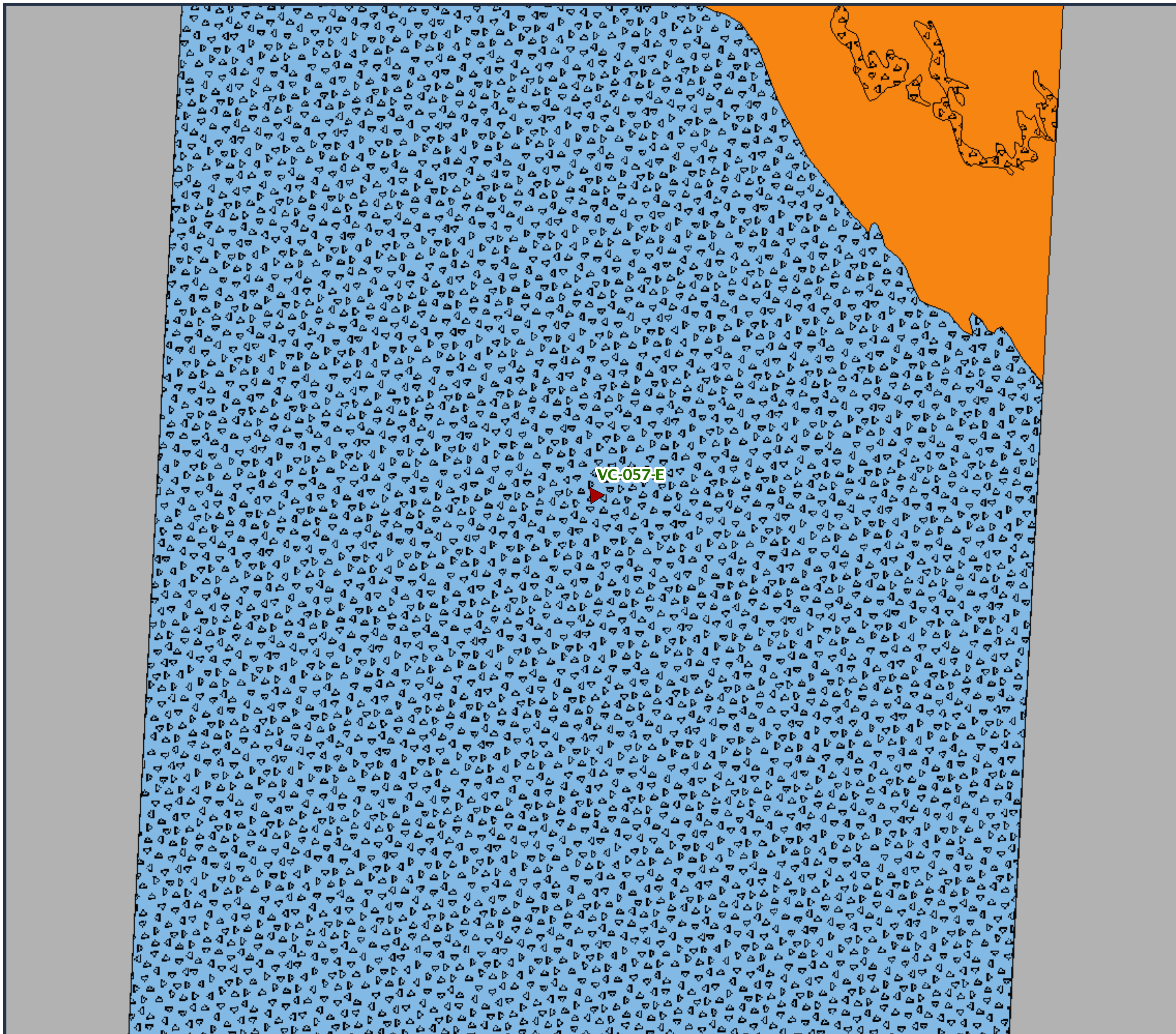
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Ripple
Heterogeneous Habitat
Soft Bottom Habitat

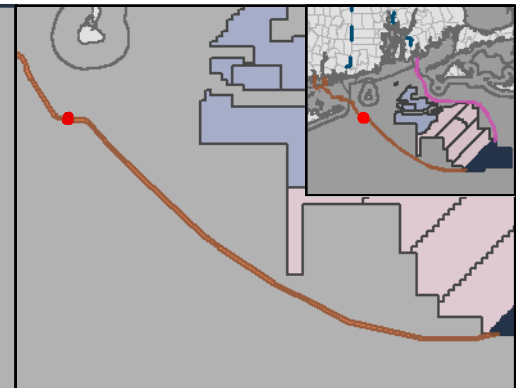
Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Ripple
- Heterogeneous Habitat
- Soft Bottom Habitat
- Complex Station - Vibracore

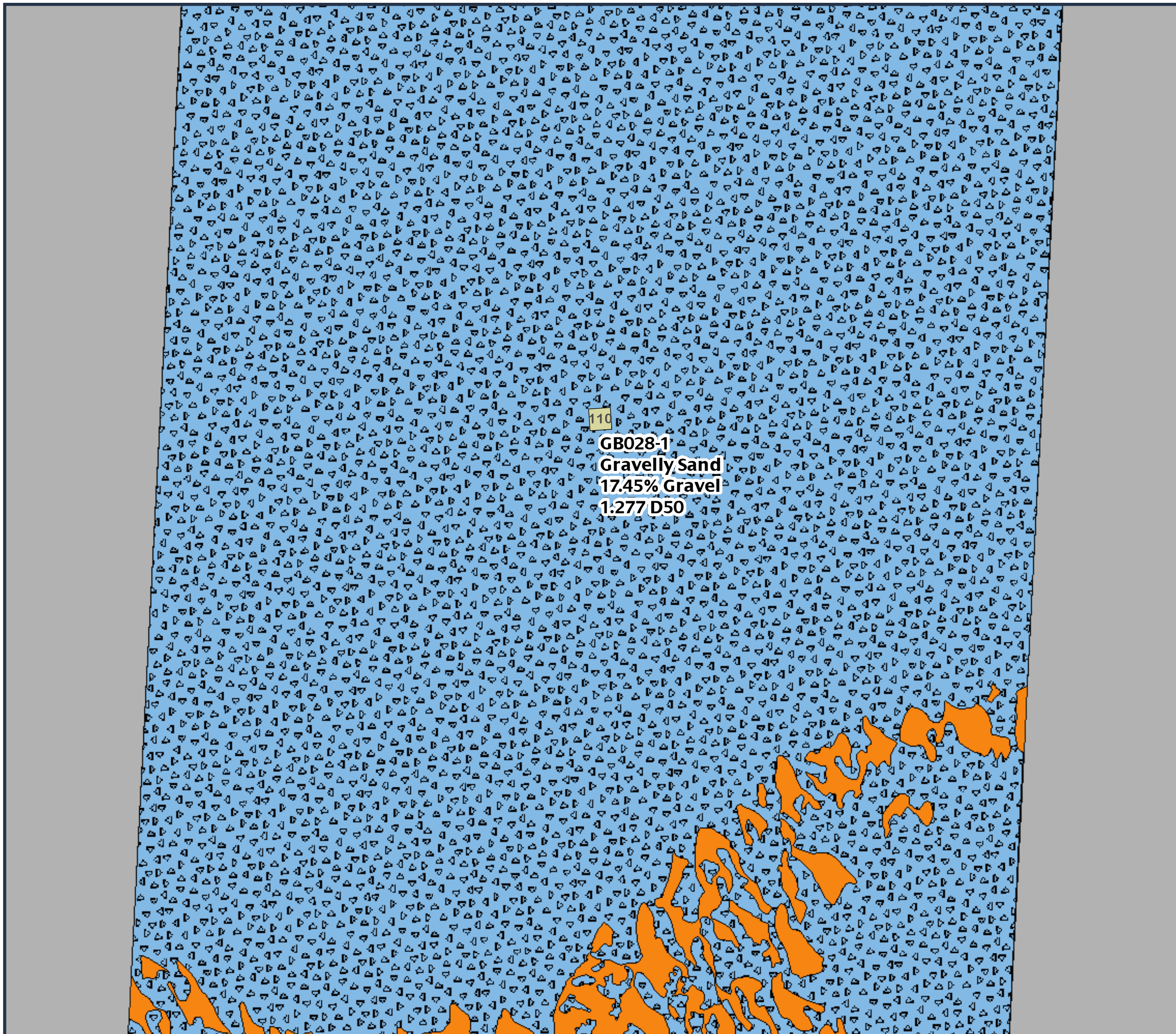
Scale 1:5,000
1 inch = 0 km

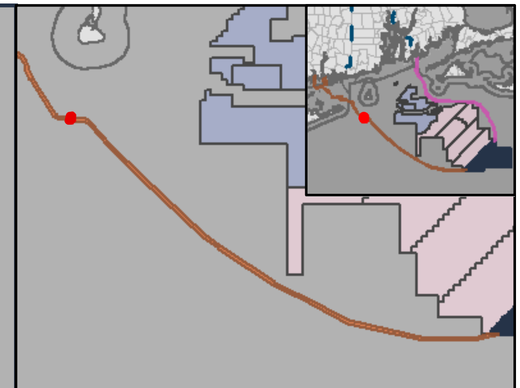
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Heterogeneous Habitat
- Soft Bottom Habitat
- Complex Station - Grab Sample

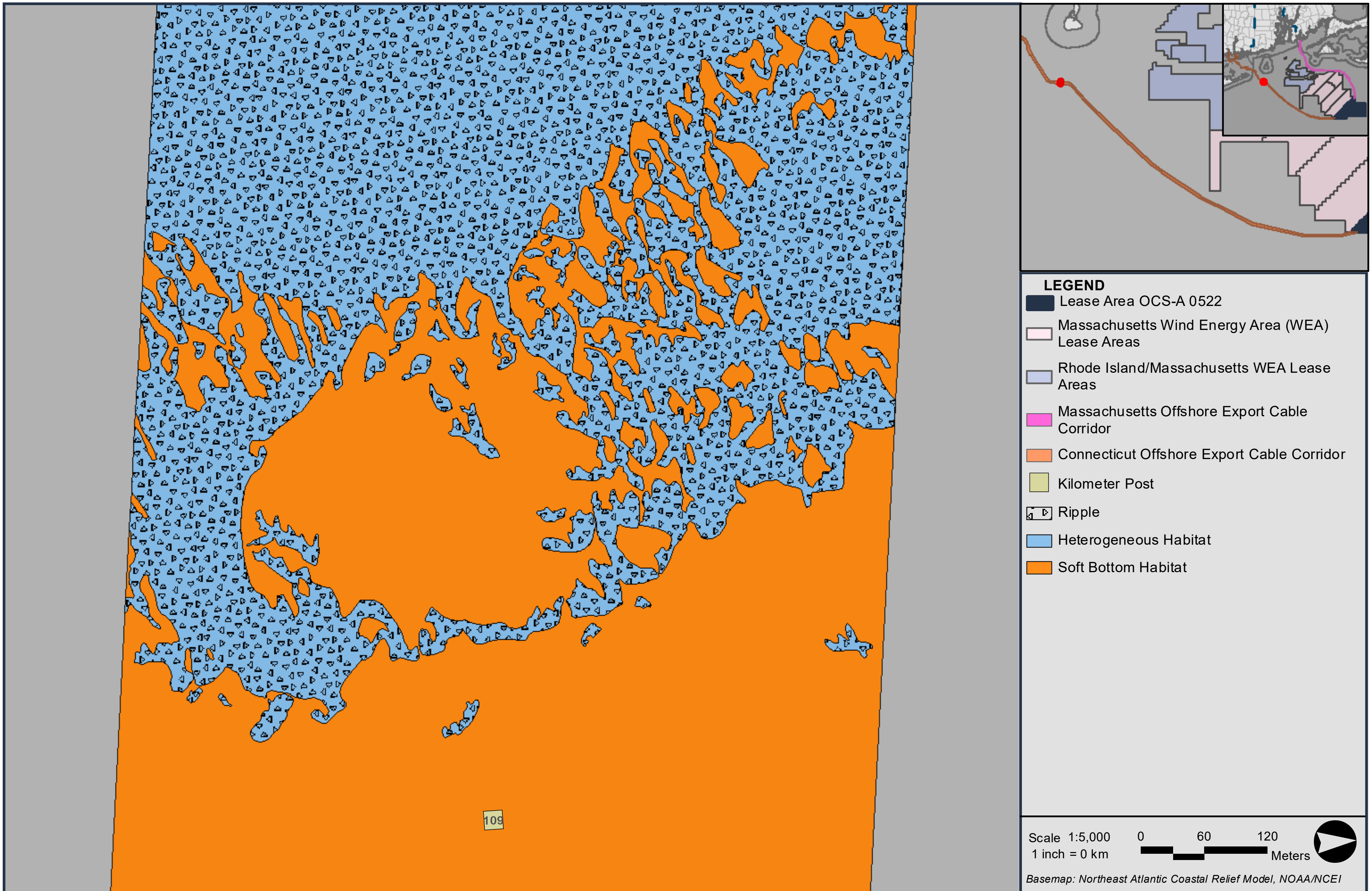
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

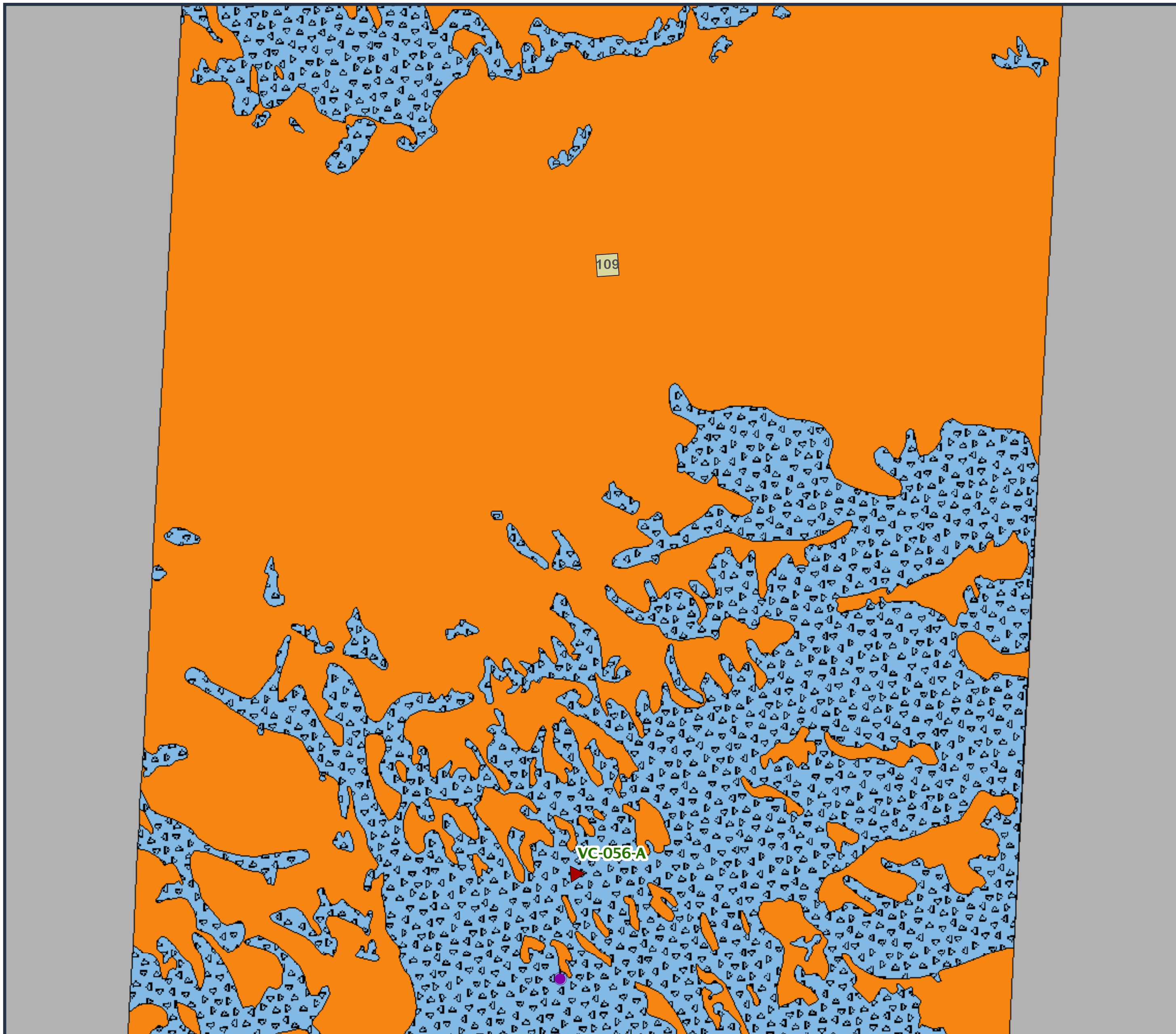
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

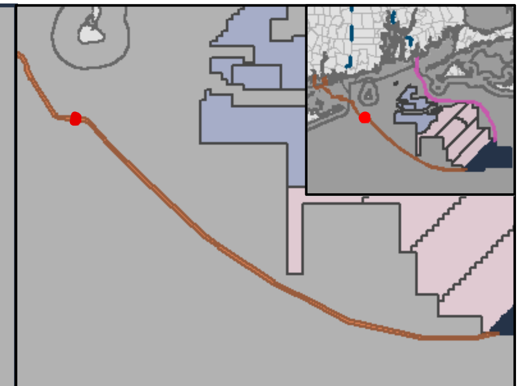
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Ripple
- Heterogeneous Habitat
- Soft Bottom Habitat
- Complex Station - Vibracore

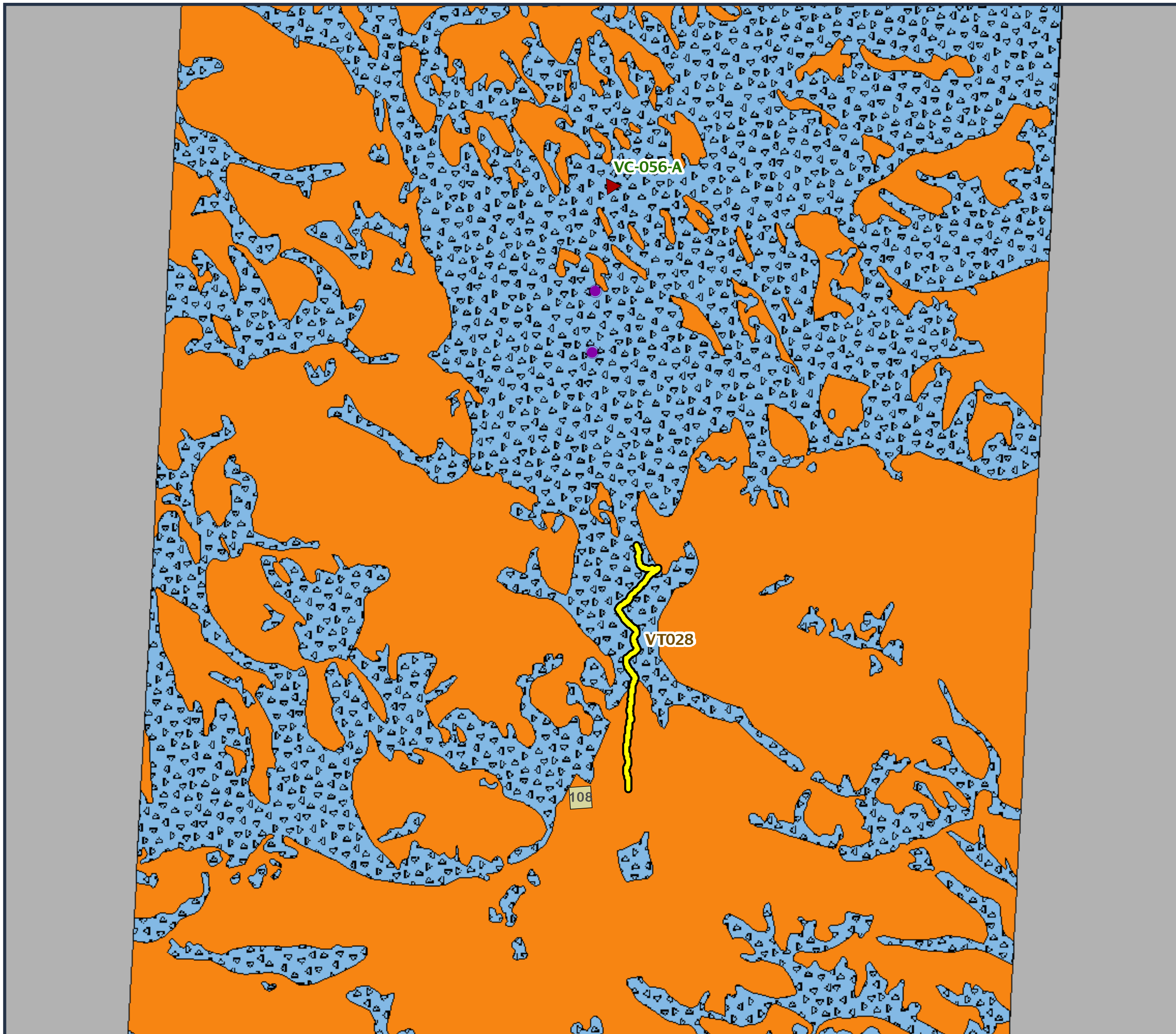
Scale 1:5,000
1 inch = 0 km

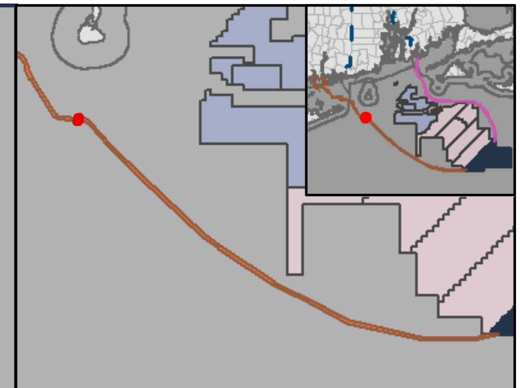
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Representative Connecticut OECC Dredge Locations
- Ripple
- Heterogeneous Habitat
- Soft Bottom Habitat
- Complex Station - Vibracore
- Complex Mix Station - Video Transect

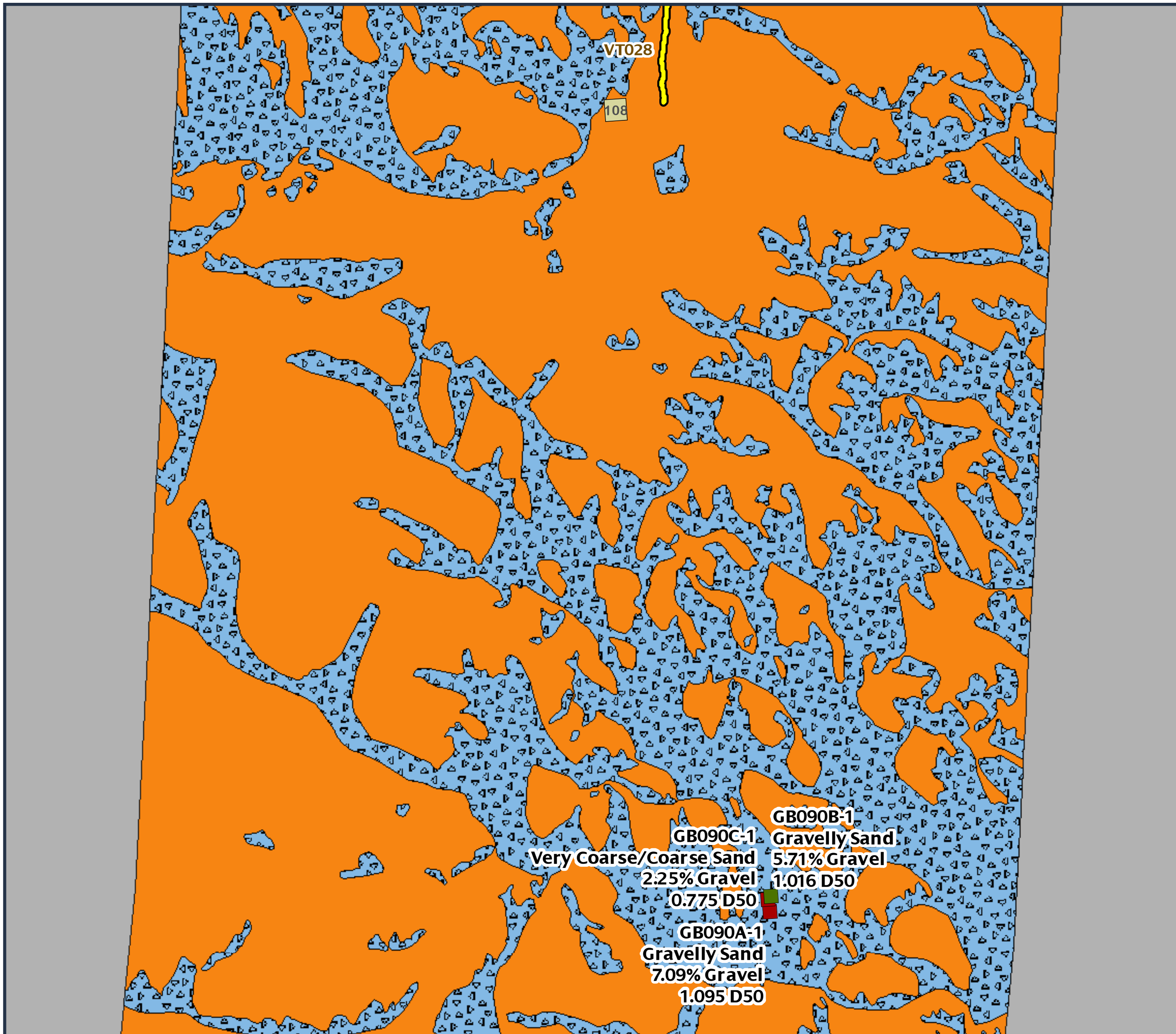
Scale 1:5,000
1 inch = 0 km

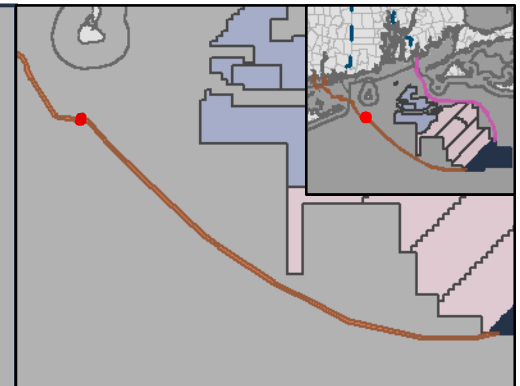
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

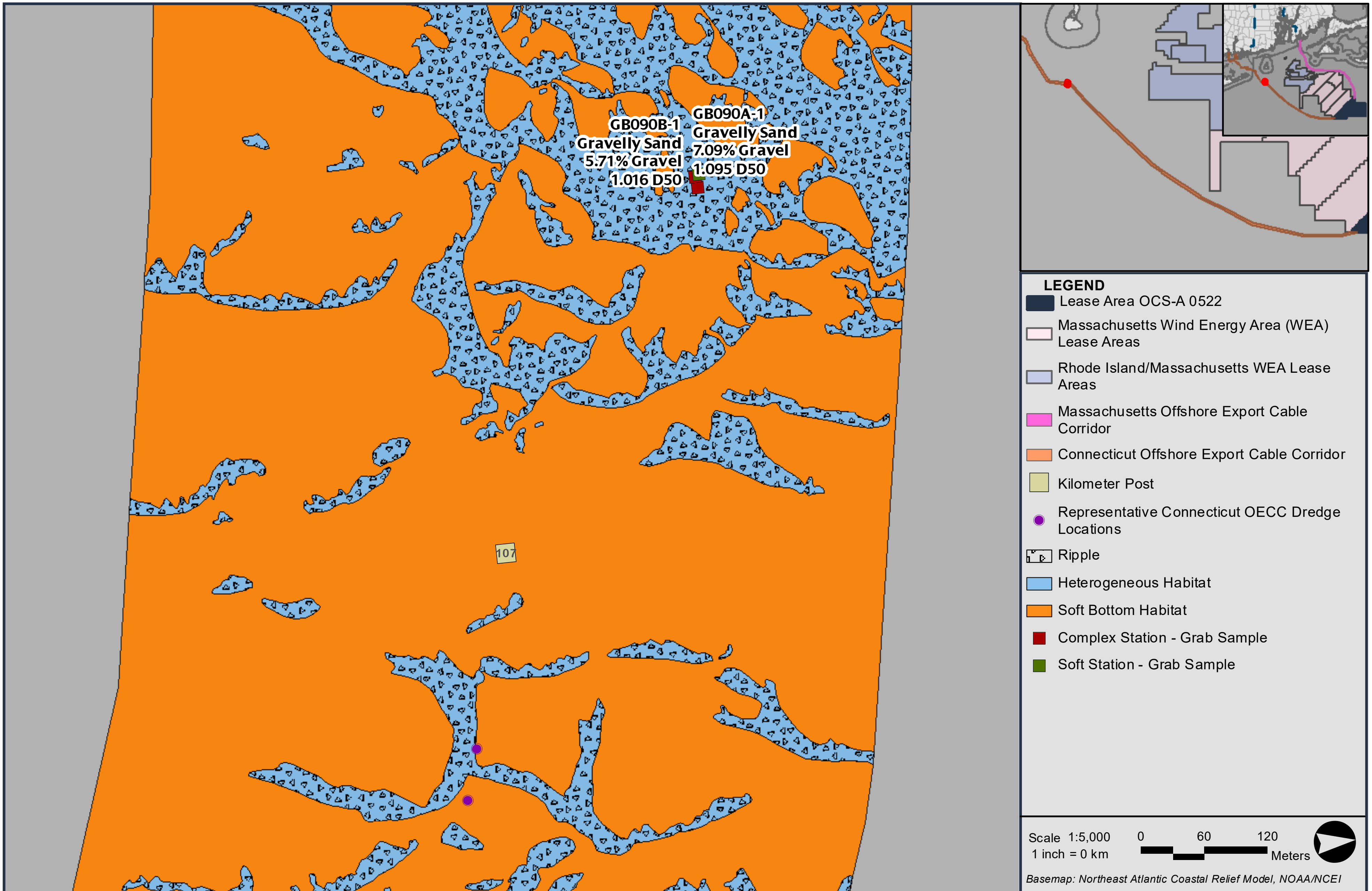
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Heterogeneous Habitat
- Soft Bottom Habitat
- Complex Station - Grab Sample
- Soft Station - Grab Sample
- Complex Mix Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

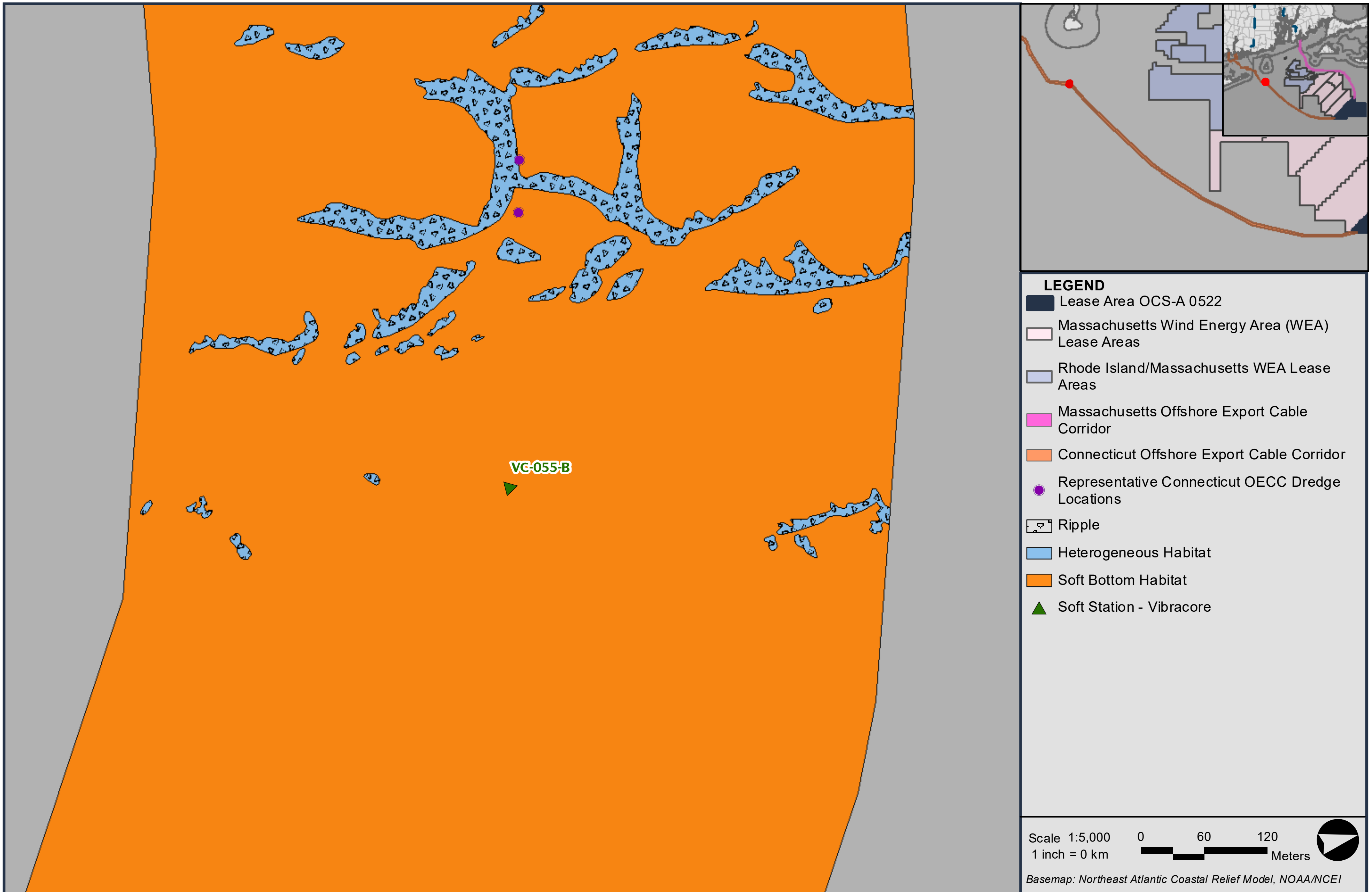
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

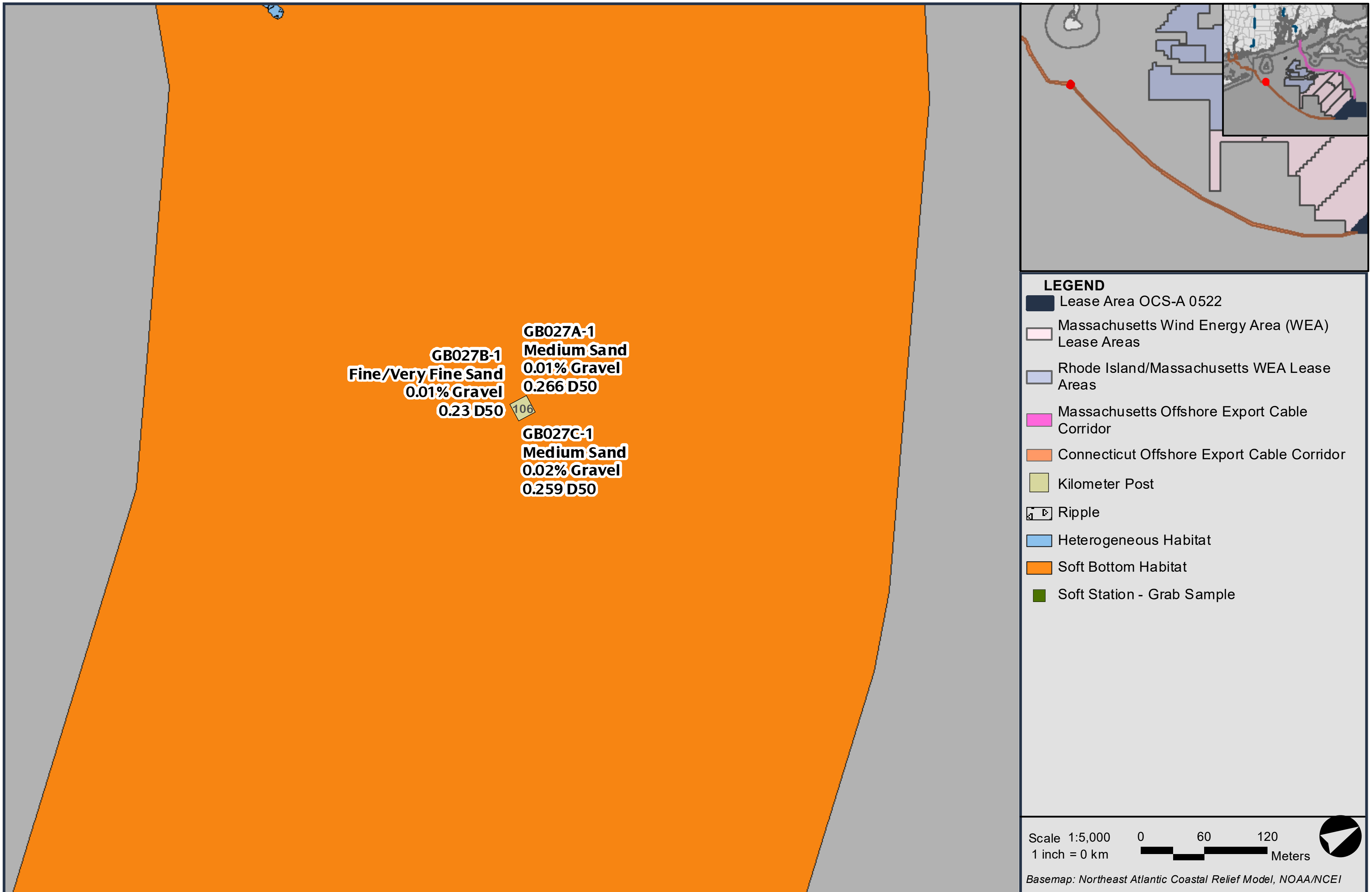
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

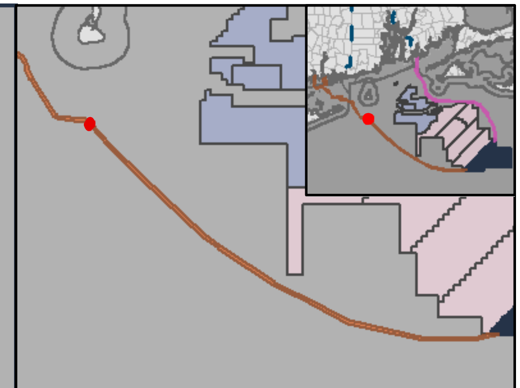
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE



LEGEND

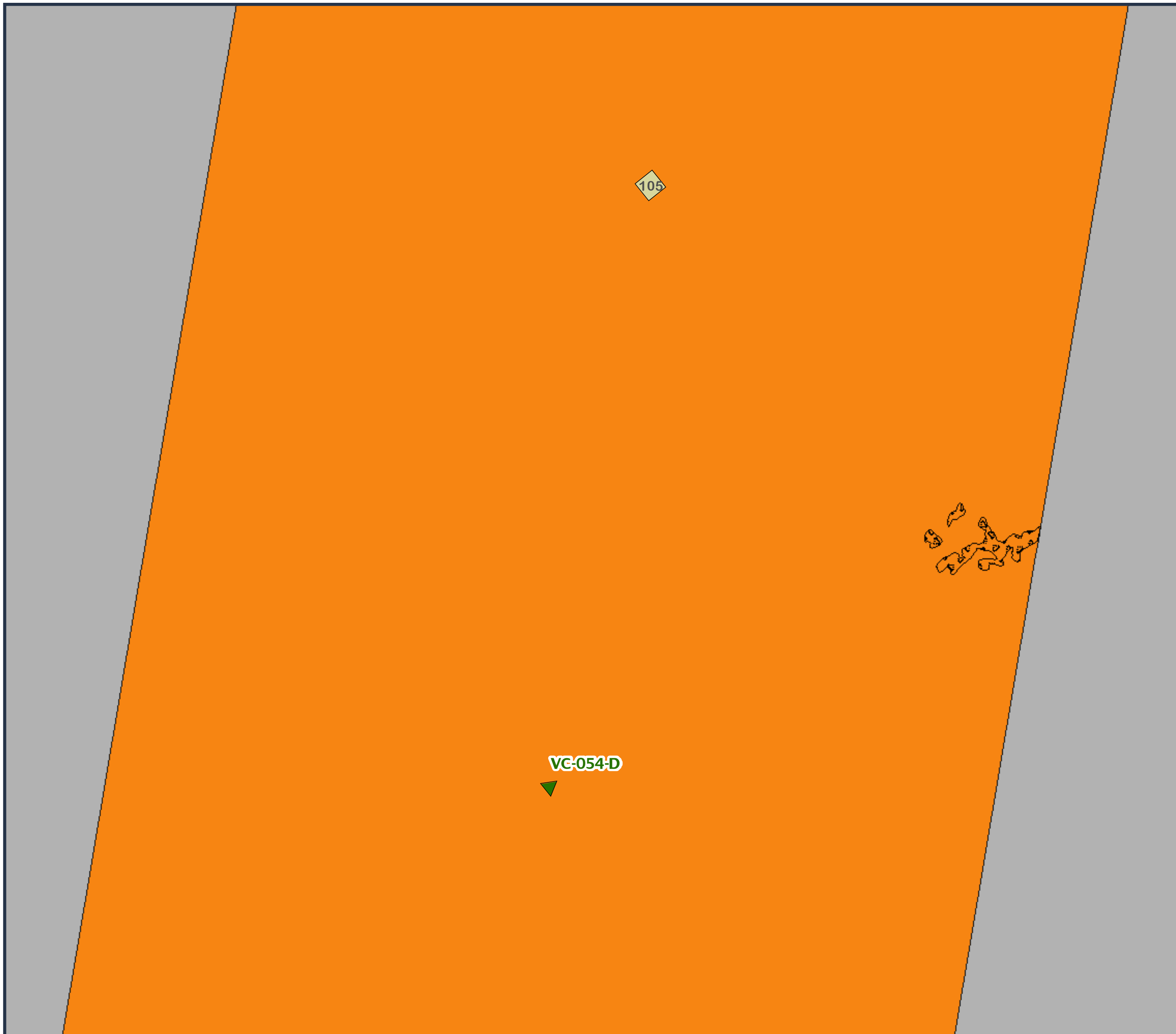
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

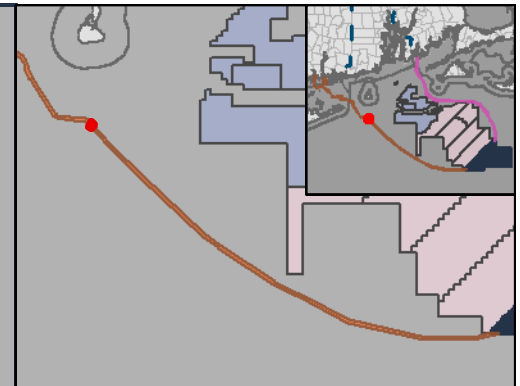
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Vibracore

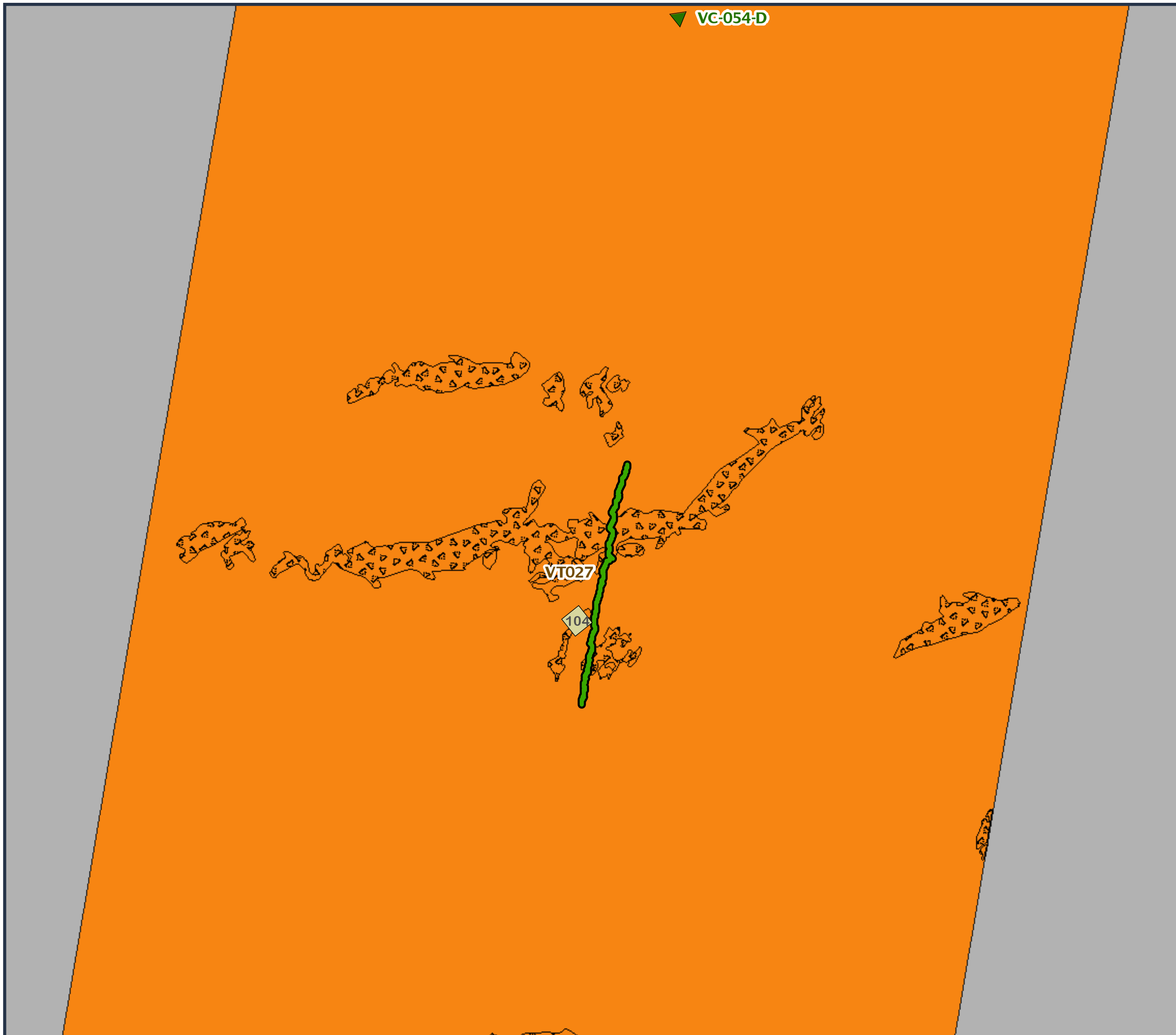
Scale 1:5,000
1 inch = 0 km

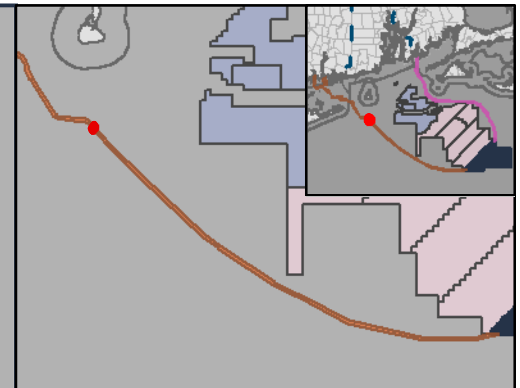
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

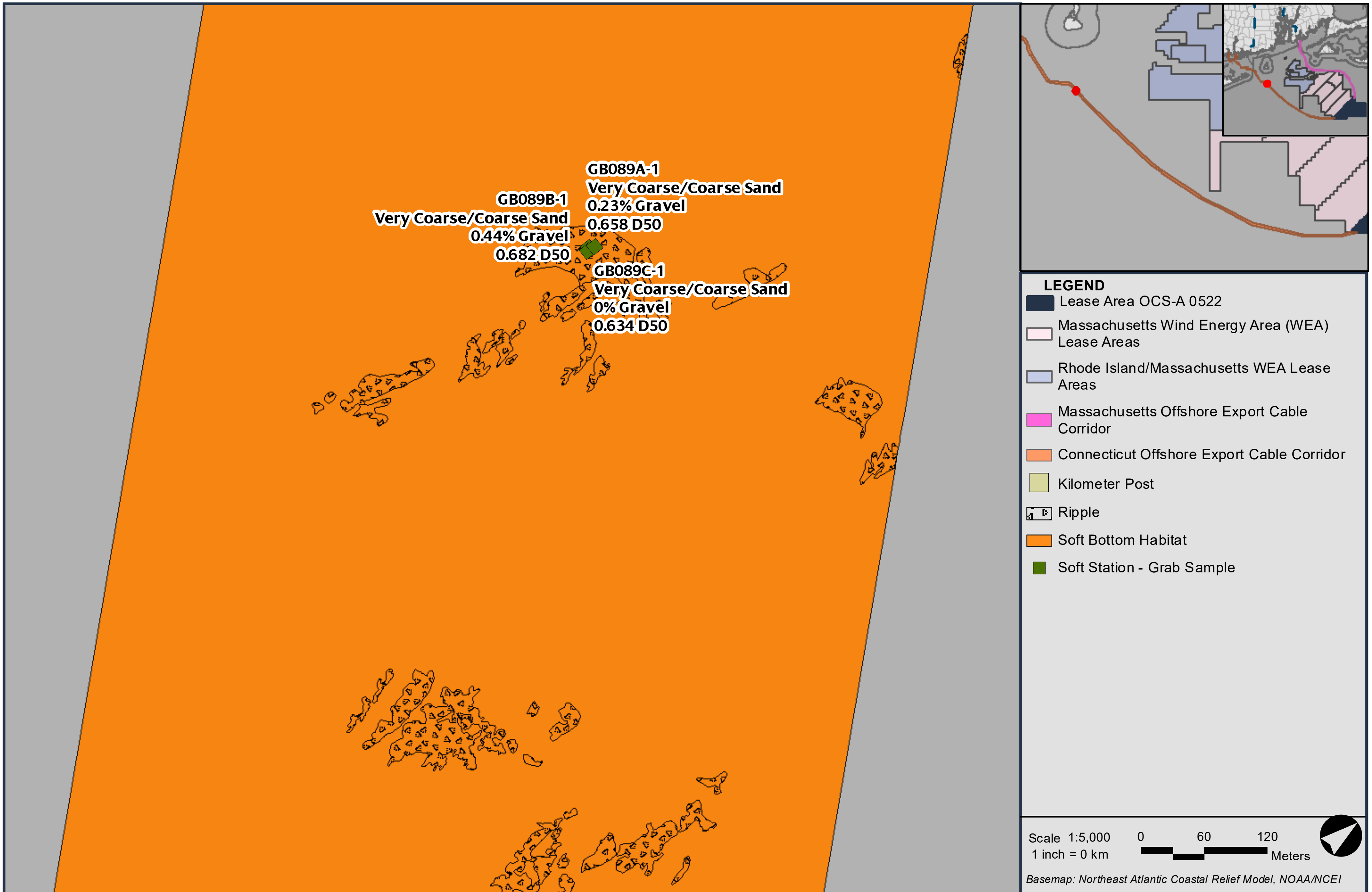
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

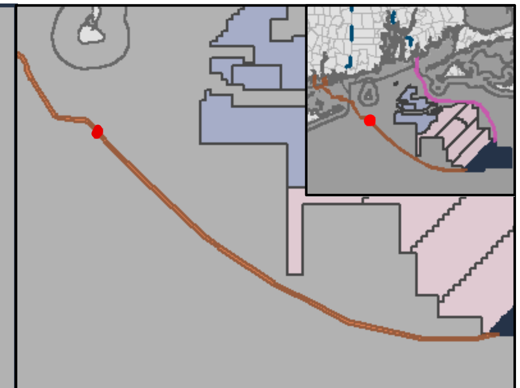
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC



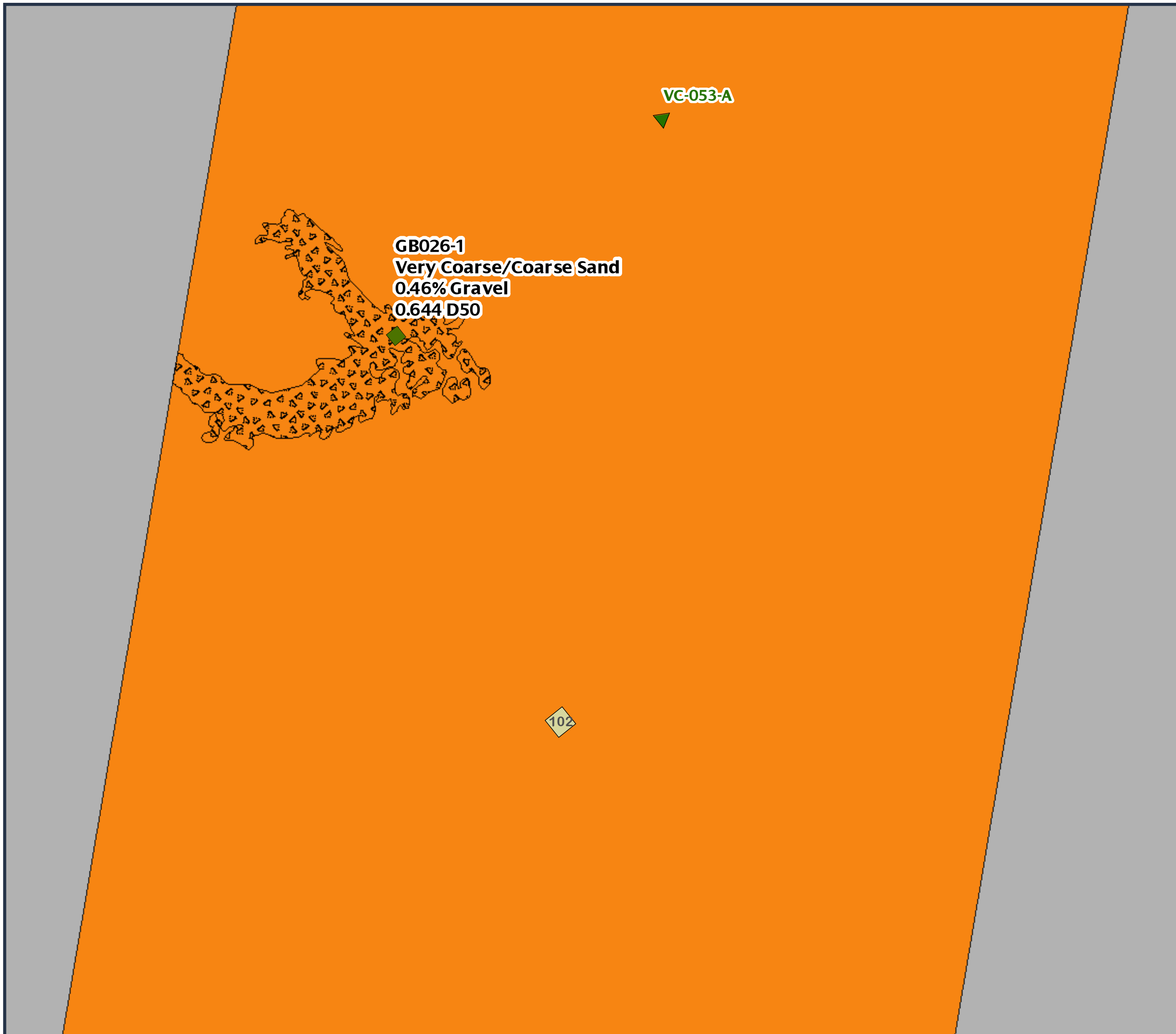
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Ripple
Soft Bottom Habitat
Soft Station - Vibracore

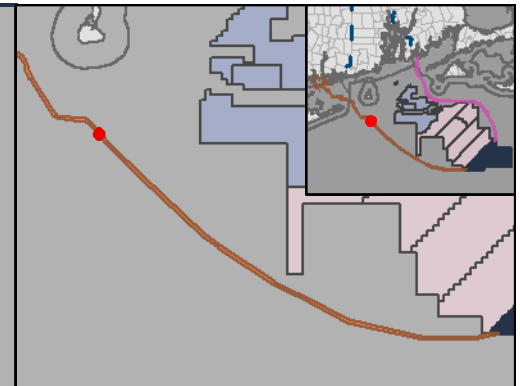
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





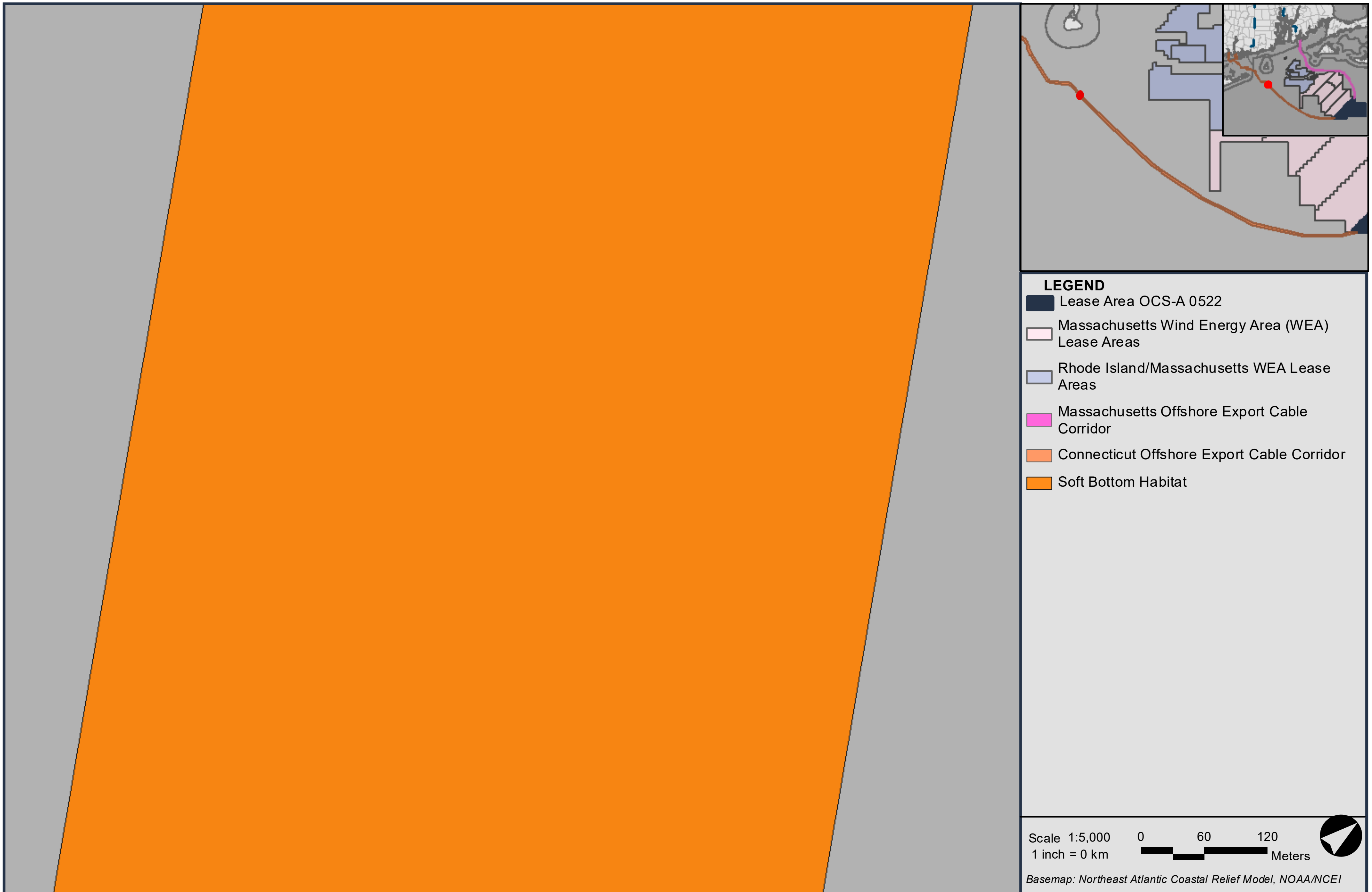
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

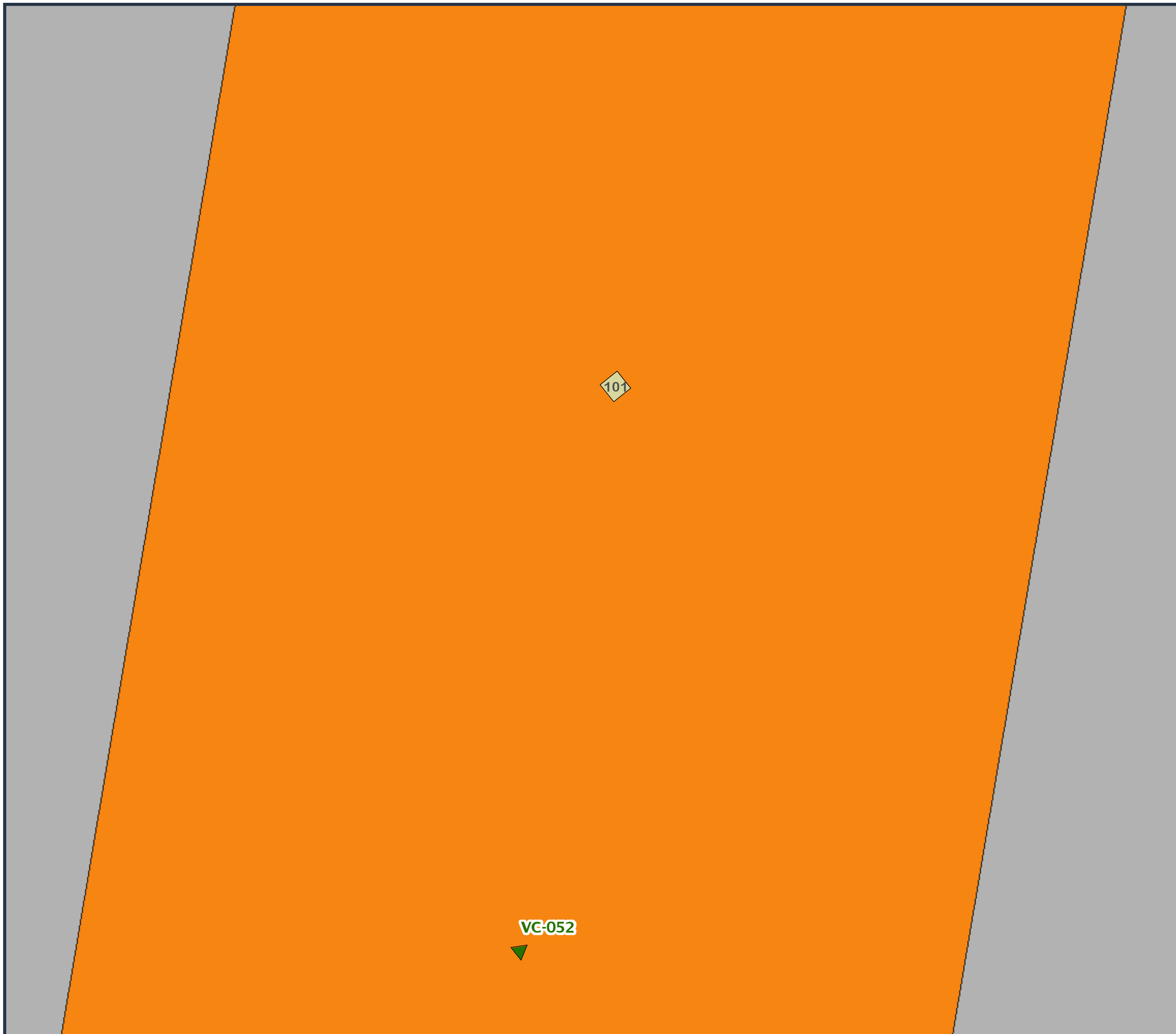
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

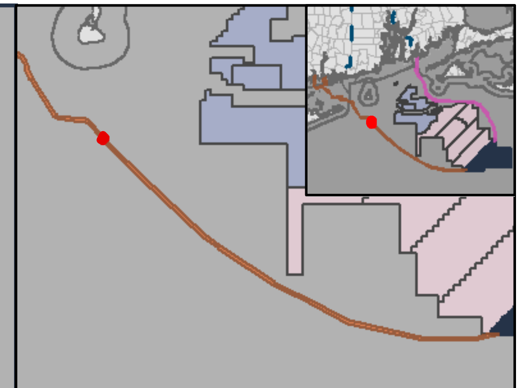
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

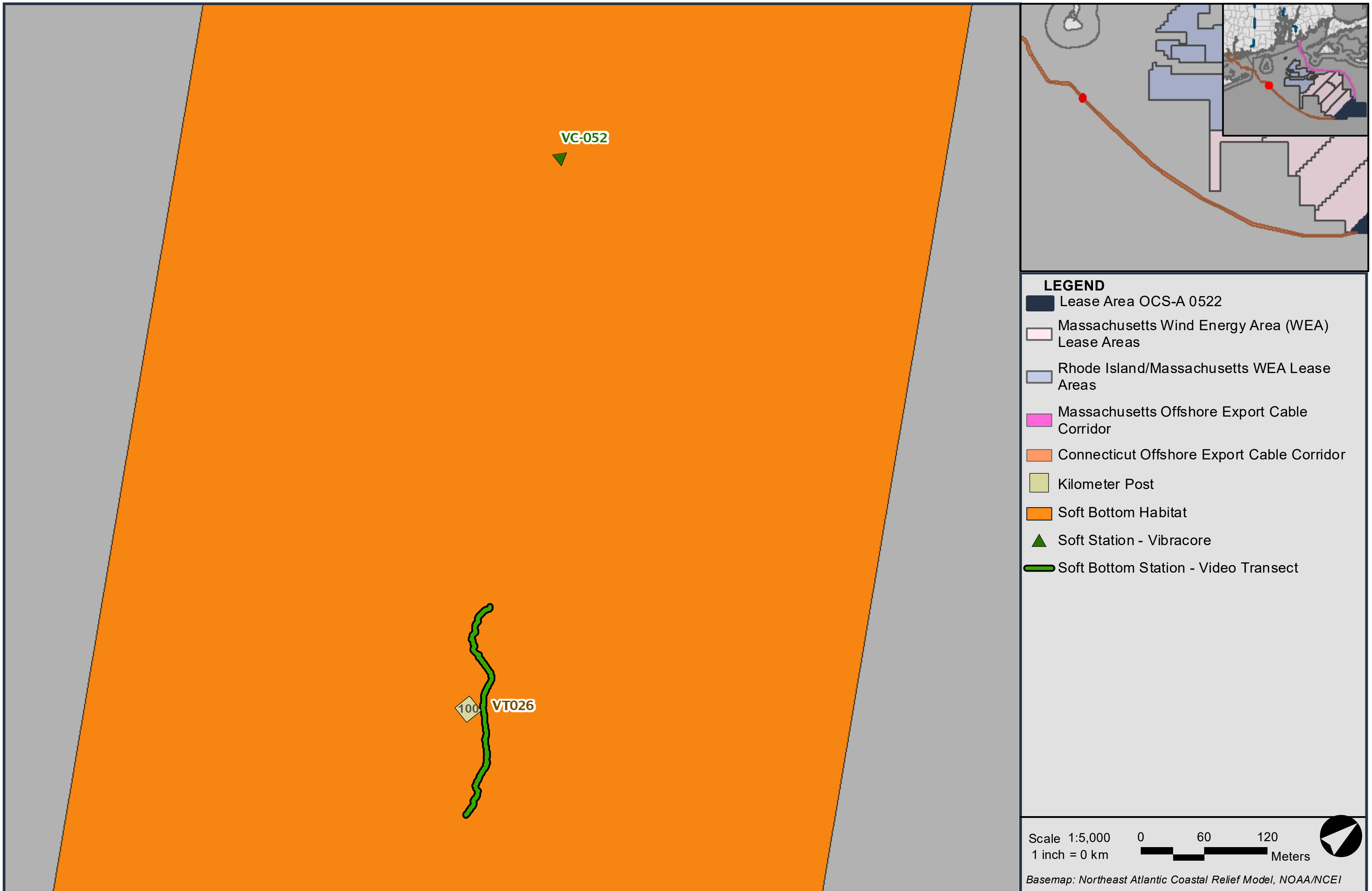
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

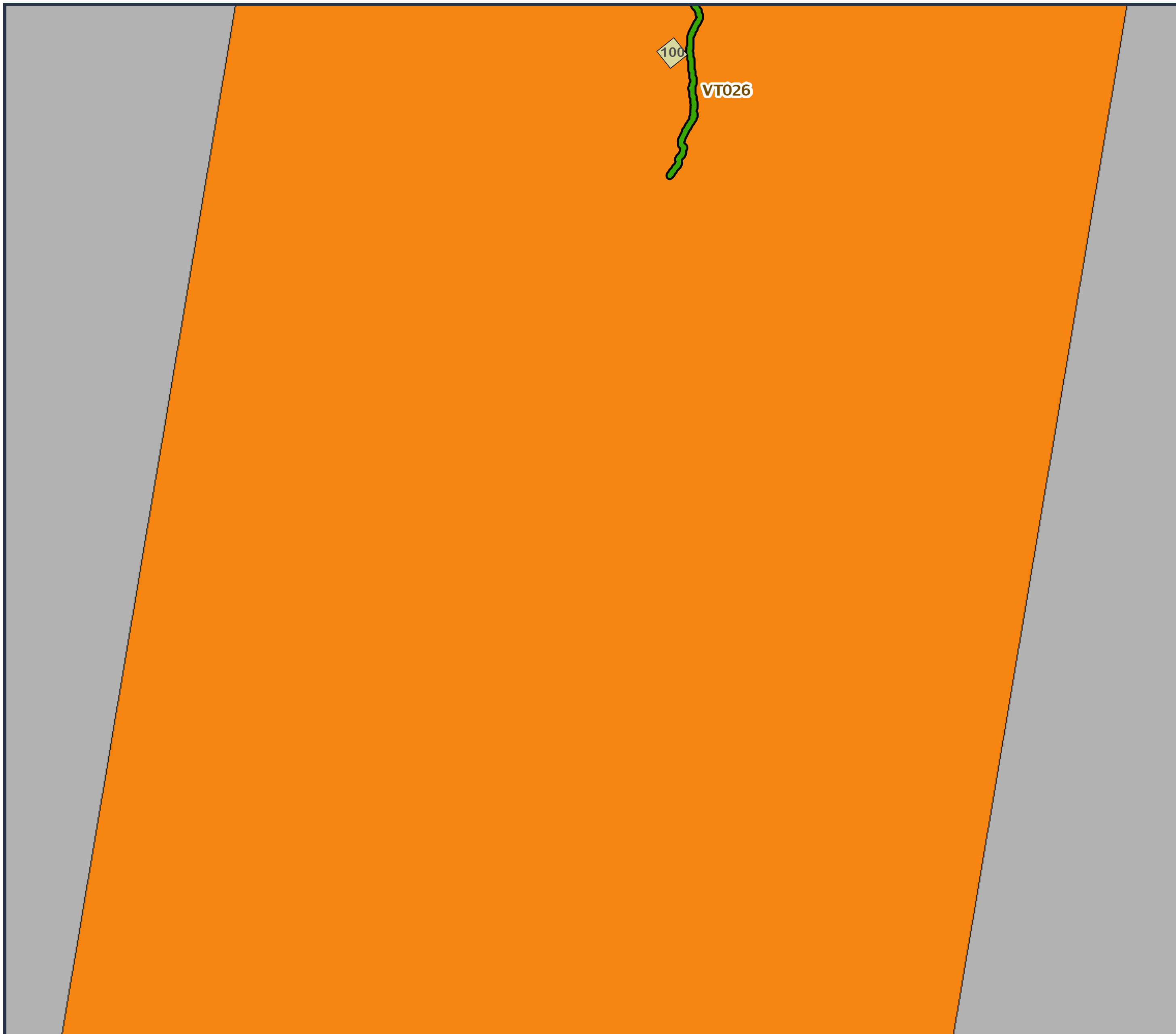
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

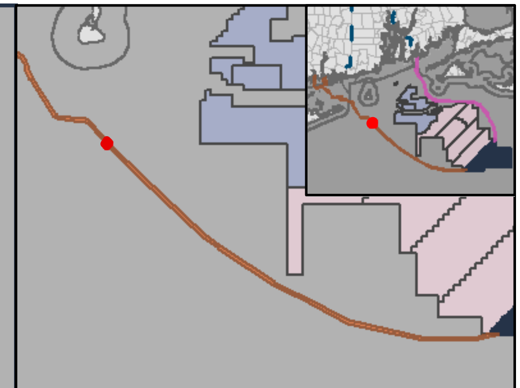
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Bottom Station - Video Transect

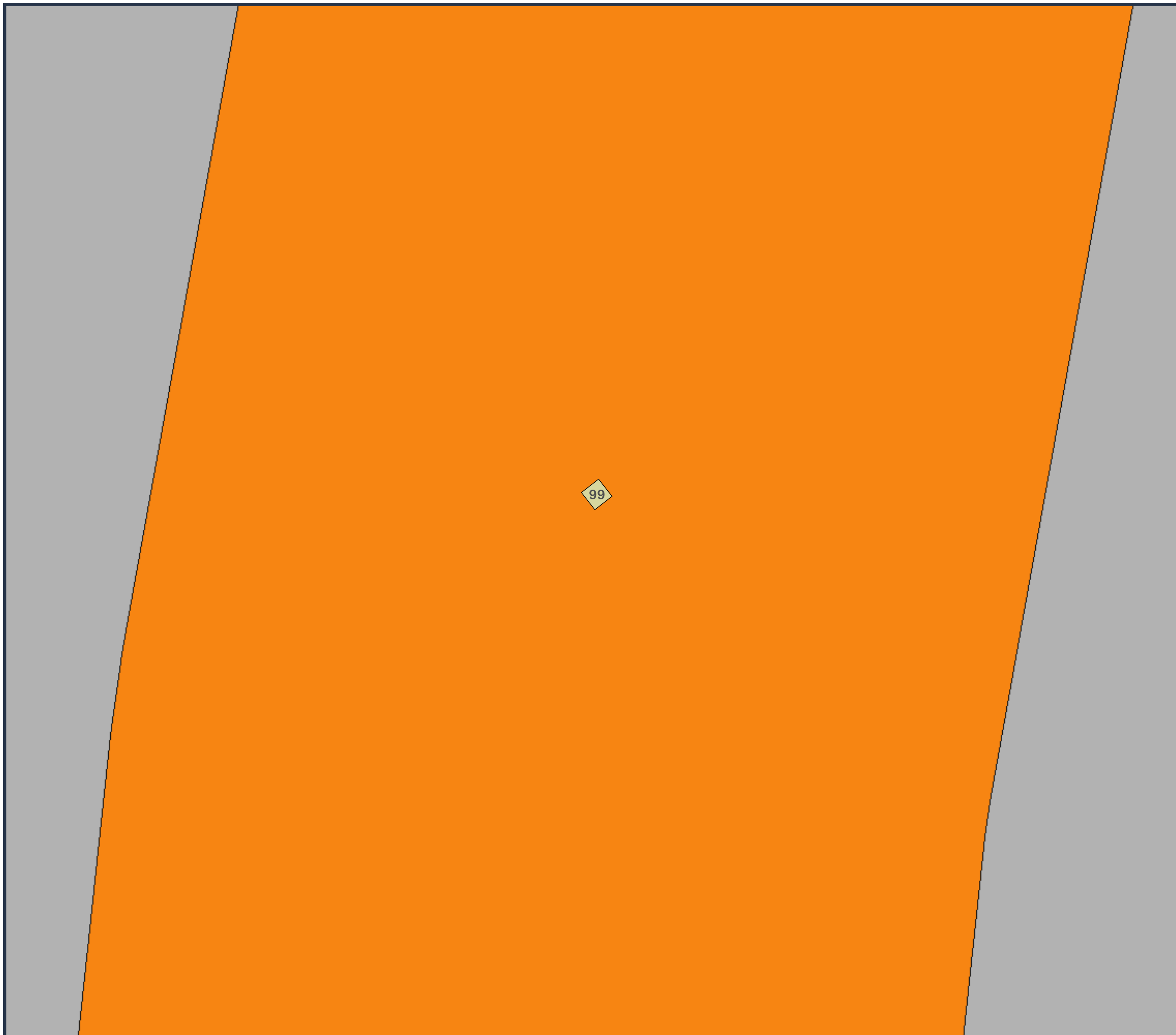
Scale 1:5,000
1 inch = 0 km

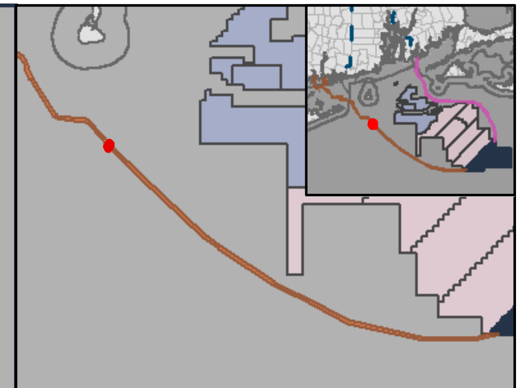
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat

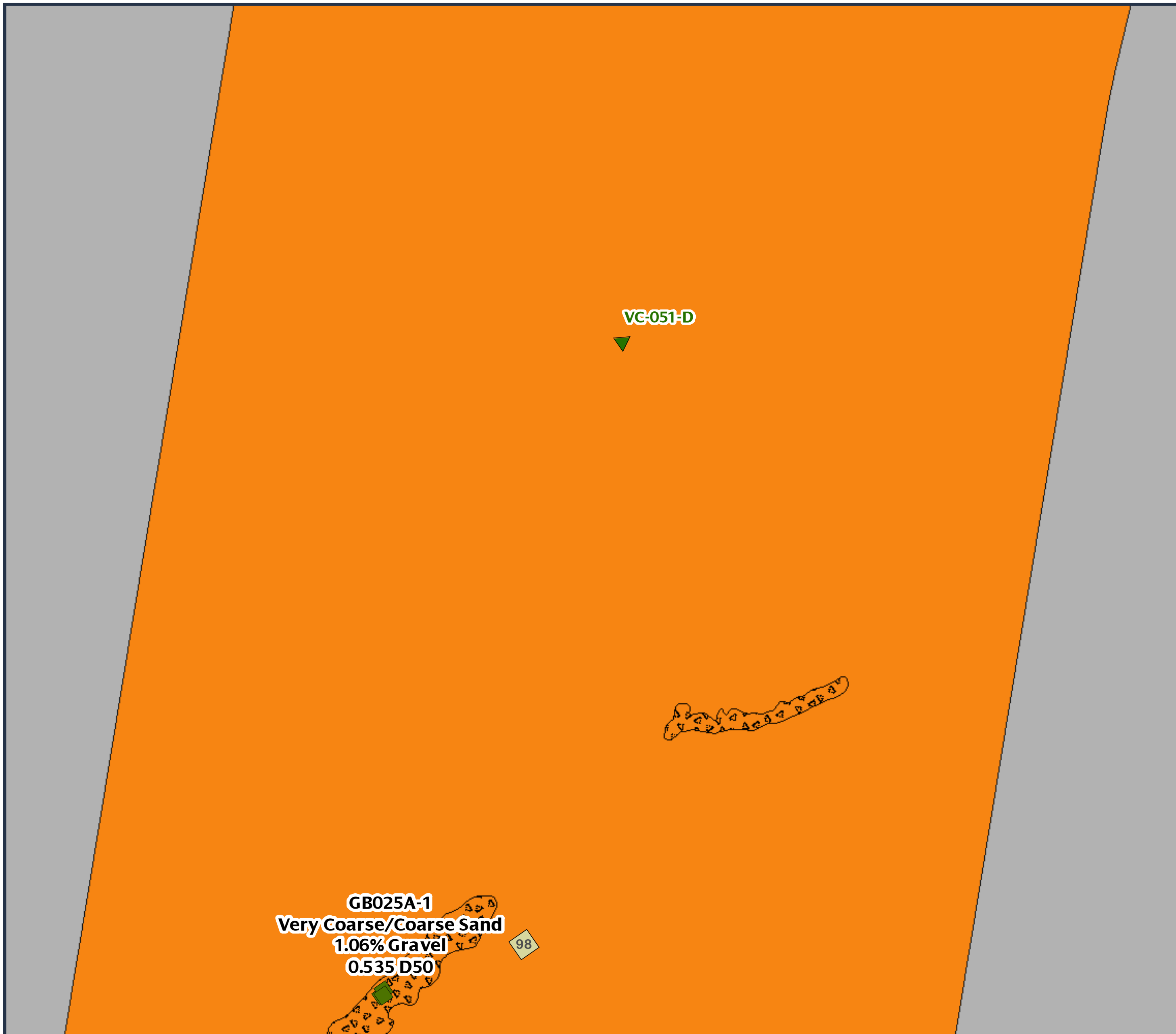
Scale 1:5,000
1 inch = 0 km

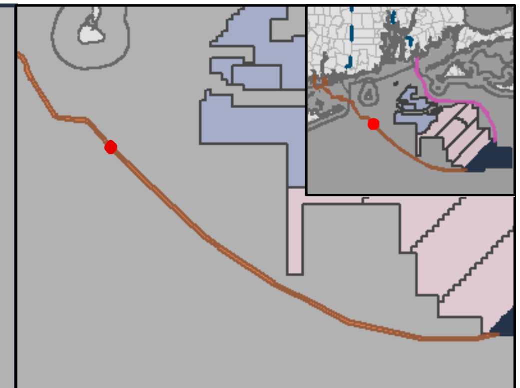
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

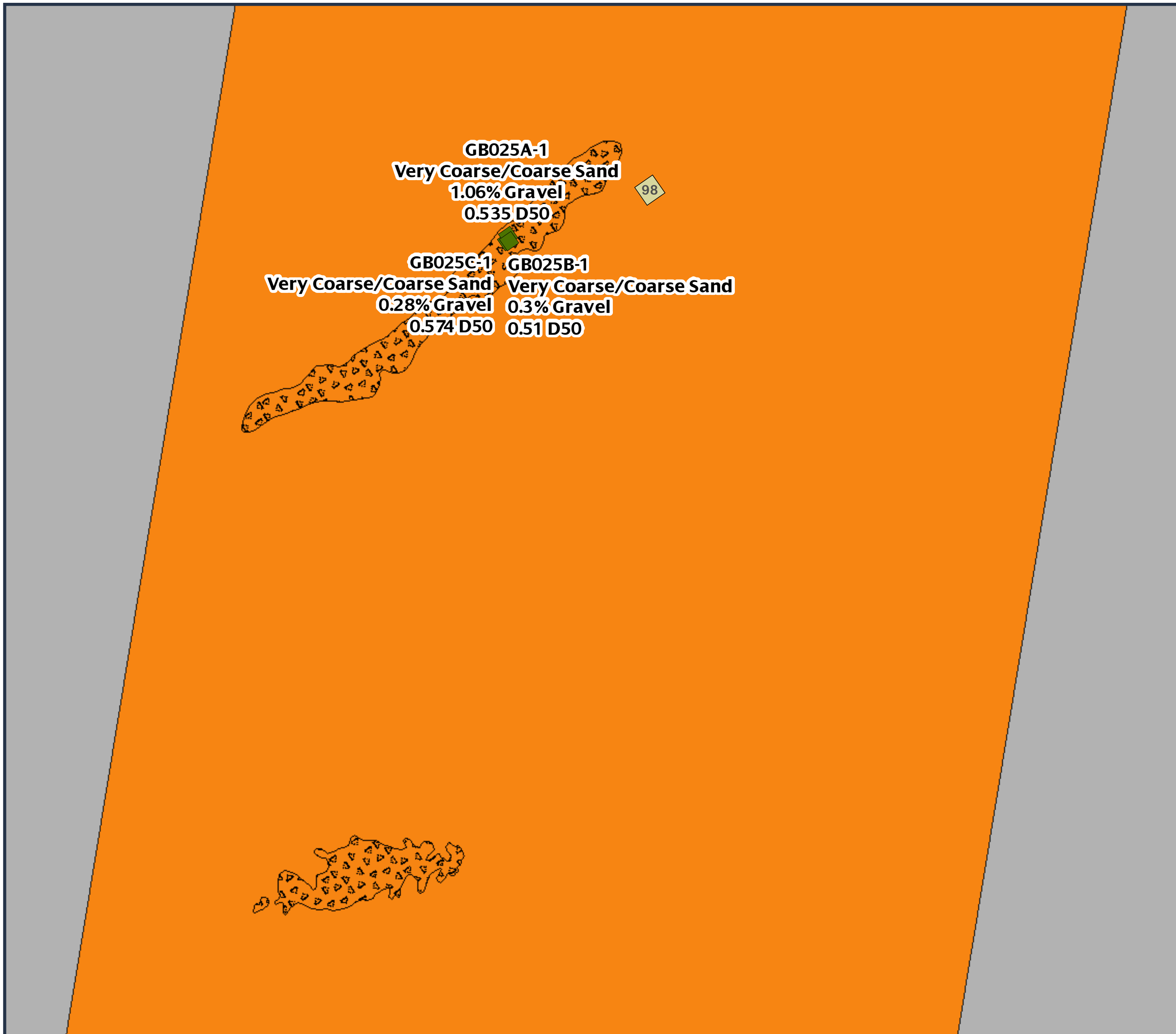
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore

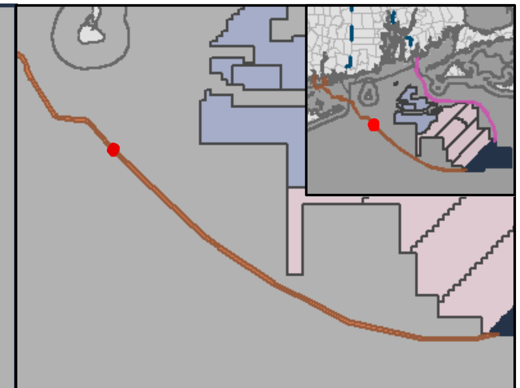
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample

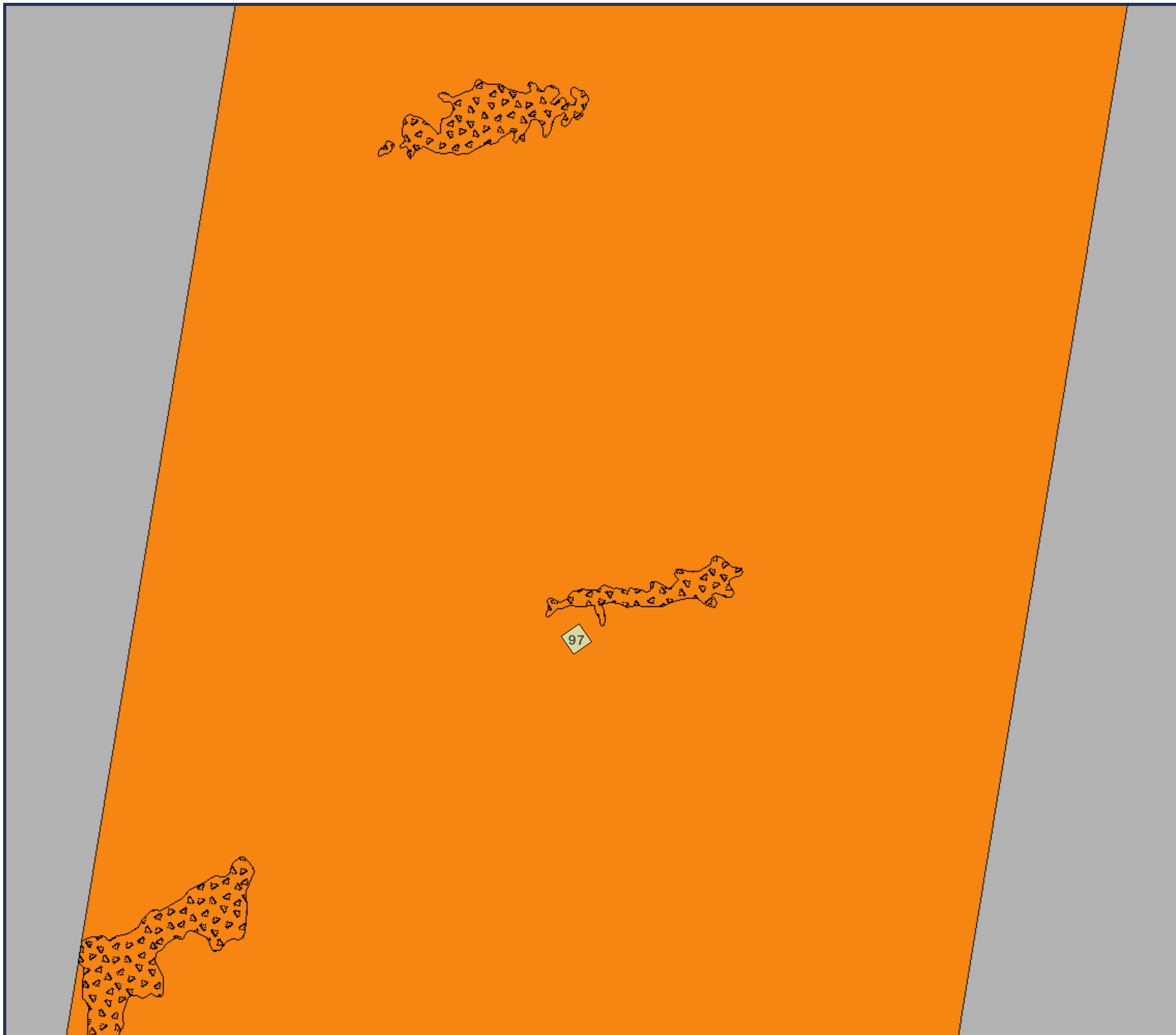
Scale 1:5,000
1 inch = 0 km

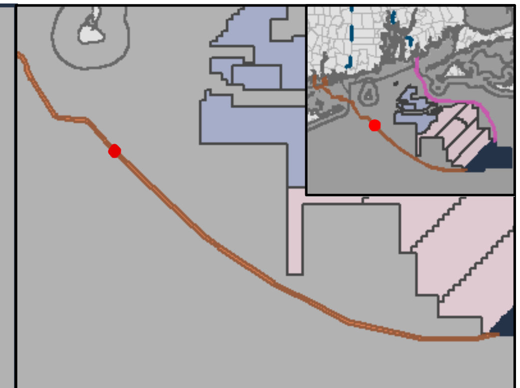
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





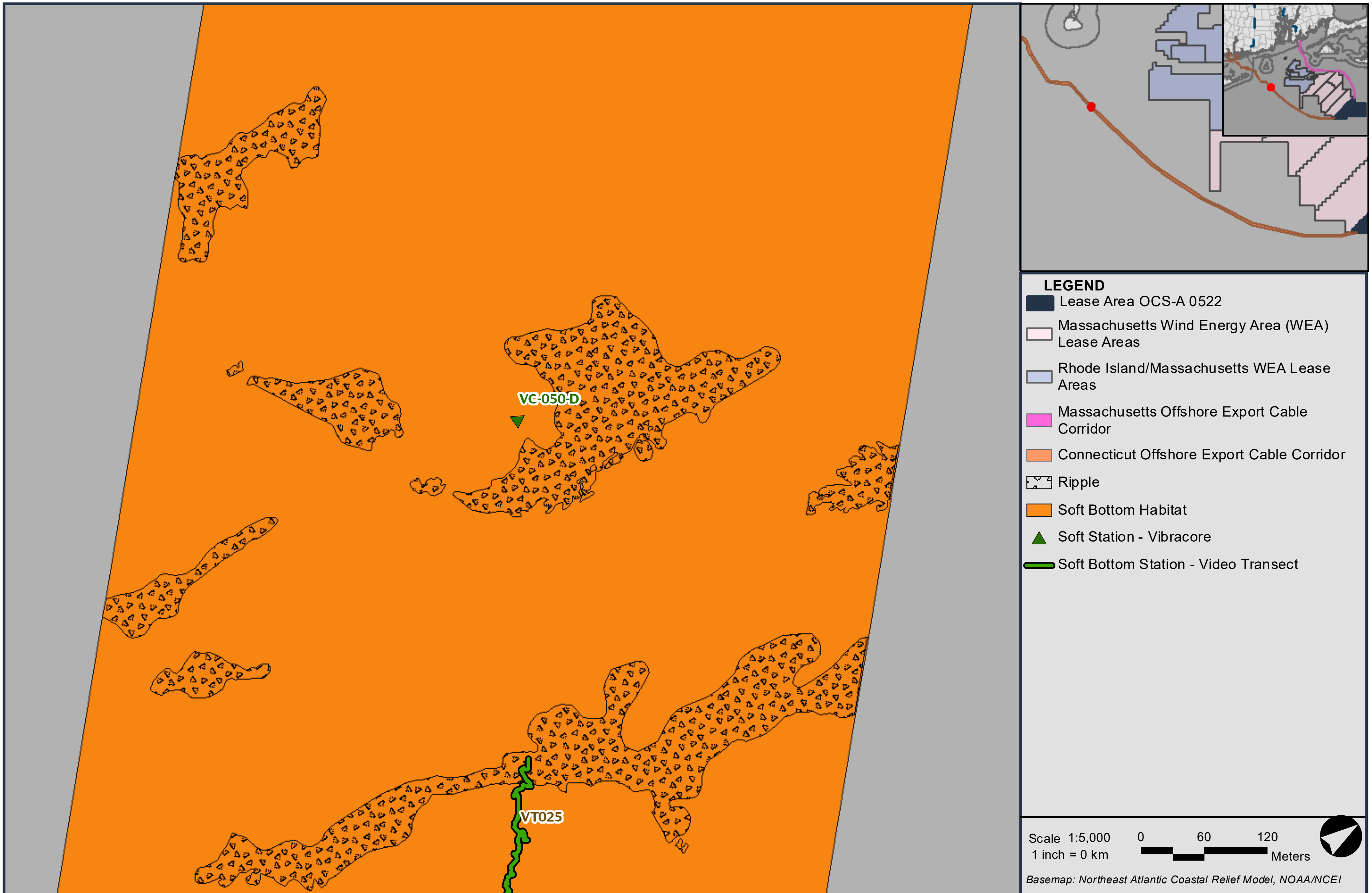
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

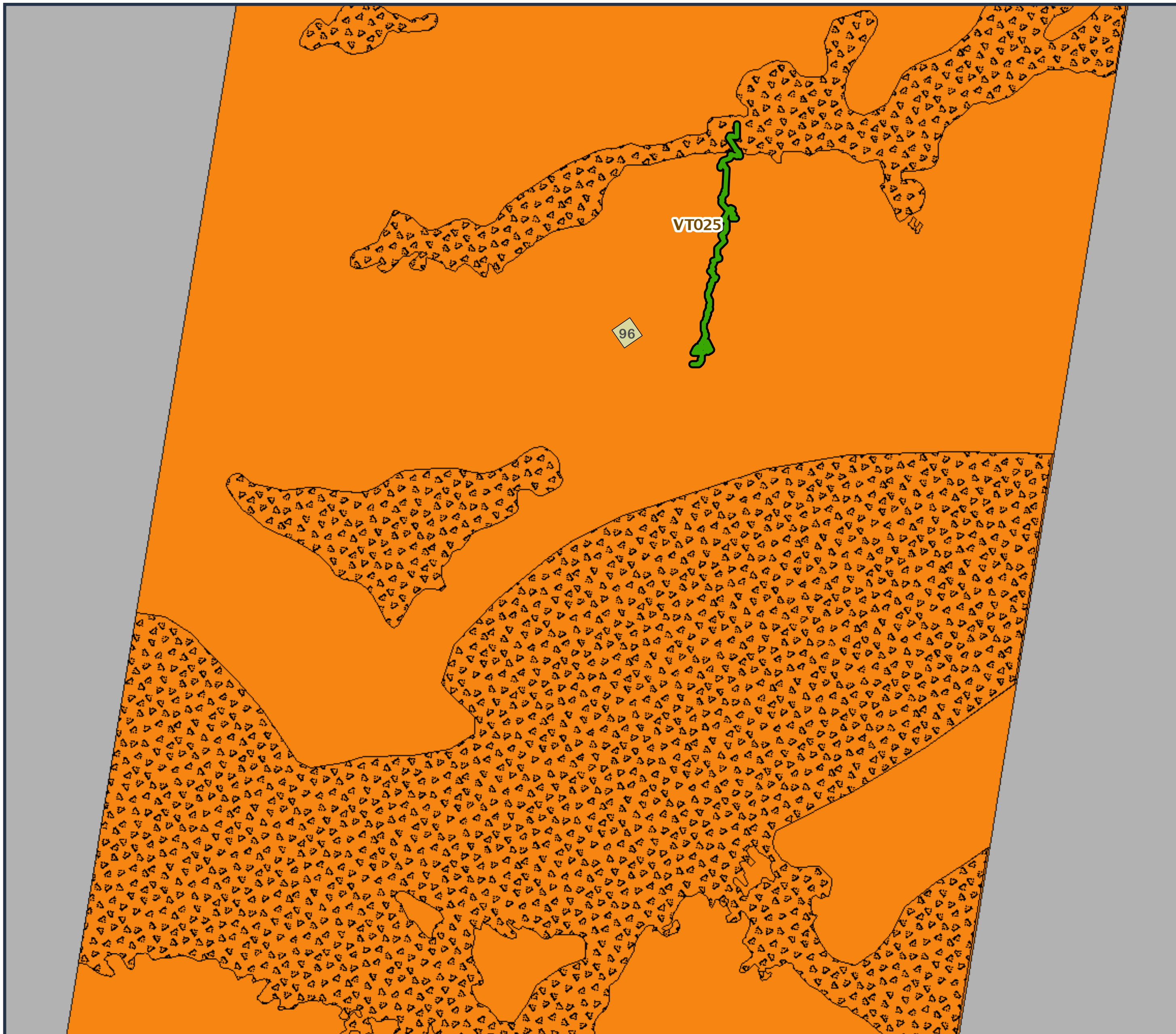
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

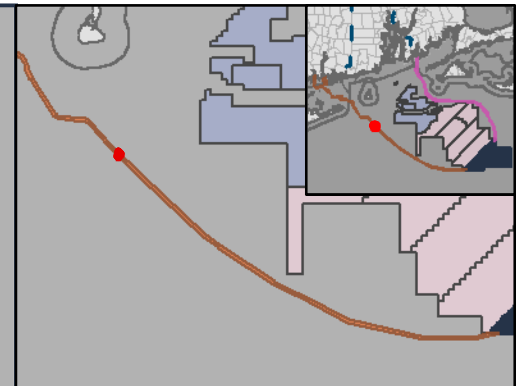
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Bottom Station - Video Transect

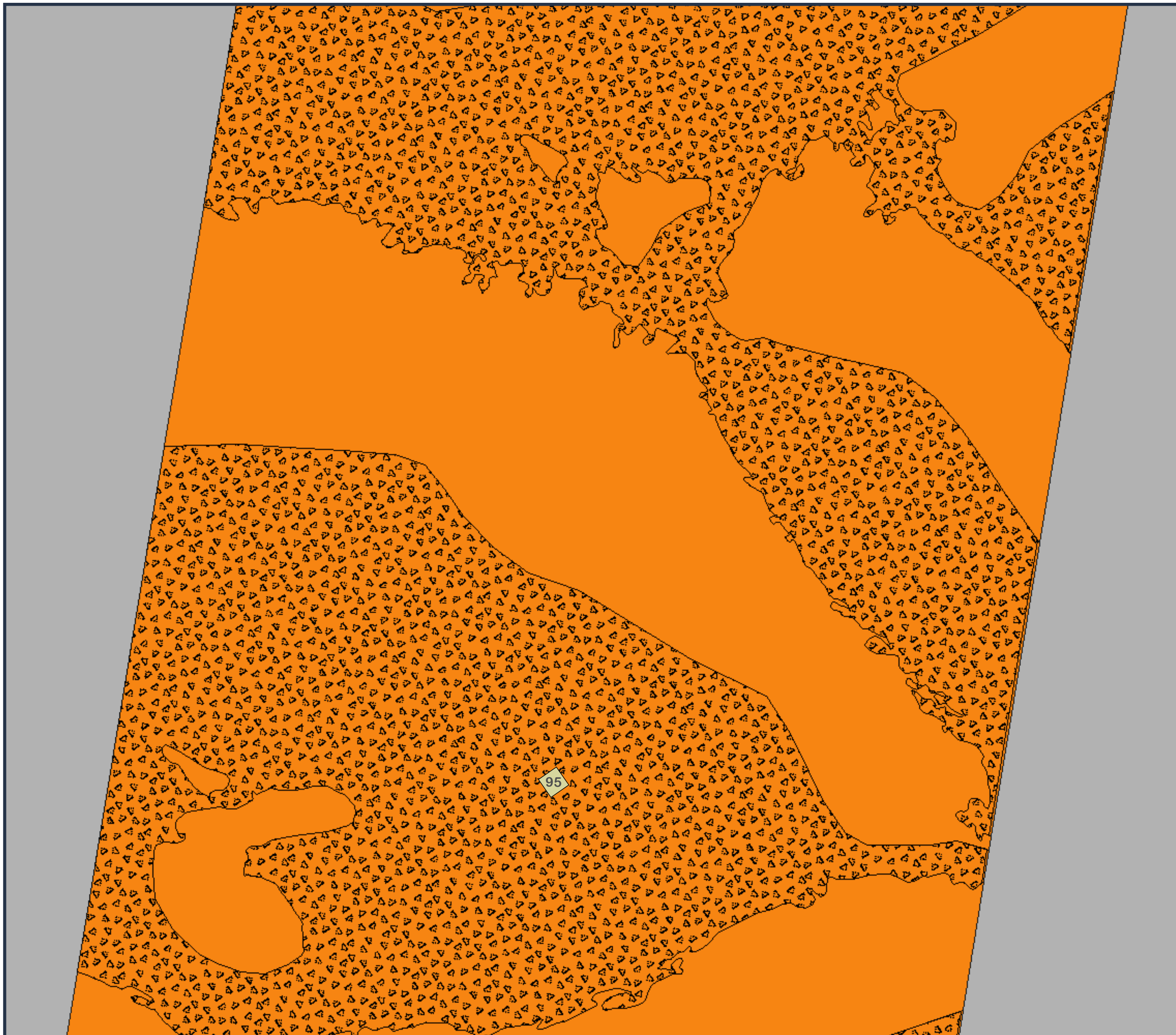
Scale 1:5,000
1 inch = 0 km

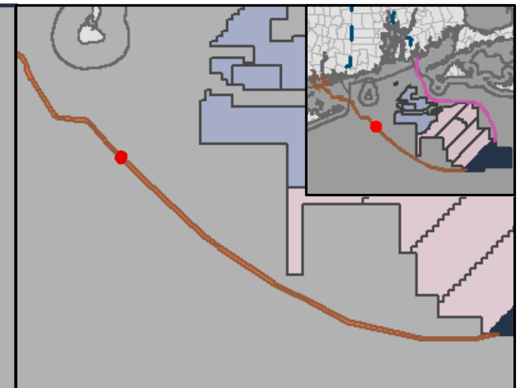
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat

Scale 1:5,000
1 inch = 0 km

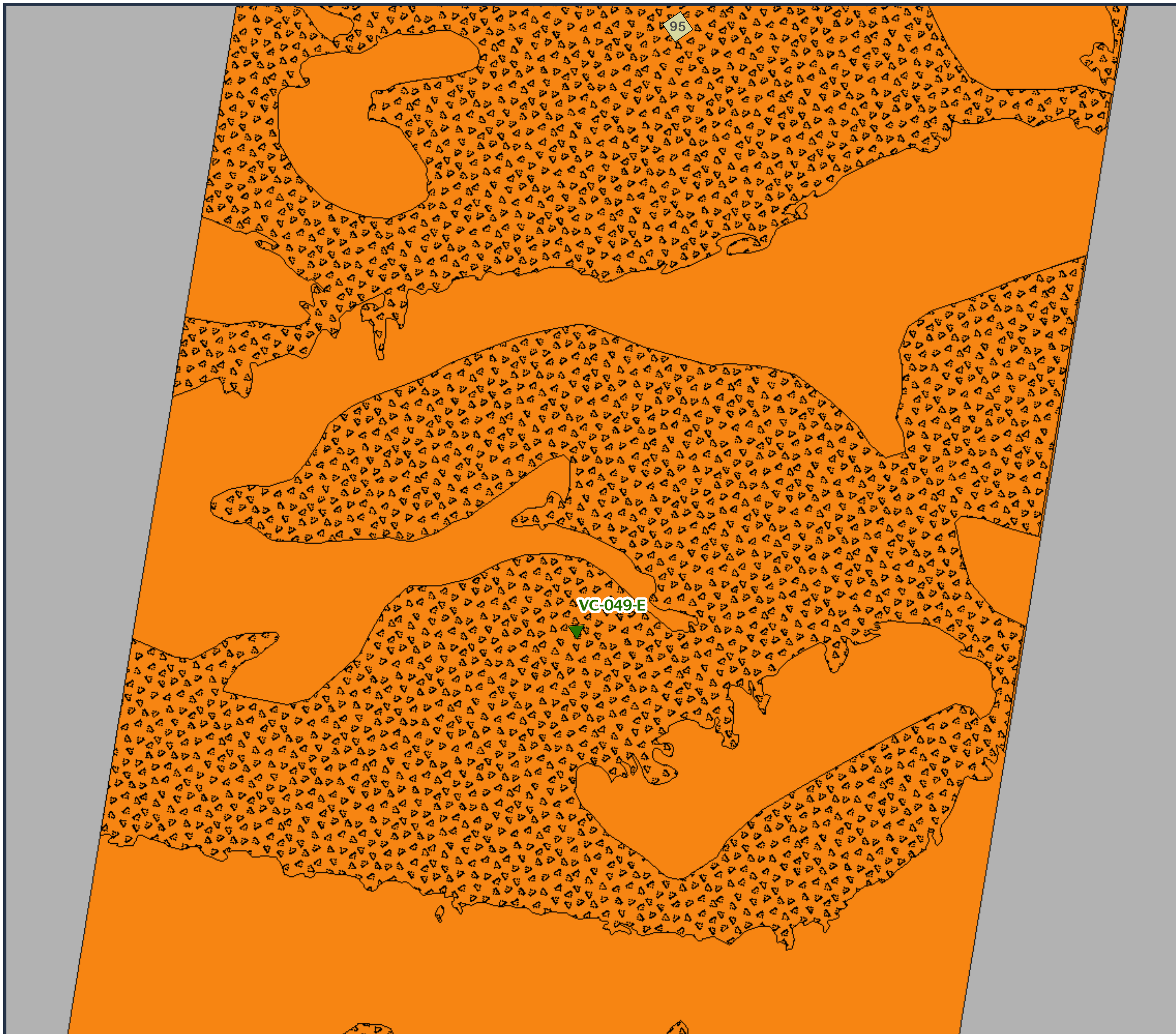
0 60 120 Meters

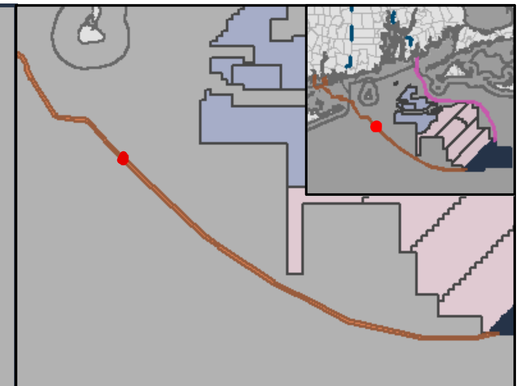
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Vibracore

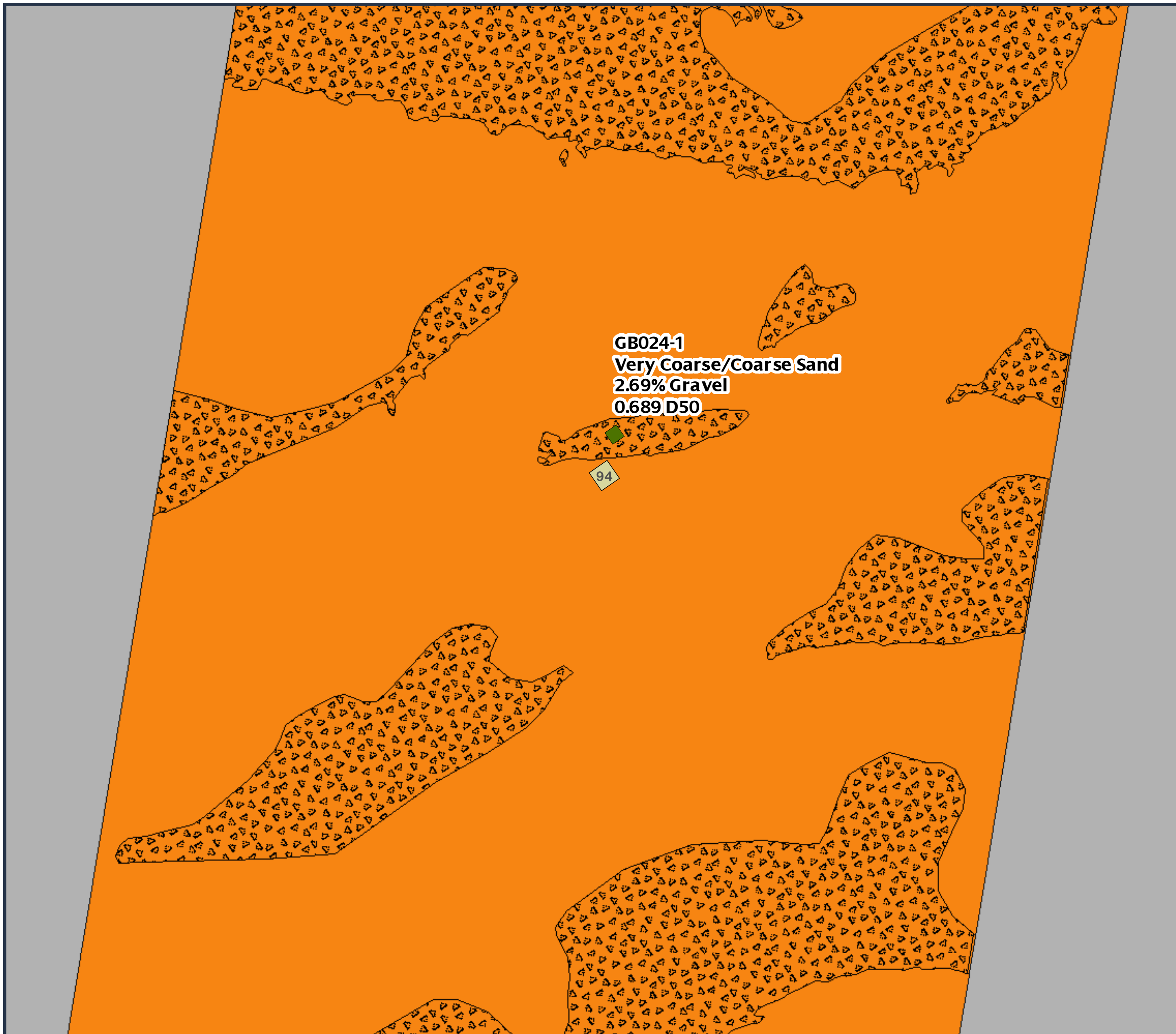
Scale 1:5,000
1 inch = 0 km

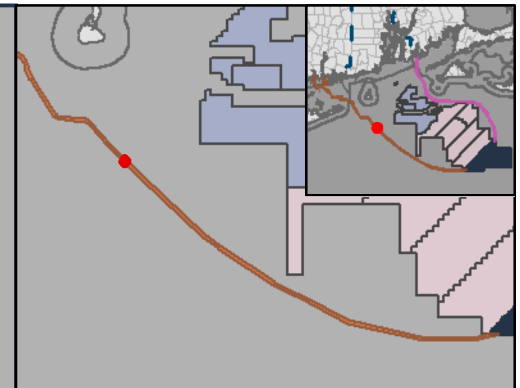
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

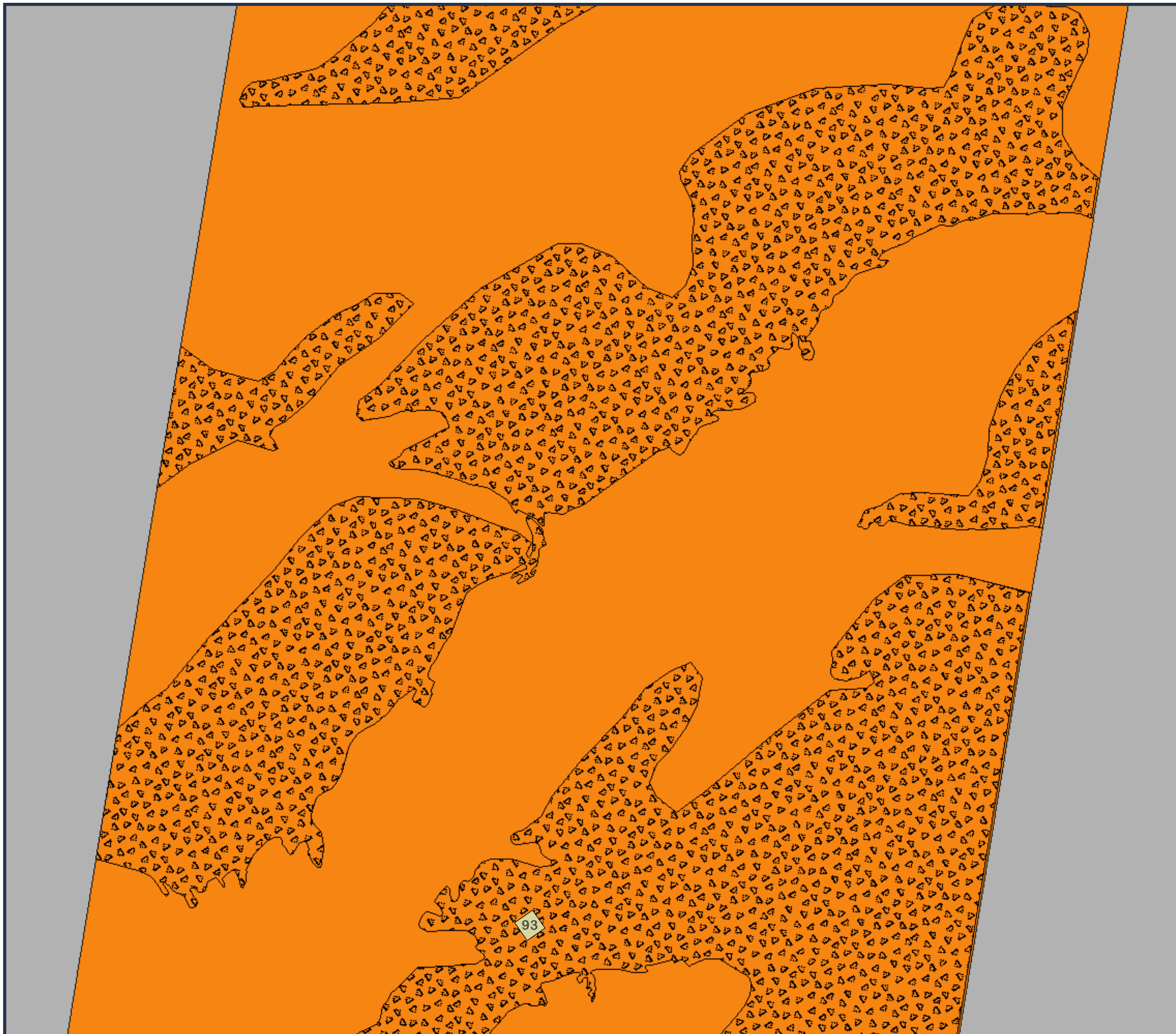
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample

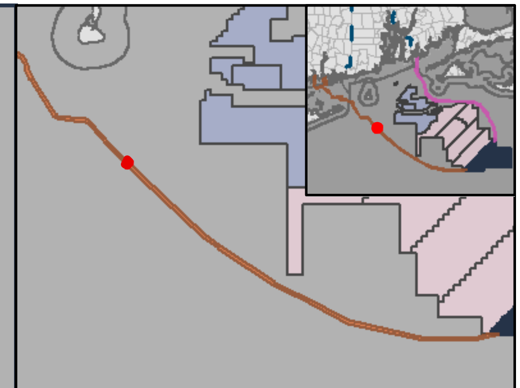
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

Lease Area OCS-A 0522

Massachusetts Wind Energy Area (WEA) Lease Areas

Rhode Island/Massachusetts WEA Lease Areas

Massachusetts Offshore Export Cable Corridor

Connecticut Offshore Export Cable Corridor

Kilometer Post

Ripple

Soft Bottom Habitat

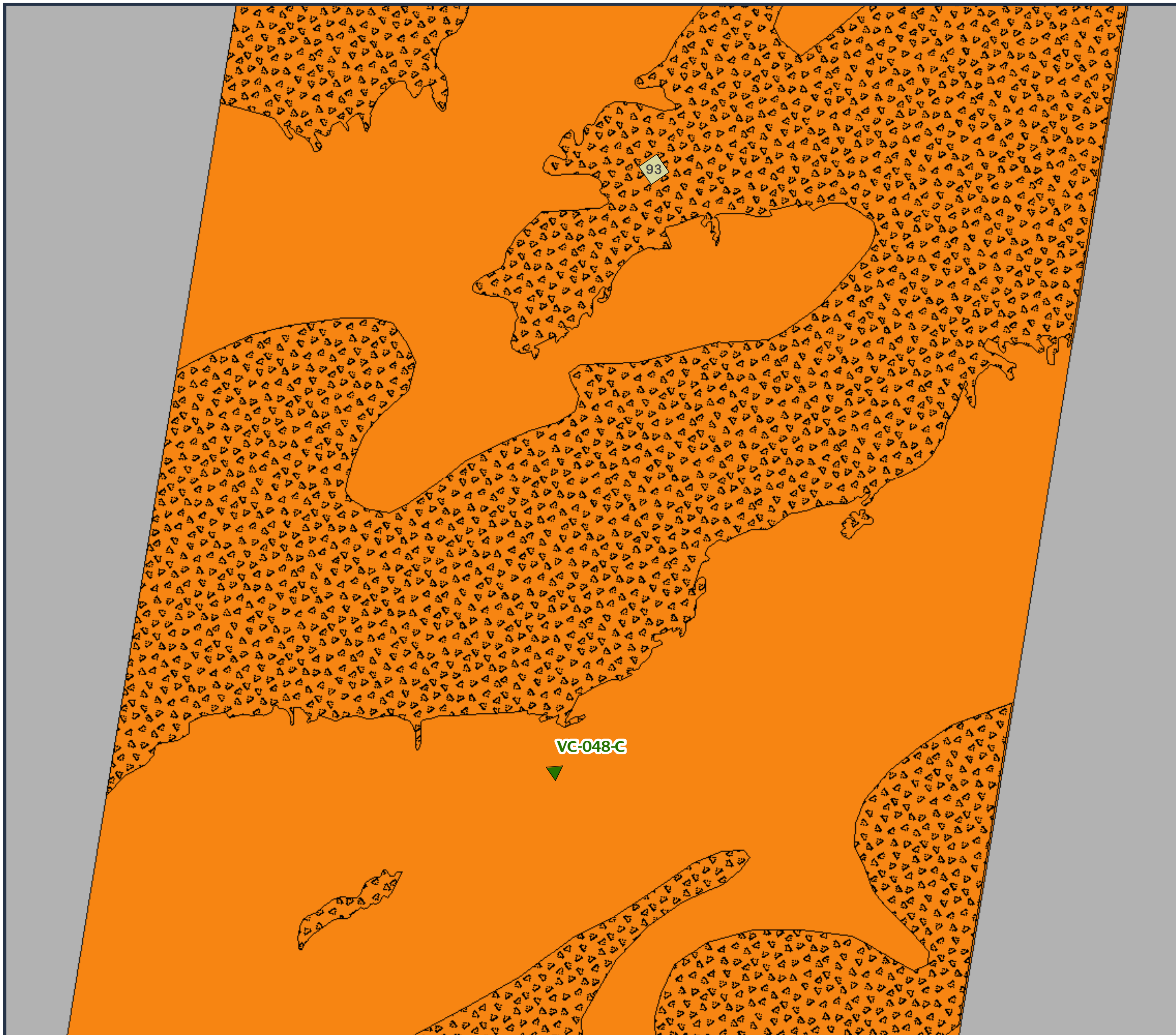
Scale 1:5,000
1 inch = 0 km

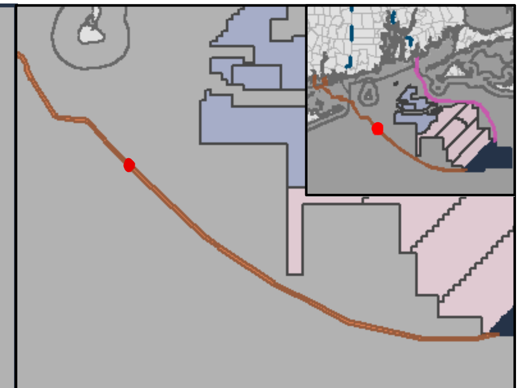
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km

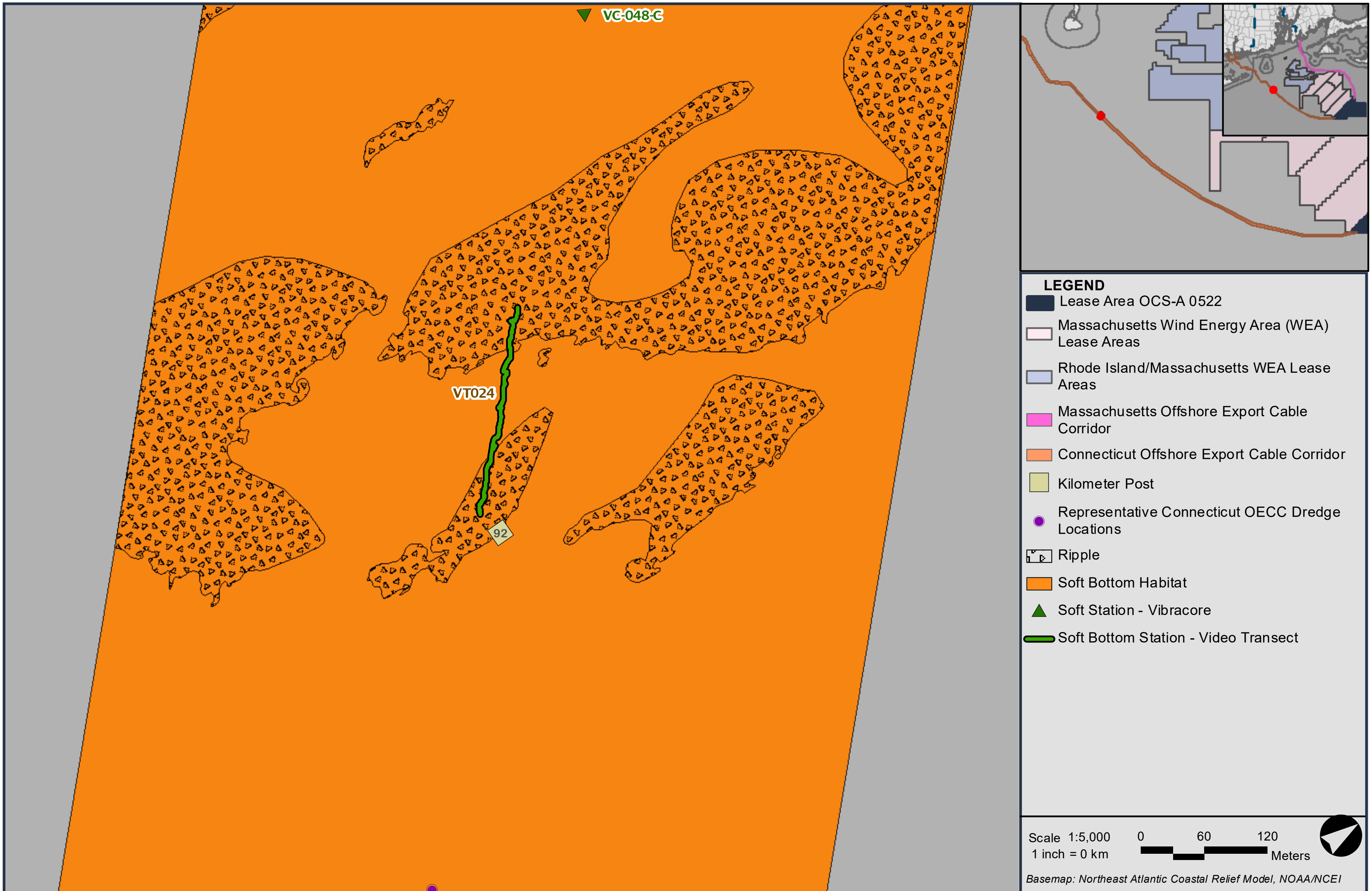
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

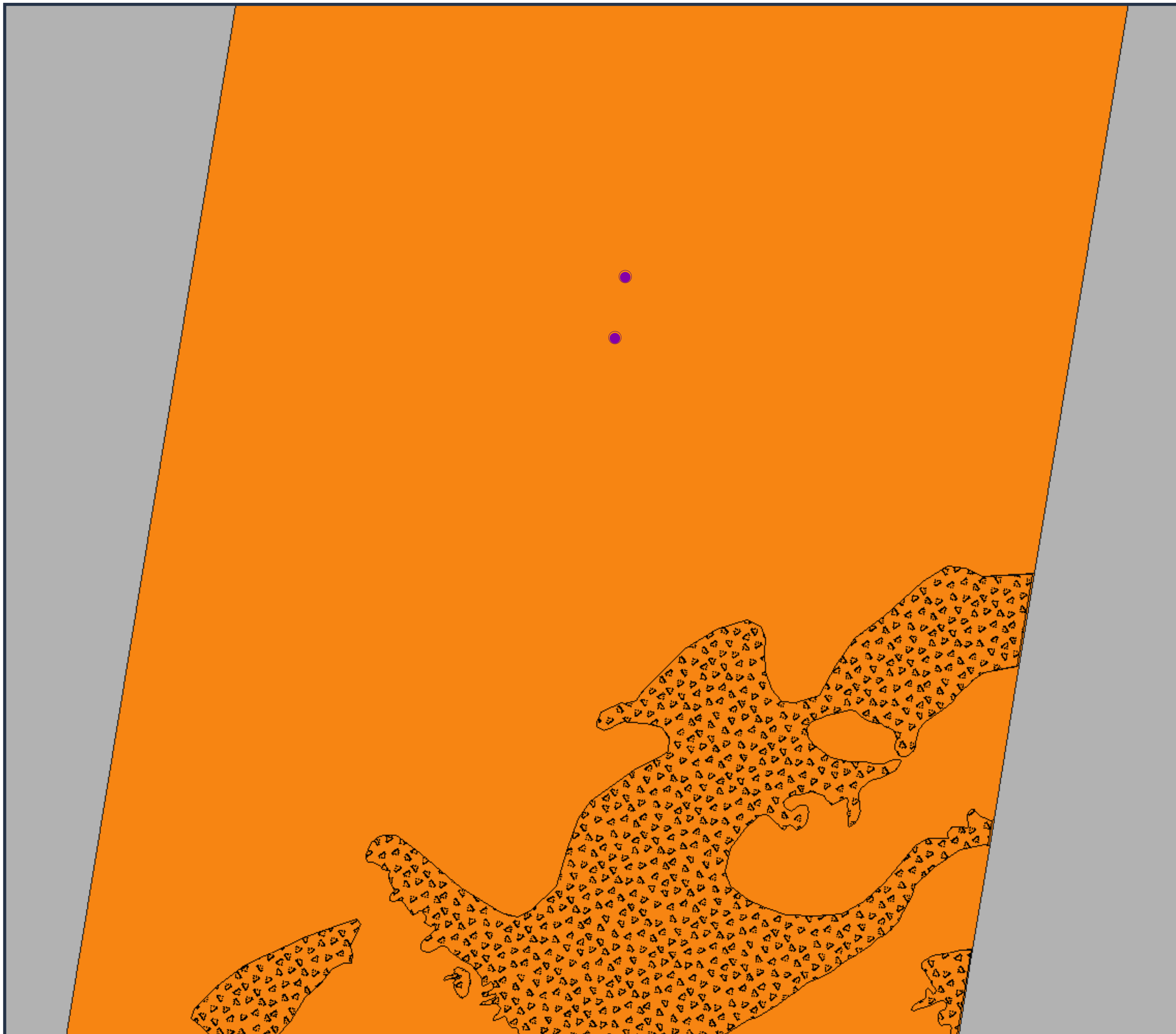
VINEYARD NORTHEAST

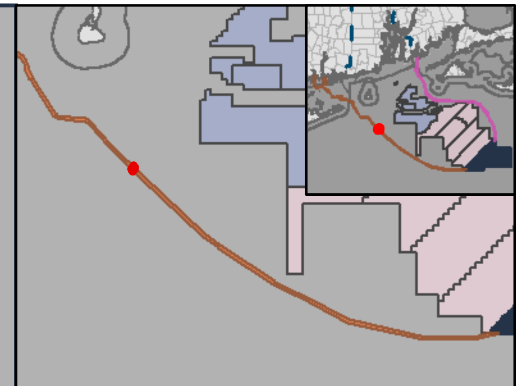
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Representative Connecticut OECC Dredge Locations
- Ripple
- Soft Bottom Habitat

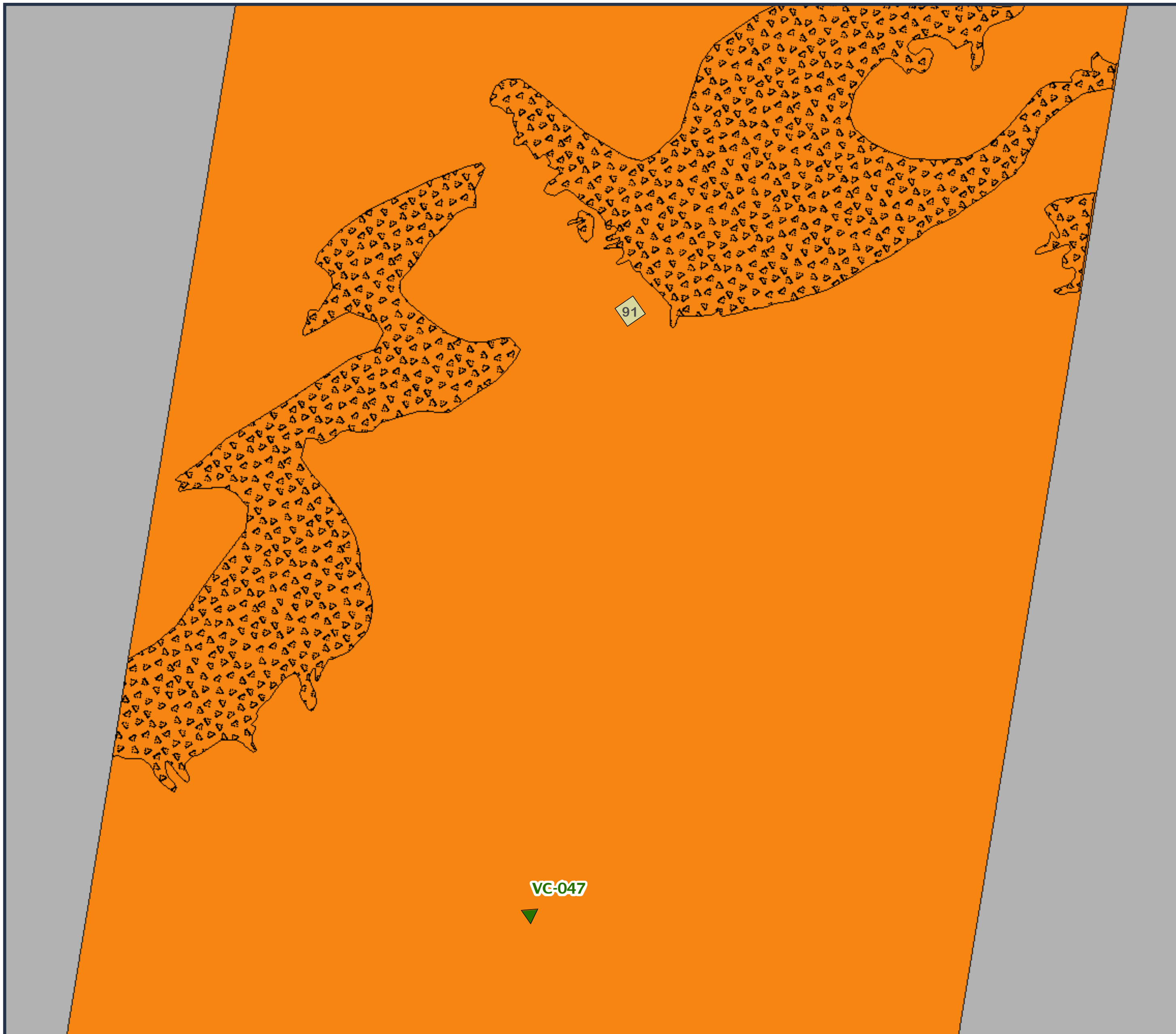
Scale 1:5,000
1 inch = 0 km

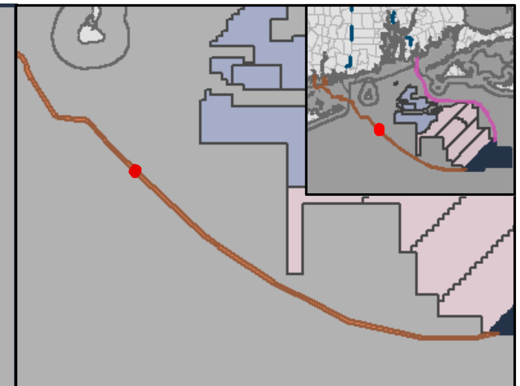
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





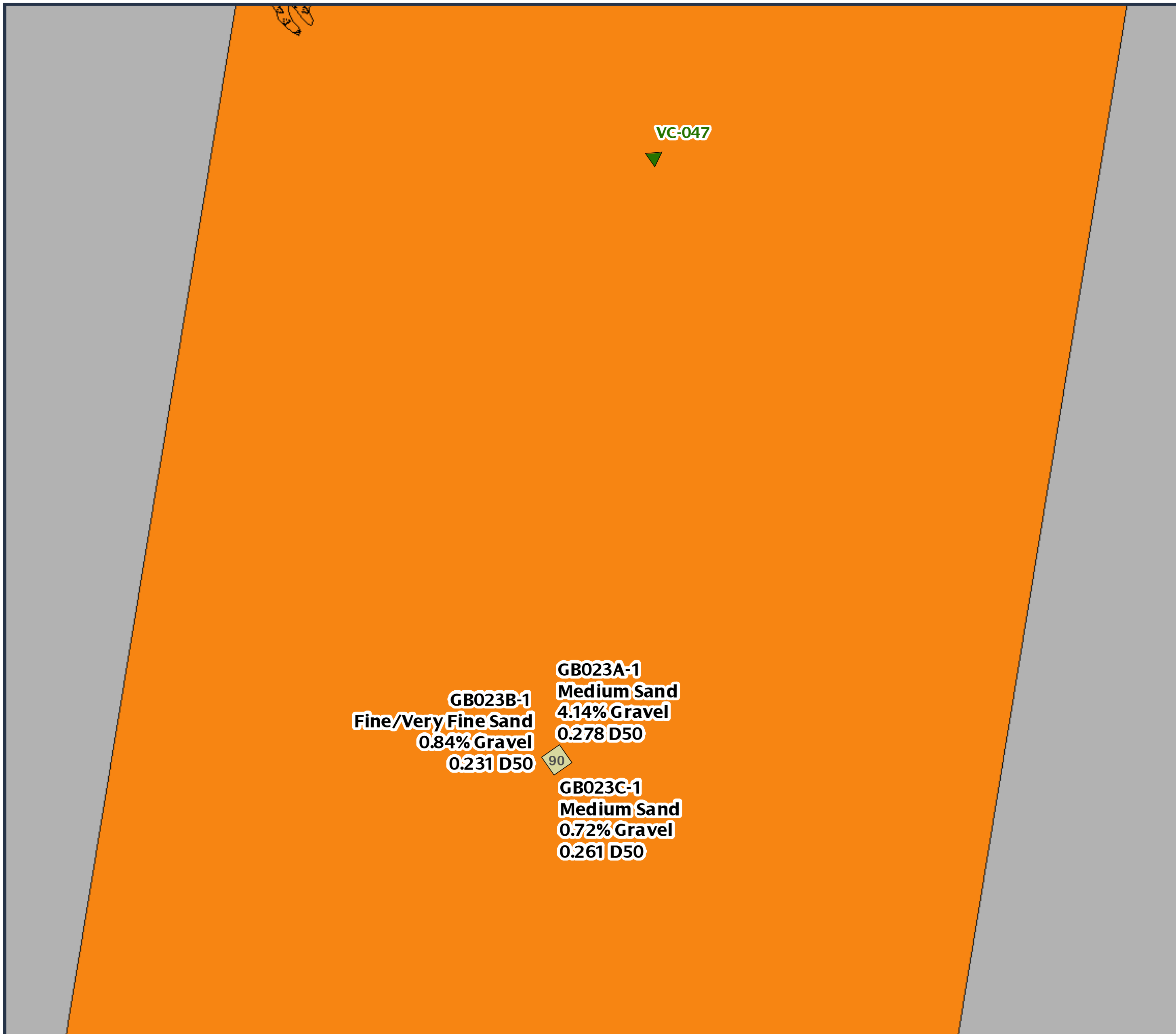
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Ripple
Soft Bottom Habitat
Soft Station - Vibracore

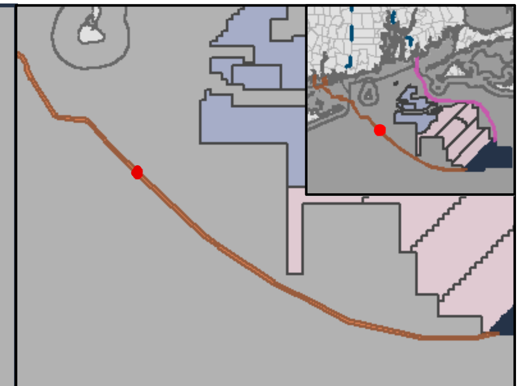
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore

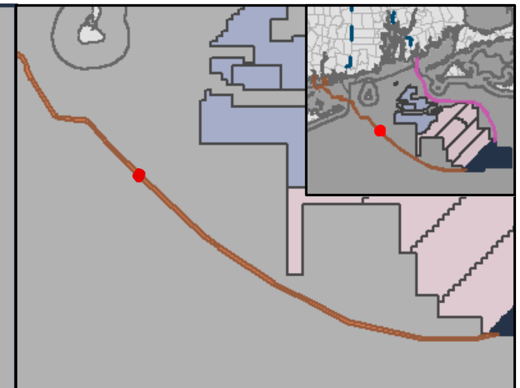
Scale 1:5,000
1 inch = 0 km

0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

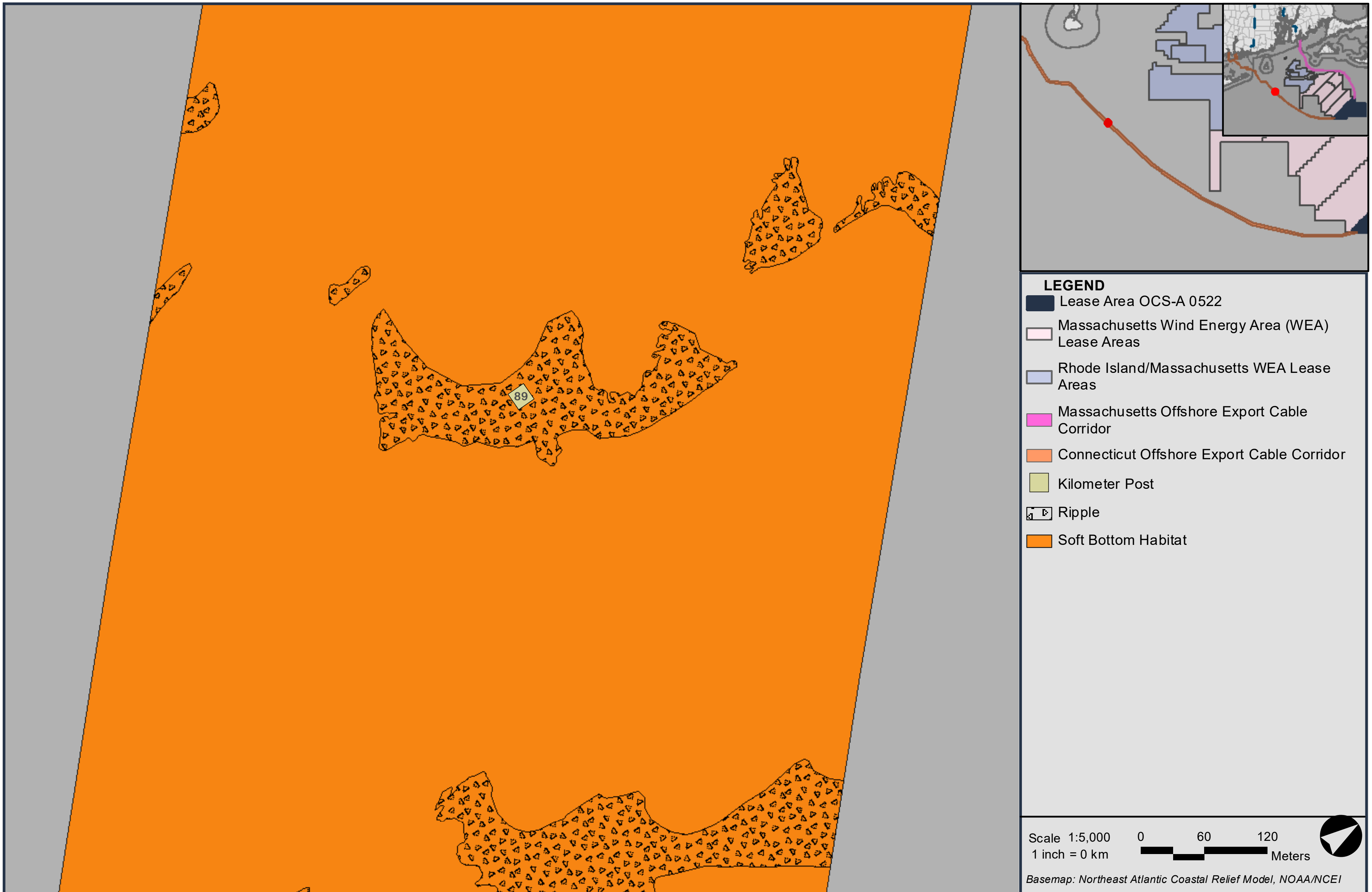
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

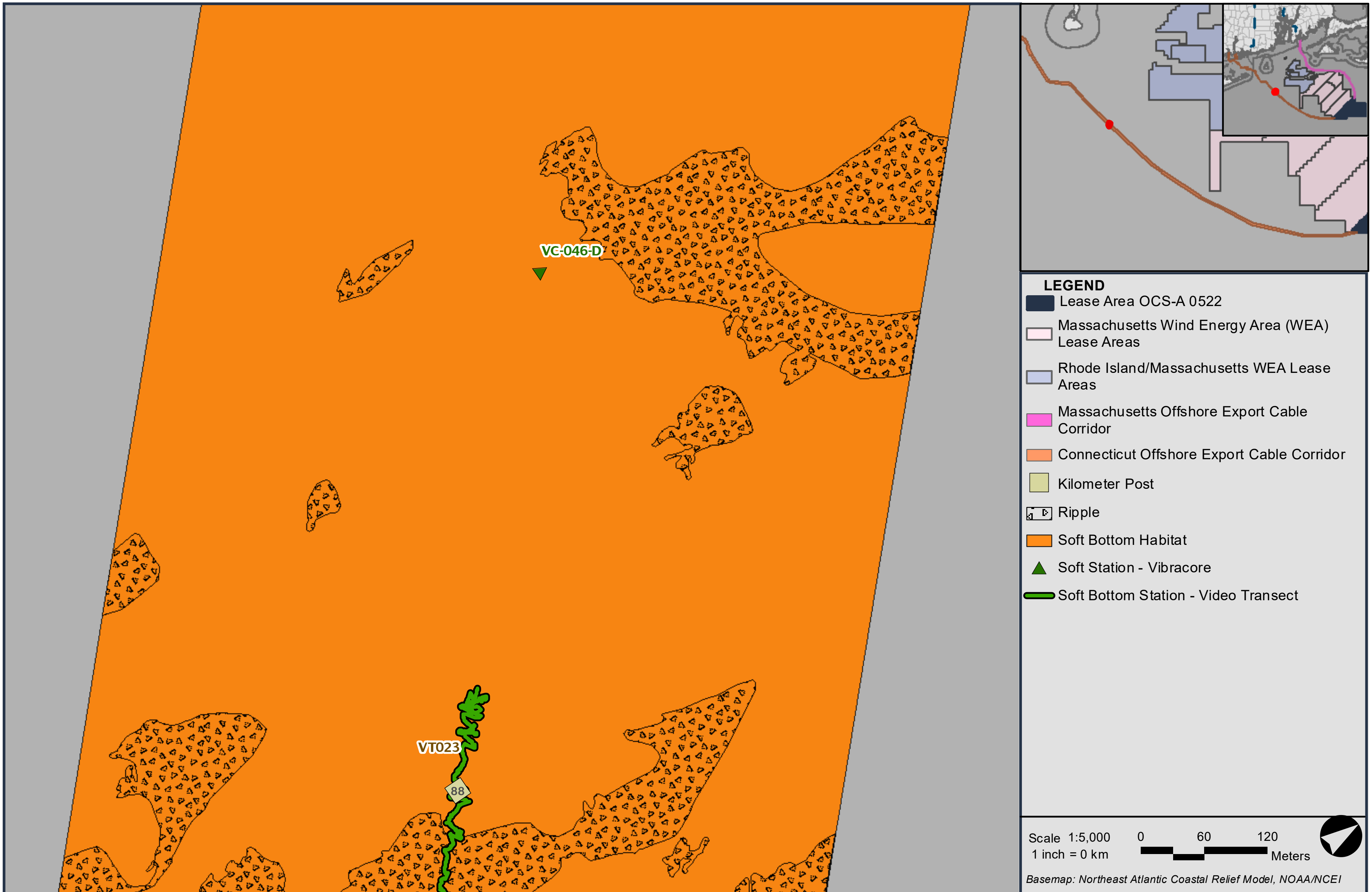
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

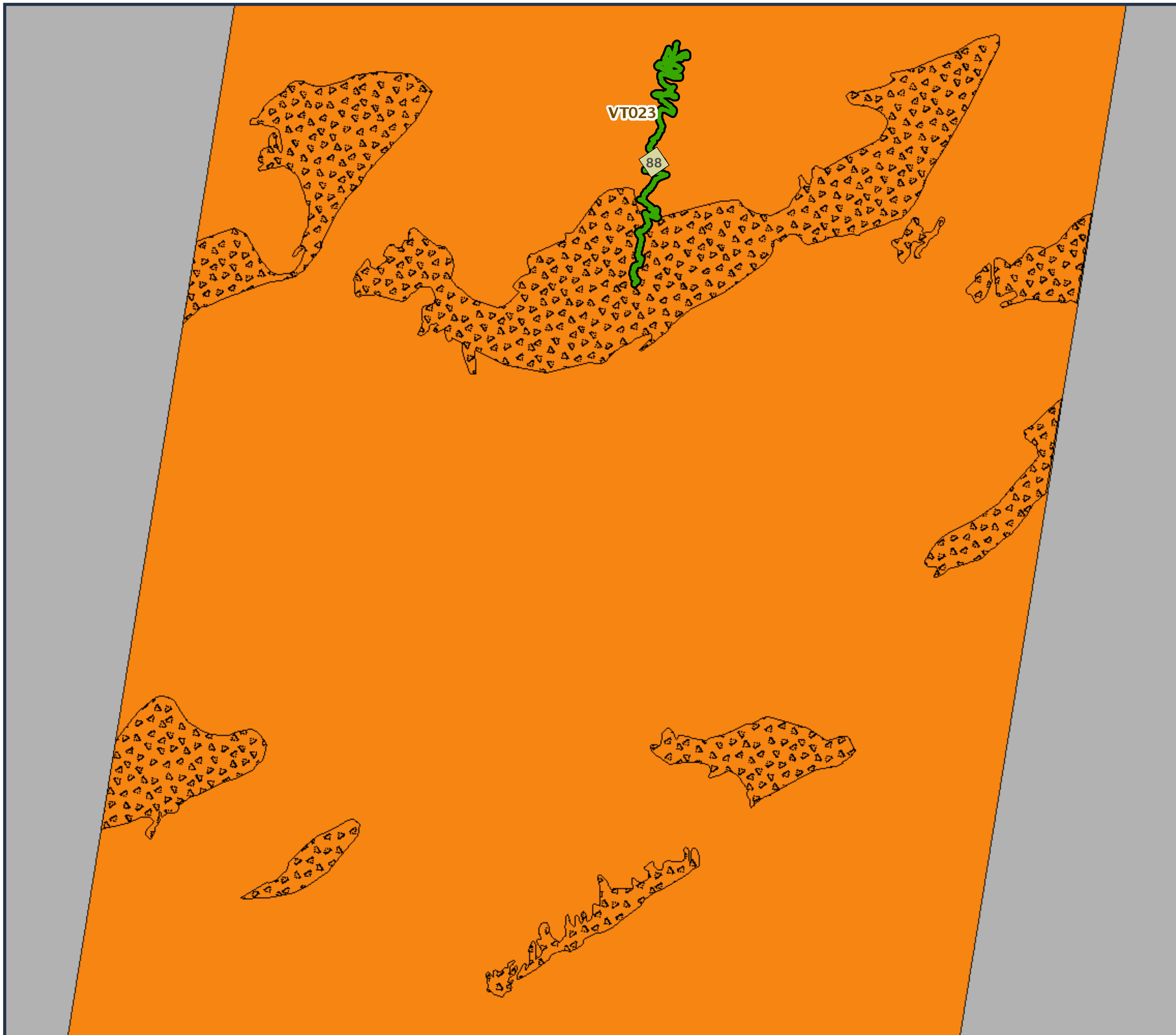
VINEYARD NORTHEAST

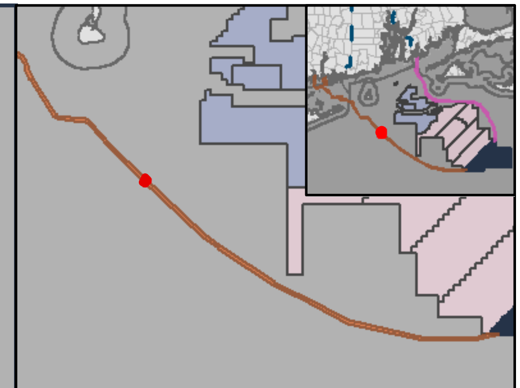
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Bottom Station - Video Transect

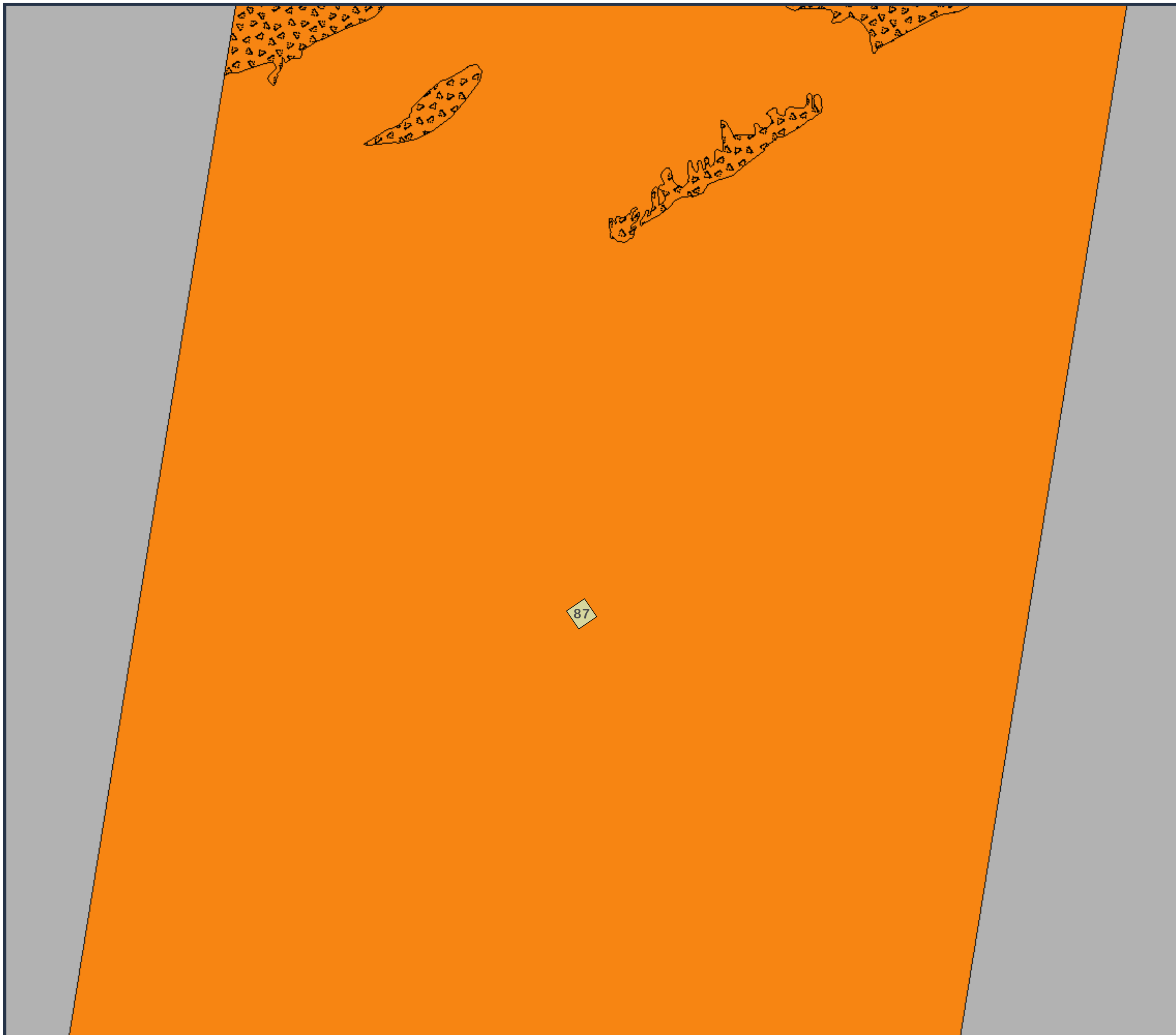
Scale 1:5,000
1 inch = 0 km

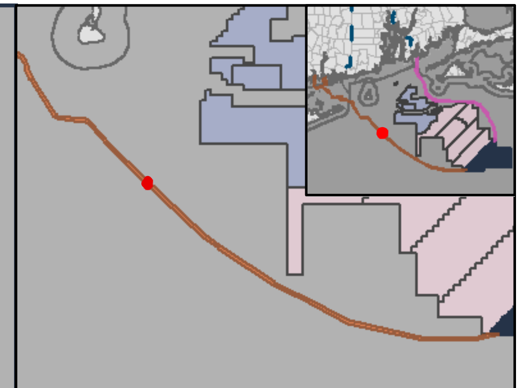
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





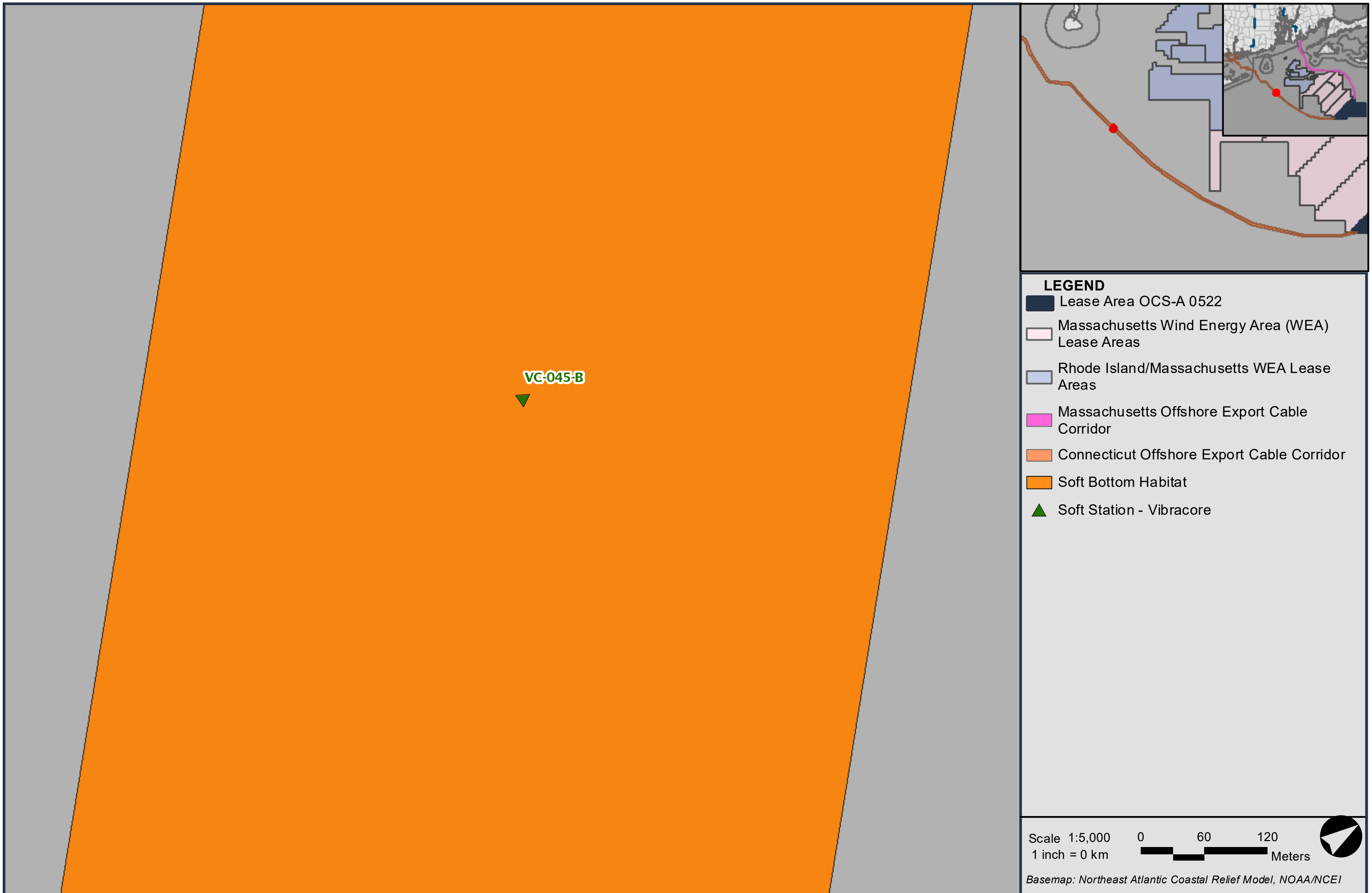
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

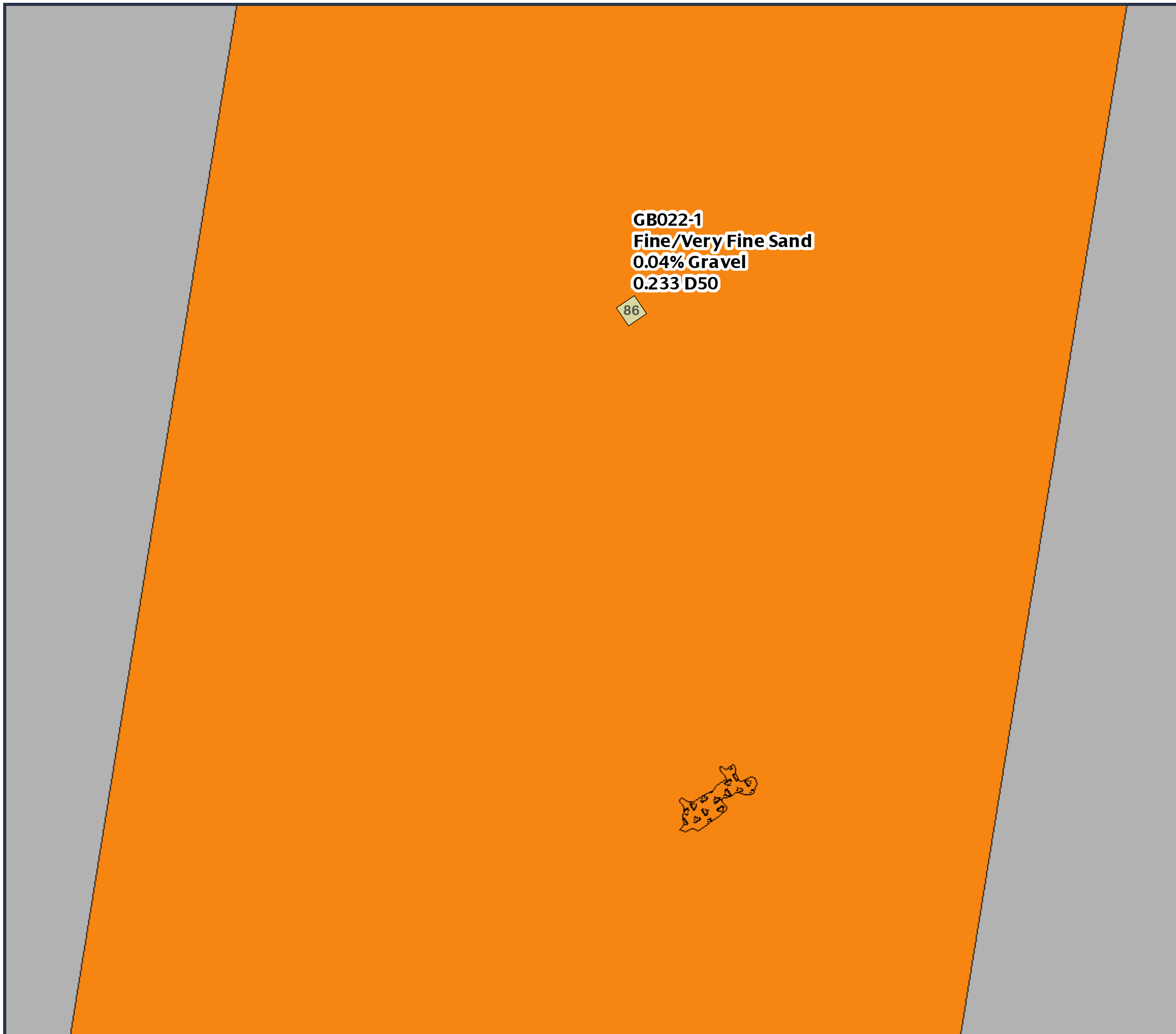
VINEYARD NORTHEAST
VINEYARD OFFSHORE

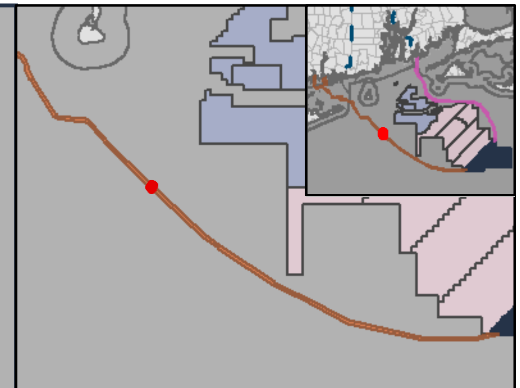


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample

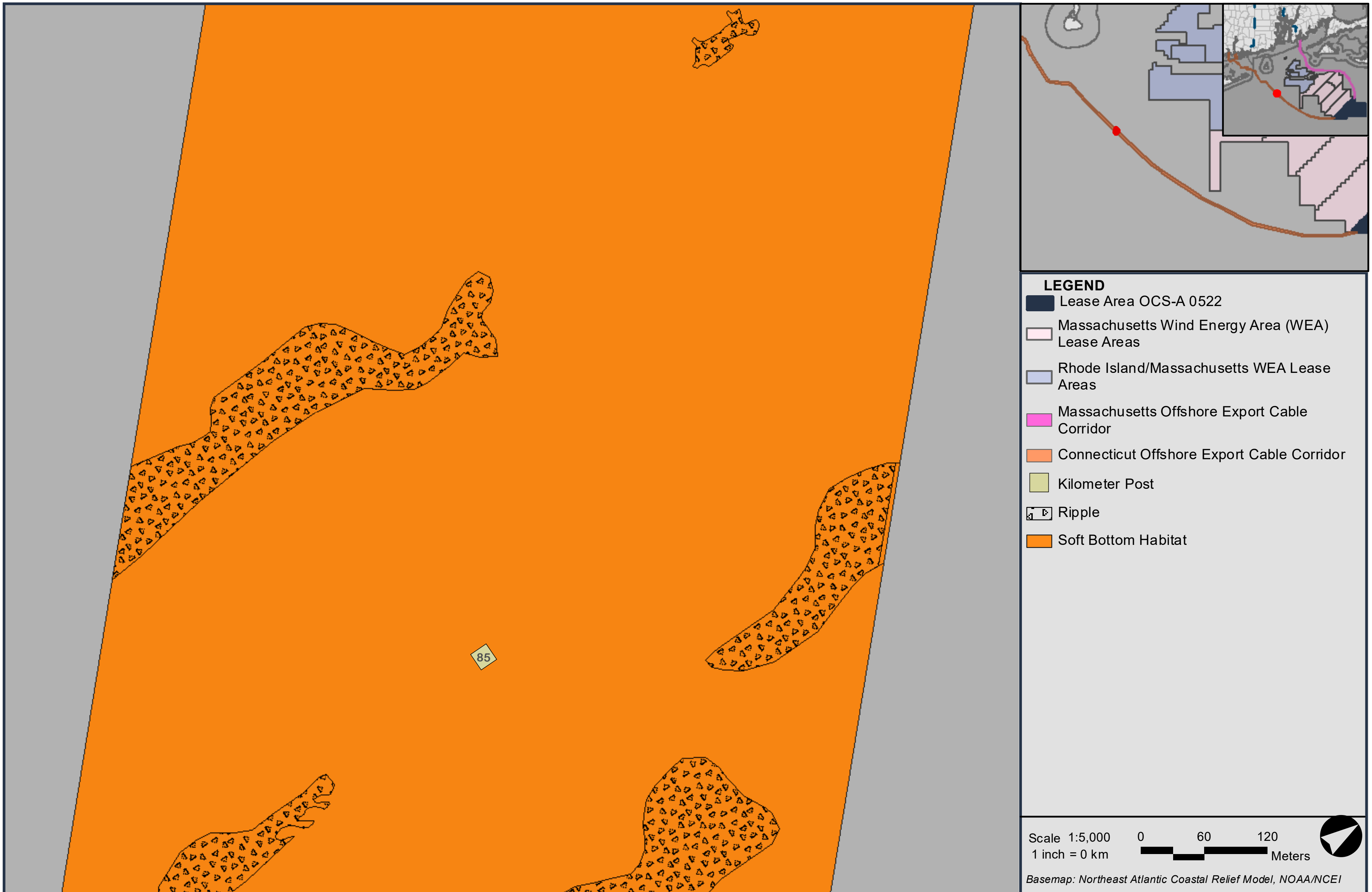
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

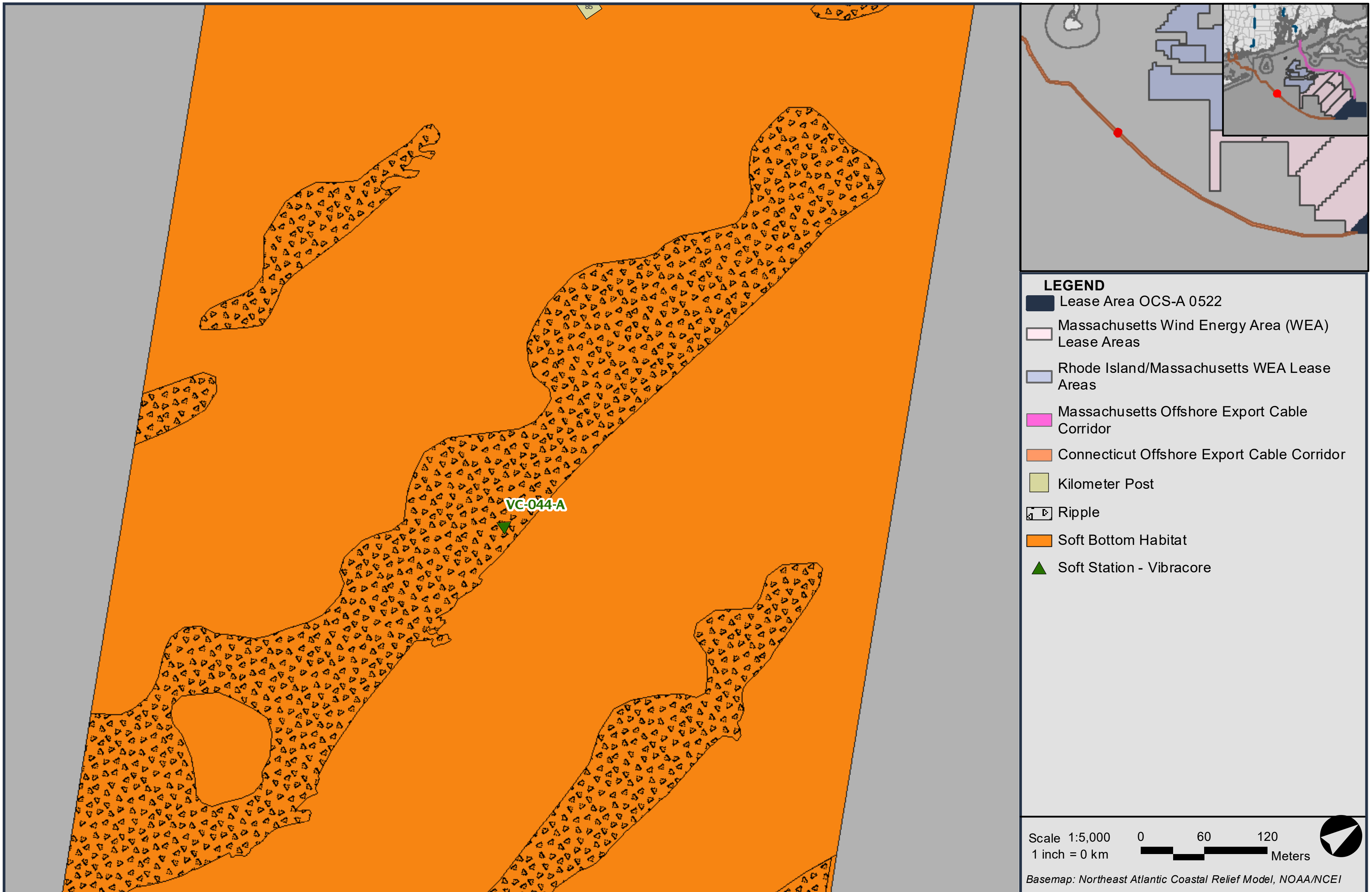
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



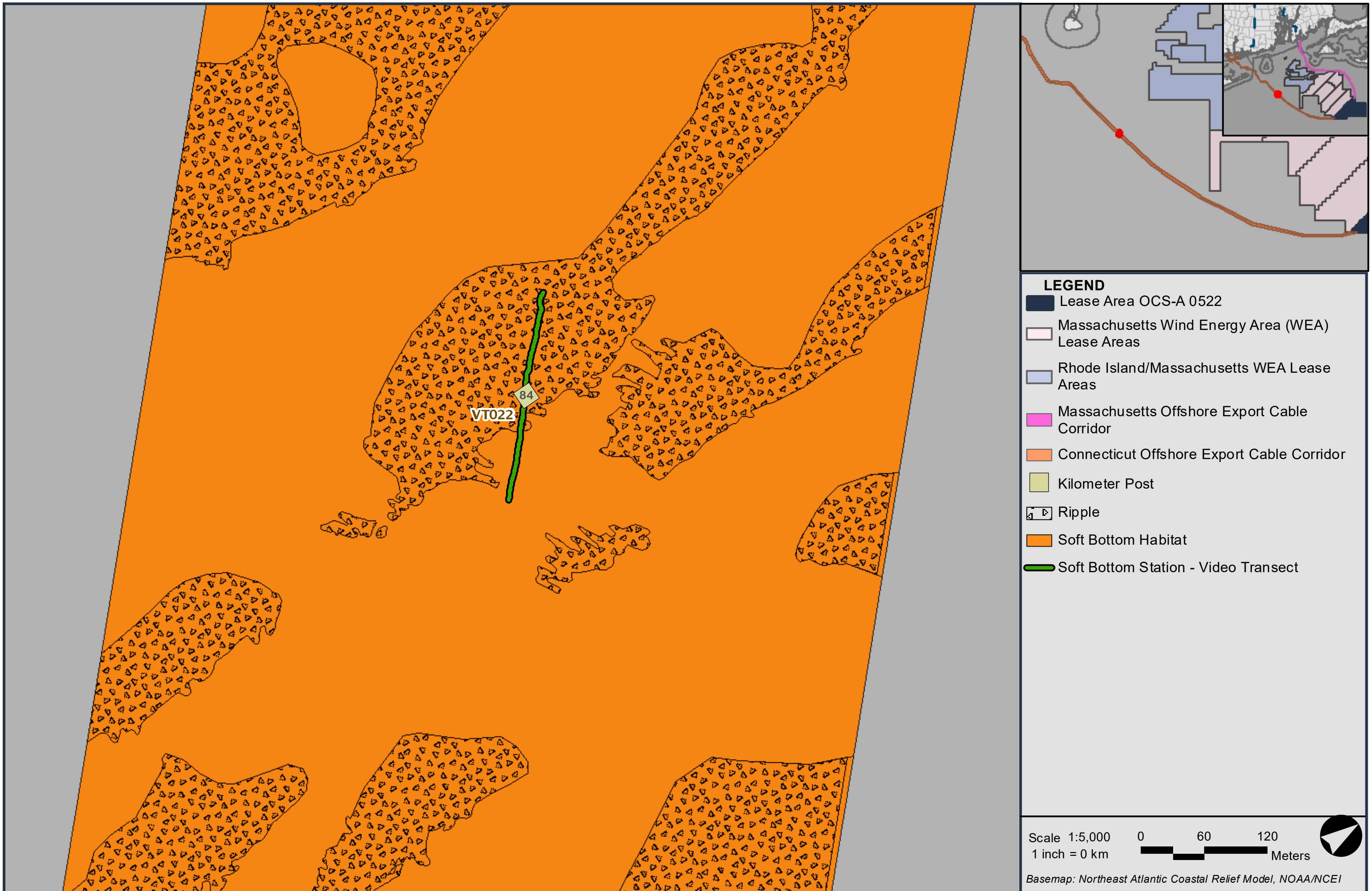
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

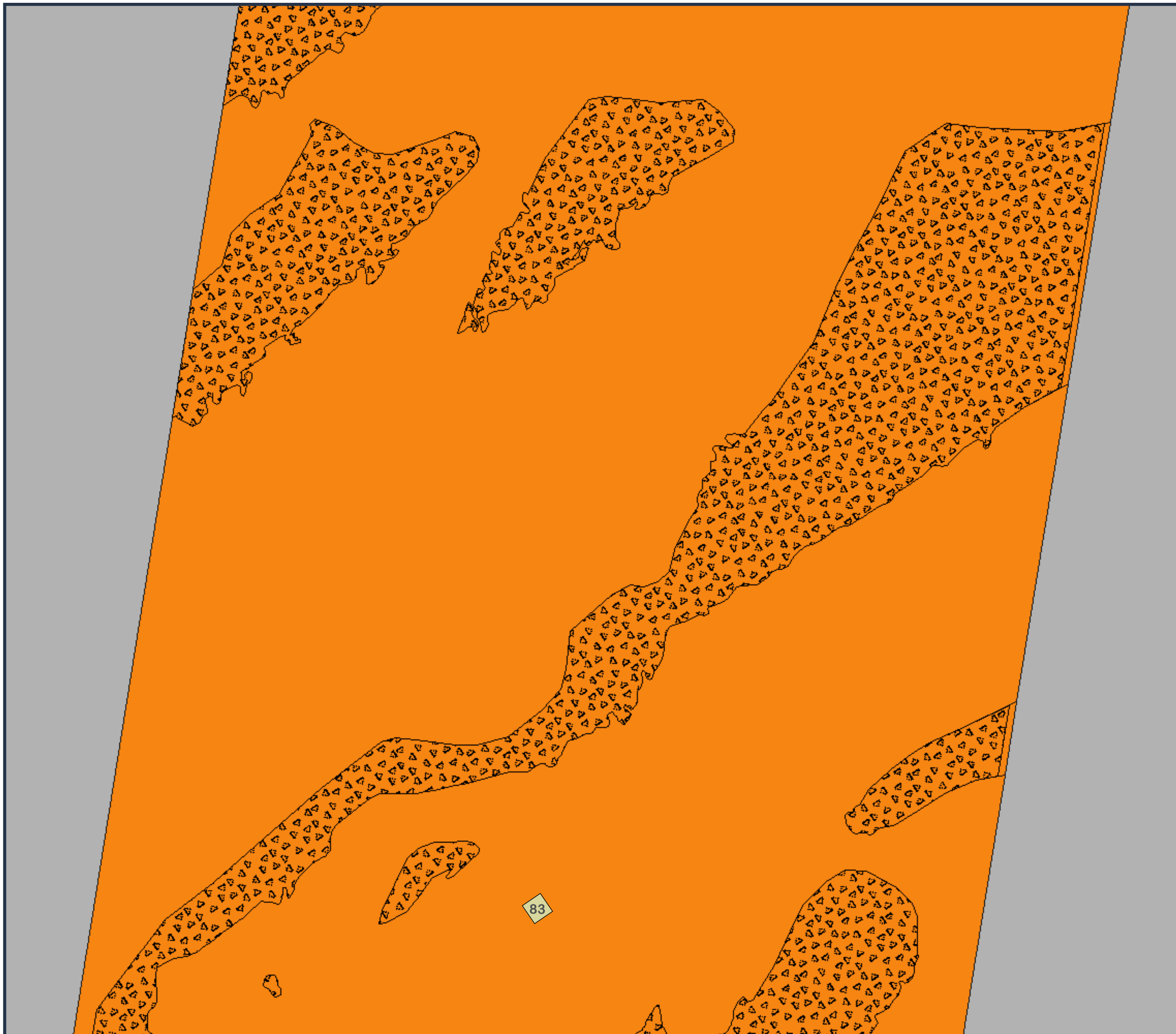
VINEYARD NORTHEAST
VINEYARD OFFSHORE

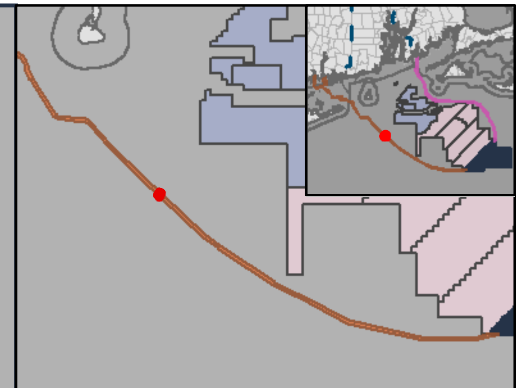


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat

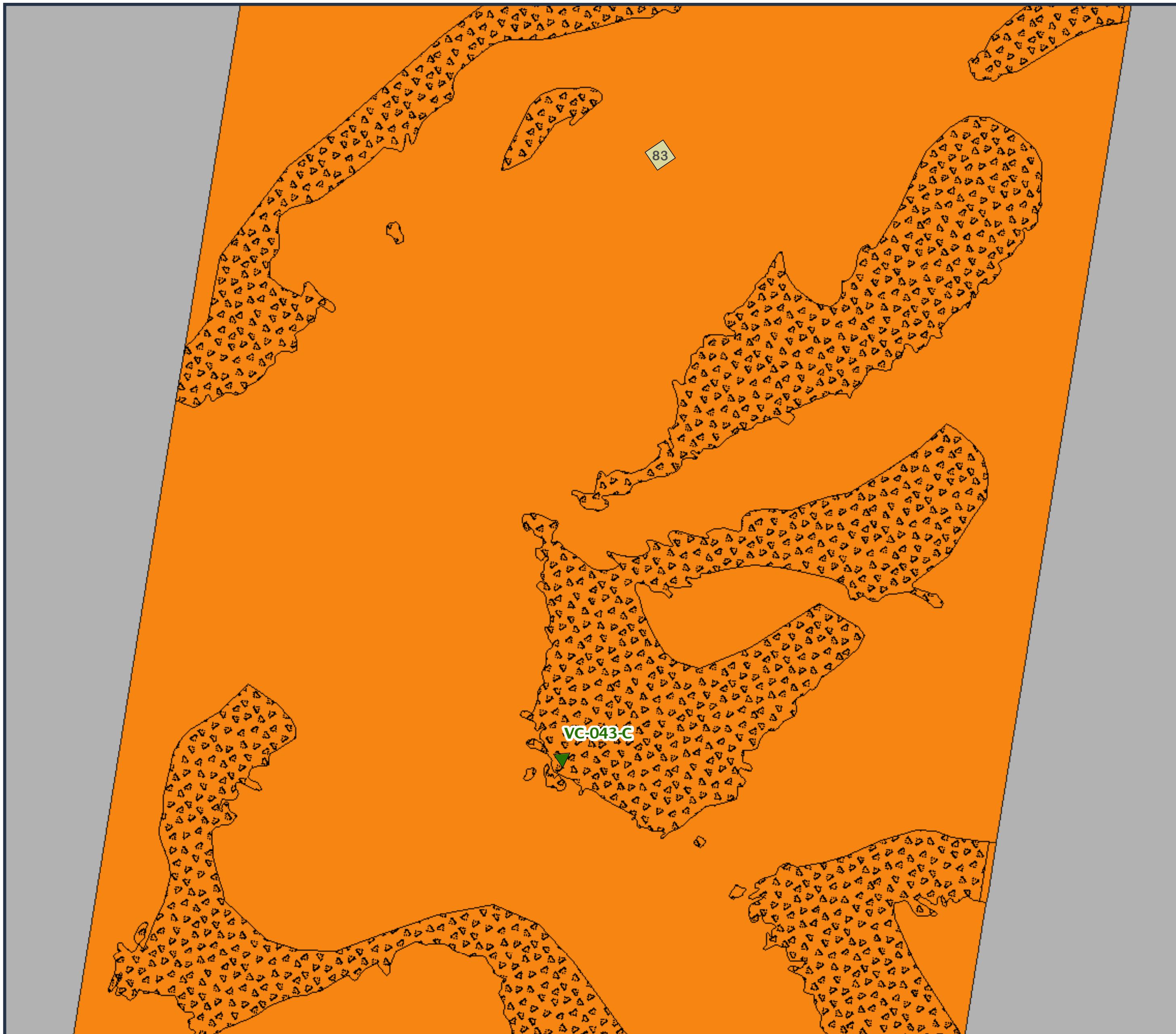
Scale 1:5,000
1 inch = 0 km

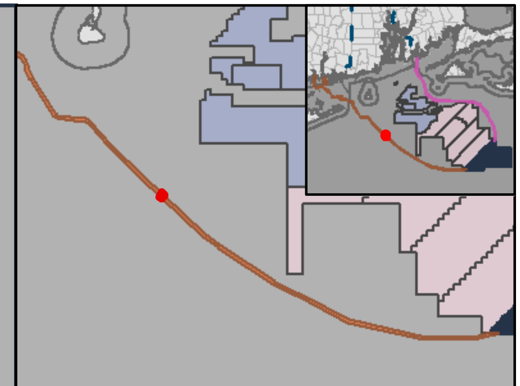
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Vibracore

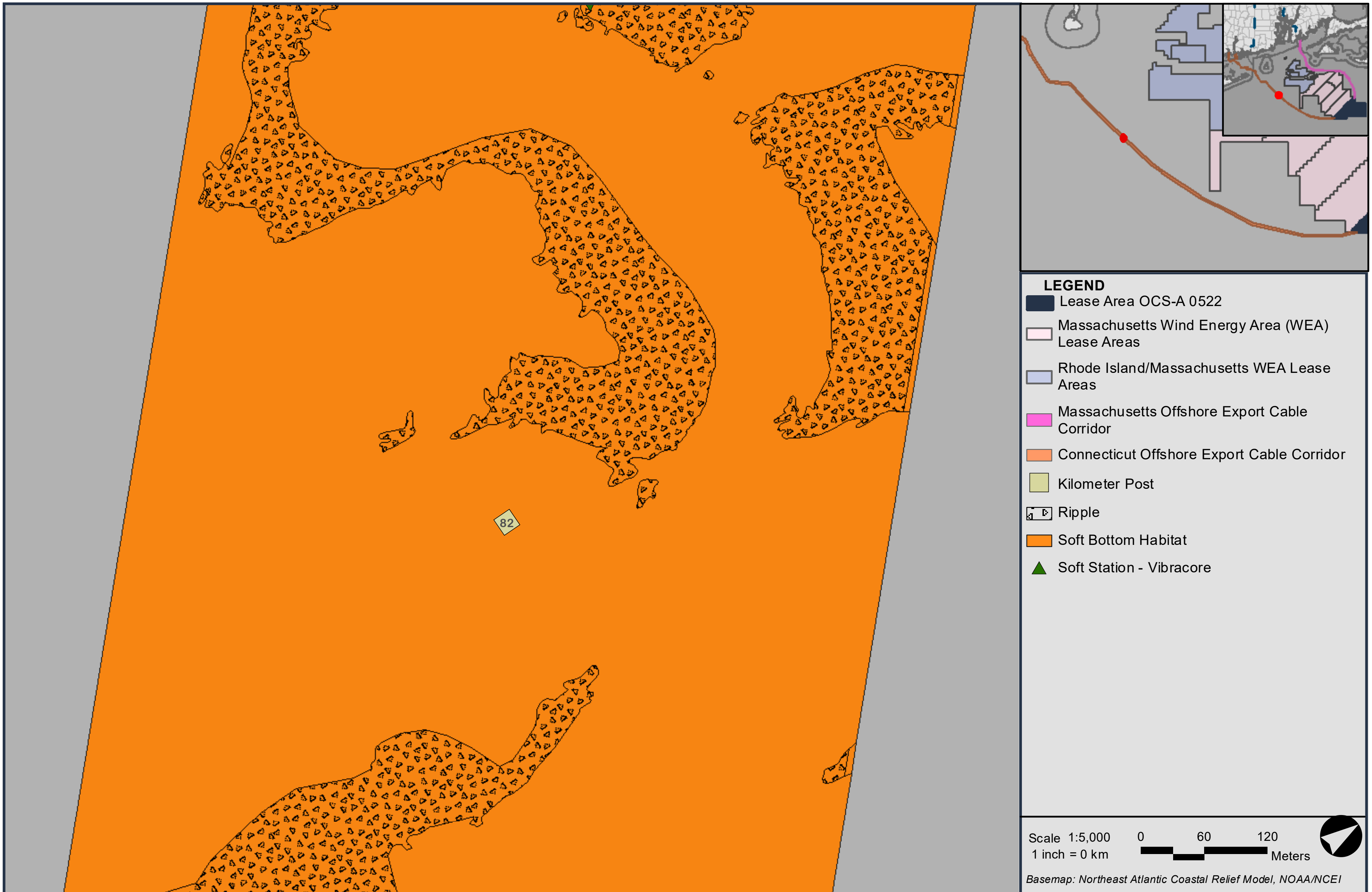
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

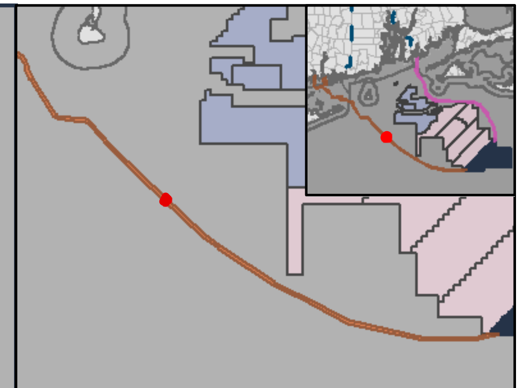
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

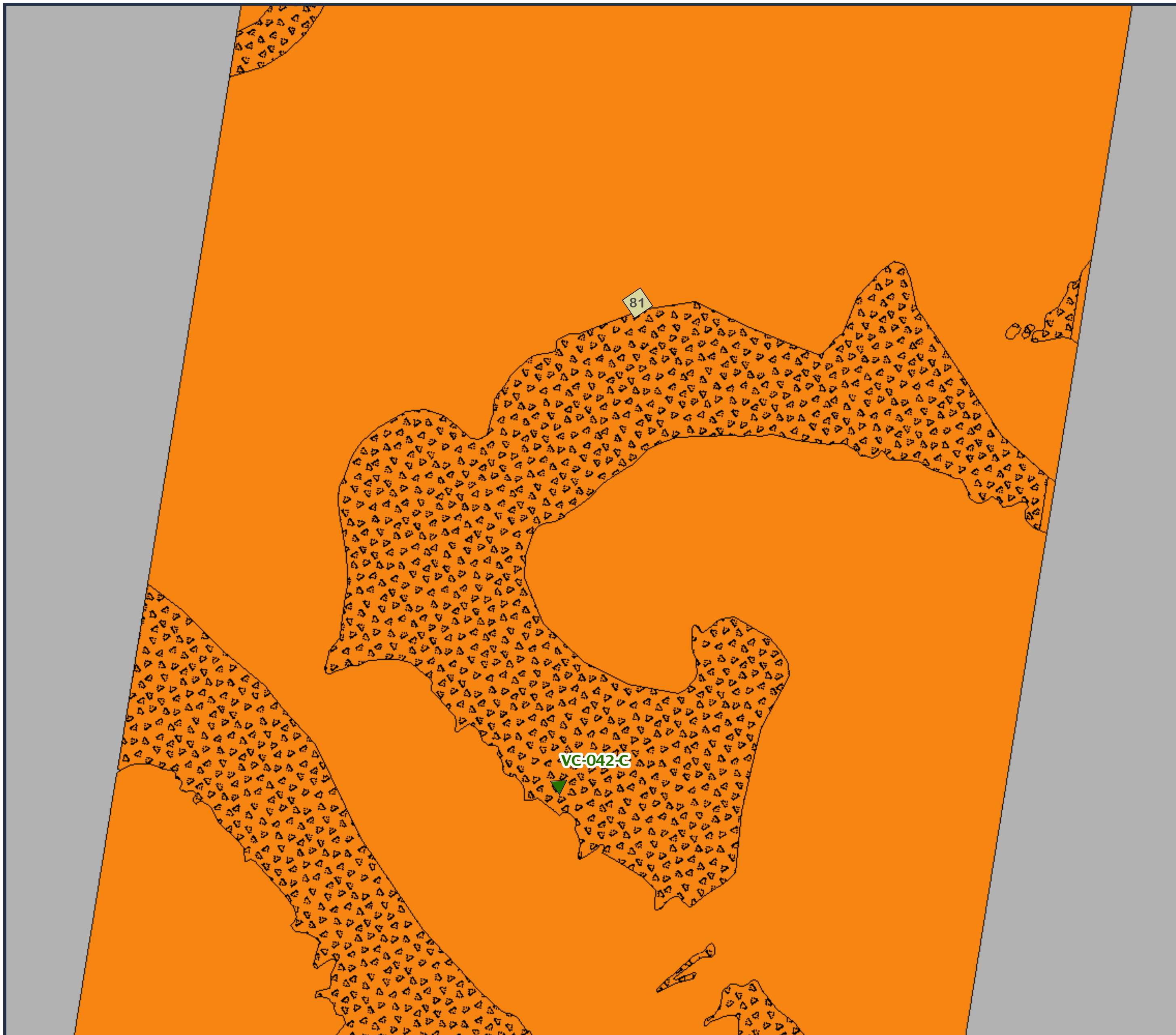
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample

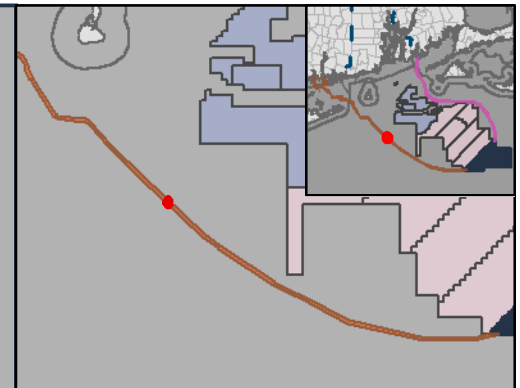
Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

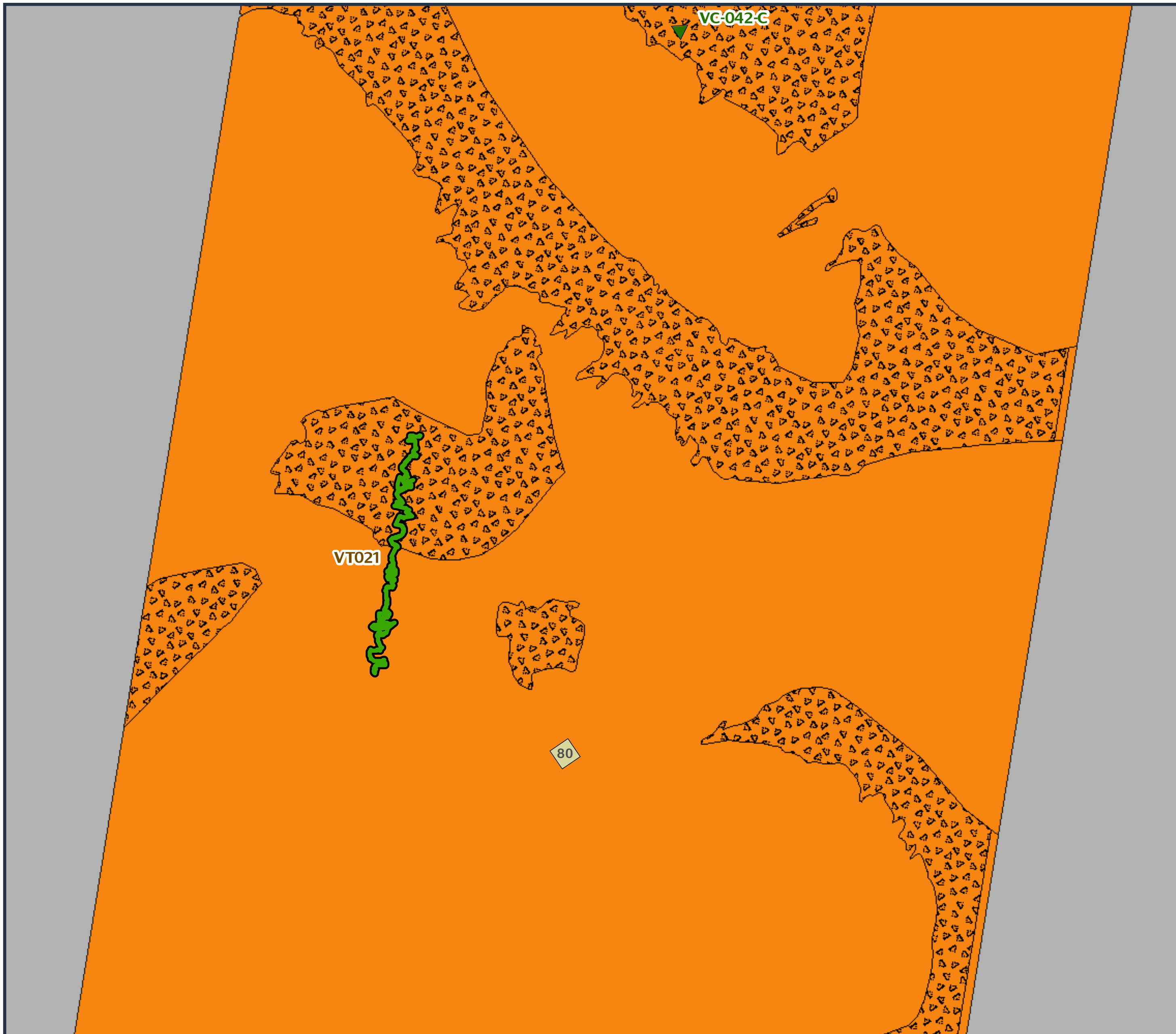
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Vibracore

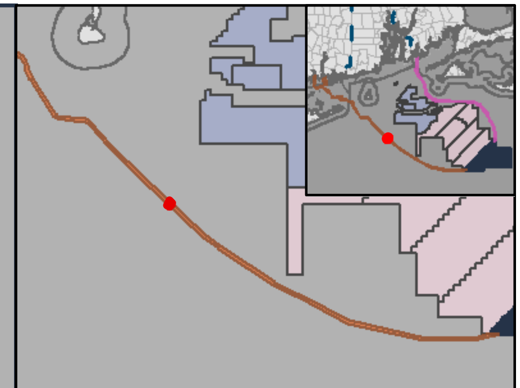
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

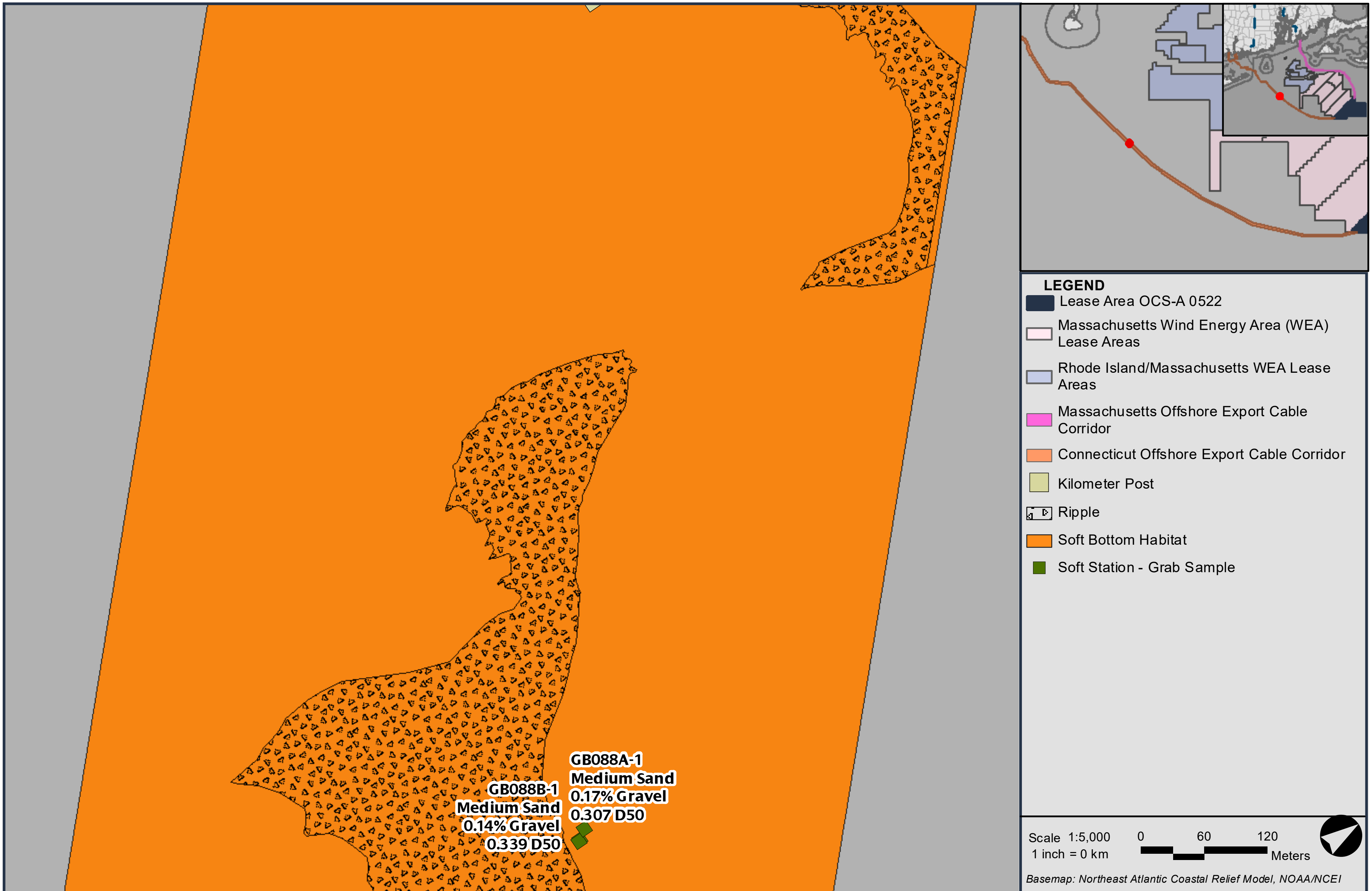
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

Scale 1:5,000
1 inch = 0 km

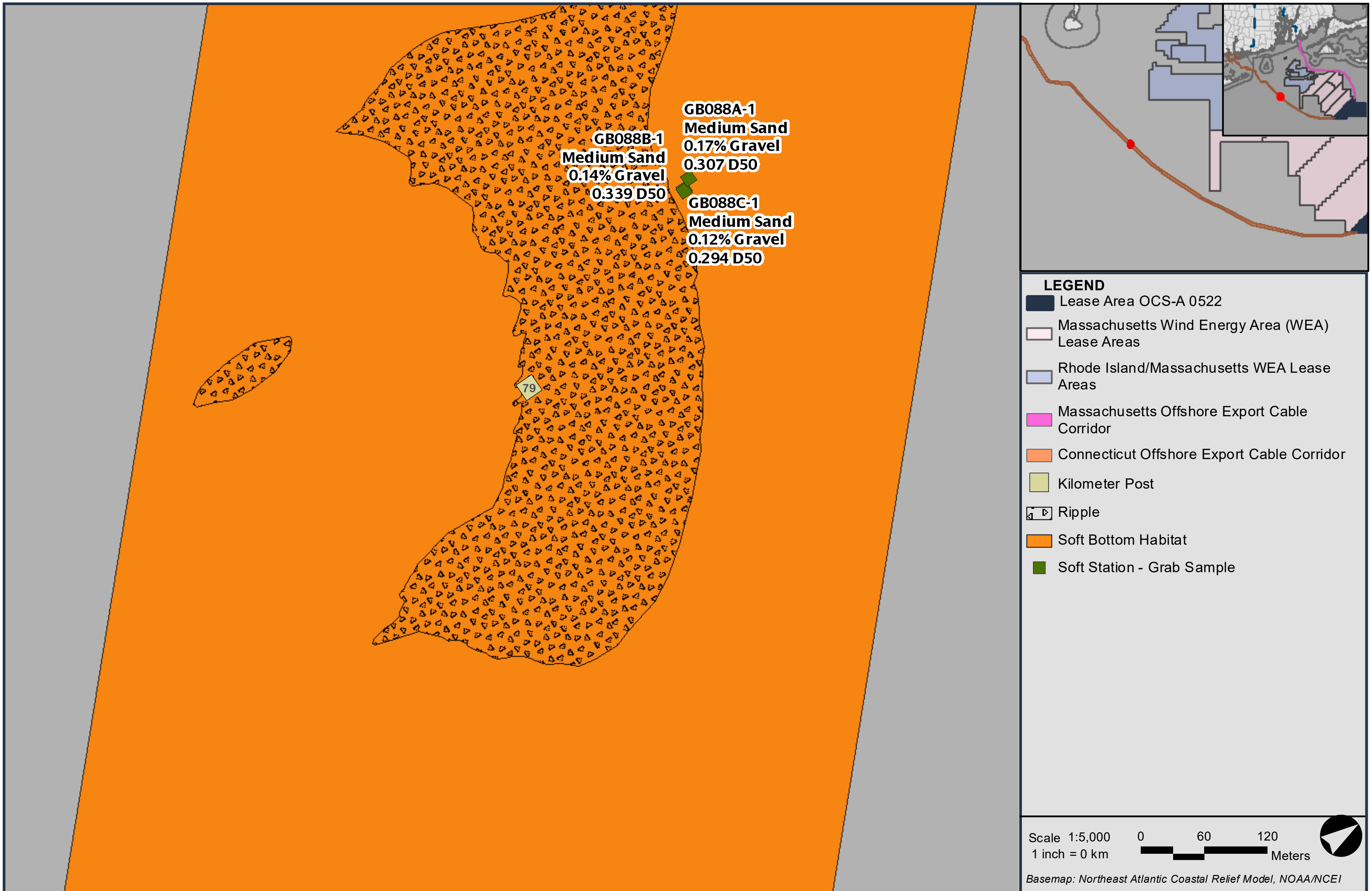
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

VINEYARD NORTHEAST
VINEYARD OFFSHORE

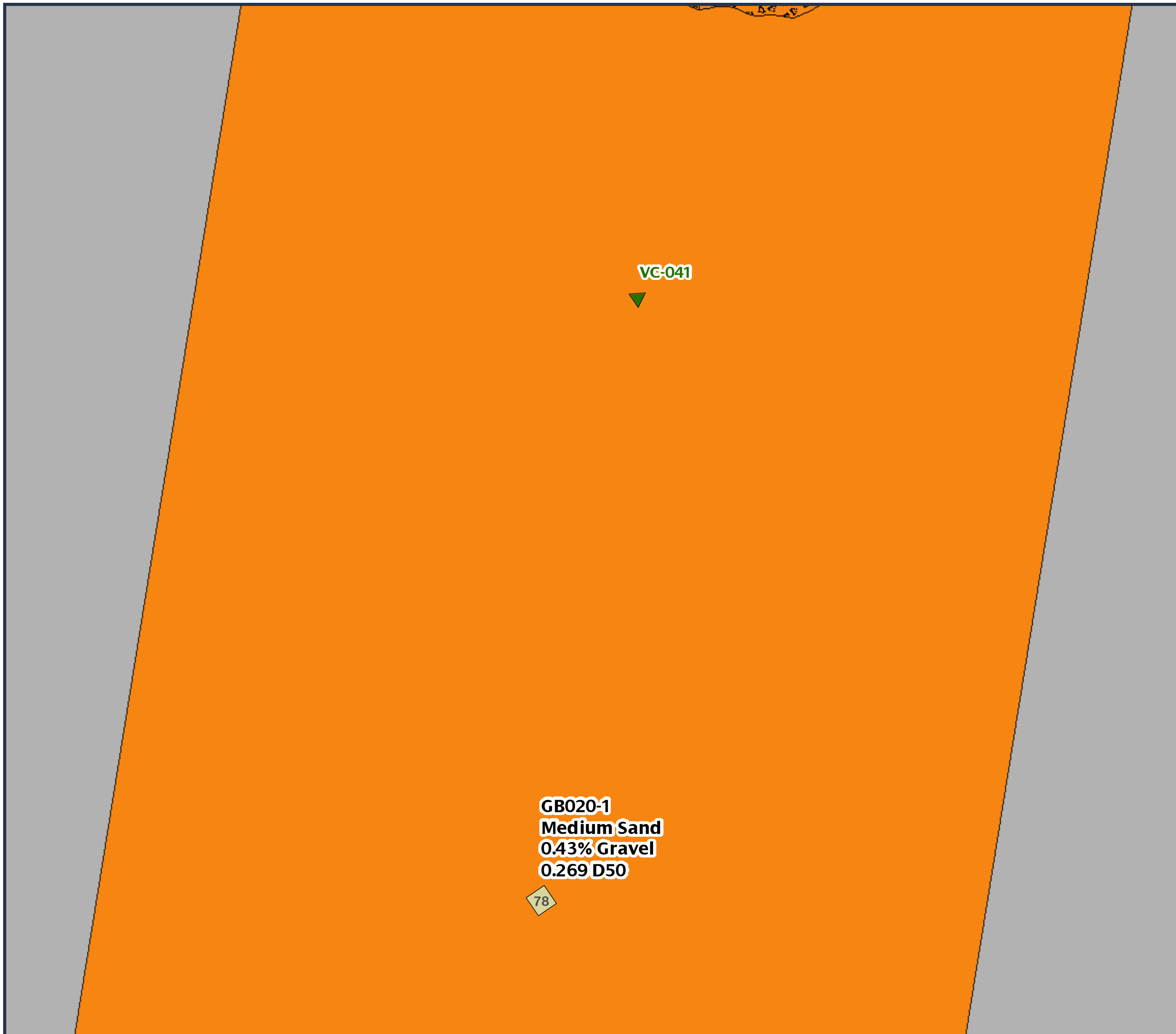


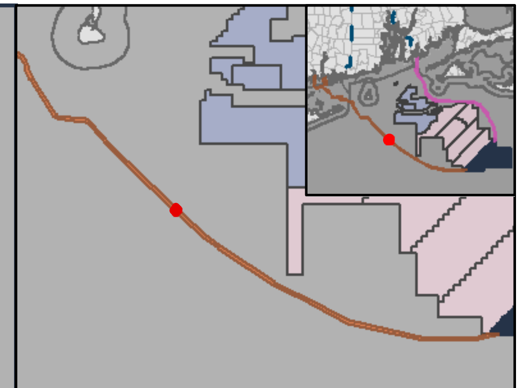
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

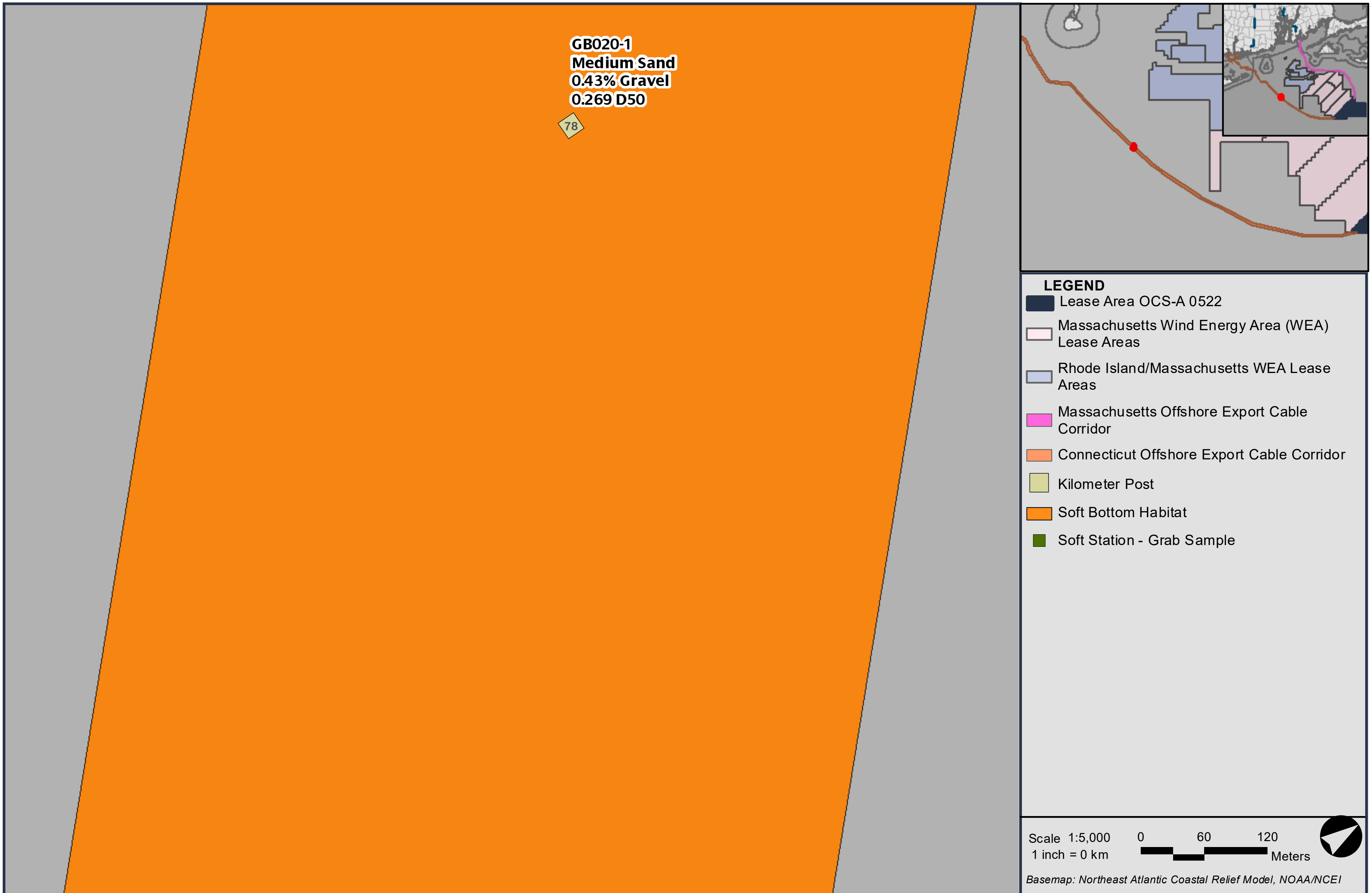
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

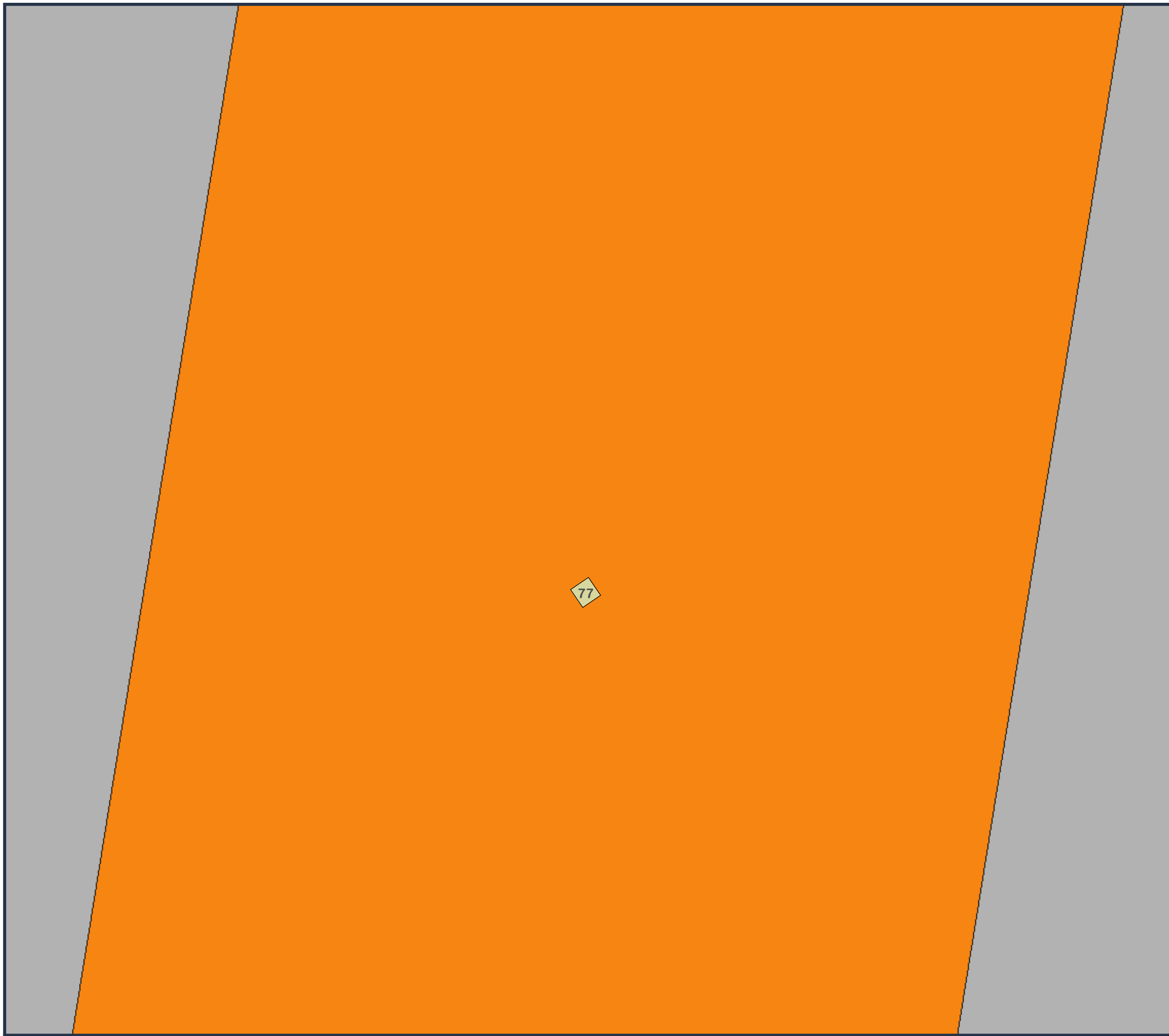
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

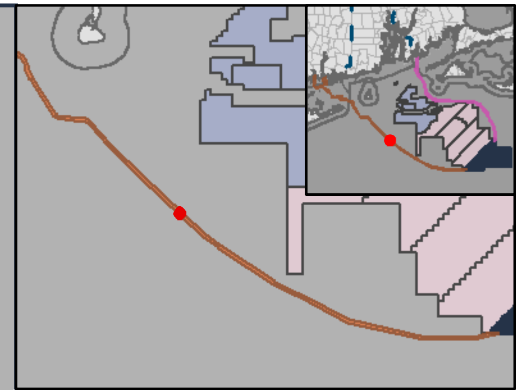
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat

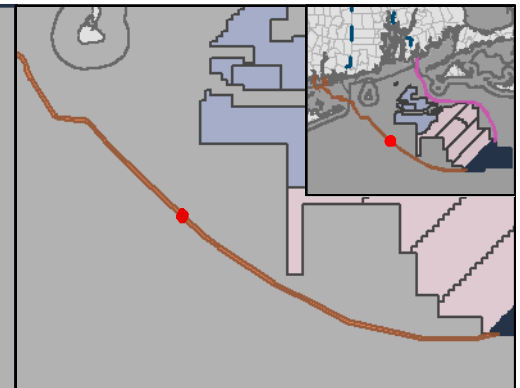
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

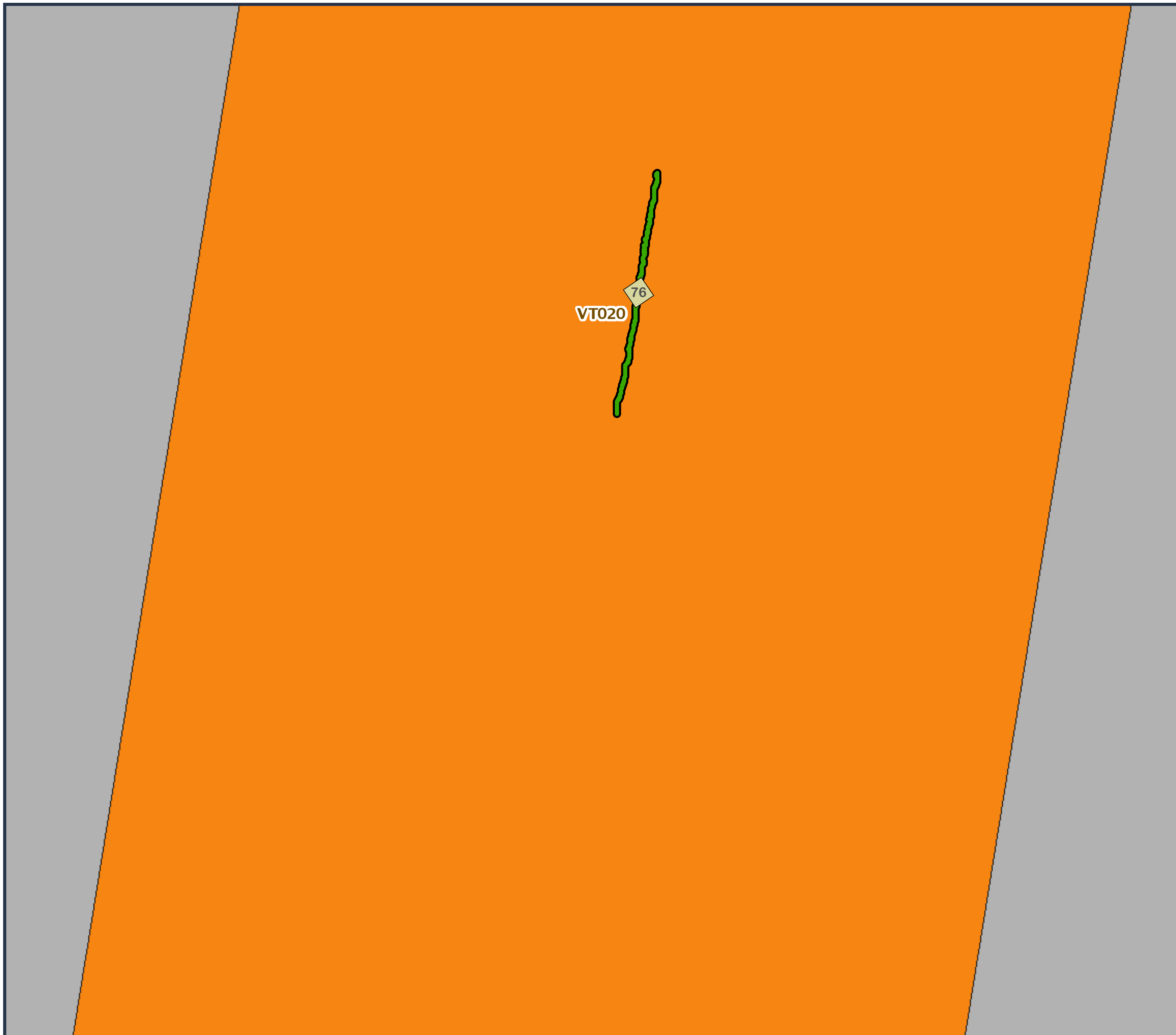
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

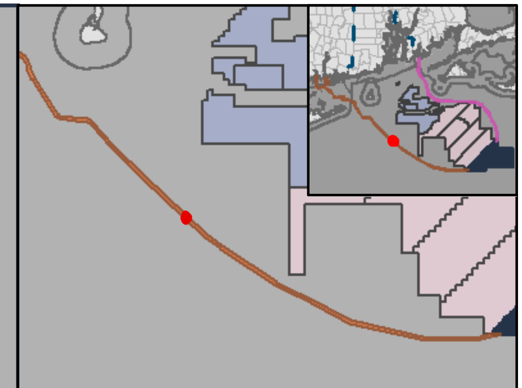
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

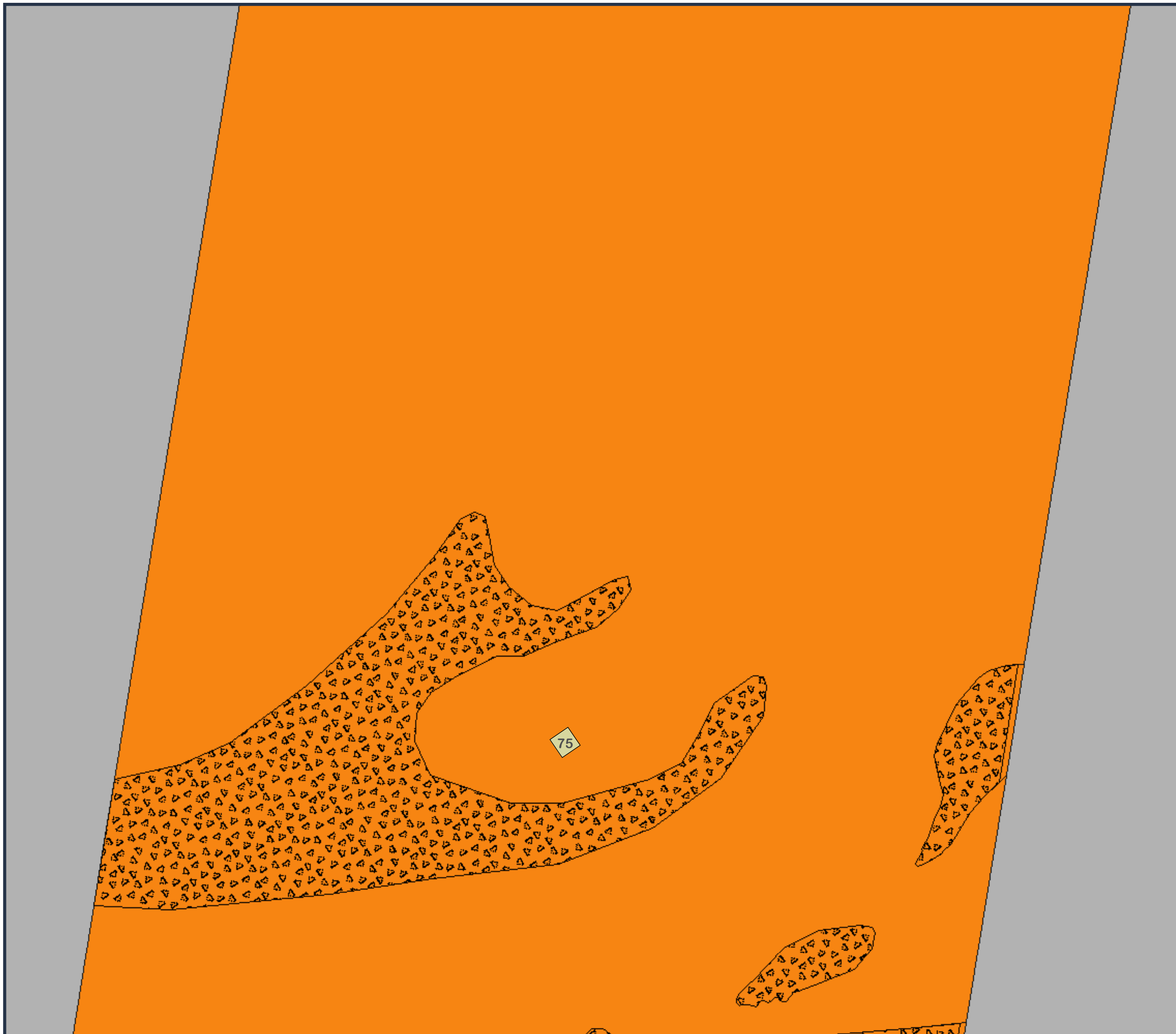
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Bottom Station - Video Transect

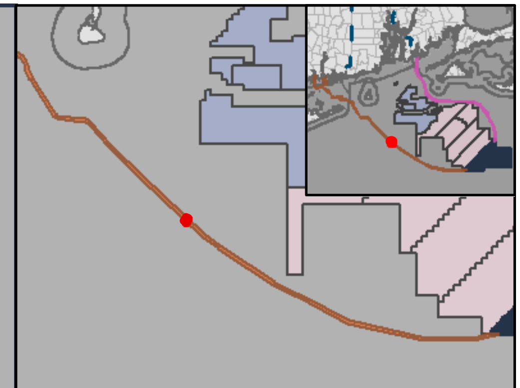
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC





LEGEND

Lease Area OCS-A 0522

Massachusetts Wind Energy Area (WEA) Lease Areas

Rhode Island/Massachusetts WEA Lease Areas

Massachusetts Offshore Export Cable Corridor

Connecticut Offshore Export Cable Corridor

Kilometer Post

Ripple

Soft Bottom Habitat

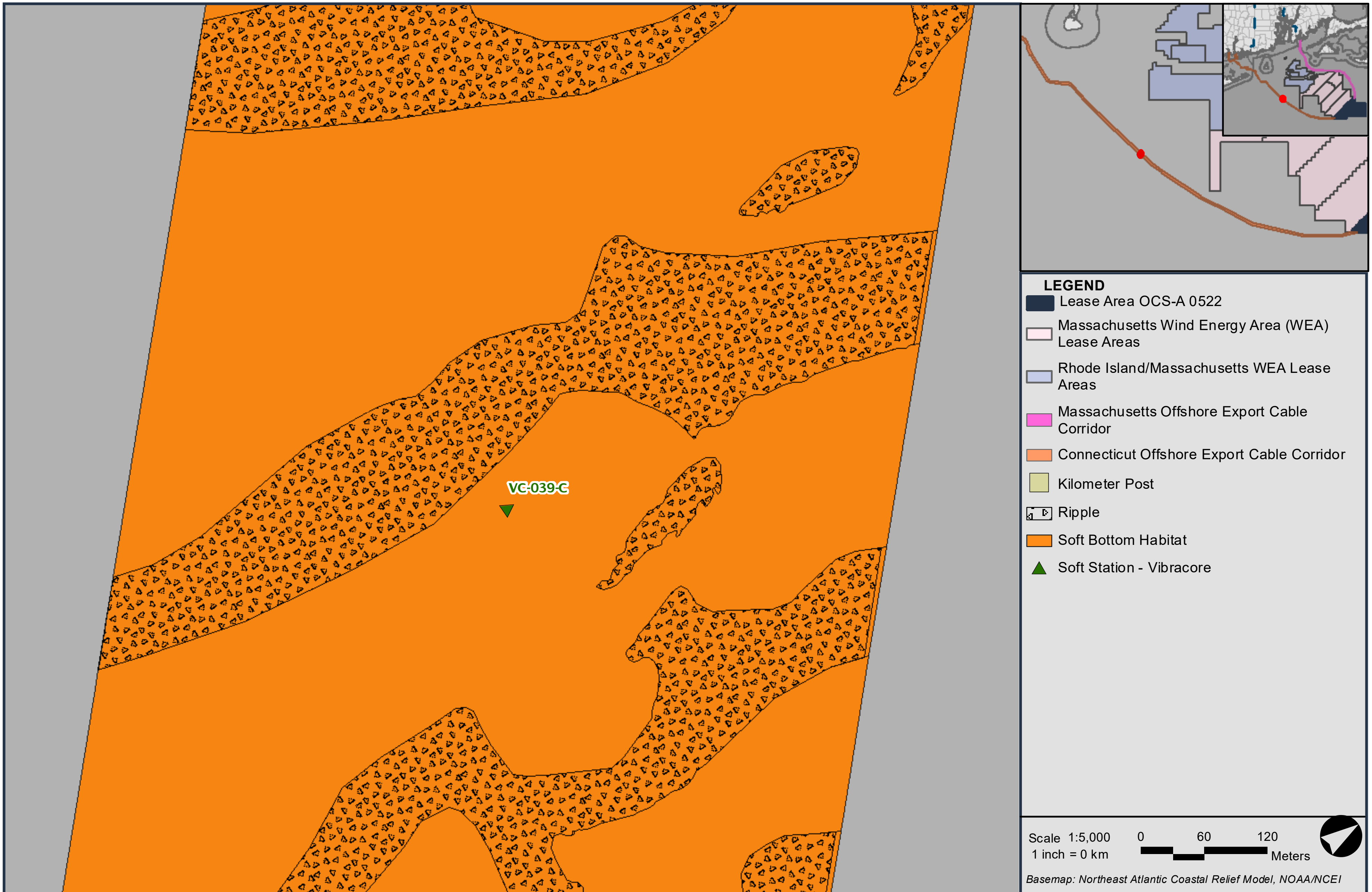
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

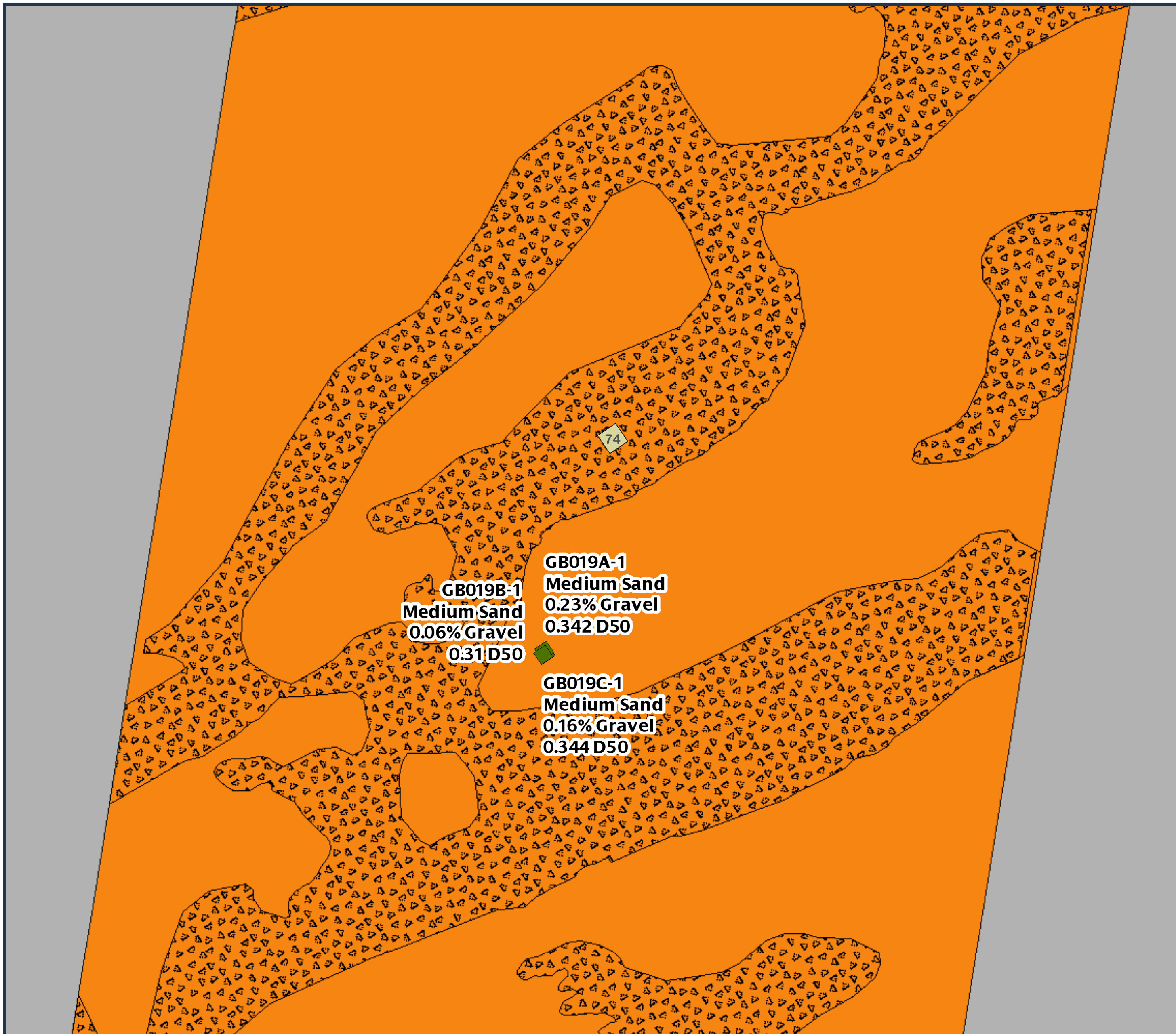
VINEYARD NORTHEAST
VINEYARD OFFSHORE

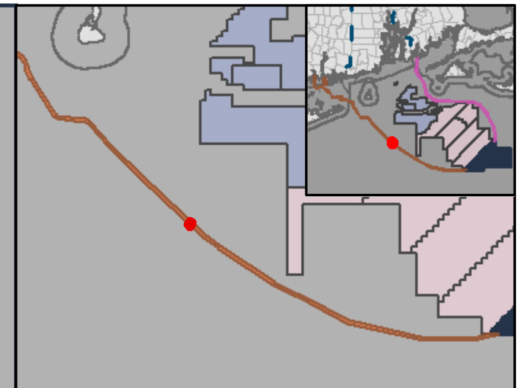


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample

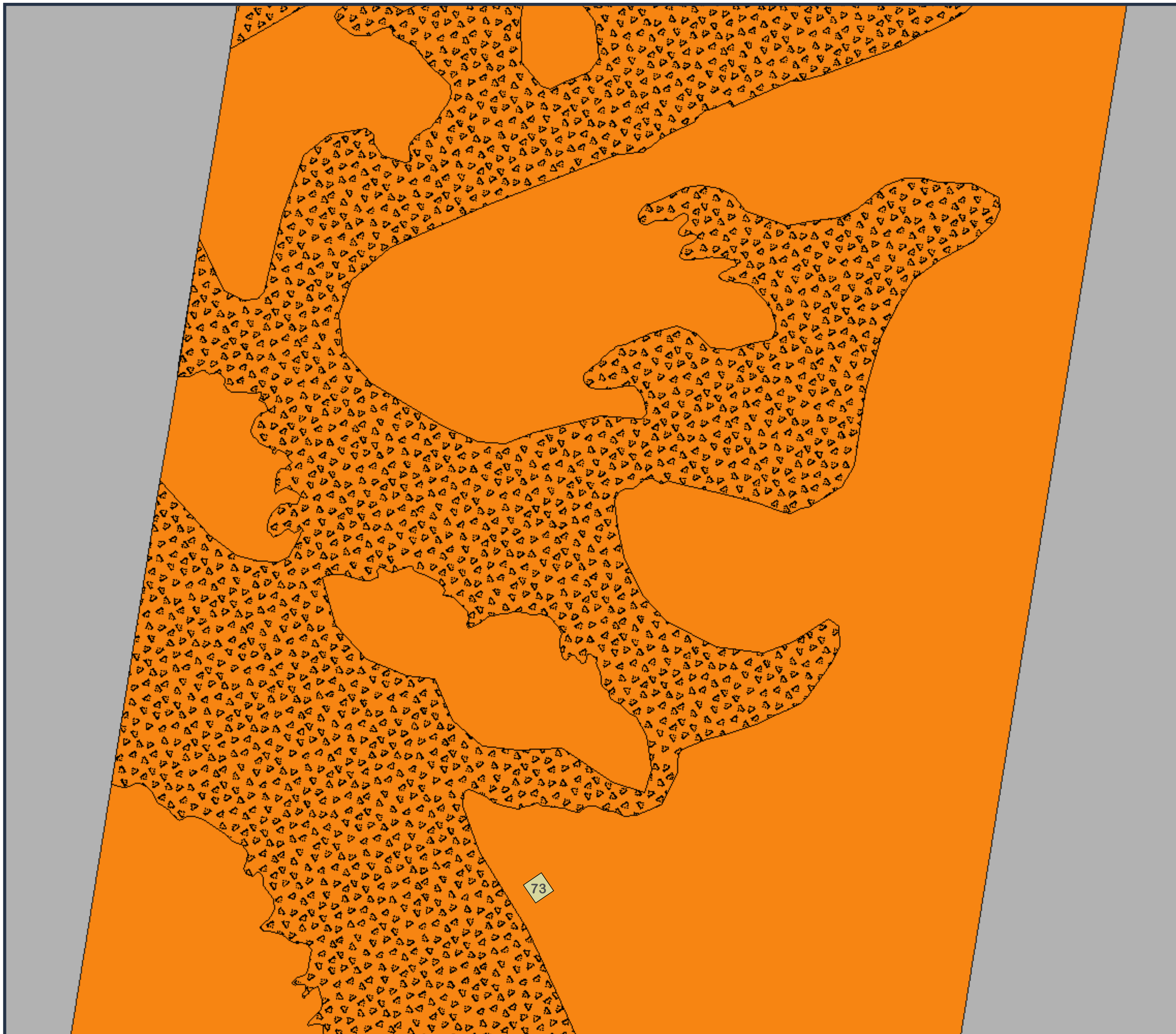
Scale 1:5,000
1 inch = 0 km

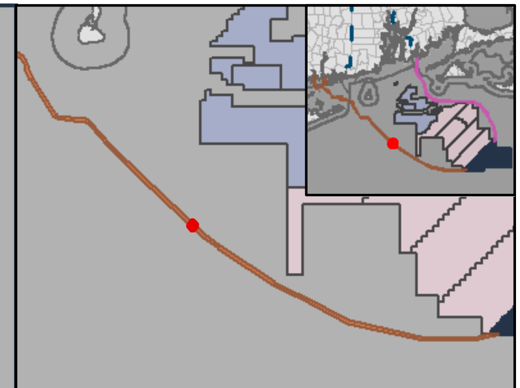
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat

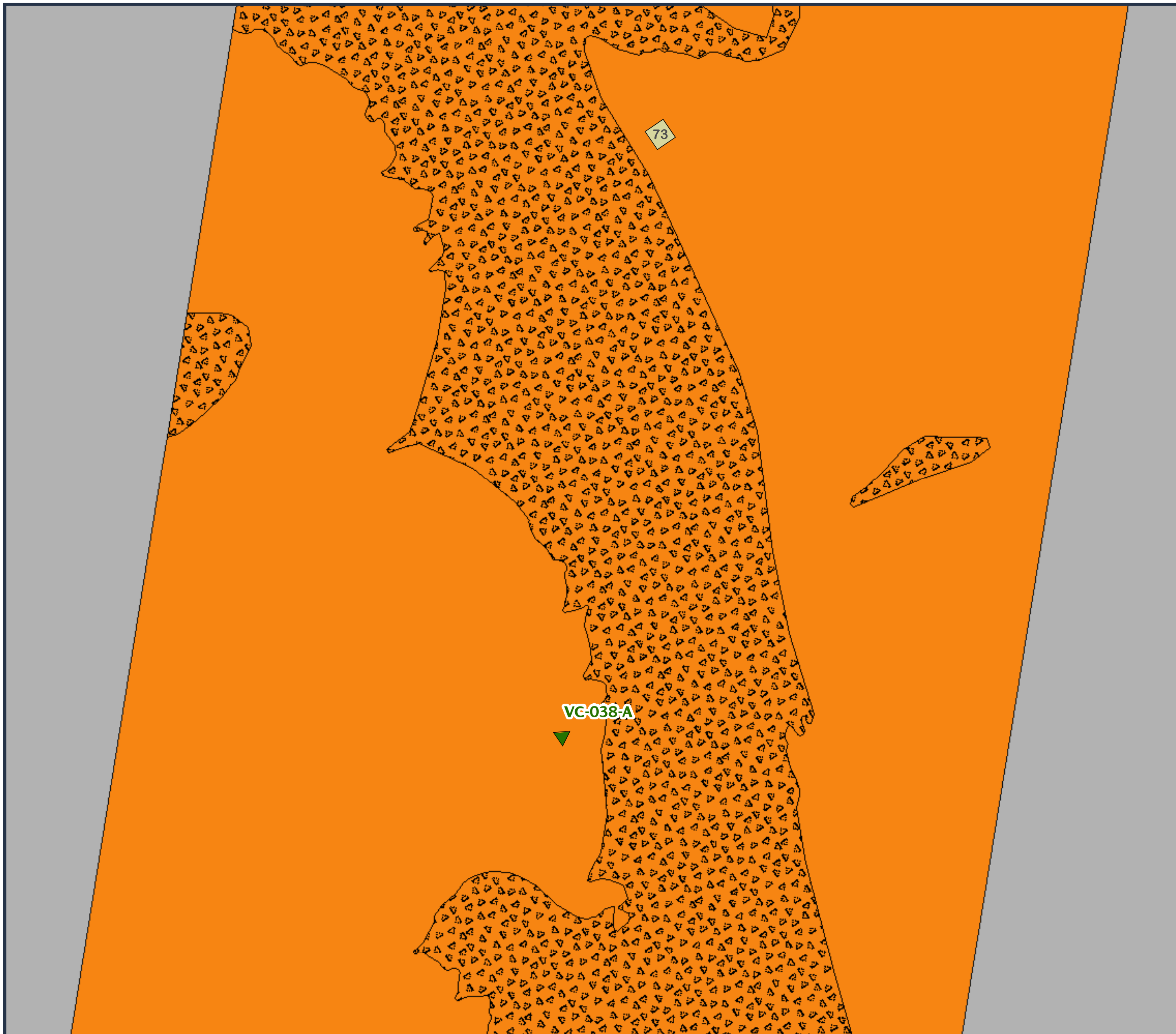
Scale 1:5,000
1 inch = 0 km

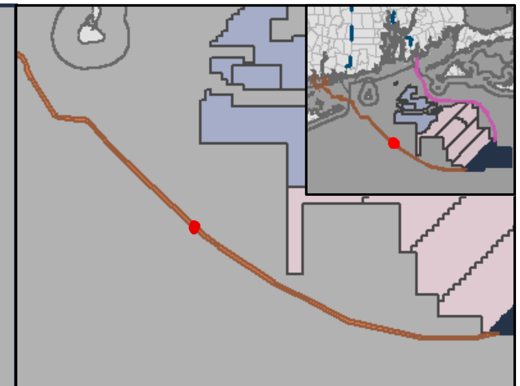
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km

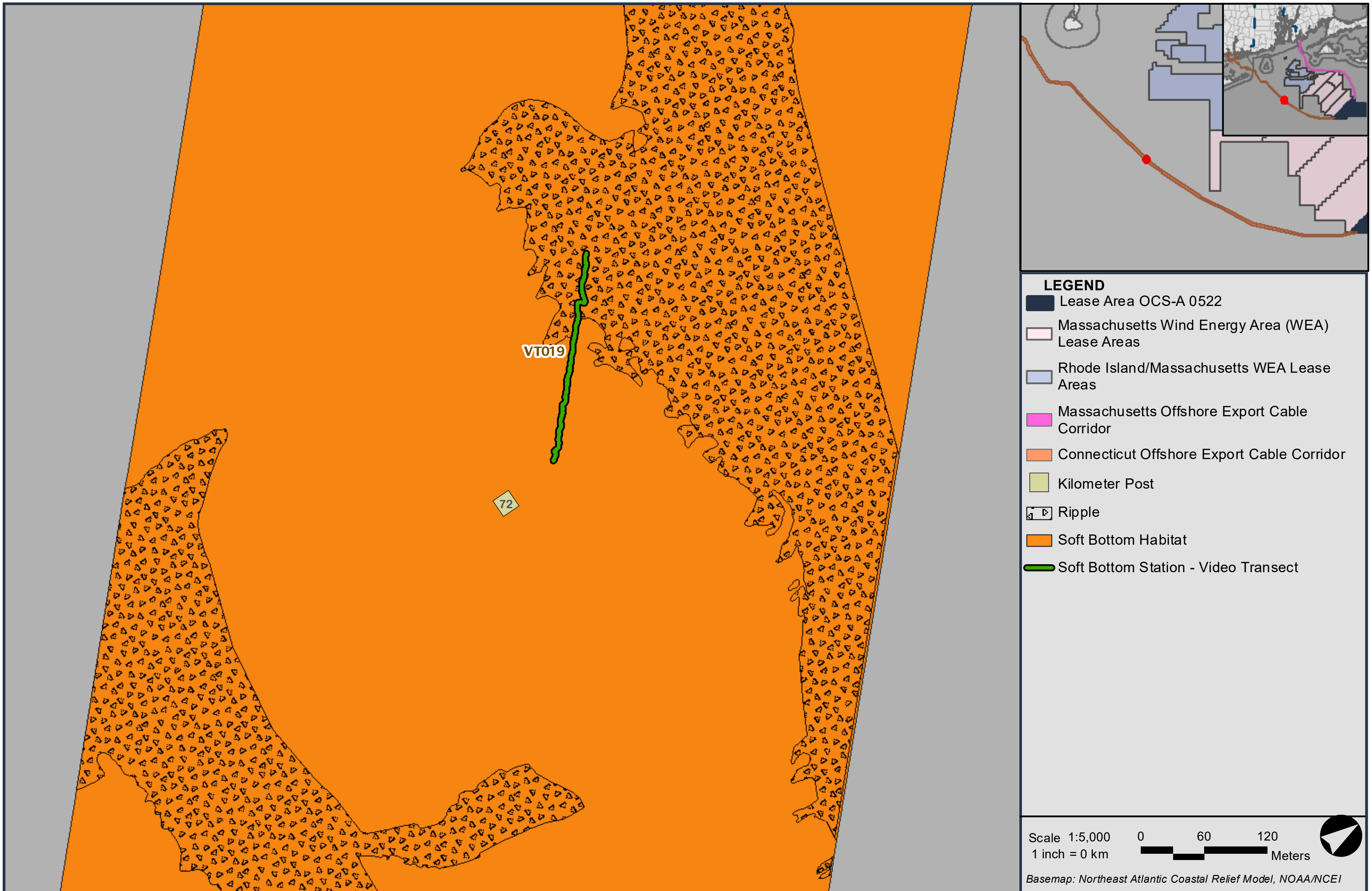
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Bottom Station - Video Transect

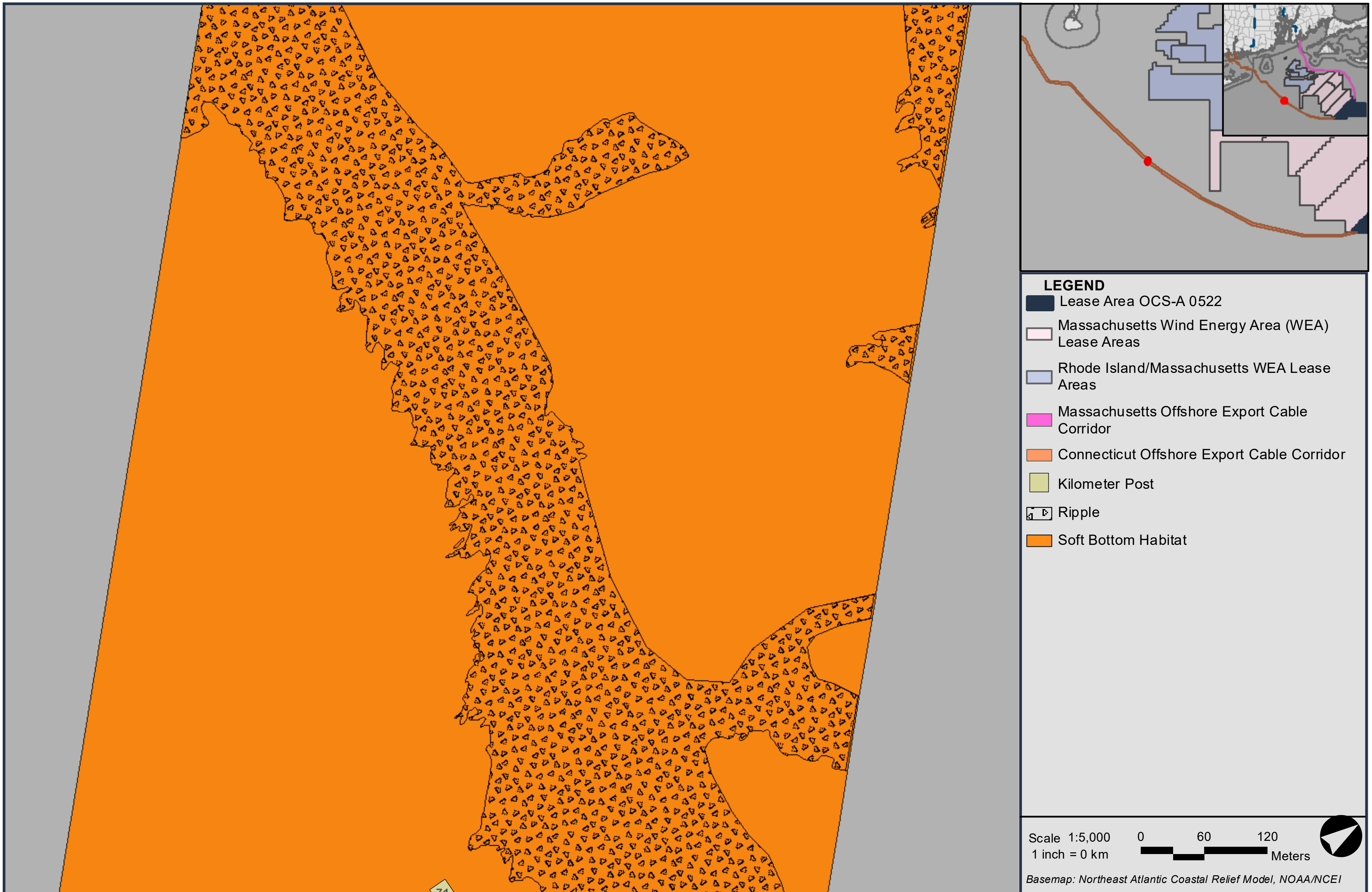
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

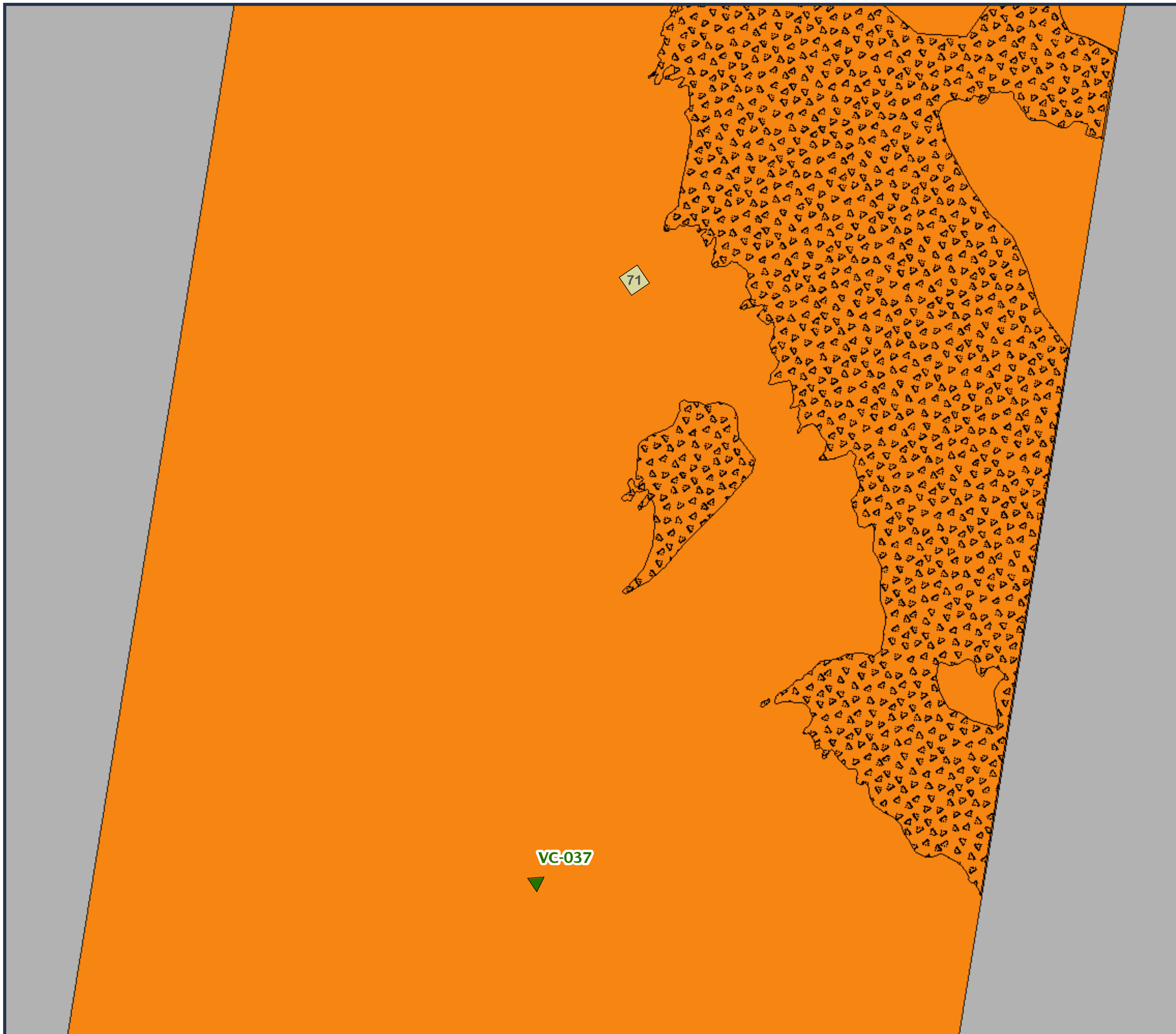
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

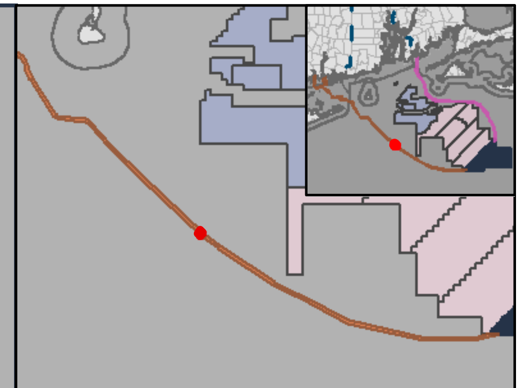
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Vibracore

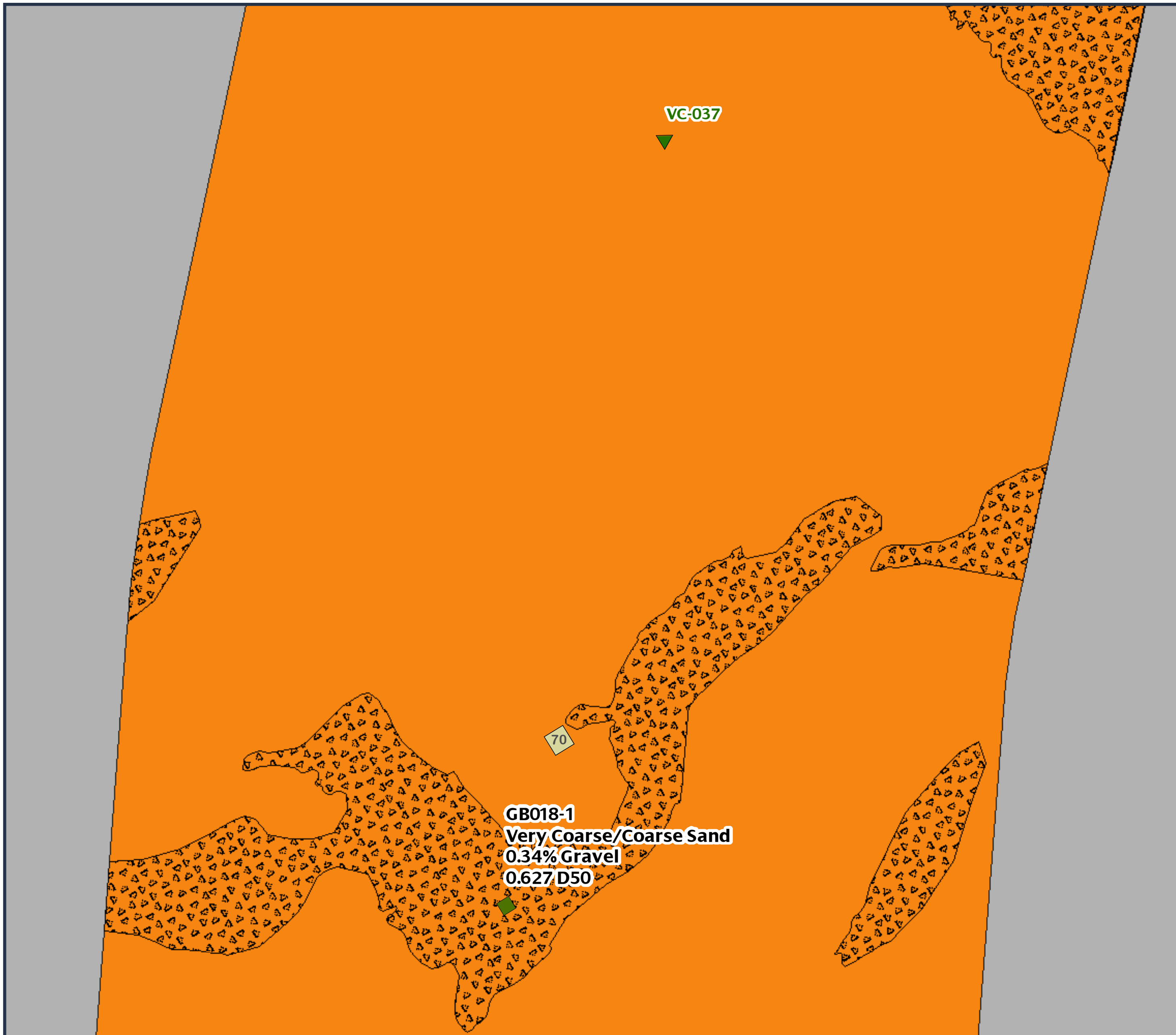
Scale 1:5,000
1 inch = 0 km

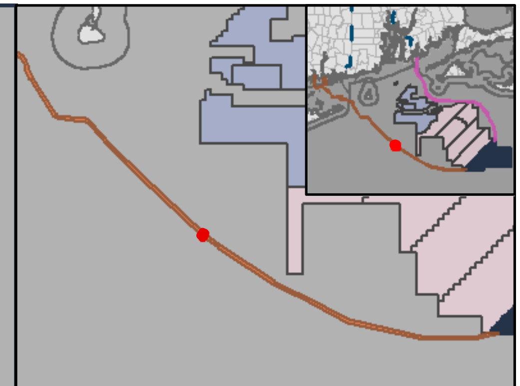
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





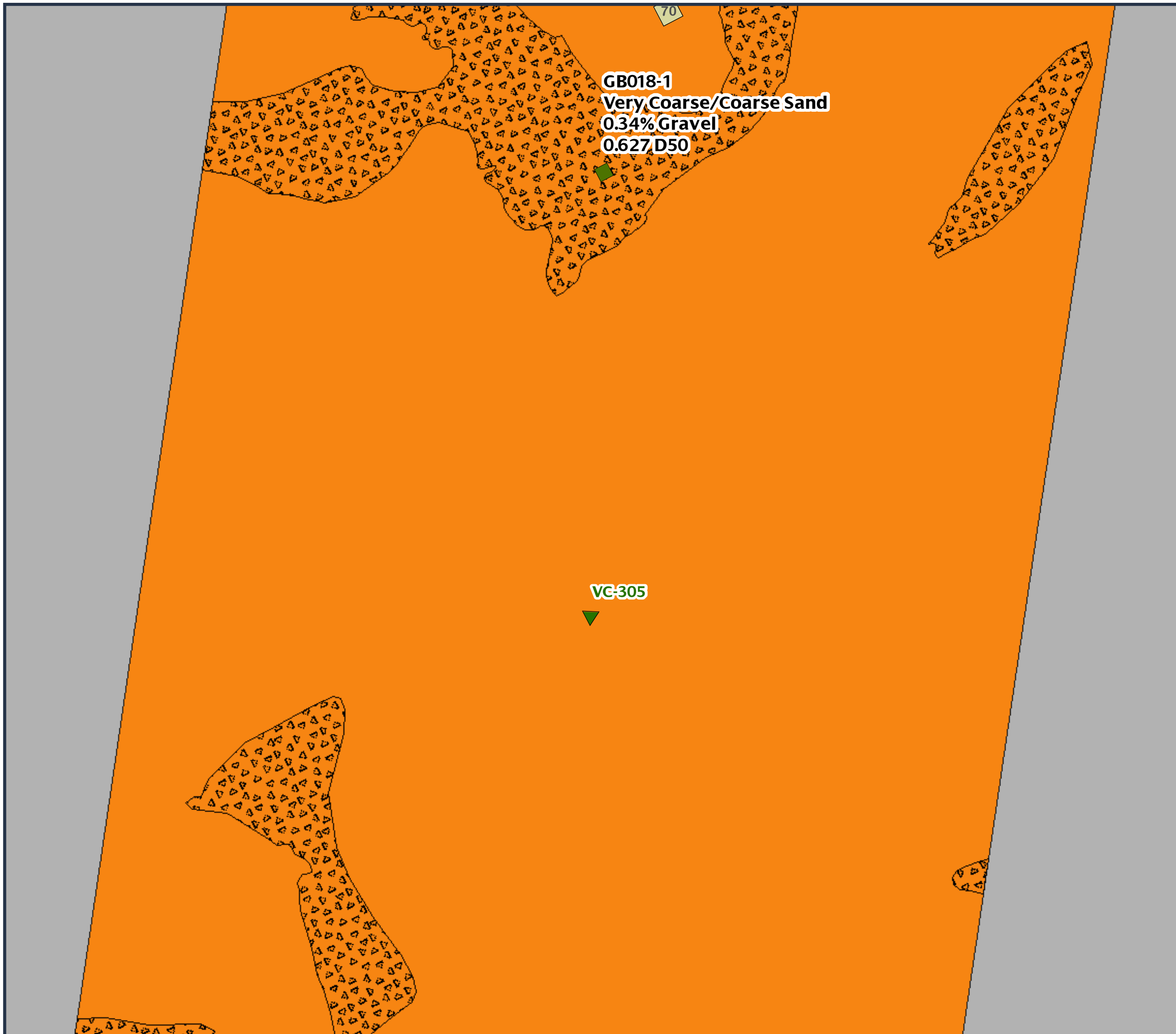
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Ripple
Soft Bottom Habitat
Soft Station - Grab Sample
Soft Station - Vibracore

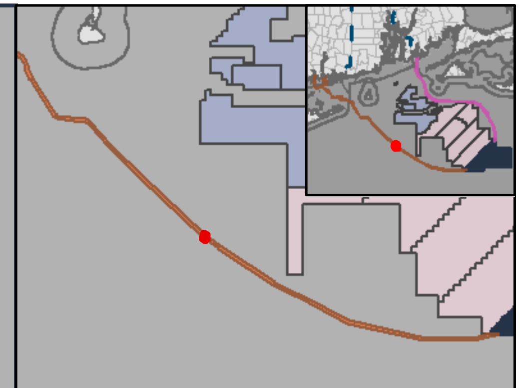
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore

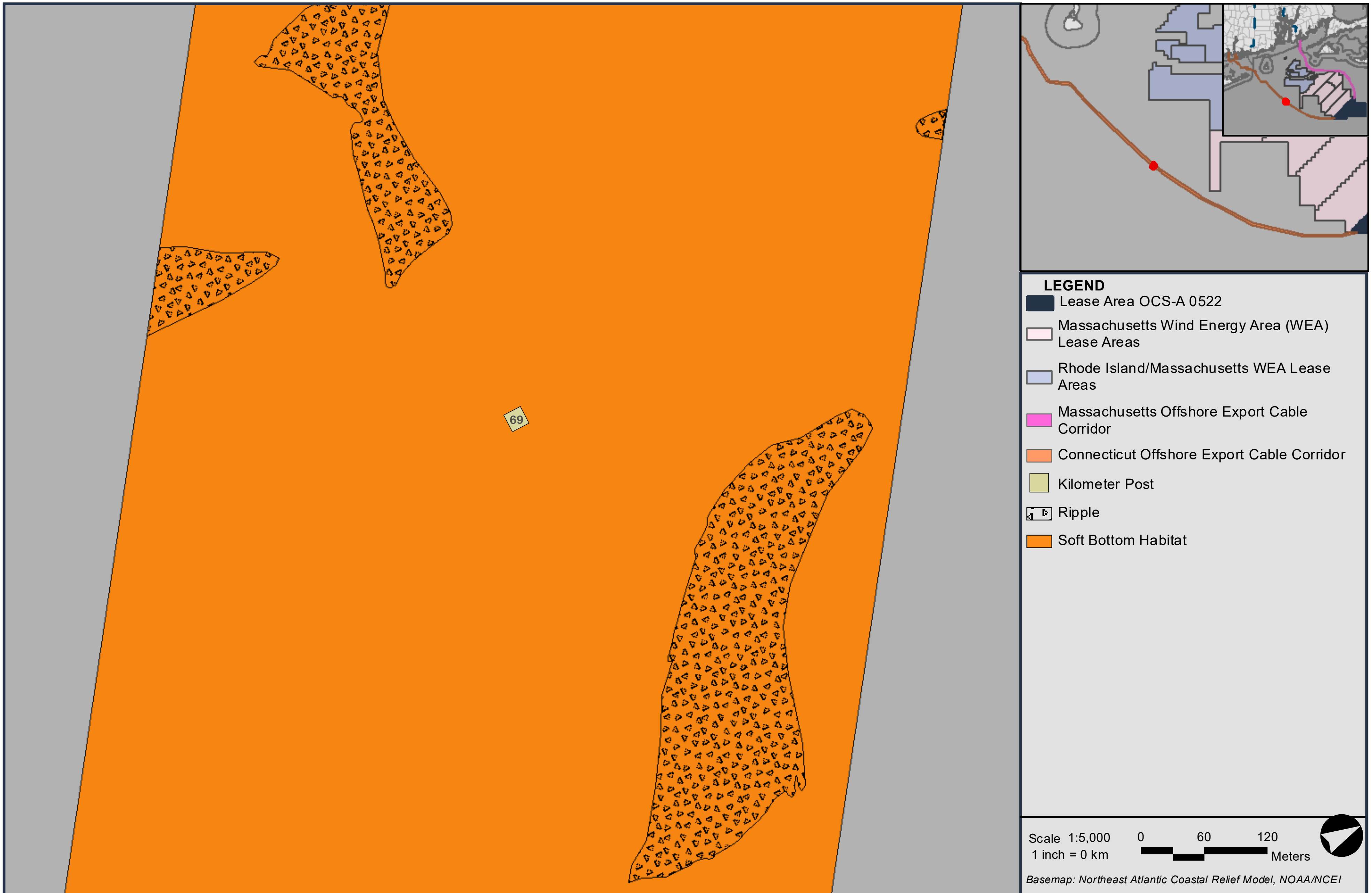
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

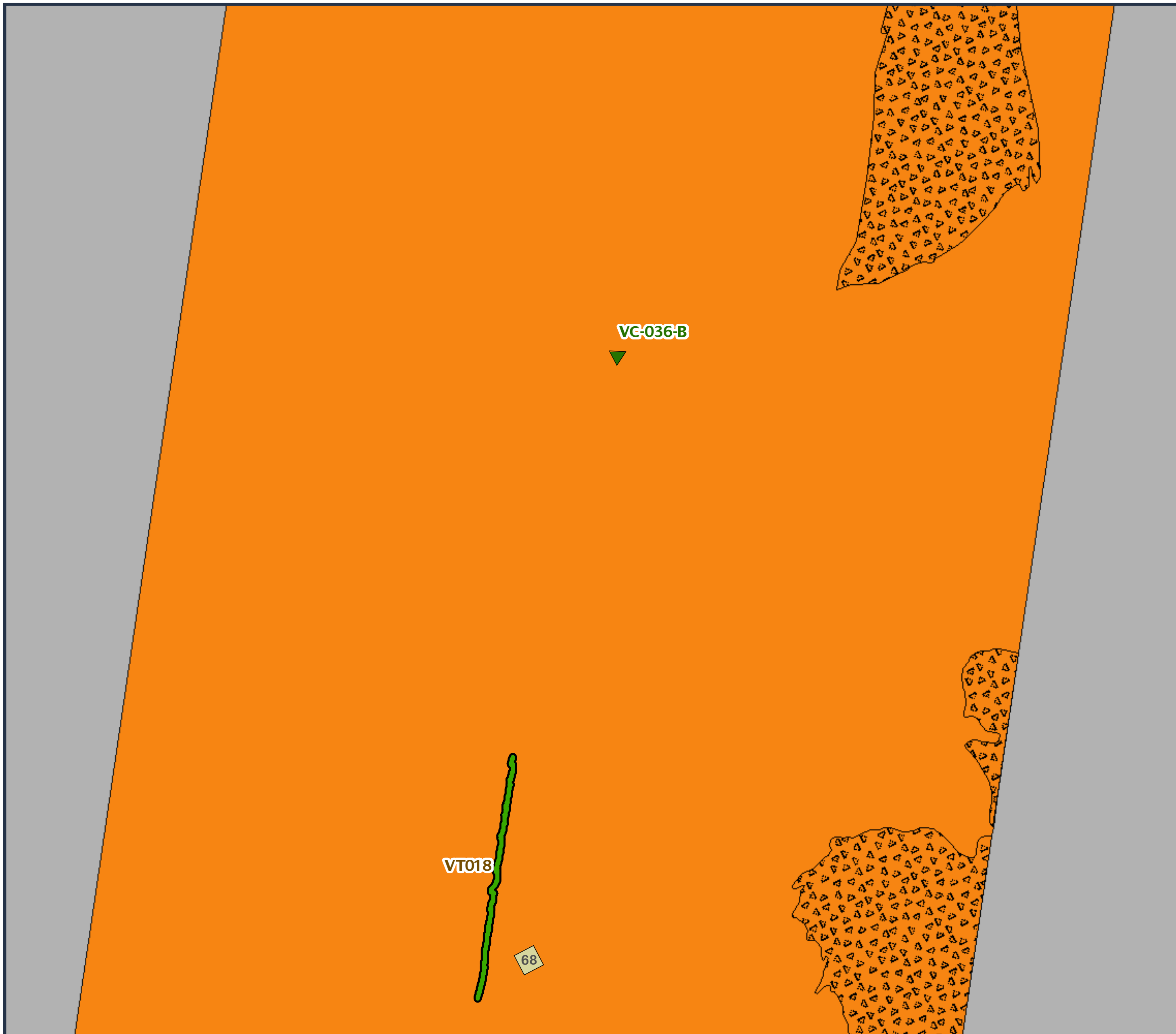
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

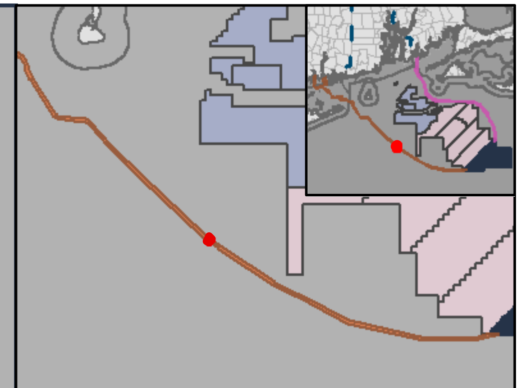
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

Scale 1:5,000
1 inch = 0 km

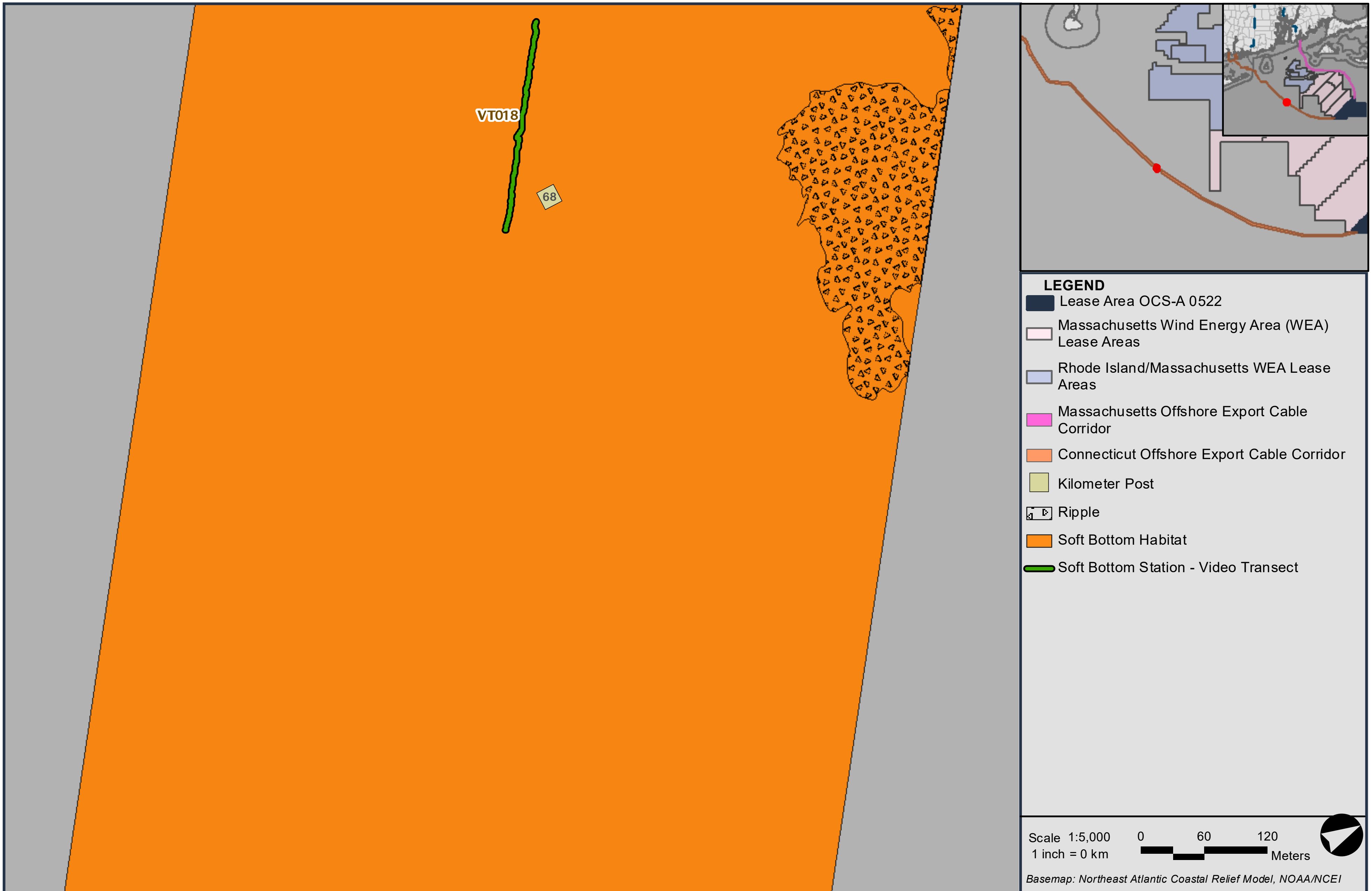
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE



LEGEND

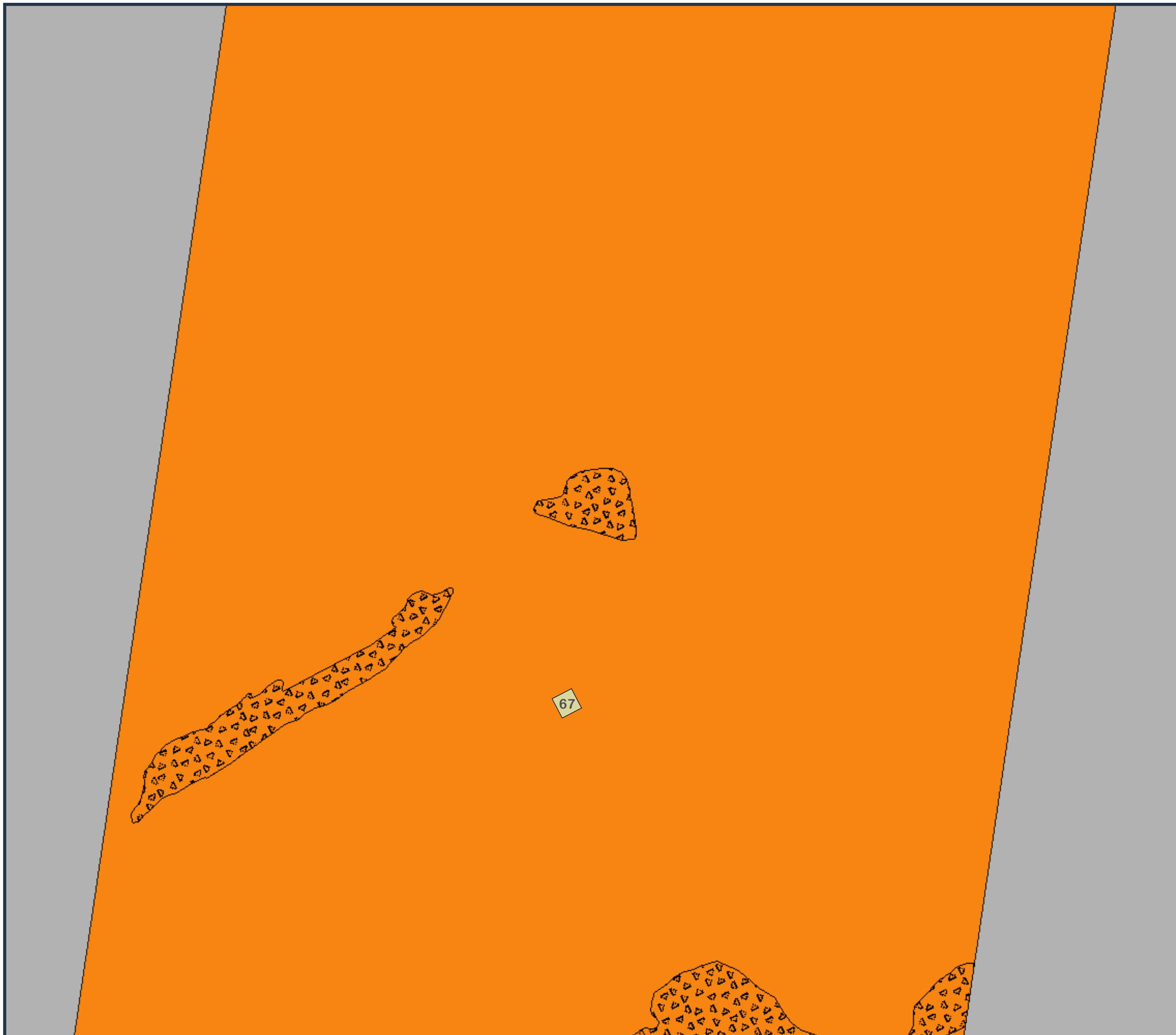
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Bottom Station - Video Transect

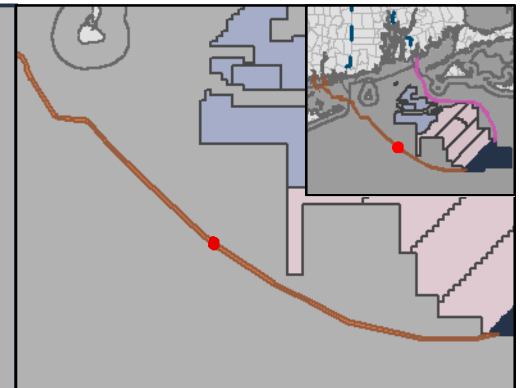
Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat

Scale 1:5,000
1 inch = 0 km

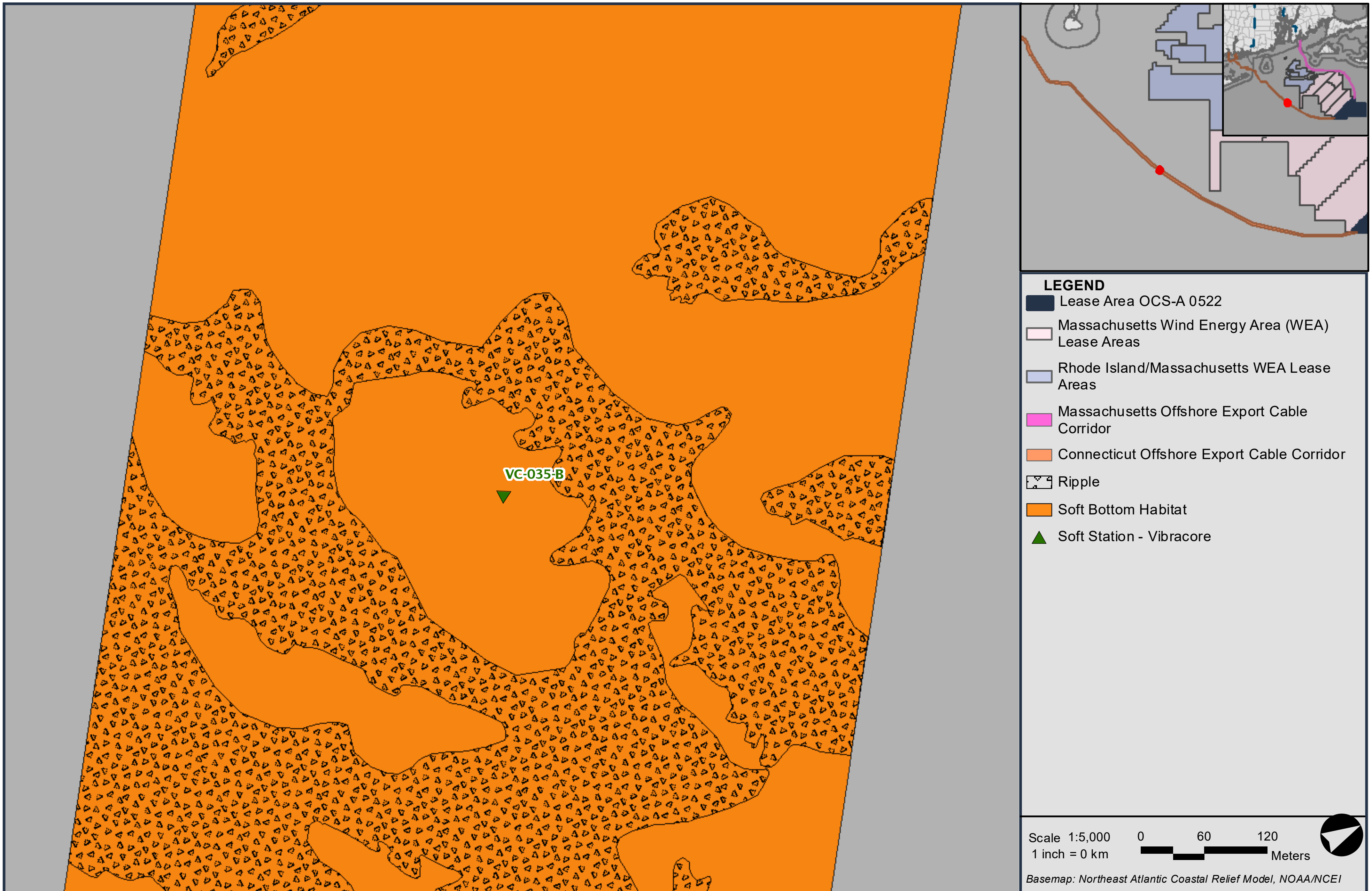
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

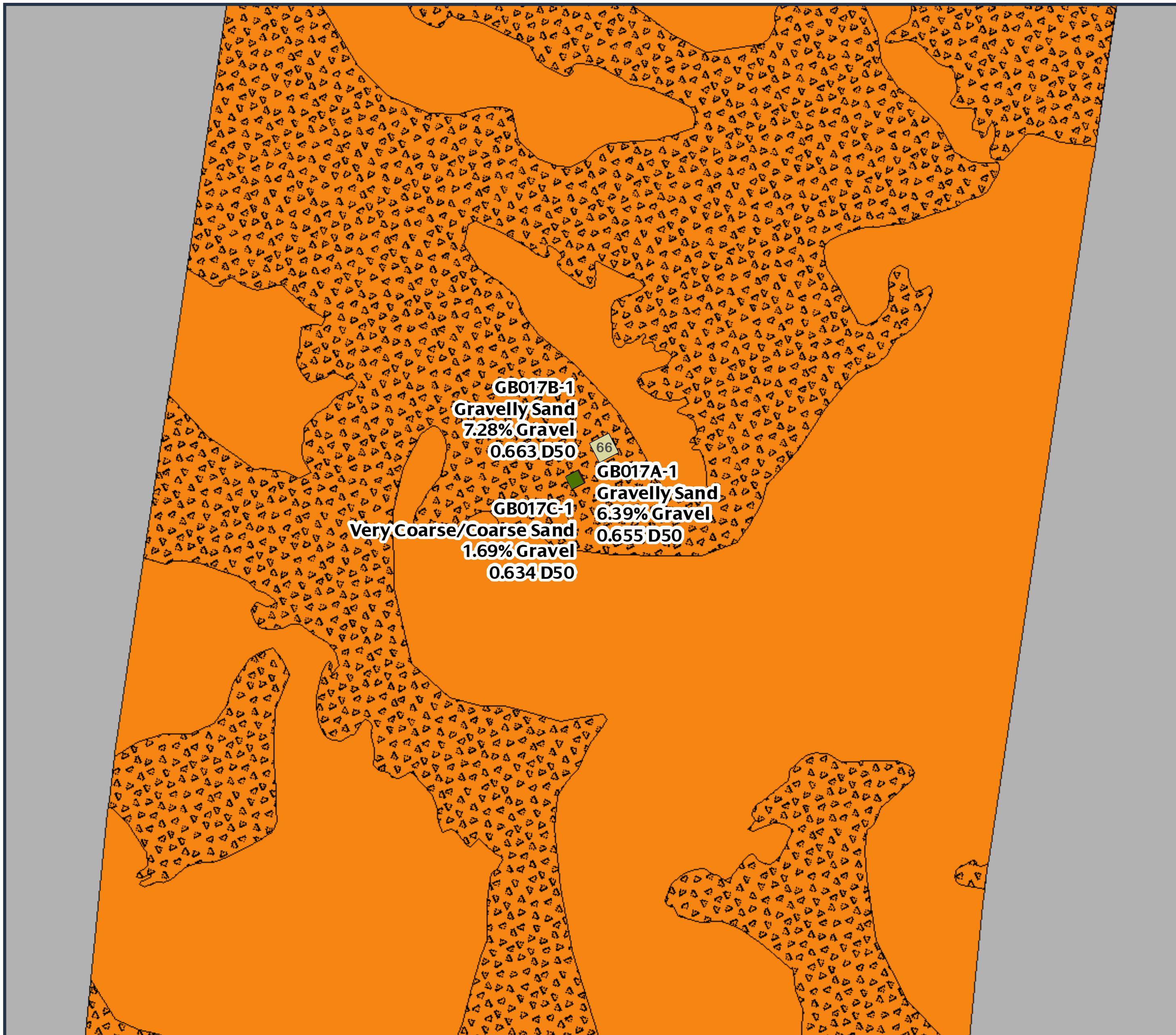
VINEYARD OFFSHORE

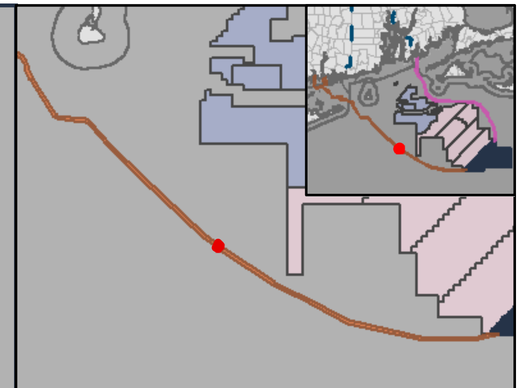


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Complex Station - Grab Sample
- Soft Station - Grab Sample

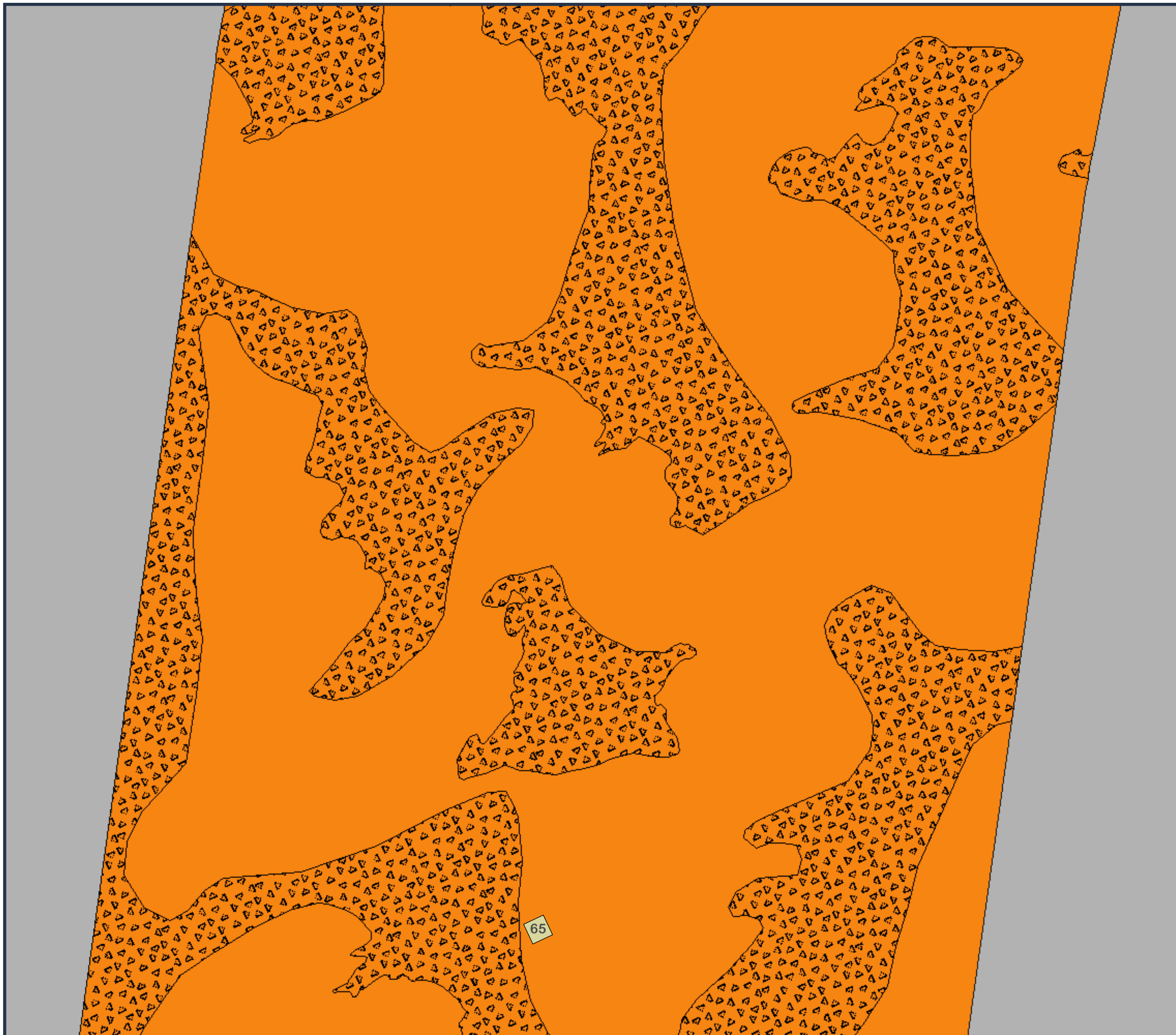
Scale 1:5,000
1 inch = 0 km

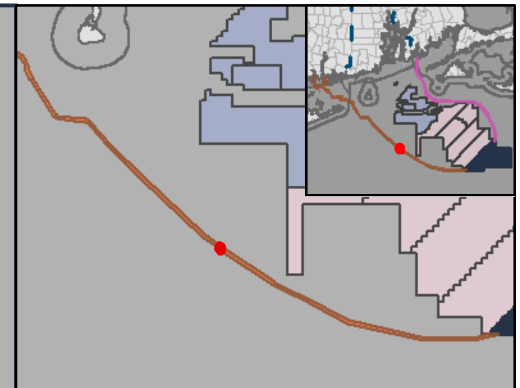
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat

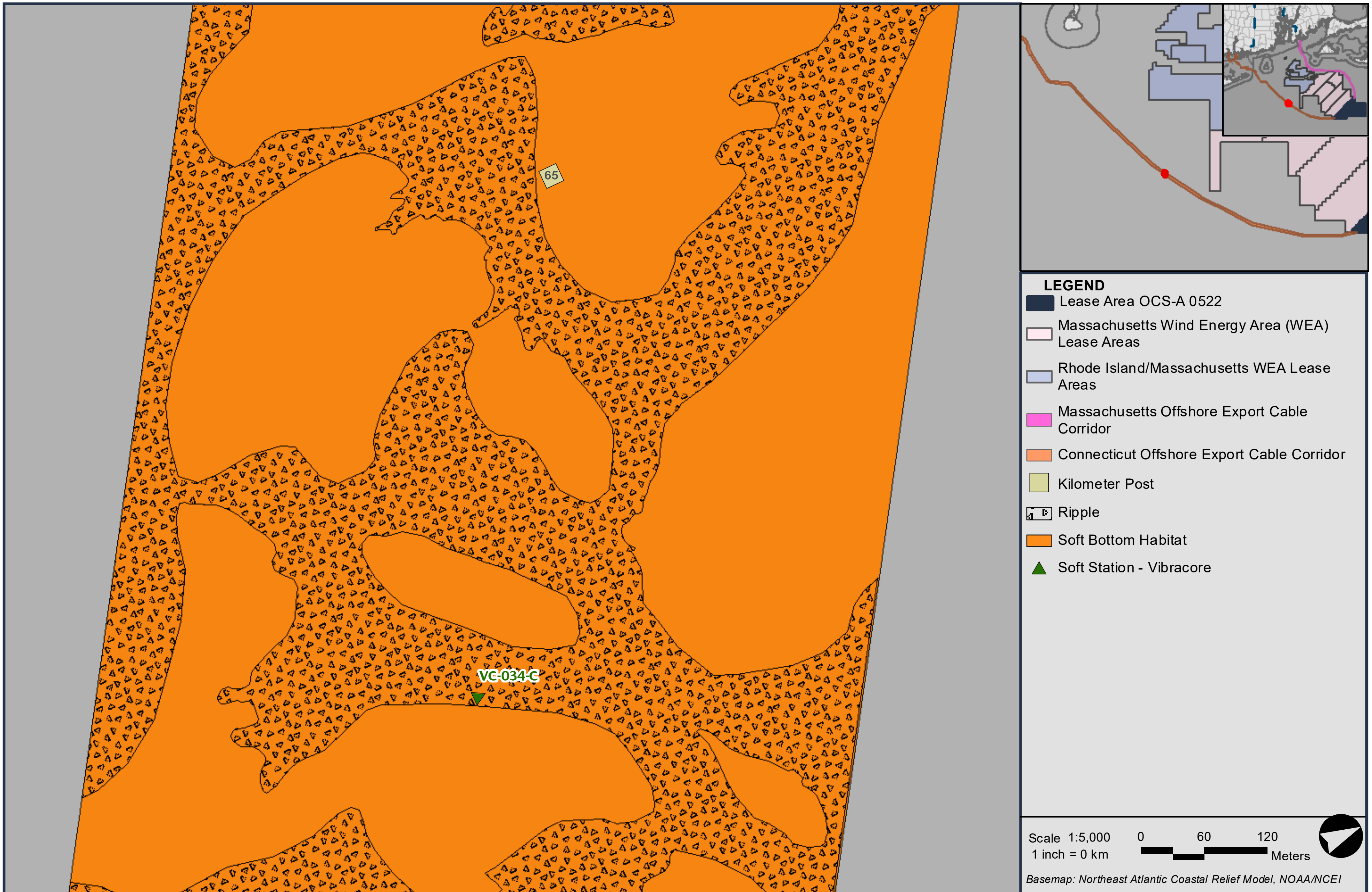
Scale 1:5,000
1 inch = 0 km

0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

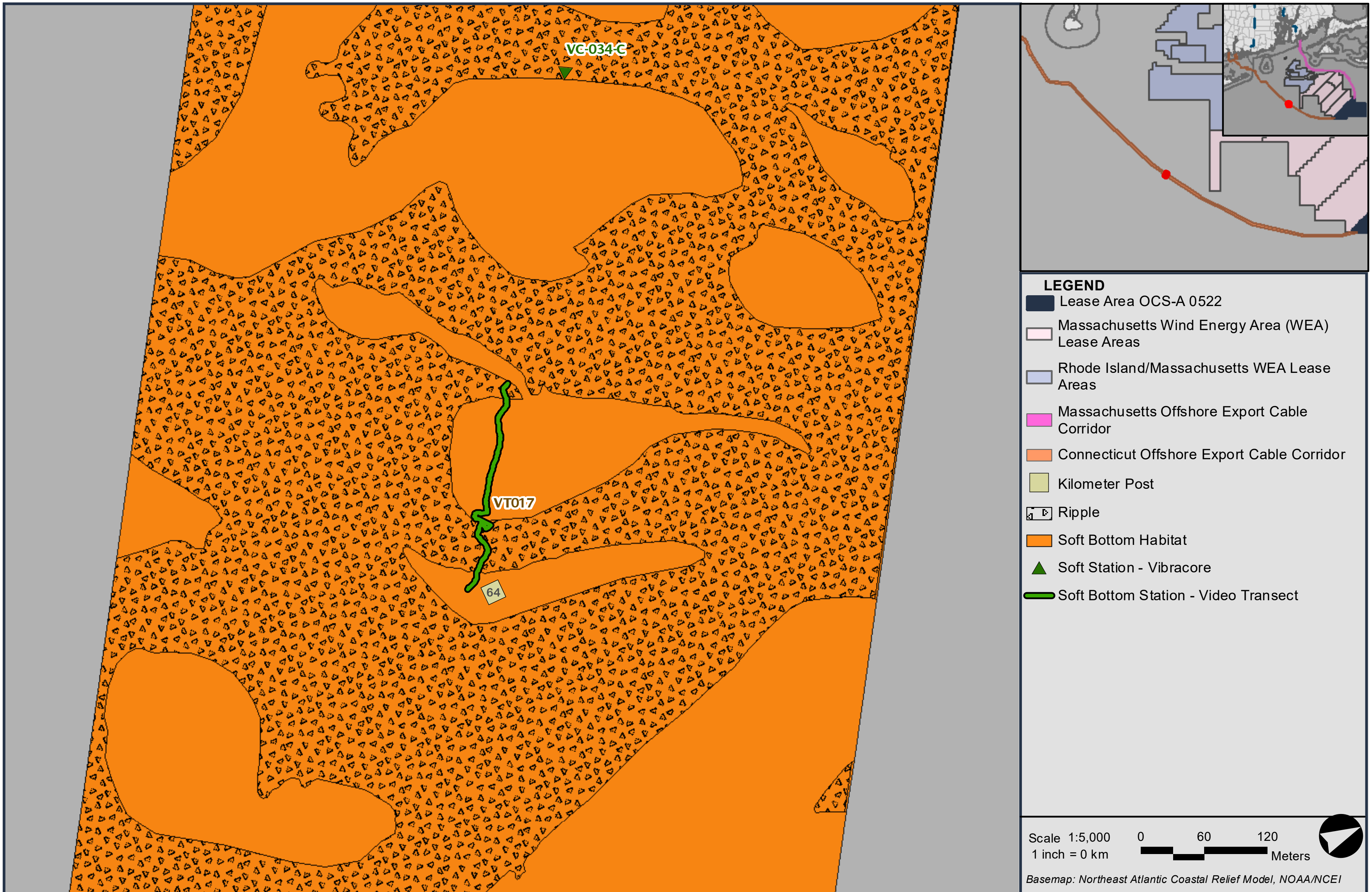
VINEYARD NORTHEAST
VINEYARD OFFSHORE

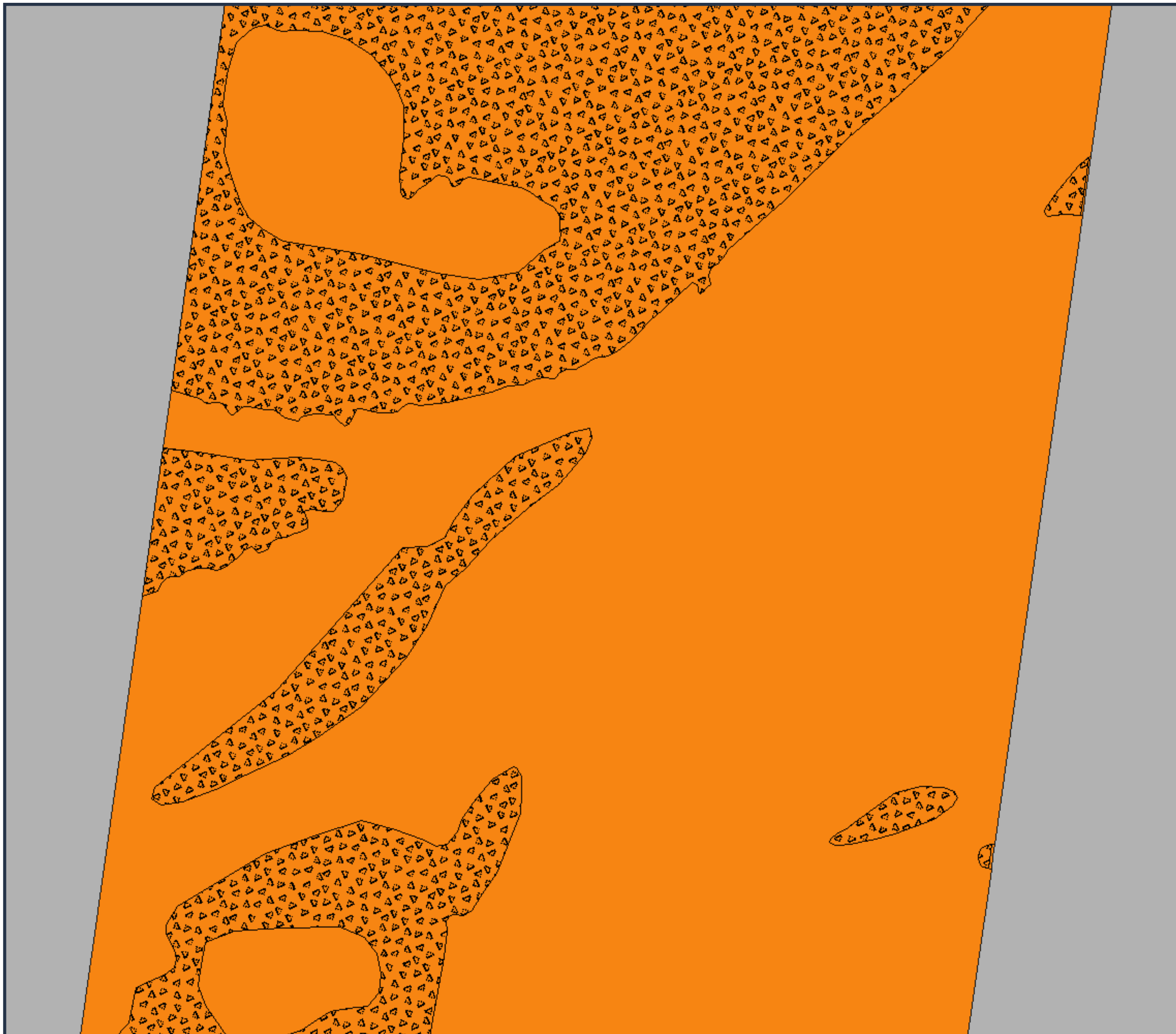


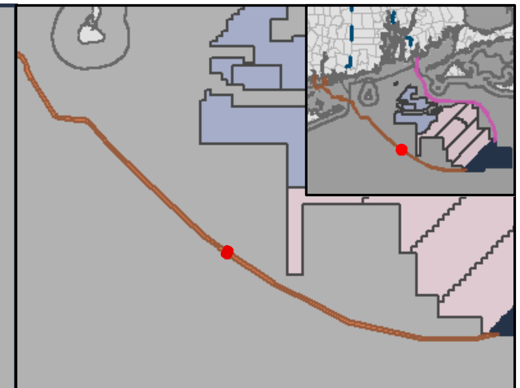
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE


VC-034-C
VT017
64
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Ripple
Soft Bottom Habitat
Soft Station - Vibracore
Soft Bottom Station - Video Transect
Scale 1:5,000
1 inch = 0 km
0 60 120
Meters
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Ripple
- Soft Bottom Habitat

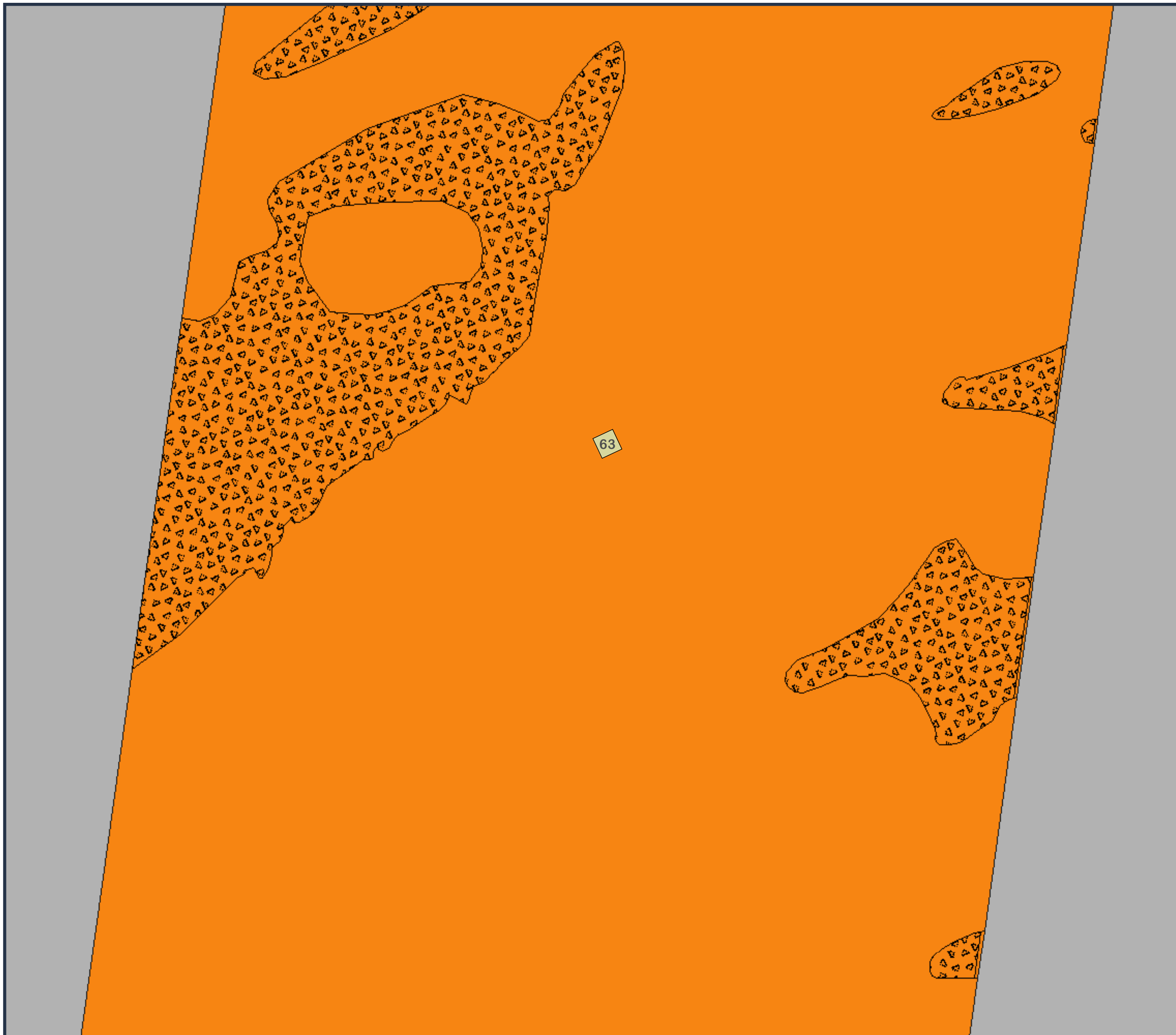
Scale 1:5,000
1 inch = 0 km

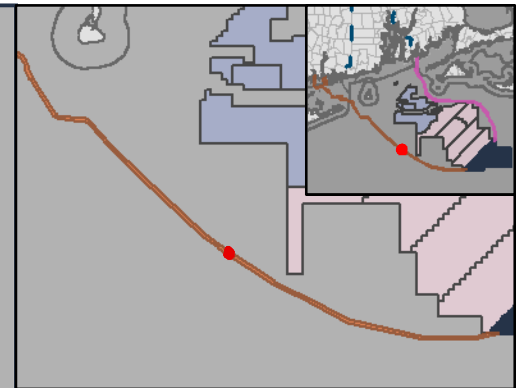
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

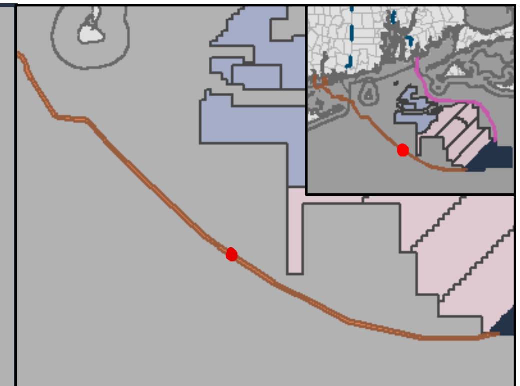
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore

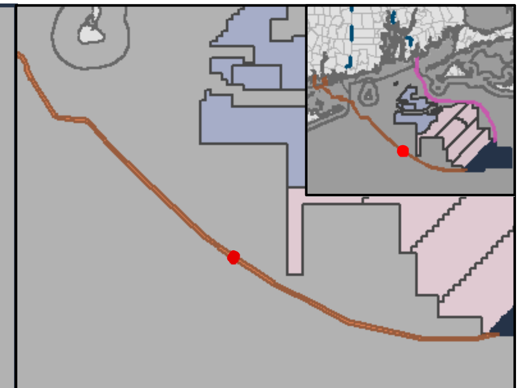
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample

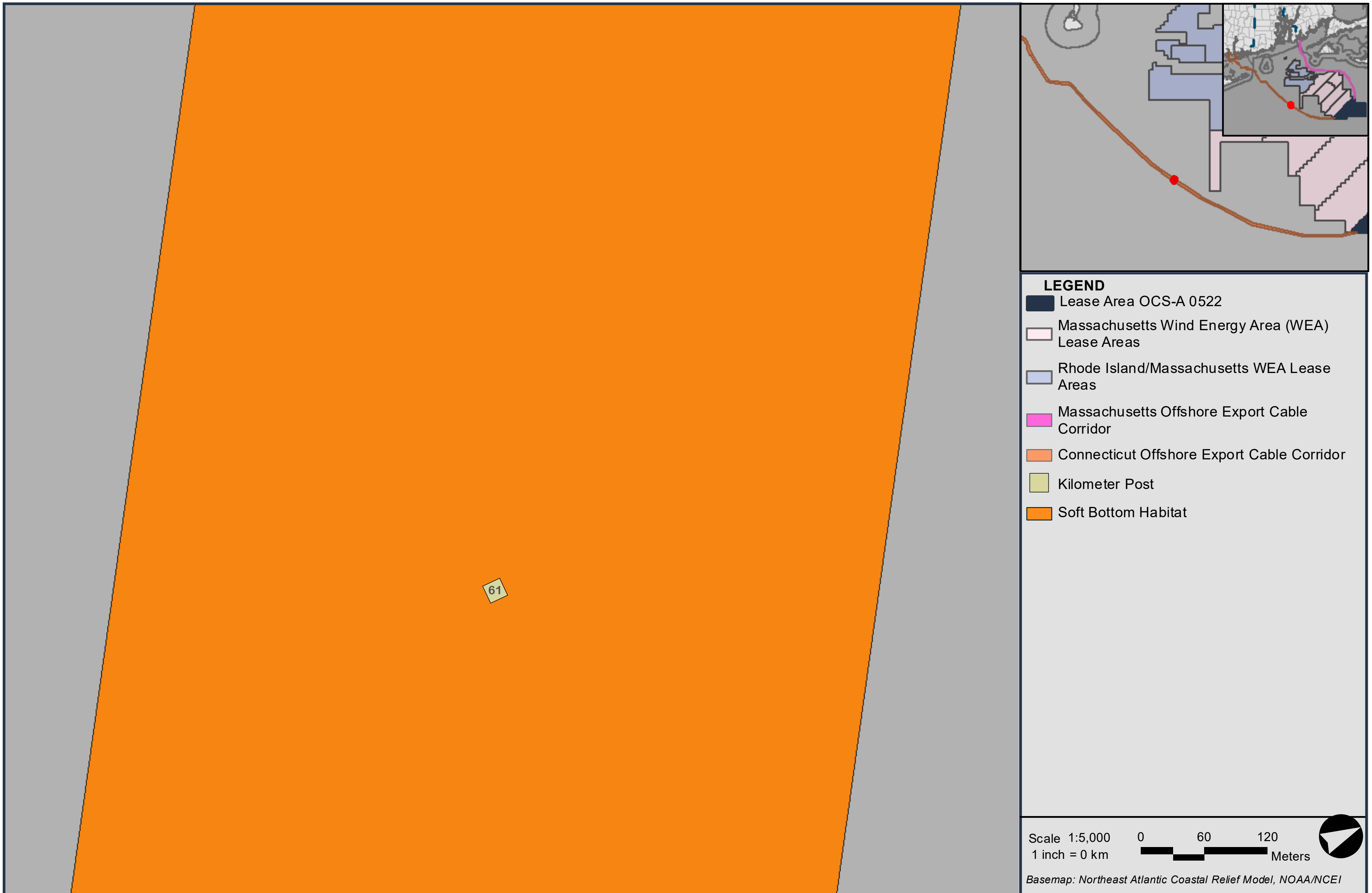
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

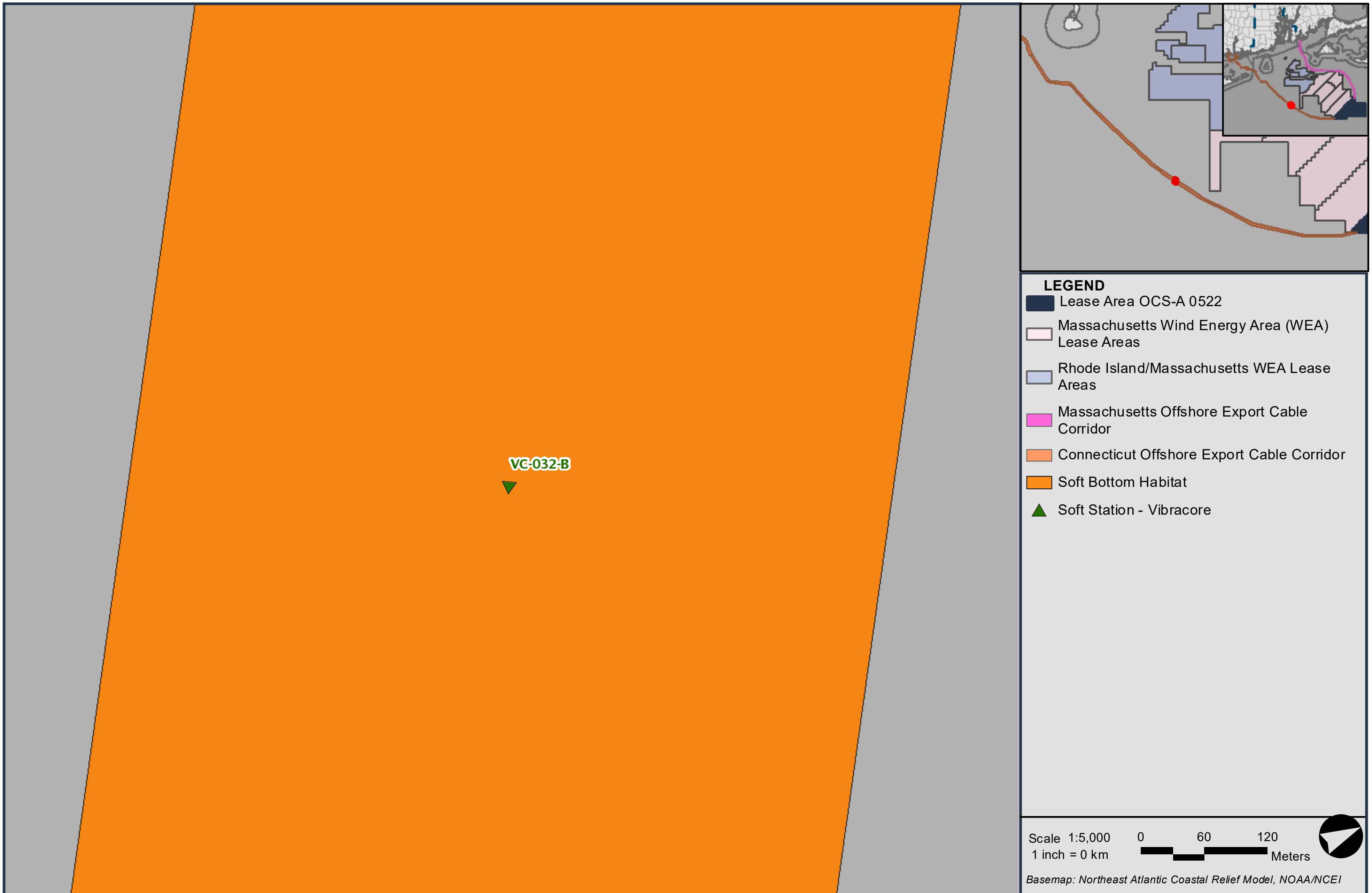
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



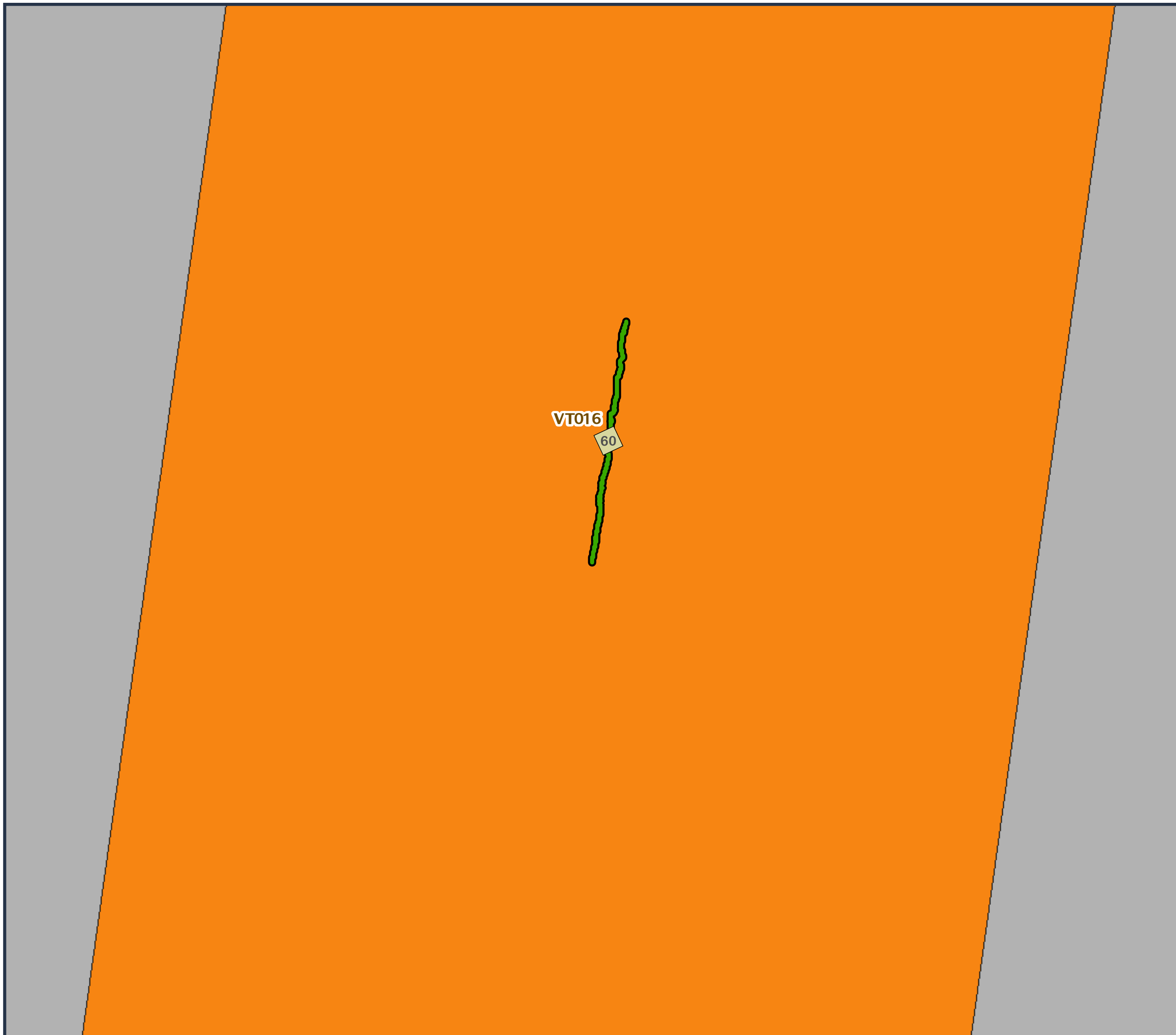
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

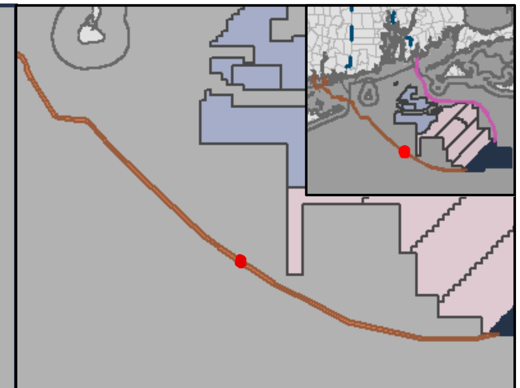


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Bottom Station - Video Transect

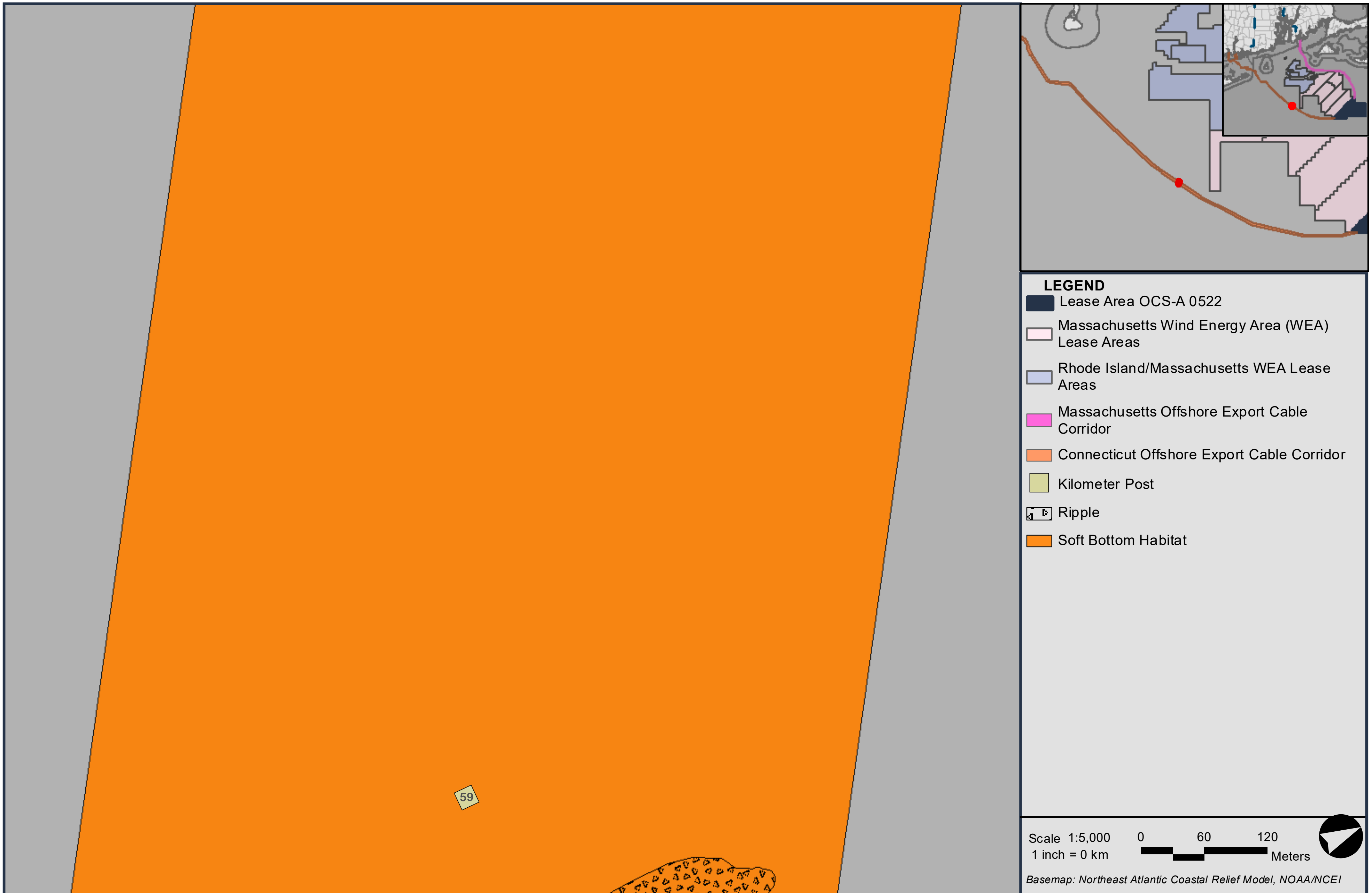
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

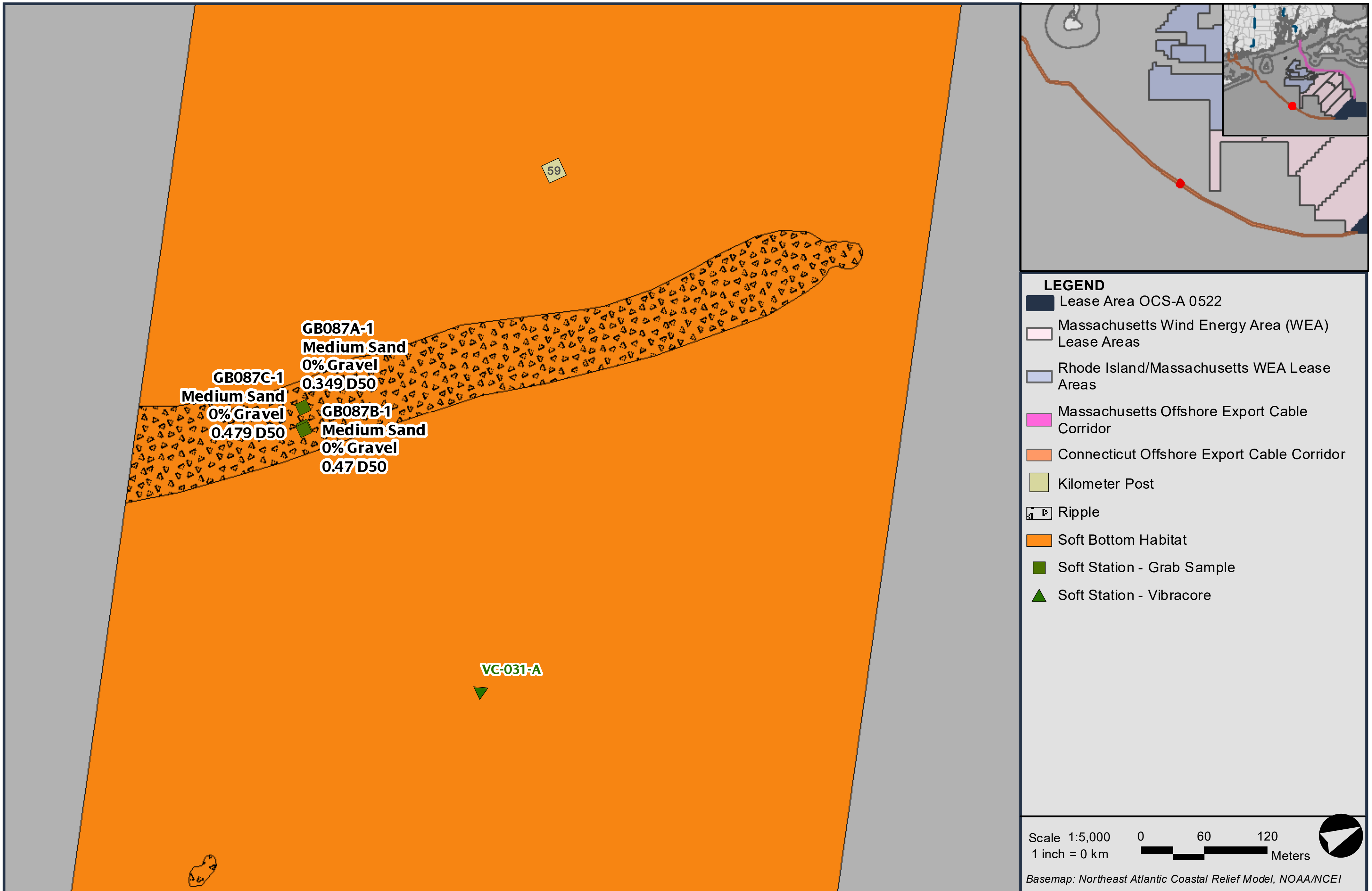
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km

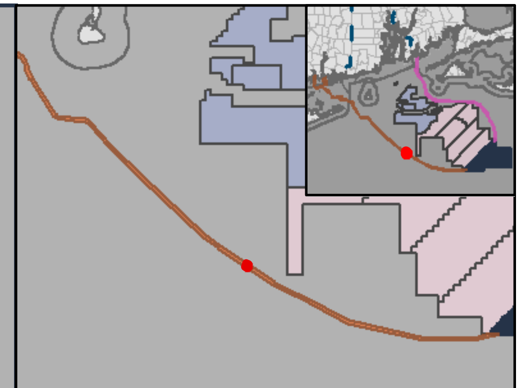
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore

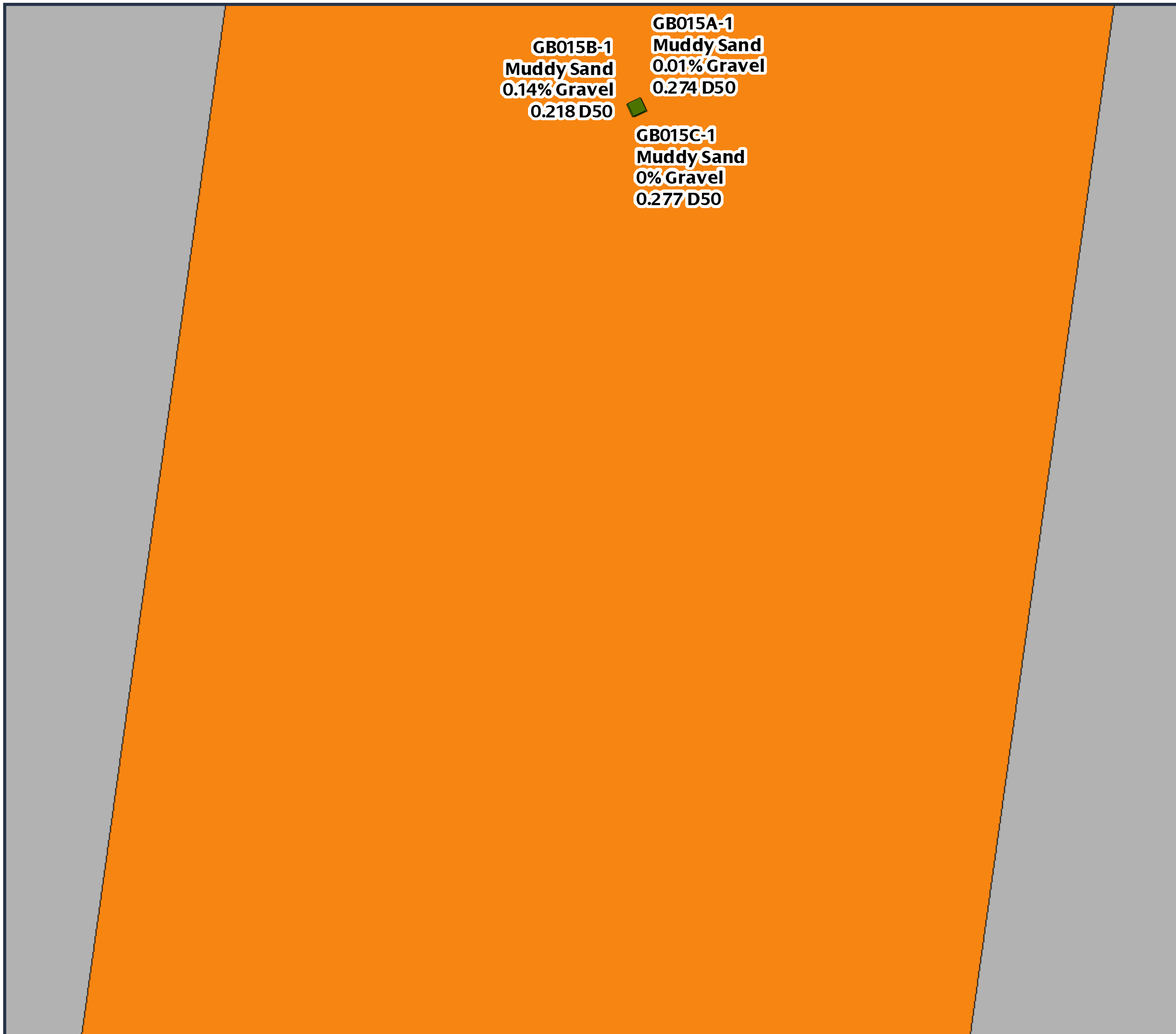
Scale 1:5,000
1 inch = 0 km

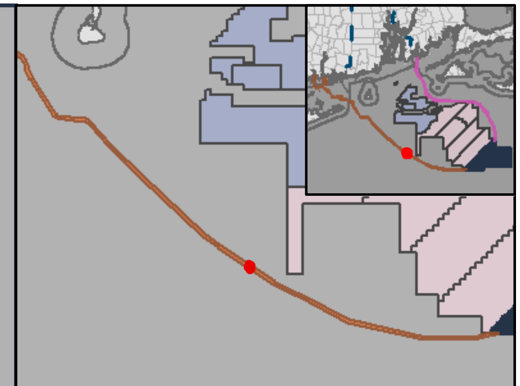
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

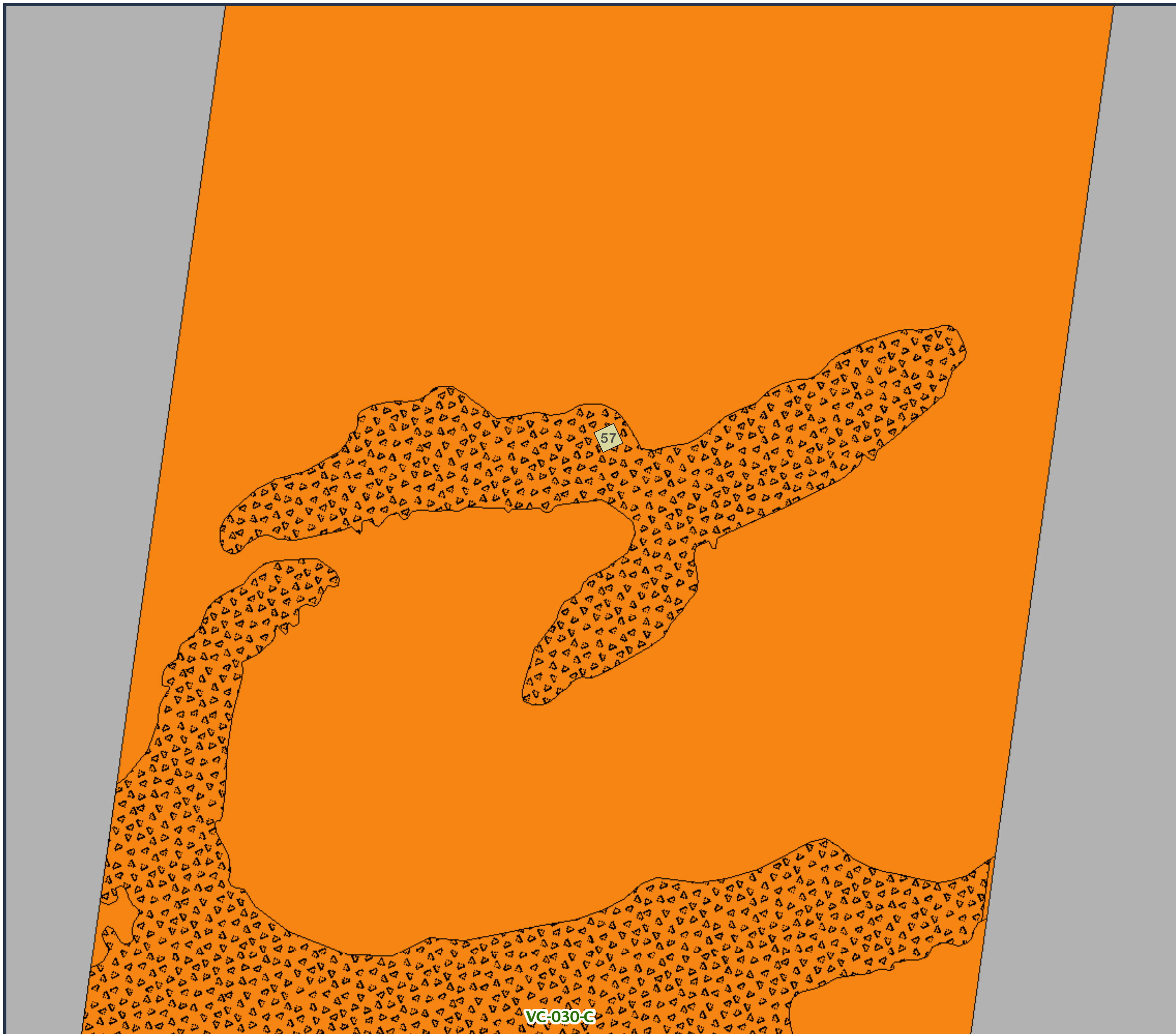
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Soft Bottom Habitat
- Soft Station - Grab Sample

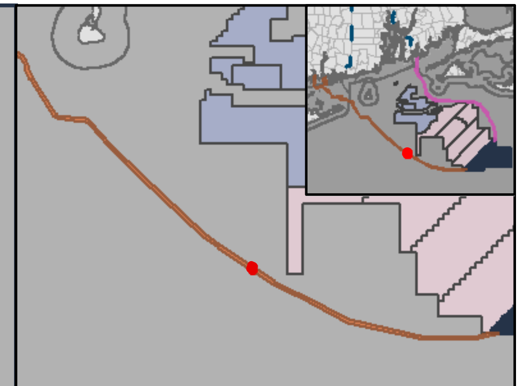
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Vibracore

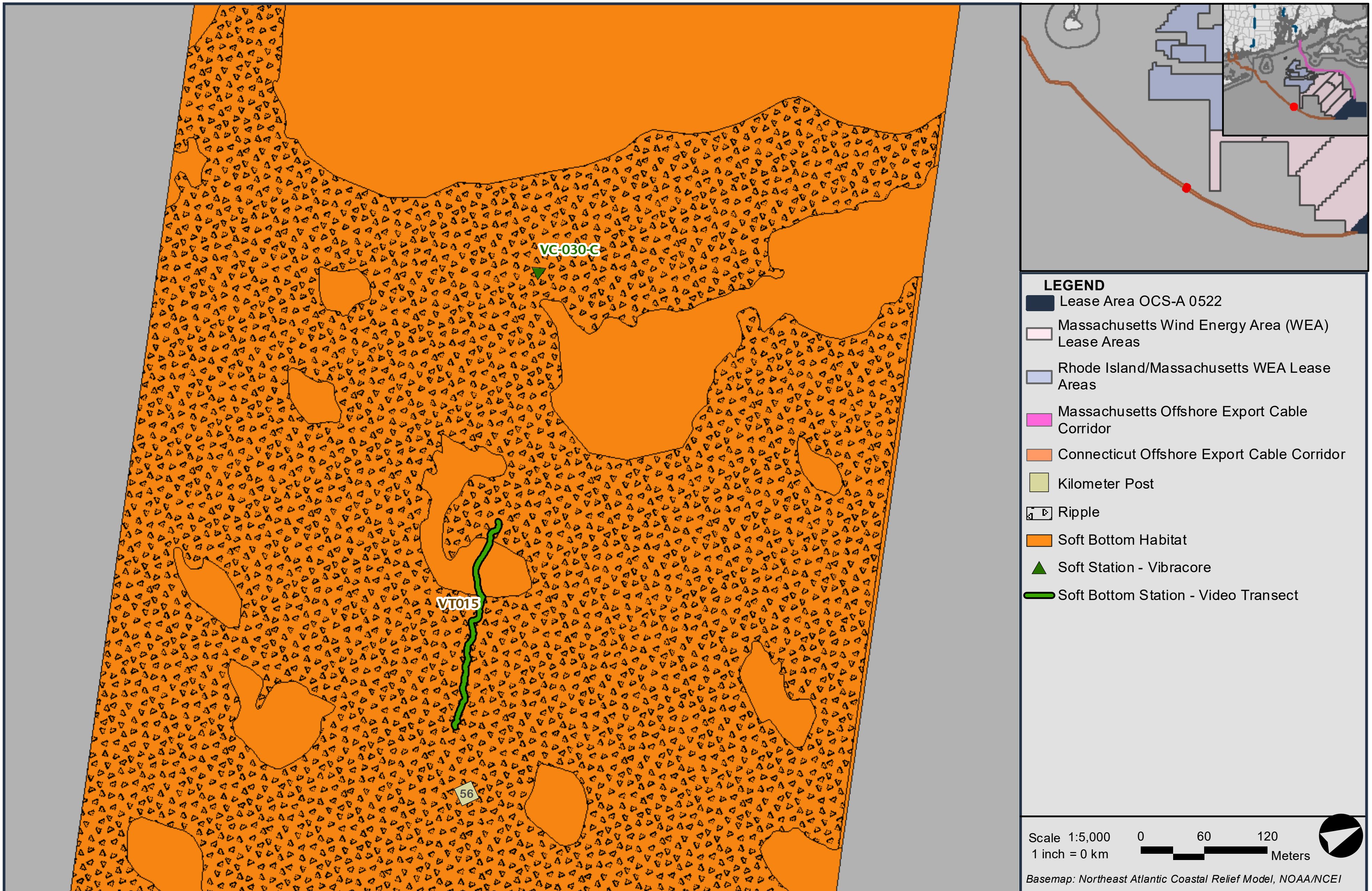
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

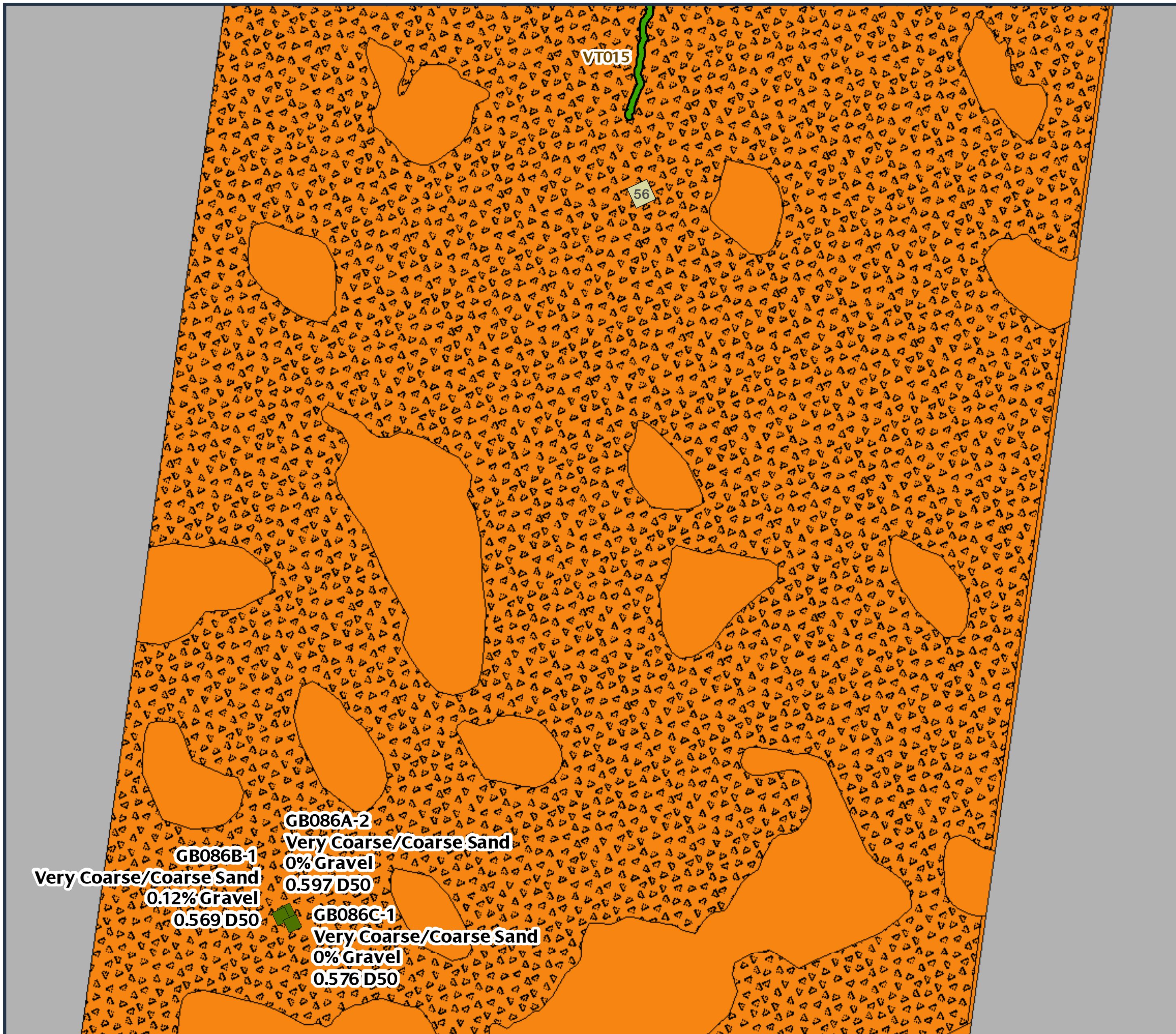
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

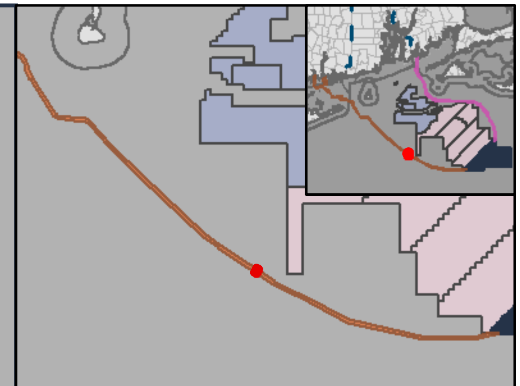
VINEYARD NORTHEAST
VINEYARD OFFSHORE



VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

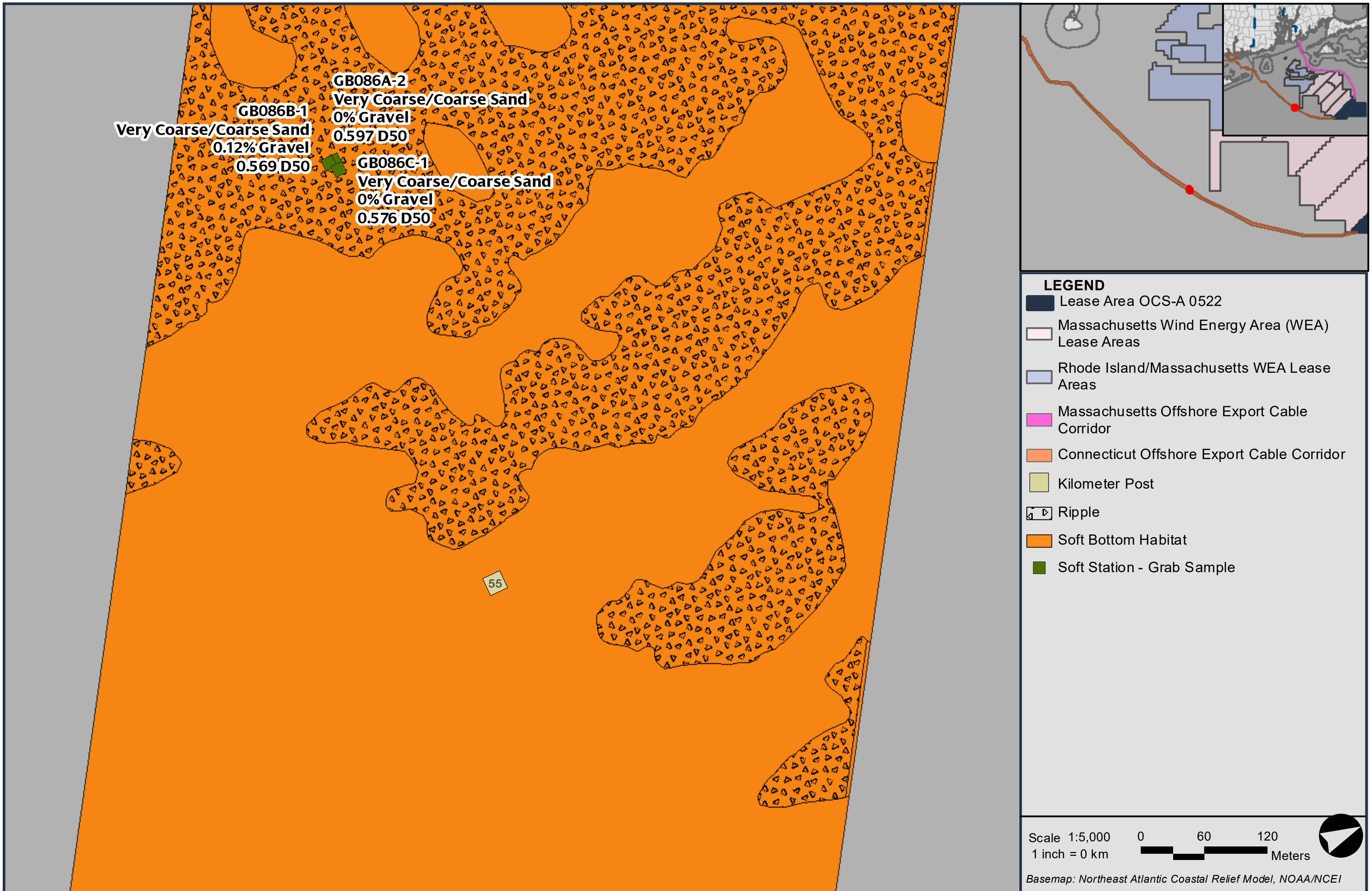
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Bottom Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



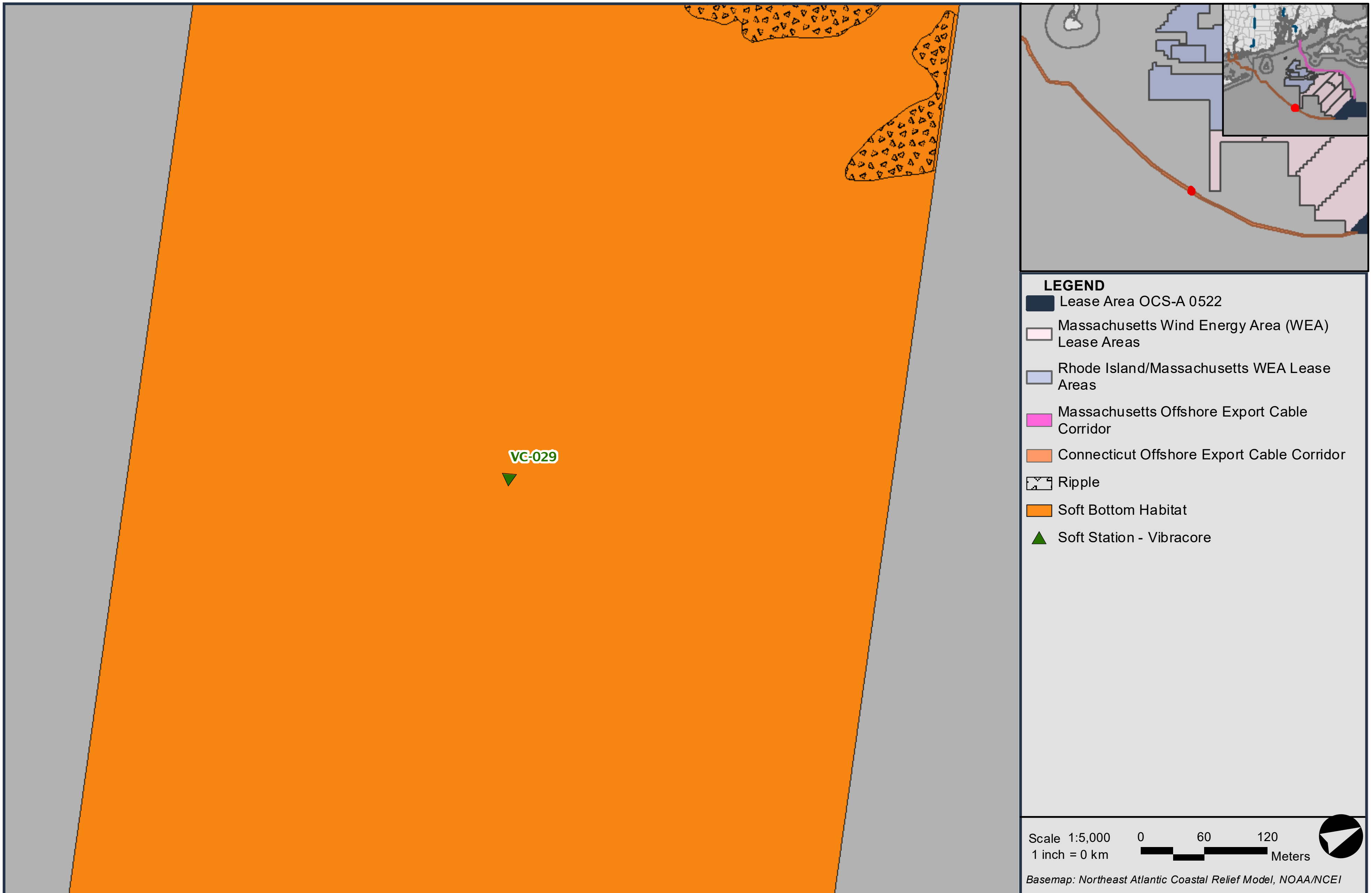
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Ripple
- Soft Bottom Habitat
- Soft Station - Grab Sample

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

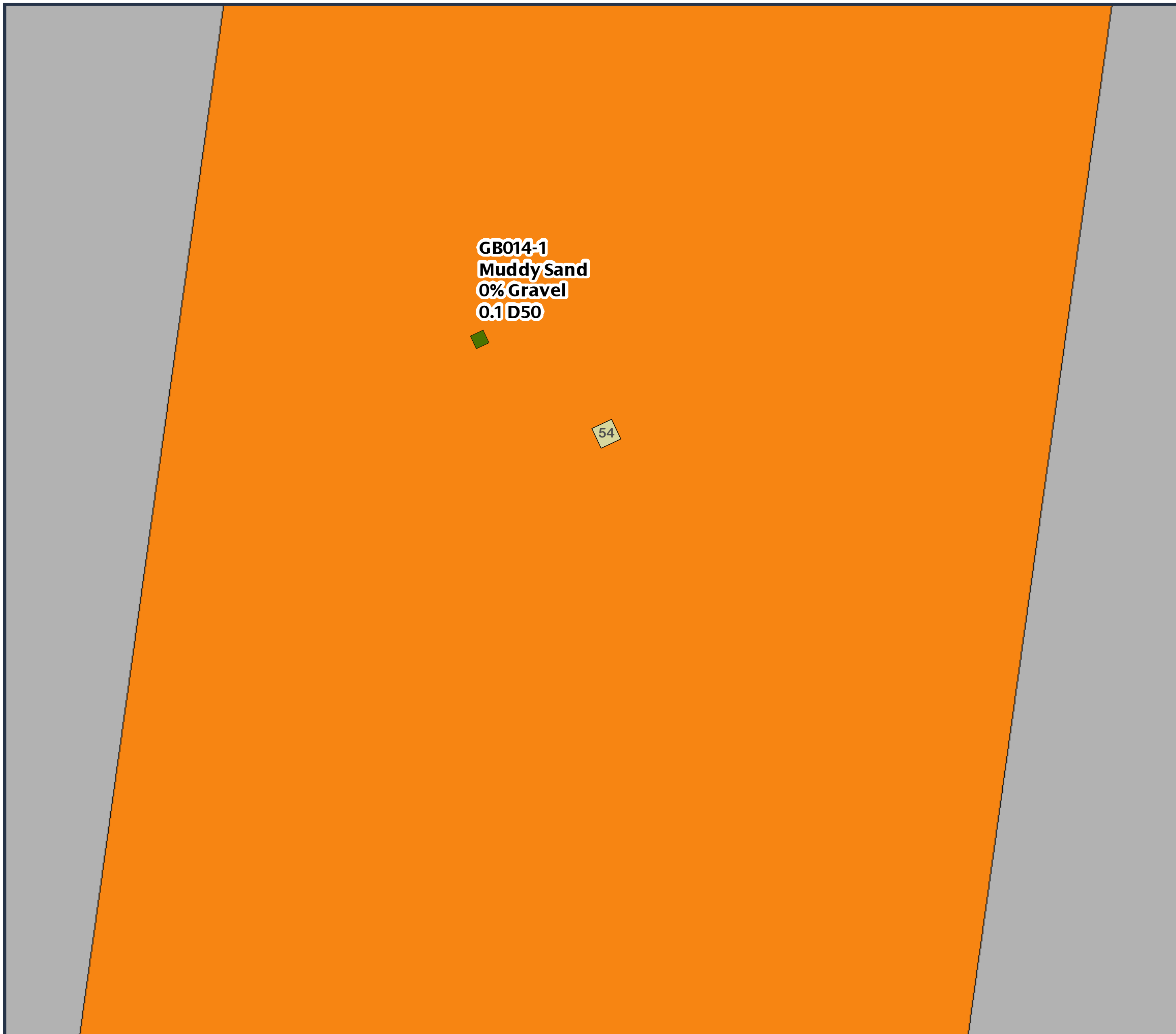
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

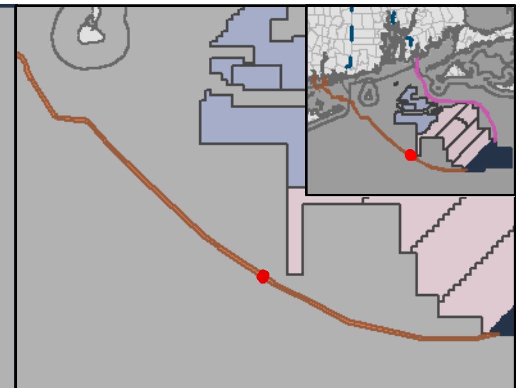
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample

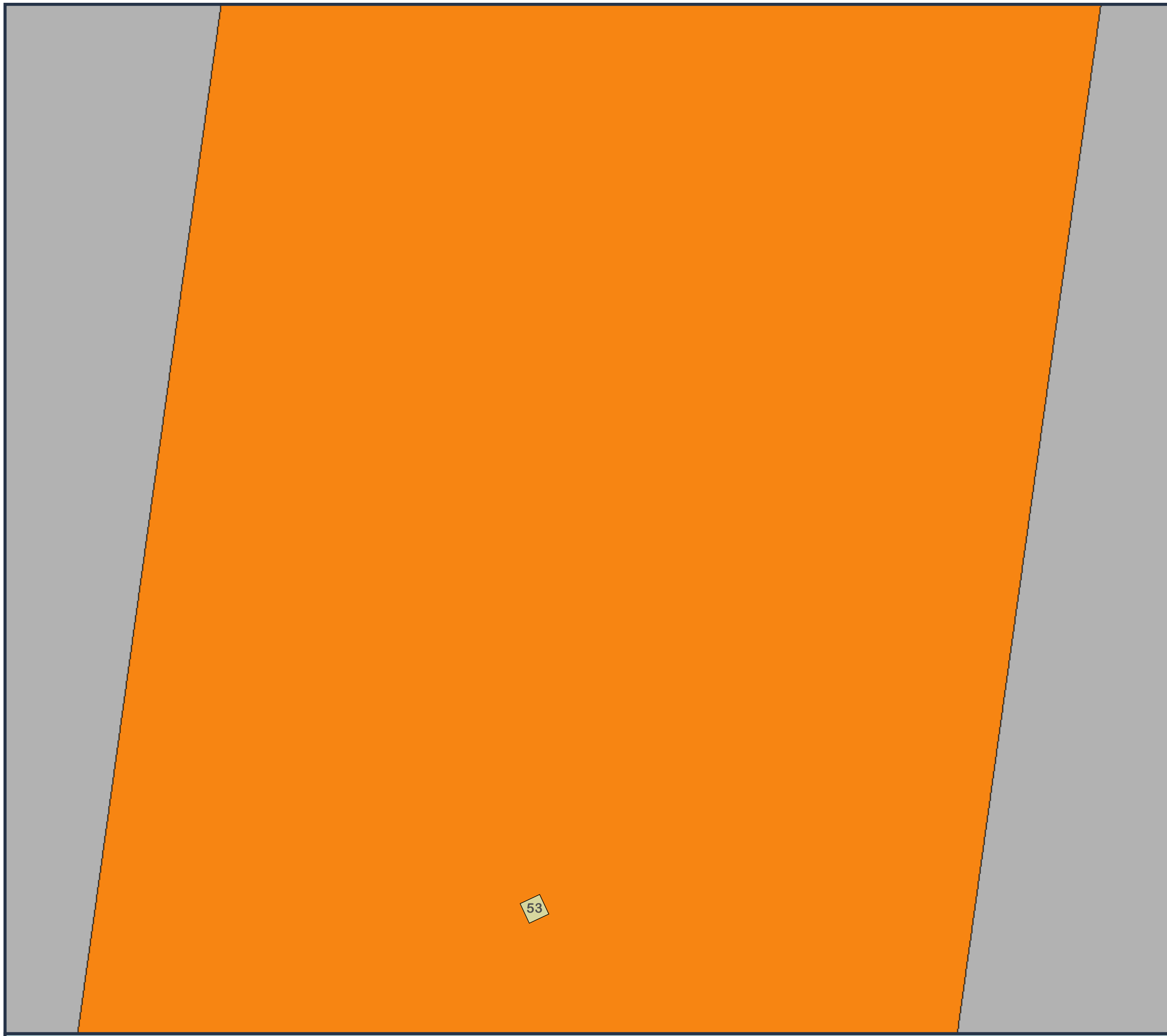
Scale 1:5,000
1 inch = 0 km

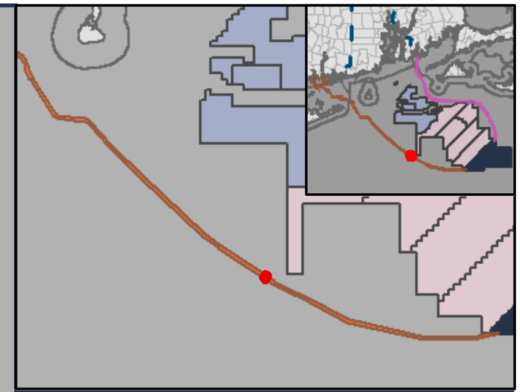
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat

Scale 1:5,000
1 inch = 0 km

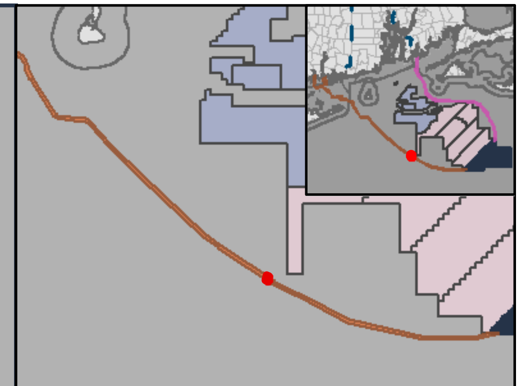
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km

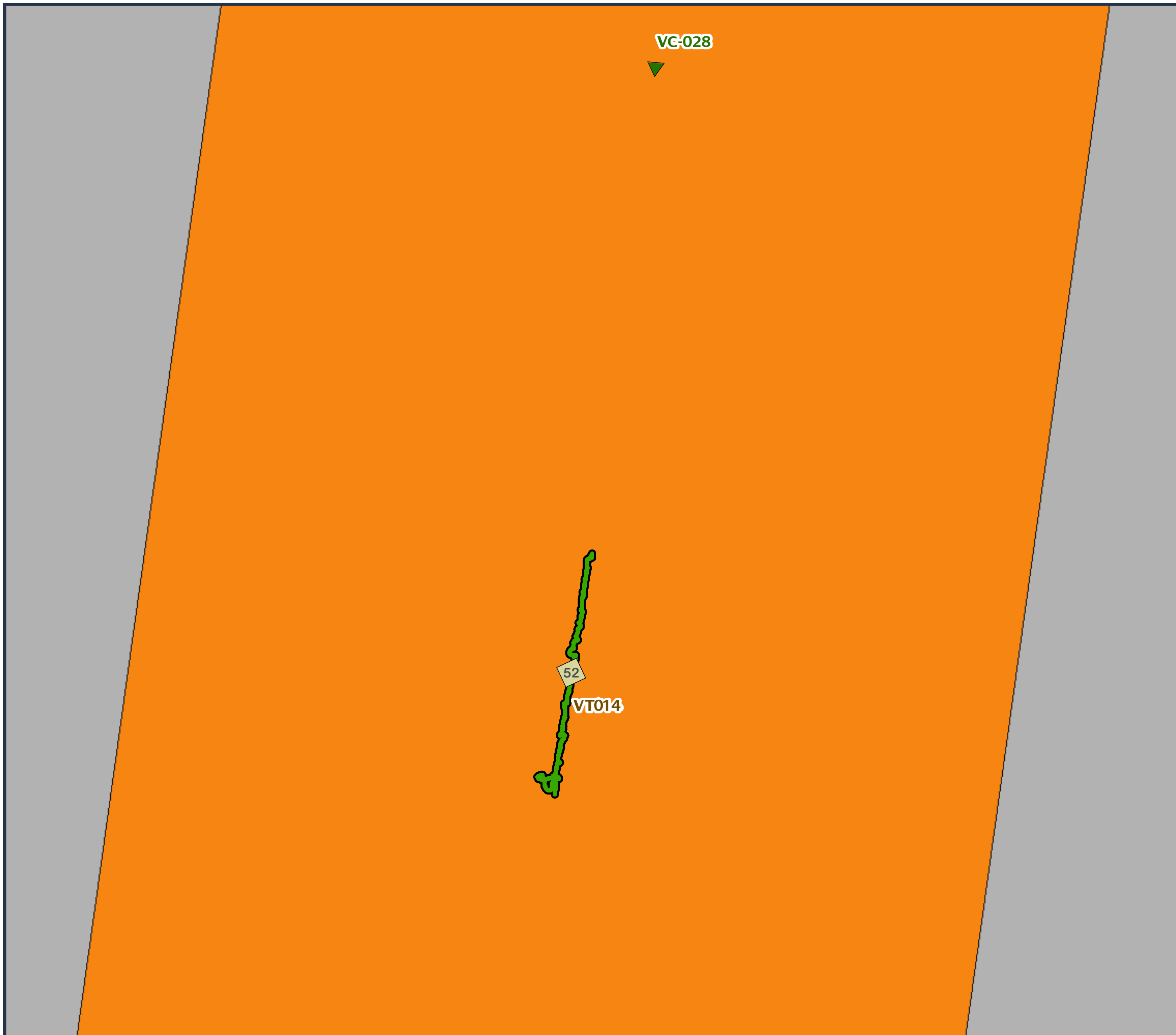
0 60 120 Meters

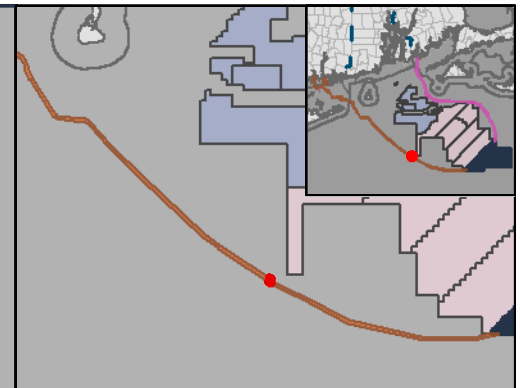
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





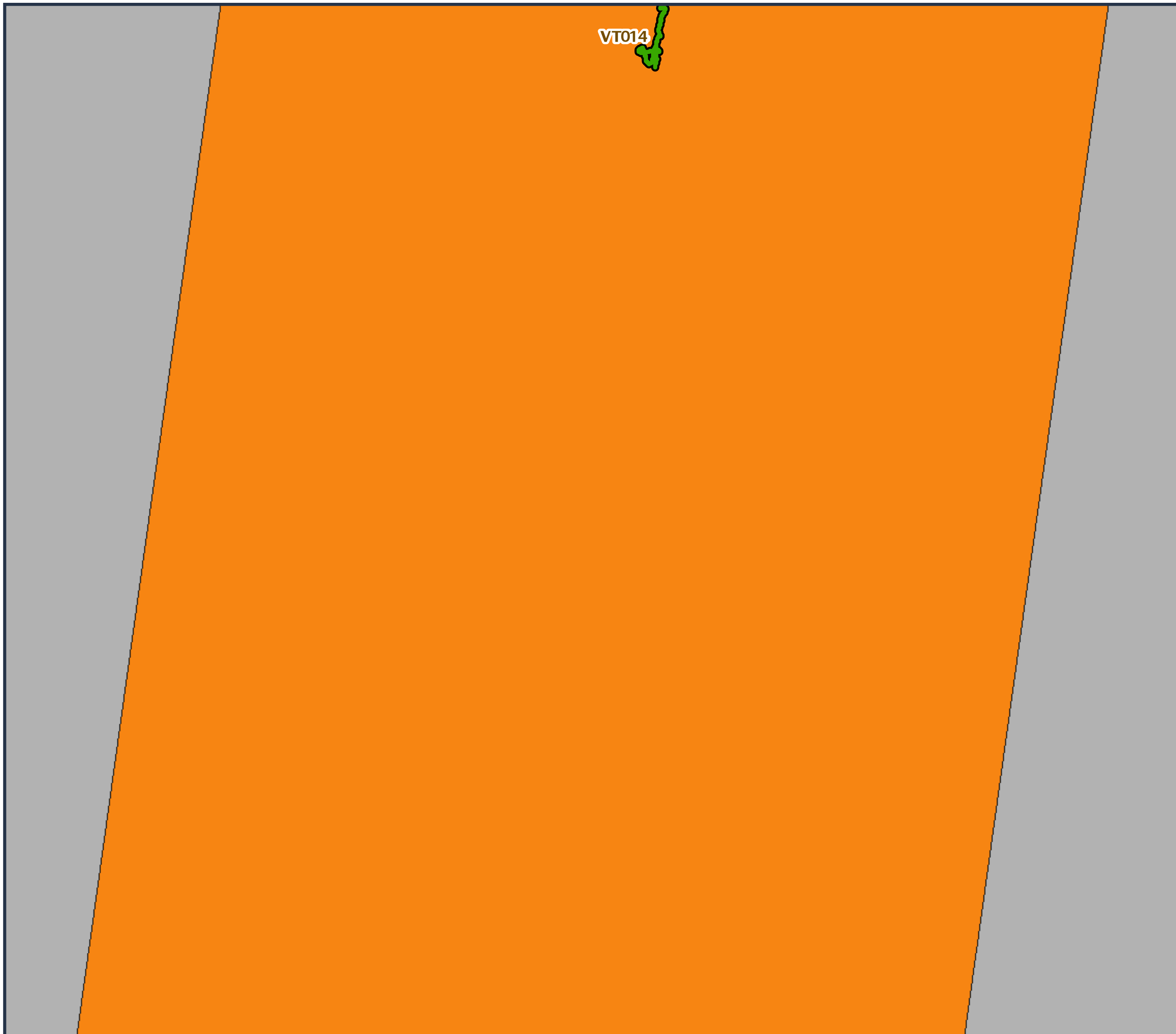
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

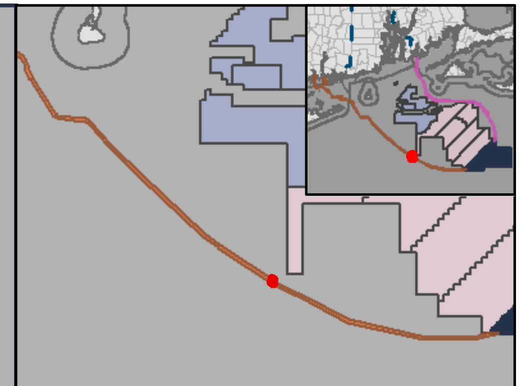
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





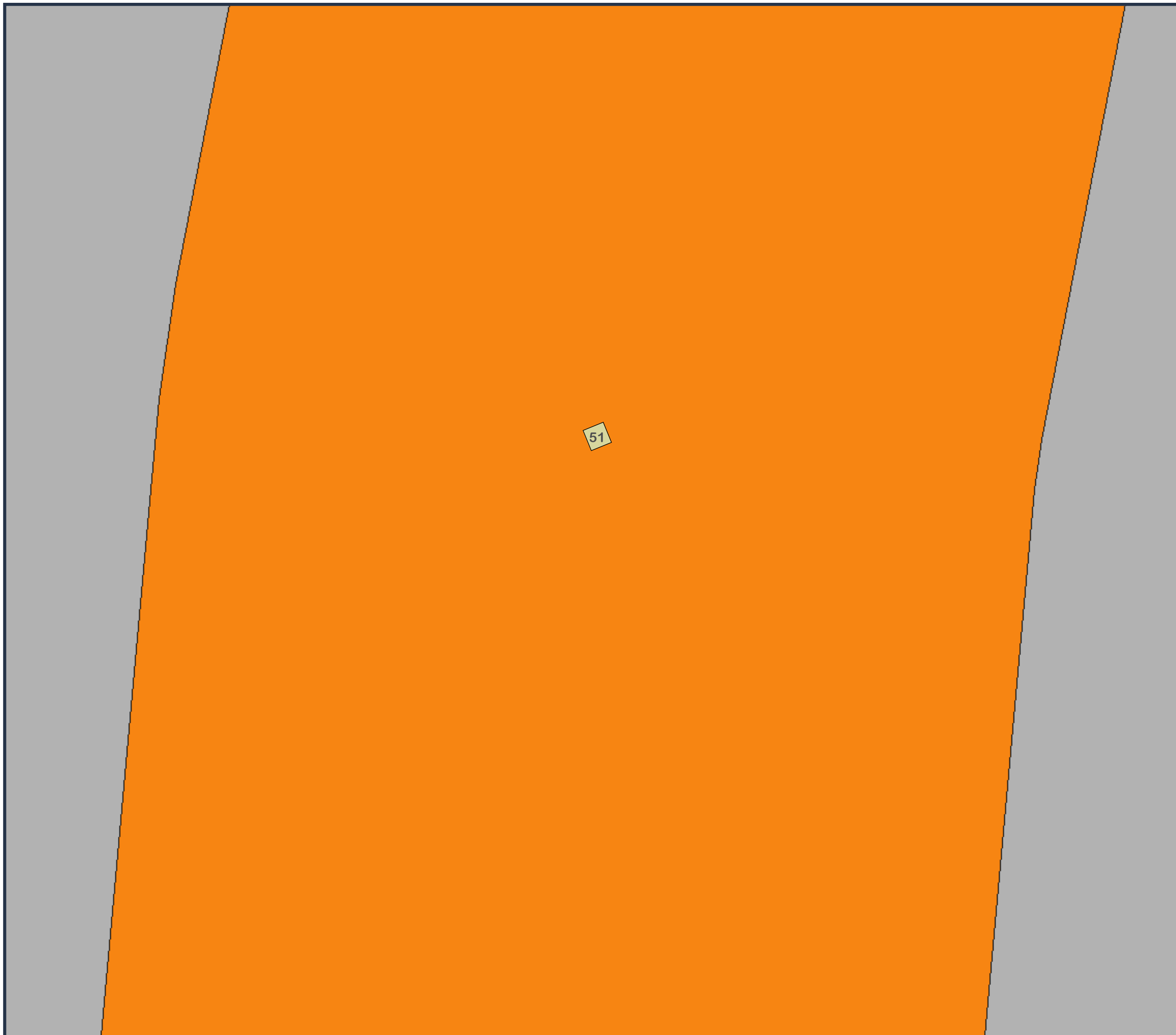
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Soft Bottom Habitat
Soft Bottom Station - Video Transect

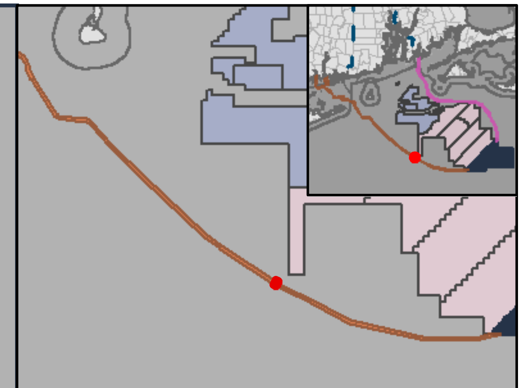
Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

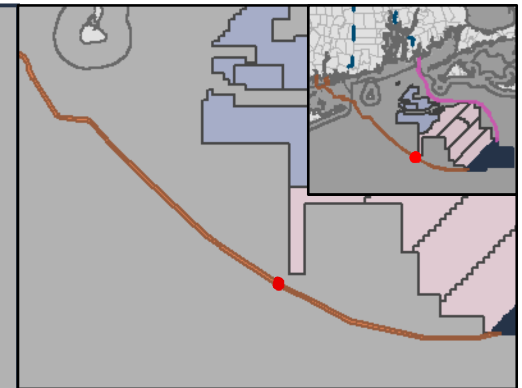
Scale 1:5,000
1 inch = 0 km

0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore

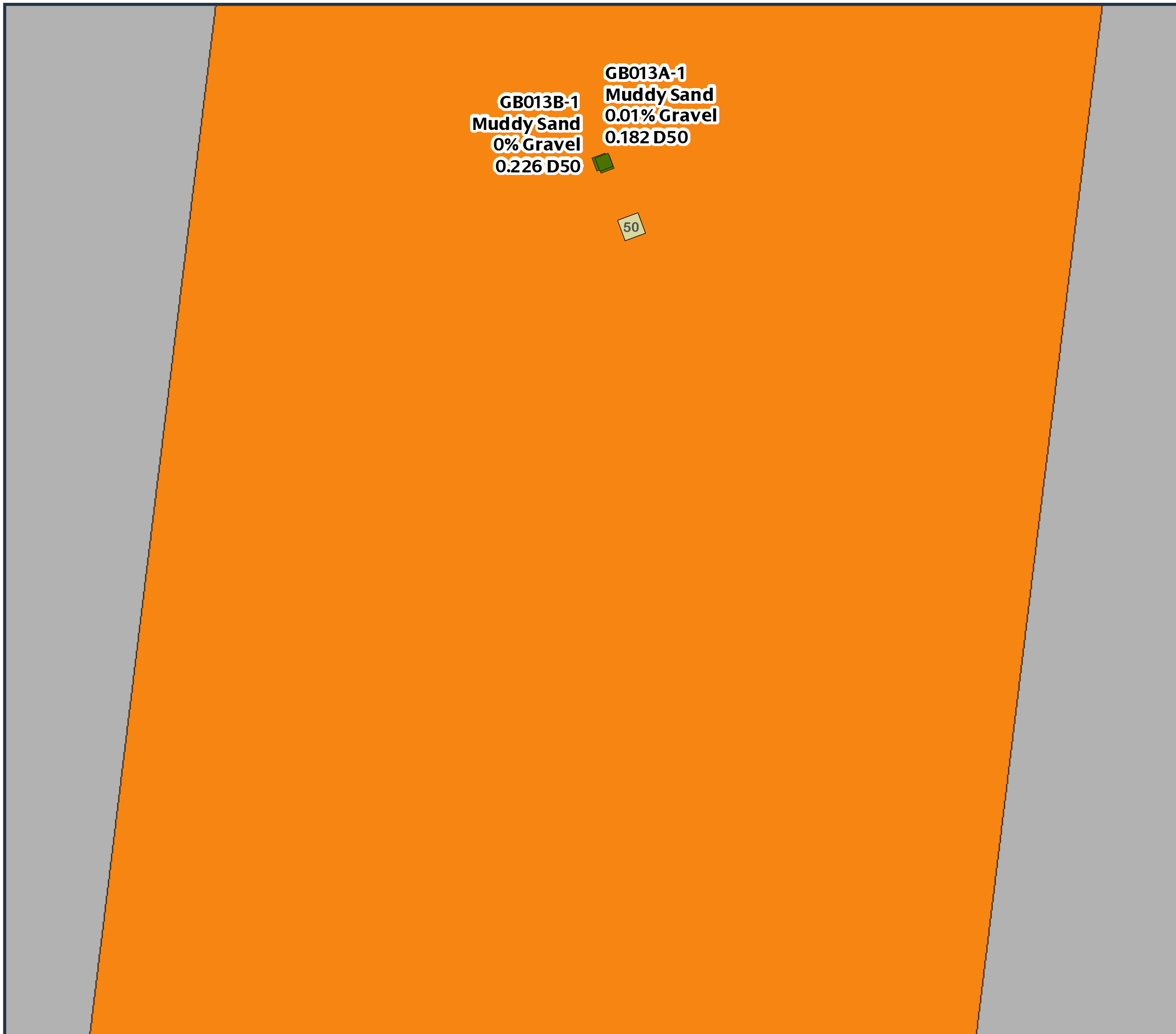
Scale 1:5,000
1 inch = 0 km

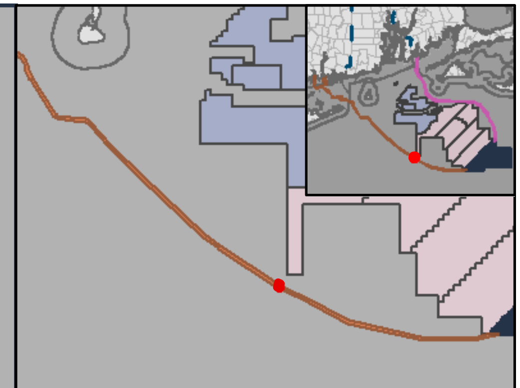
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample

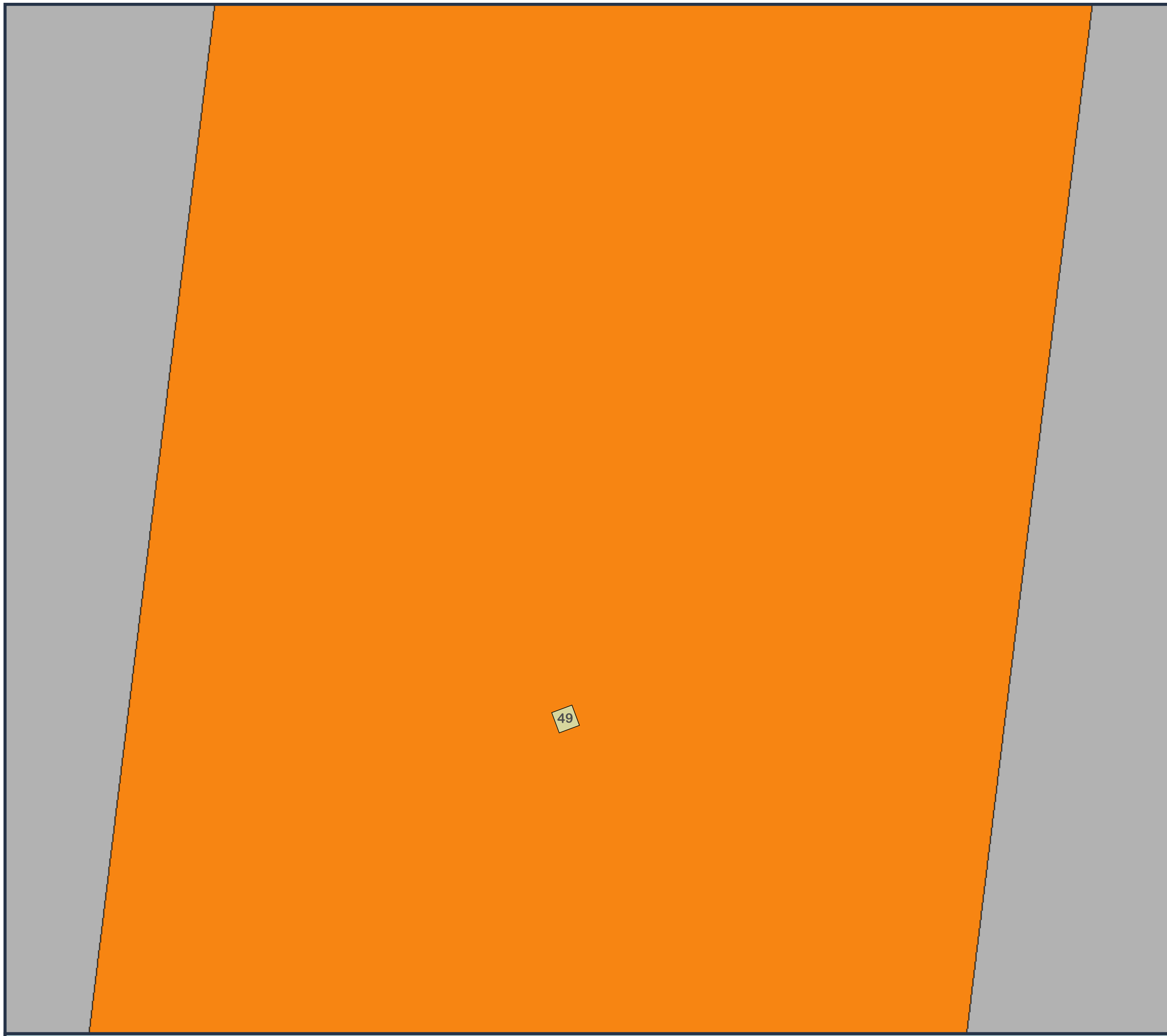
Scale 1:5,000
1 inch = 0 km

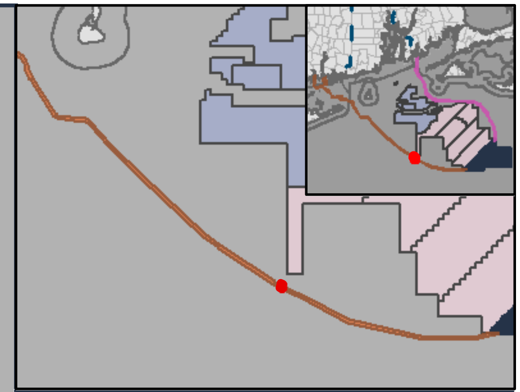
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat

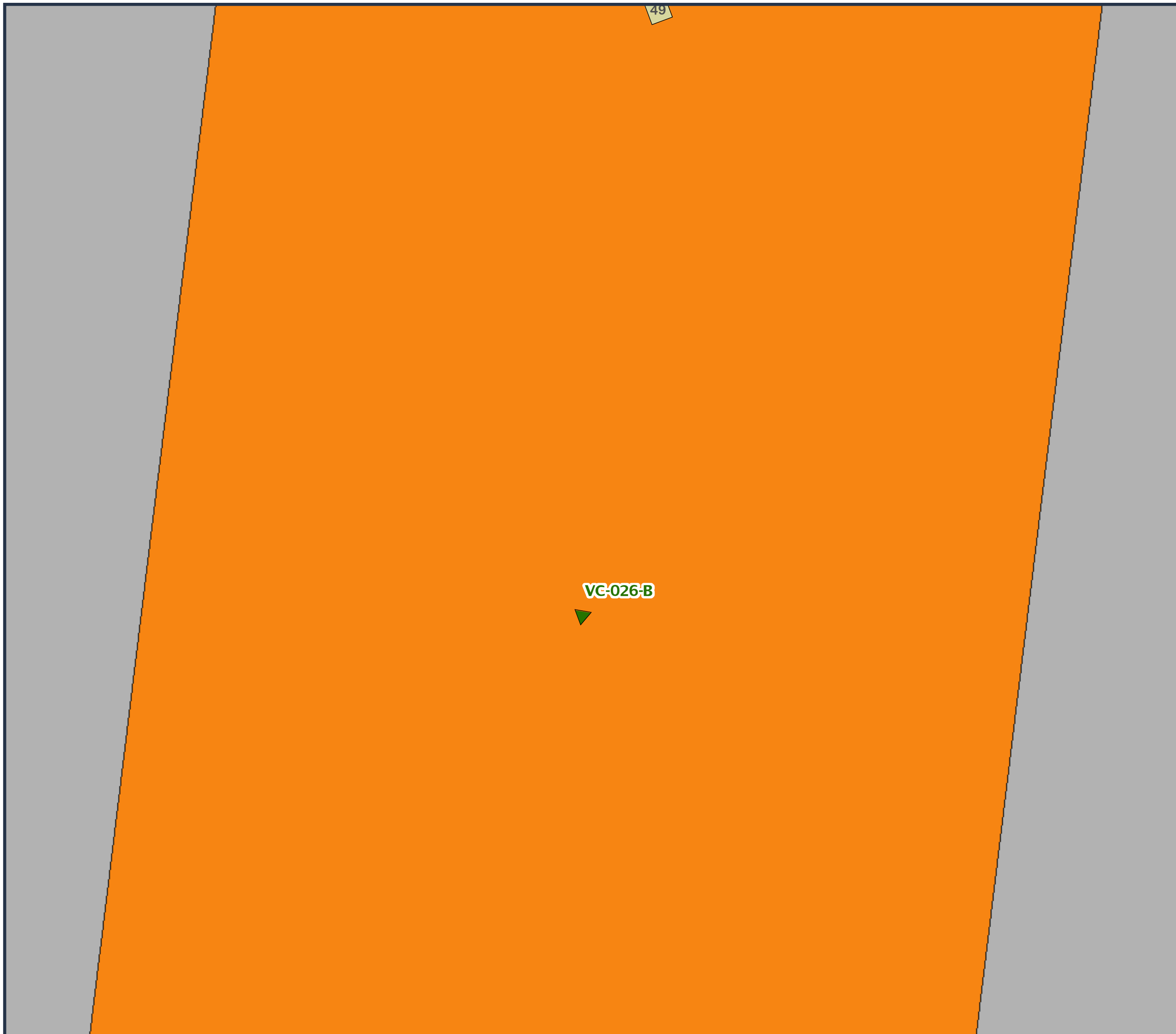
Scale 1:5,000
1 inch = 0 km

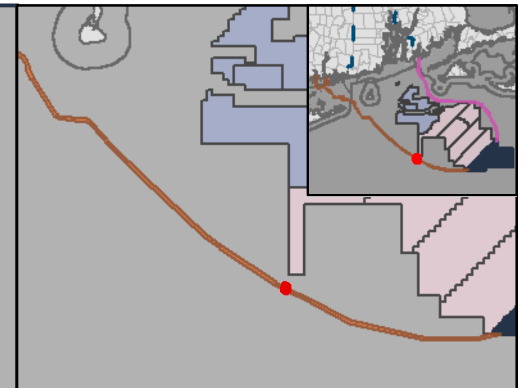
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





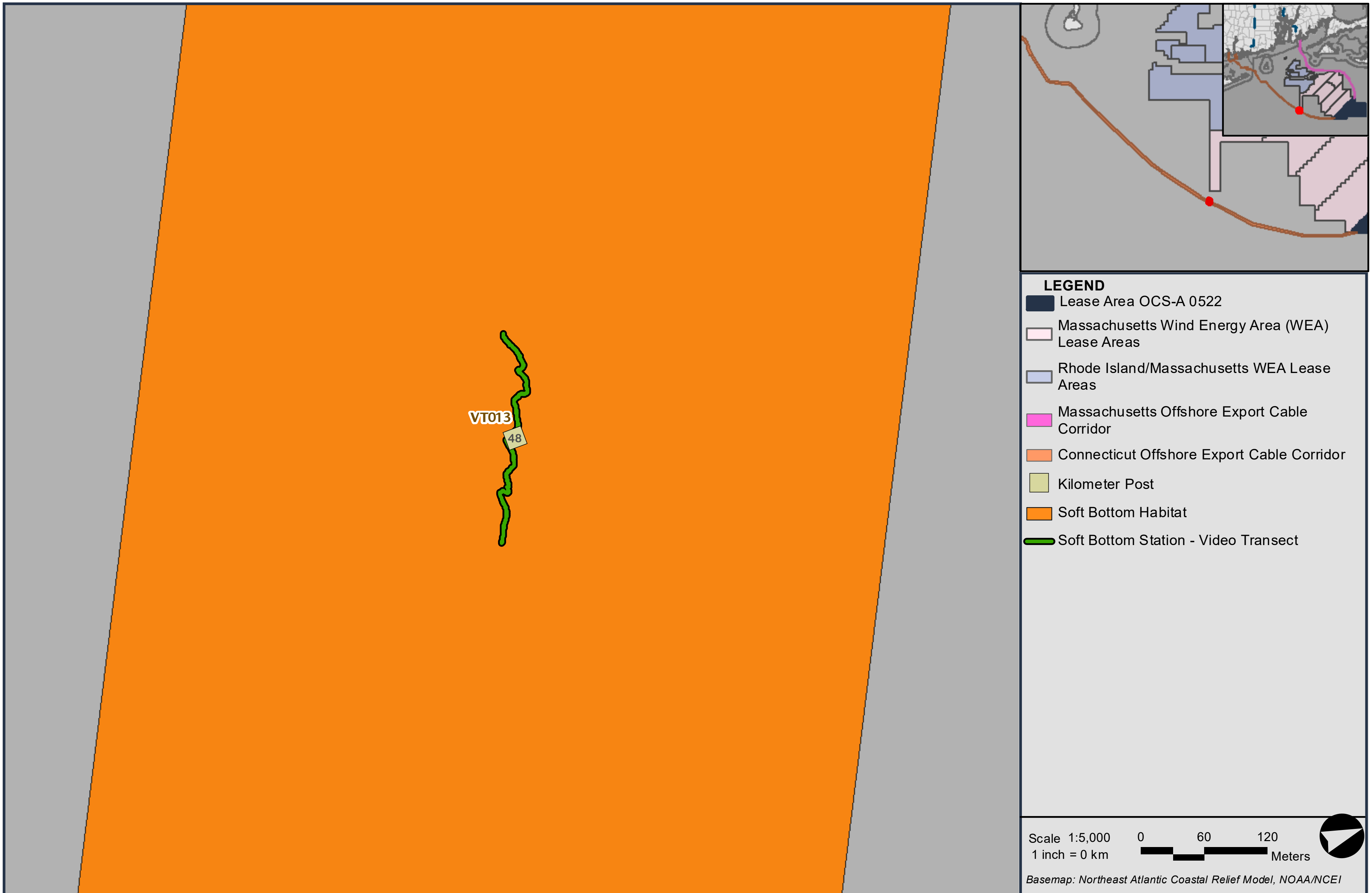
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

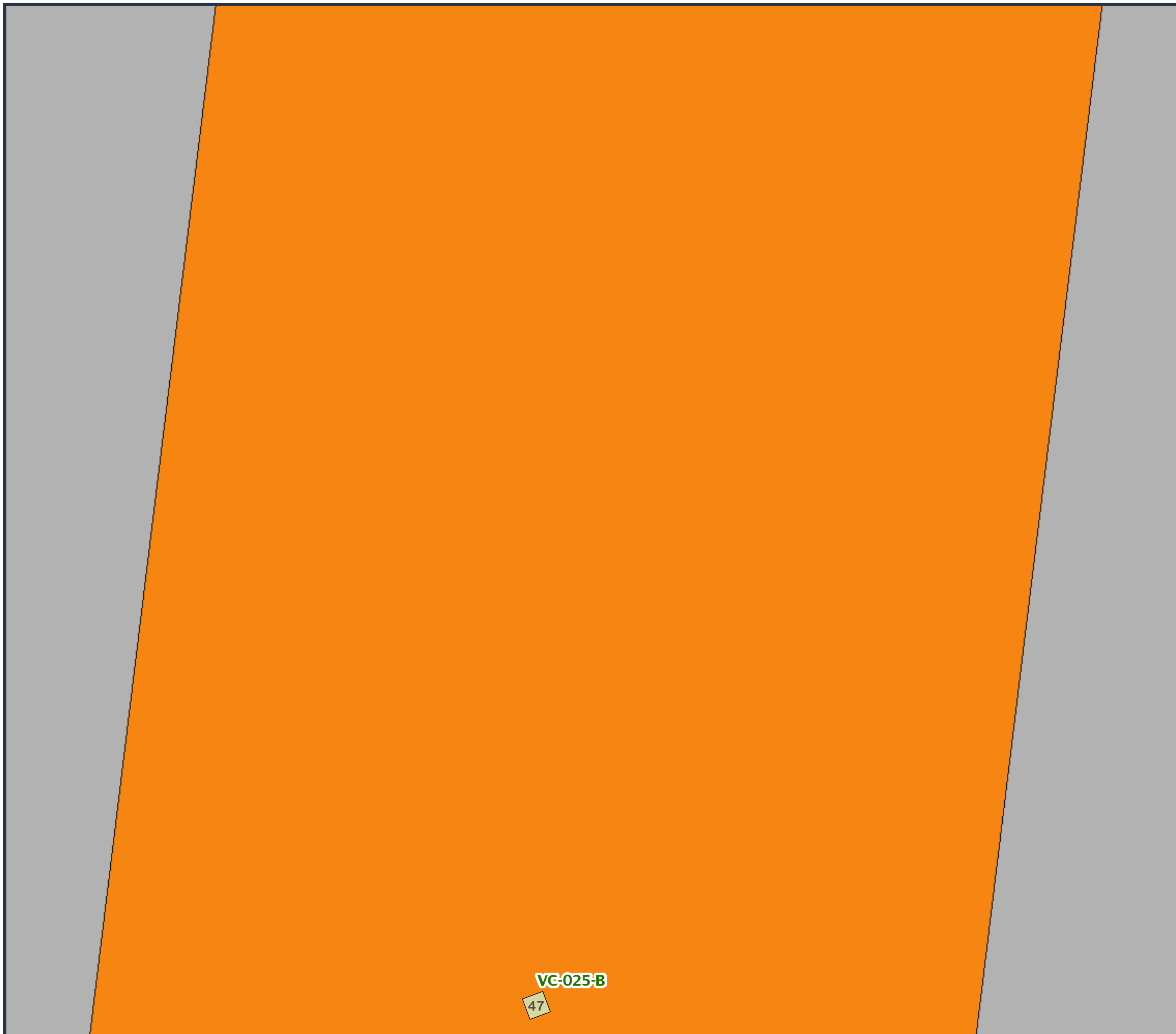
VINEYARD NORTHEAST
VINEYARD OFFSHORE

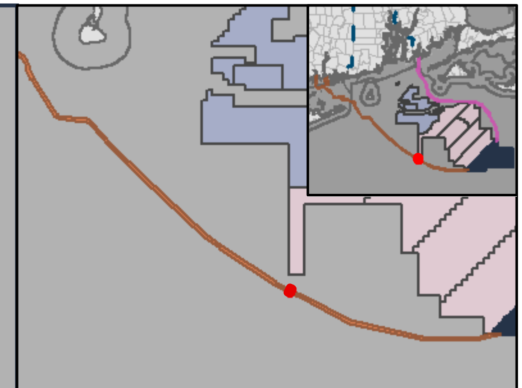


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

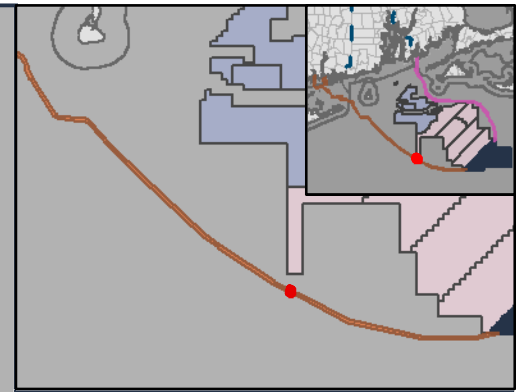
Scale 1:5,000
1 inch = 0 km

0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore

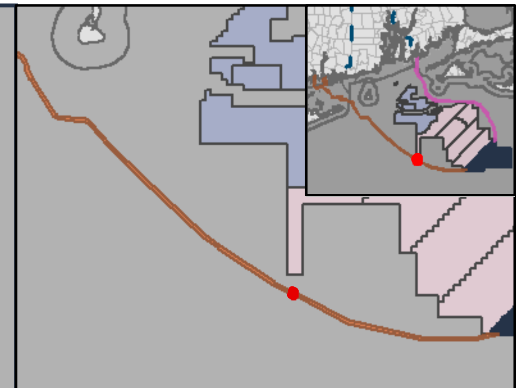
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample

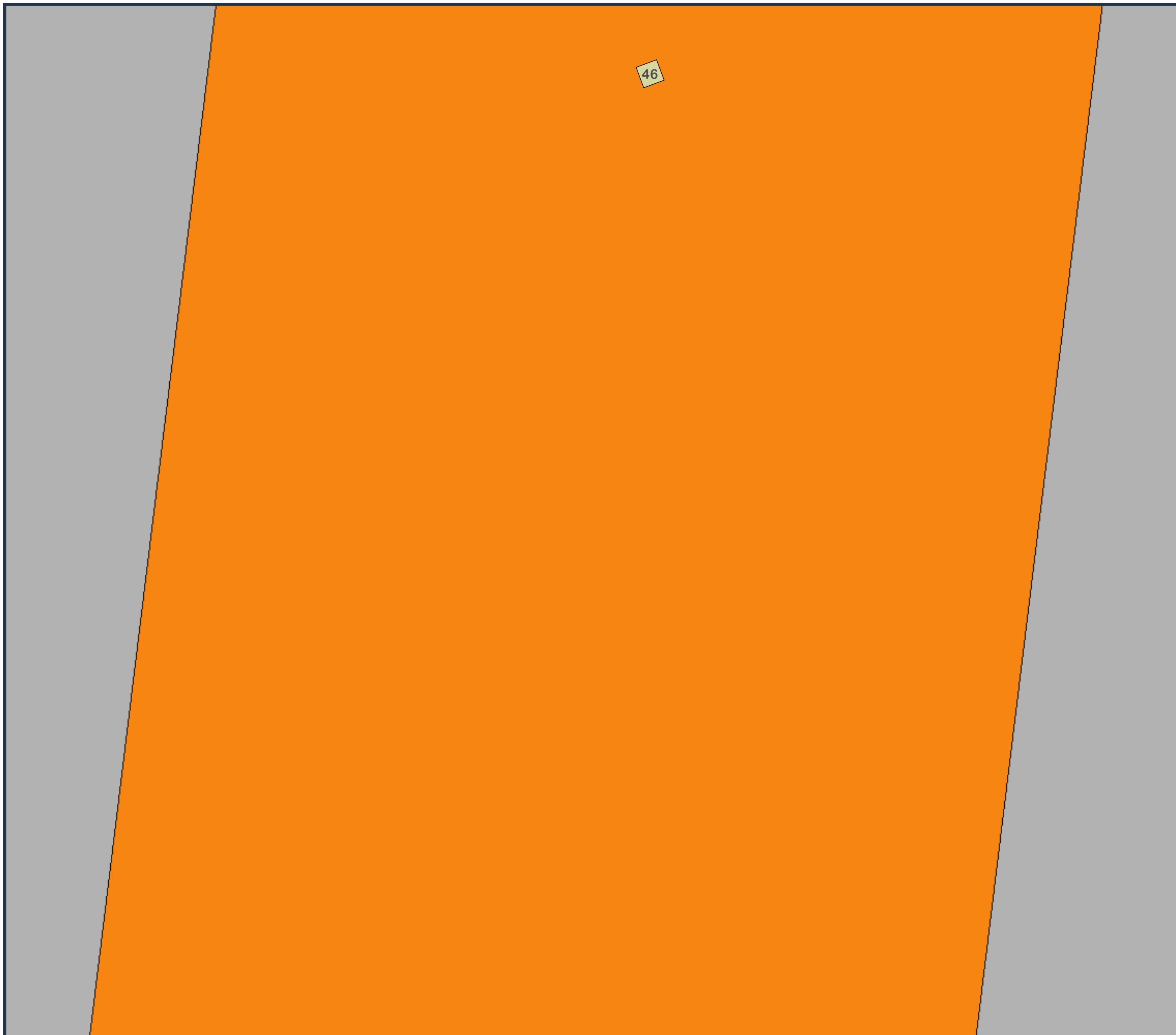
Scale 1:5,000
1 inch = 0 km

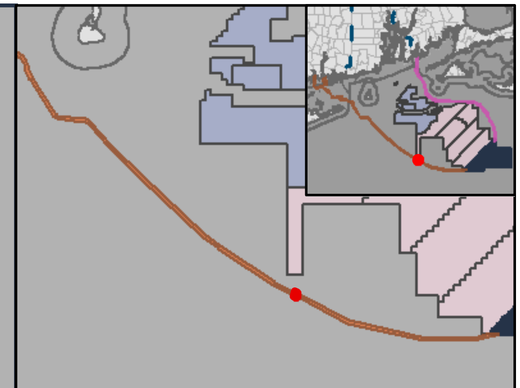
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

Lease Area OCS-A 0522

Massachusetts Wind Energy Area (WEA) Lease Areas

Rhode Island/Massachusetts WEA Lease Areas

Massachusetts Offshore Export Cable Corridor

Connecticut Offshore Export Cable Corridor

Kilometer Post

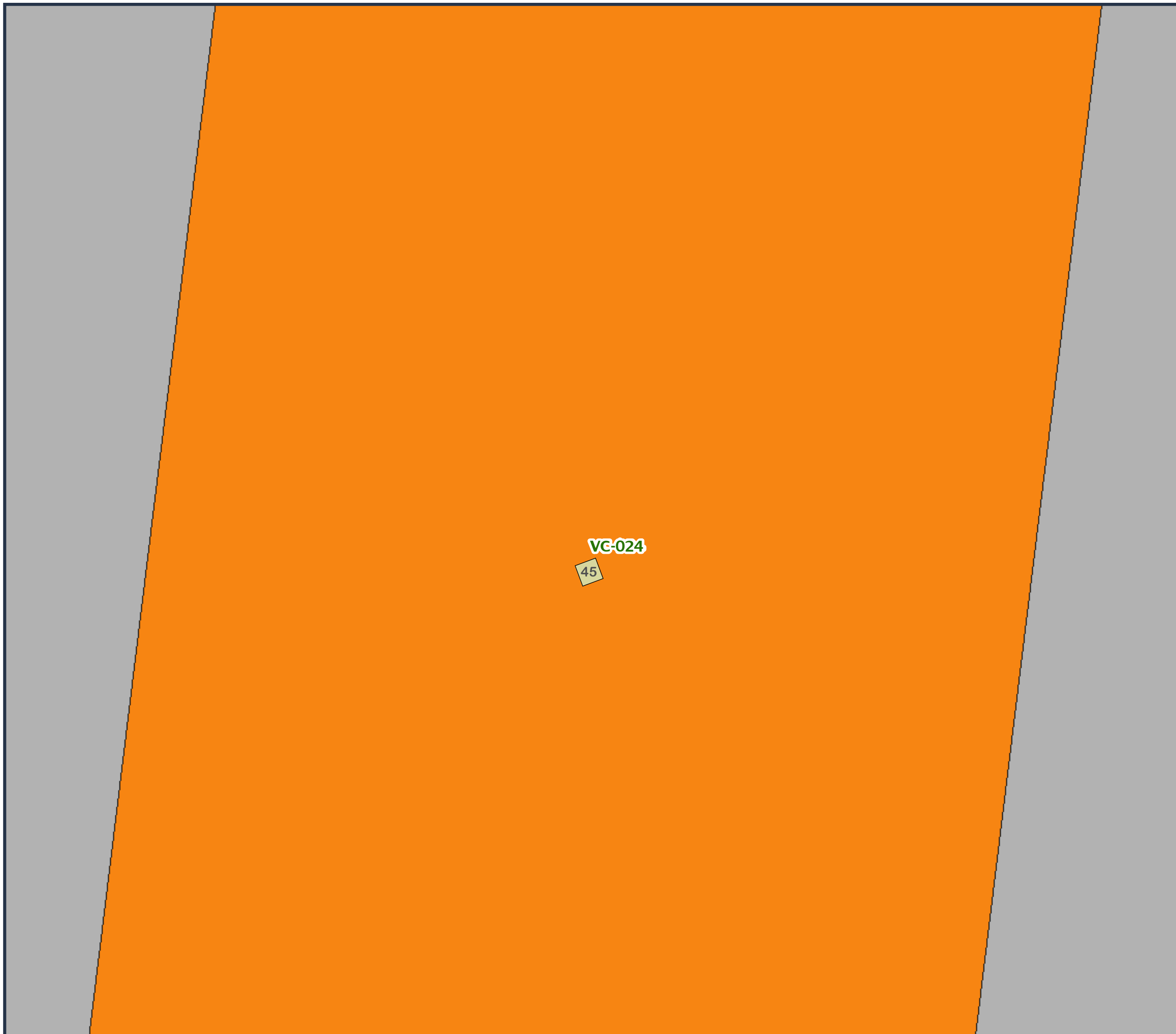
Soft Bottom Habitat

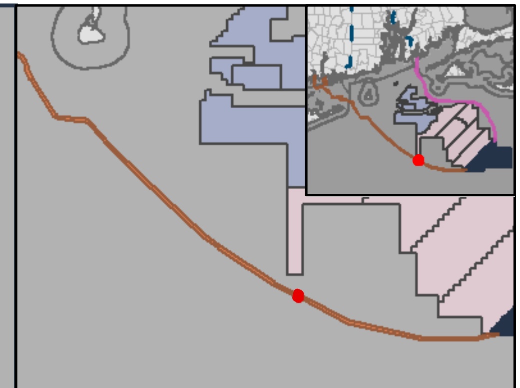
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

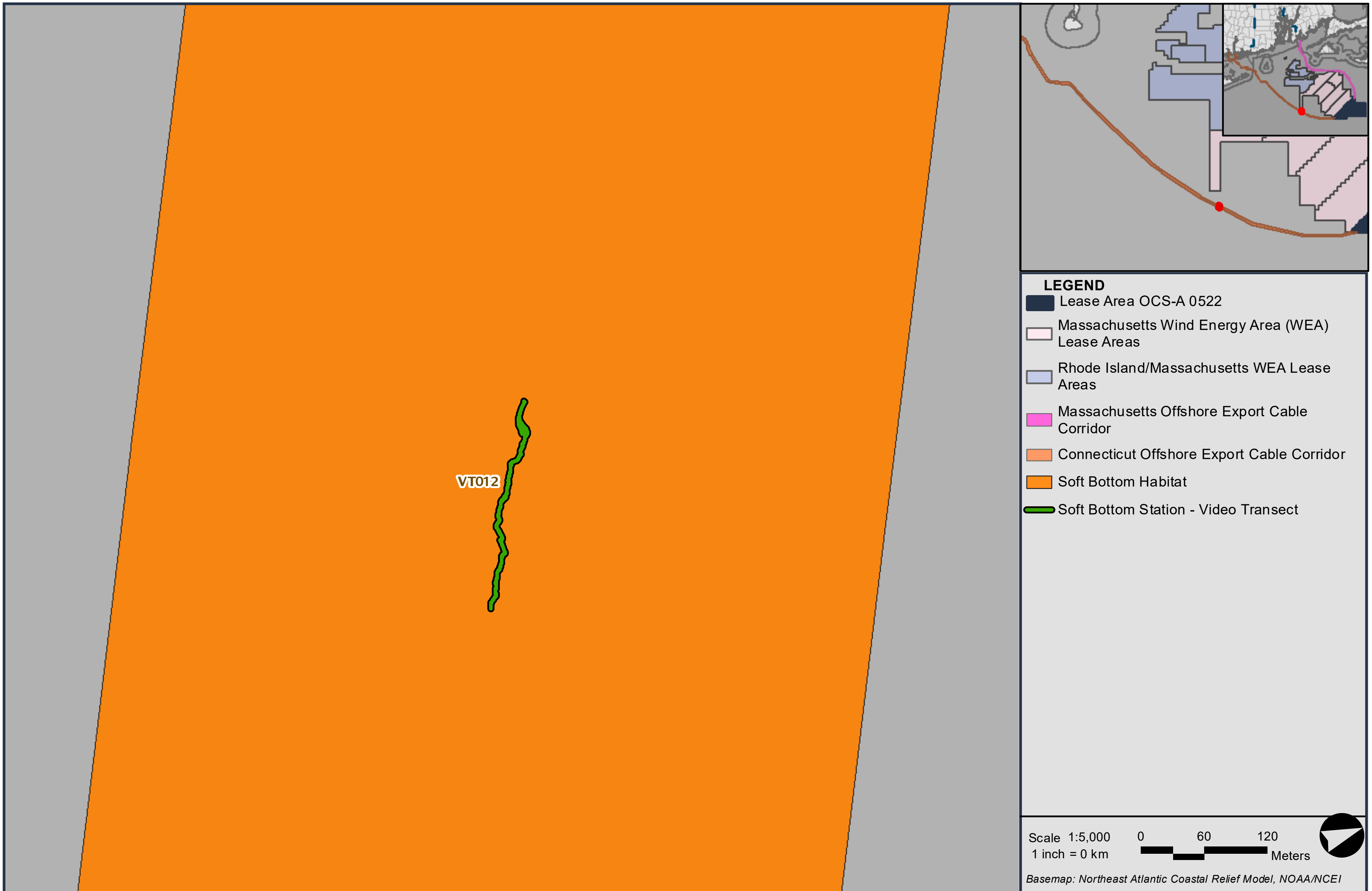
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Soft Bottom Habitat
- Soft Bottom Station - Video Transect

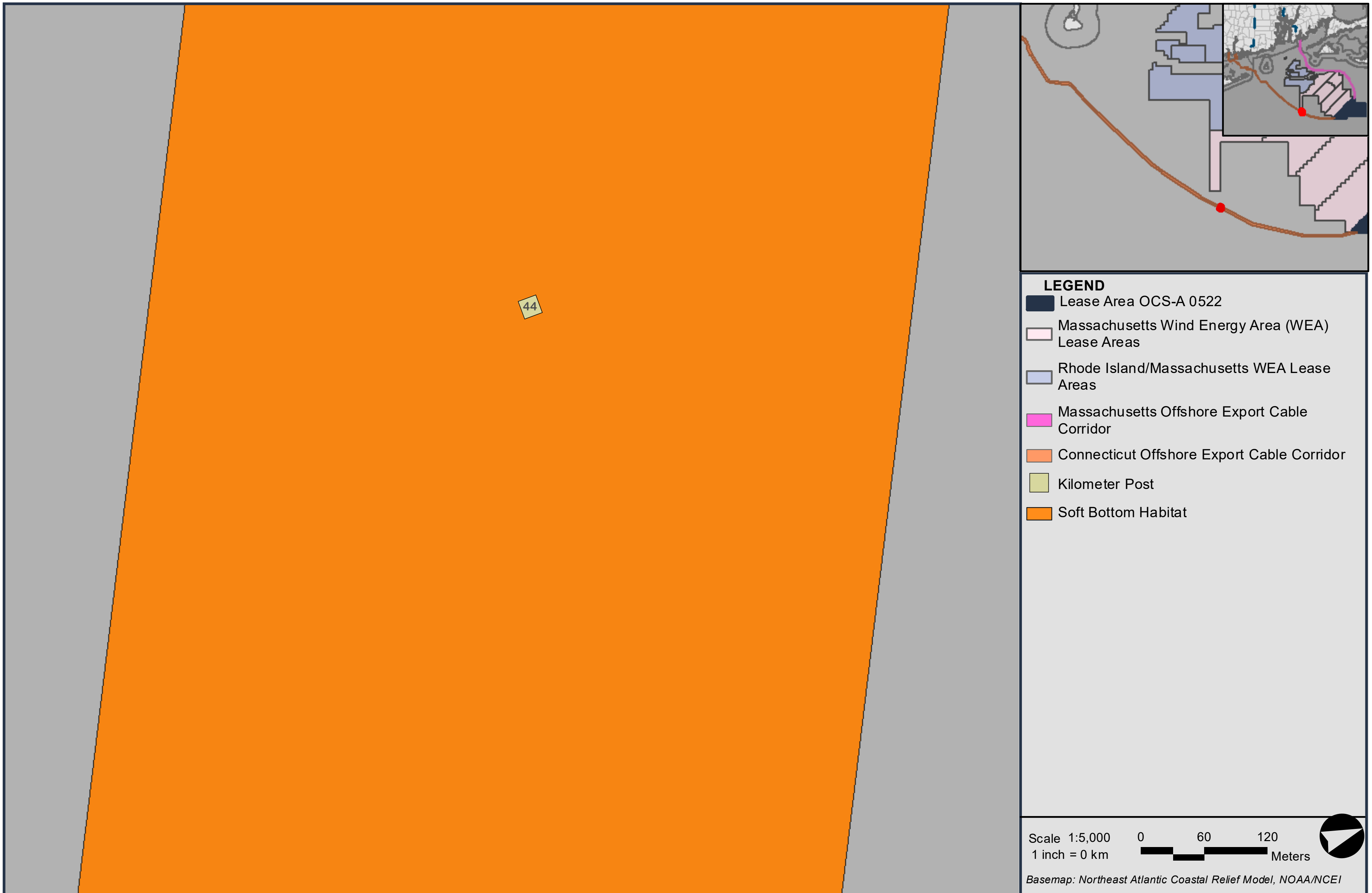
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

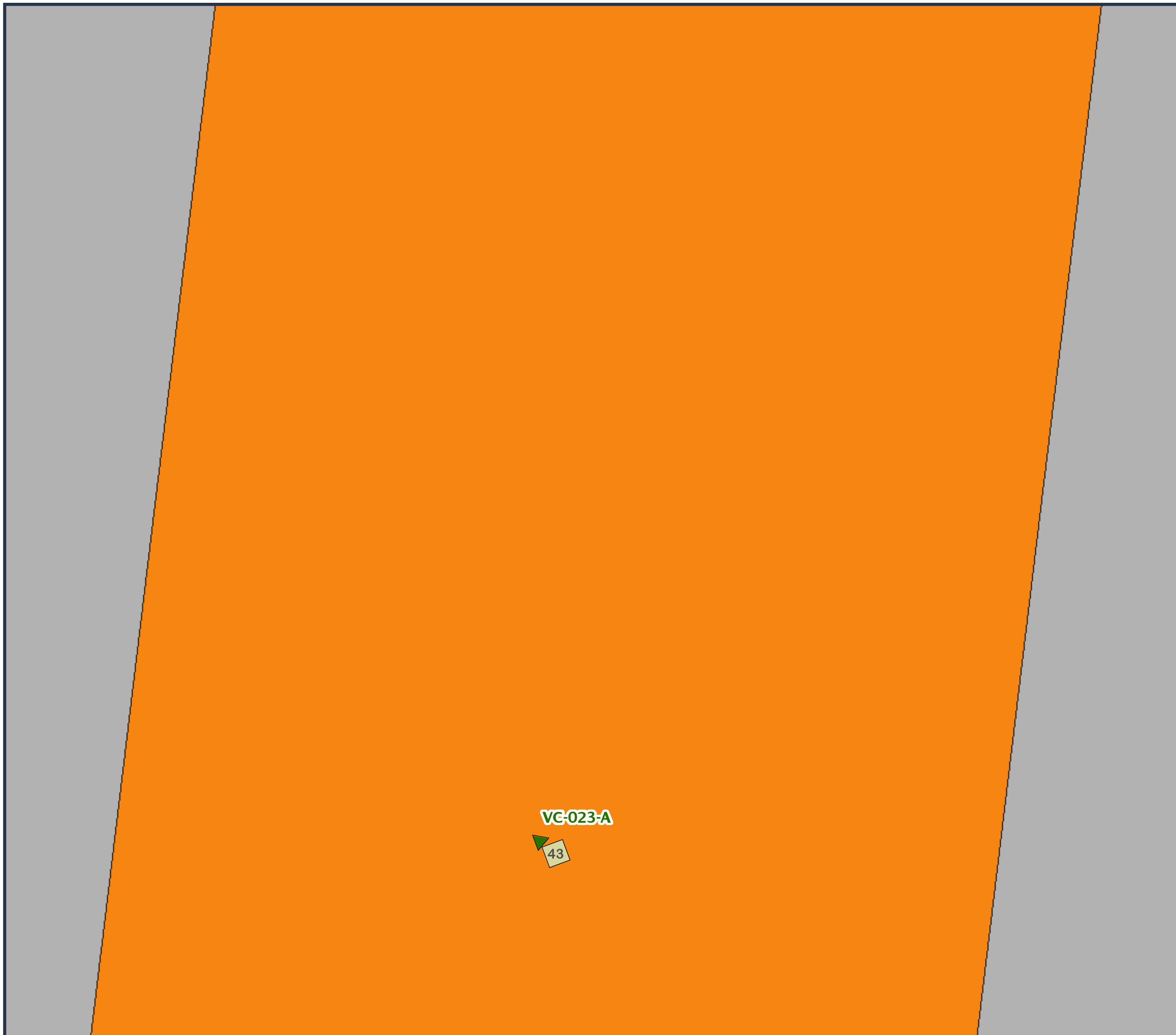
VINEYARD NORTHEAST
VINEYARD OFFSHORE

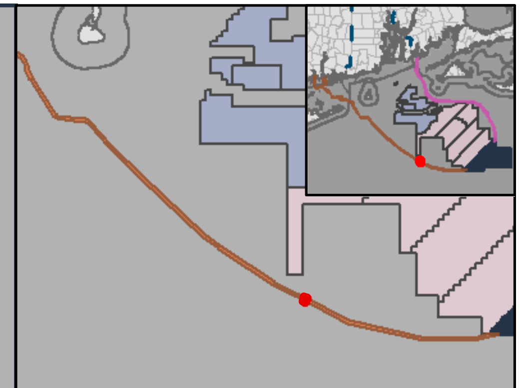


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

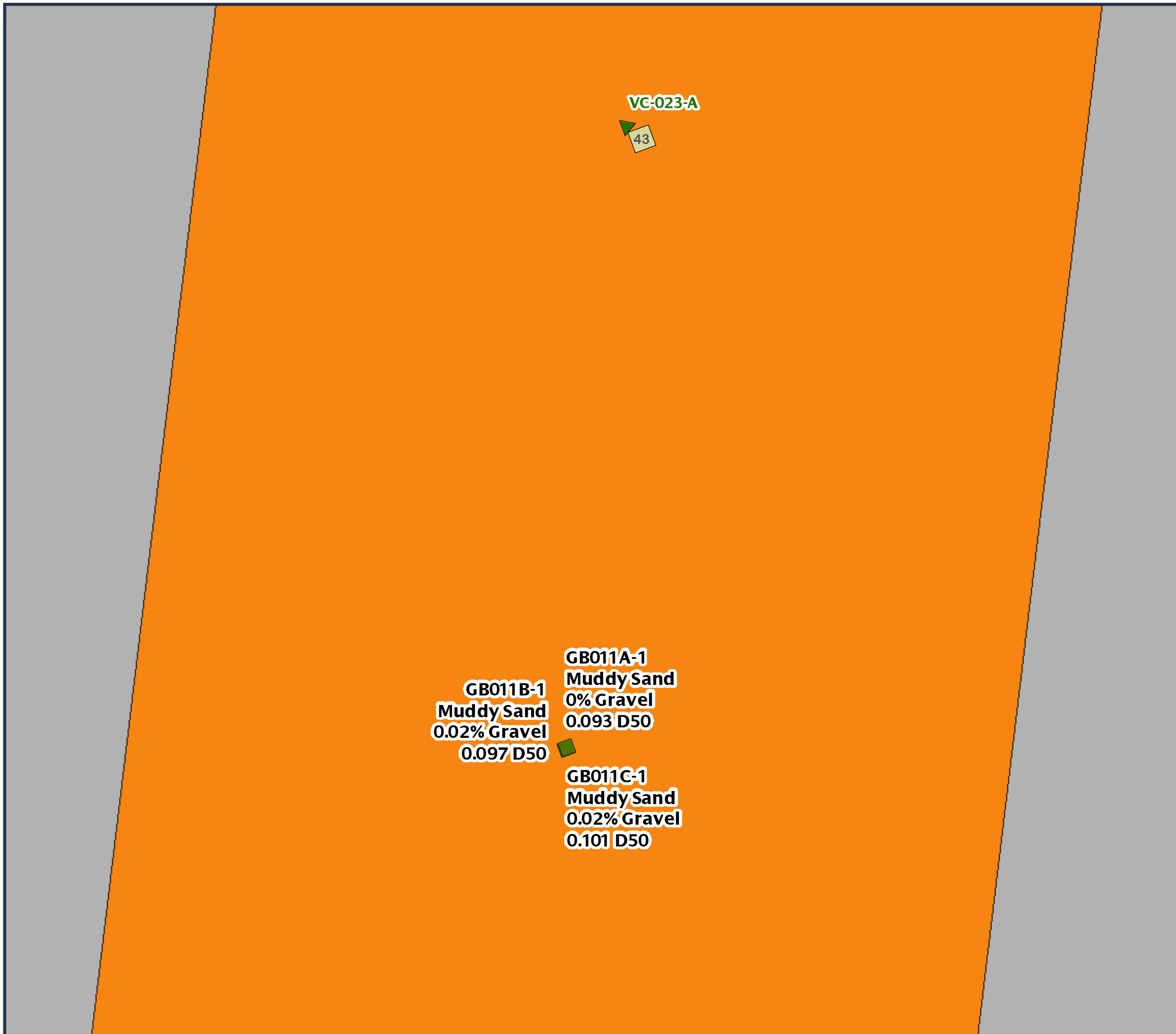
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

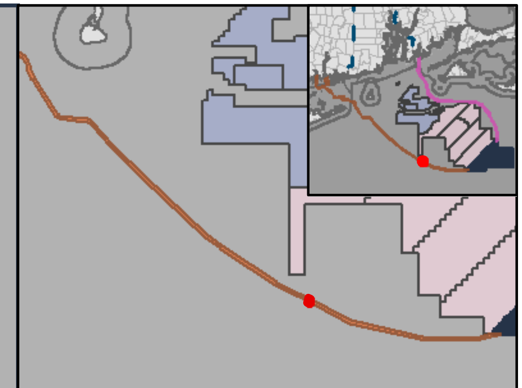
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

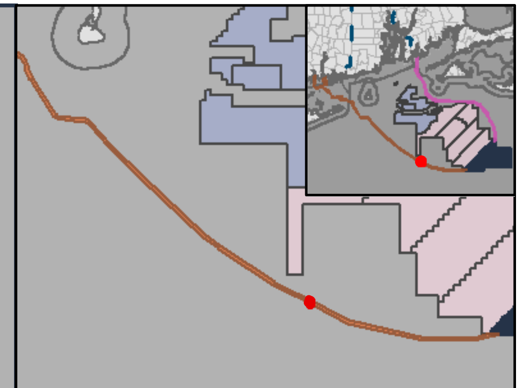
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

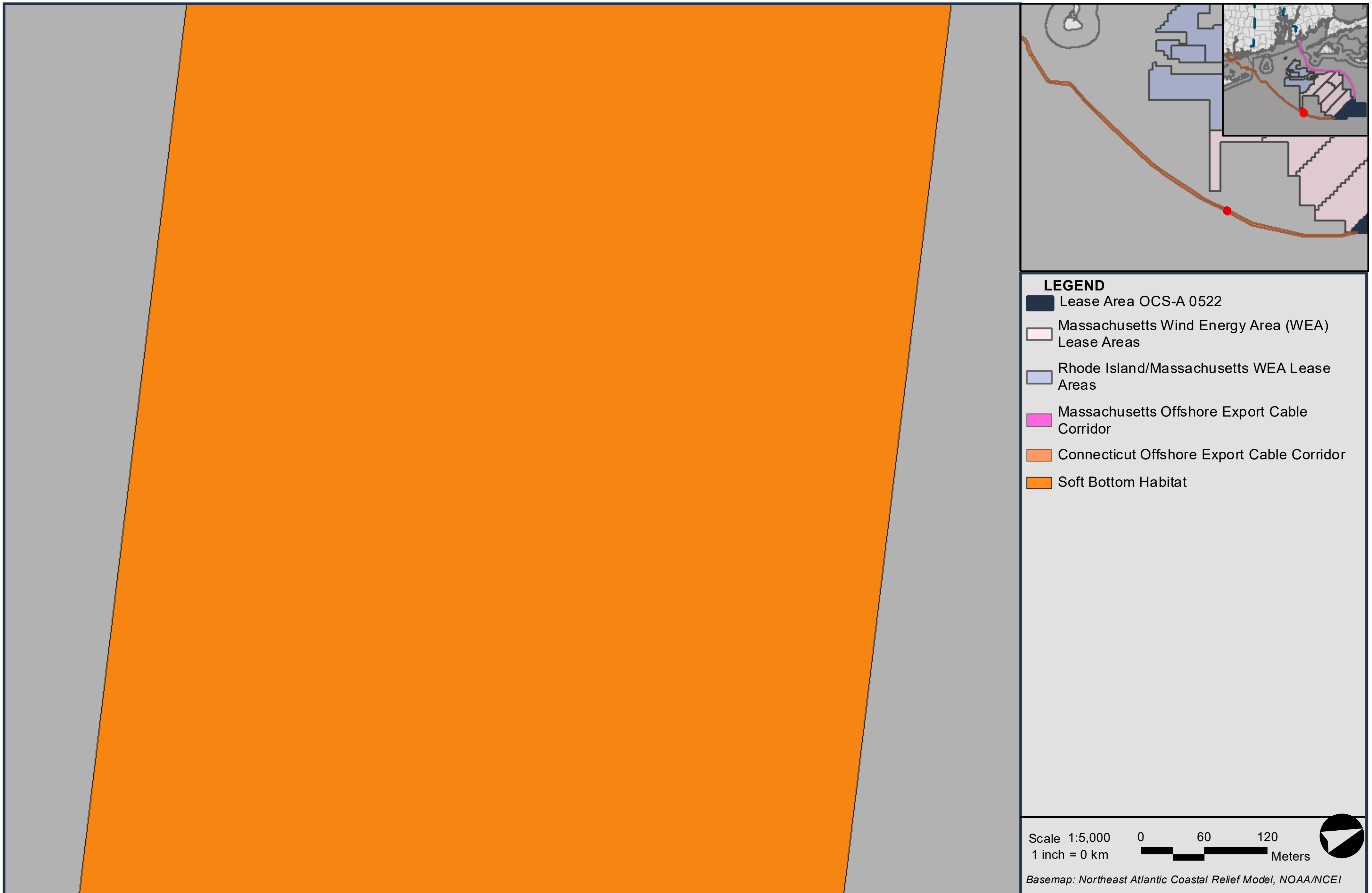
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

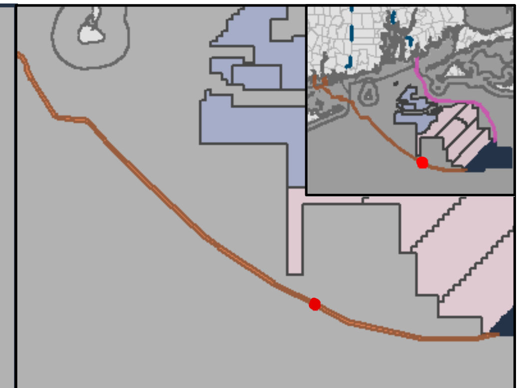
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

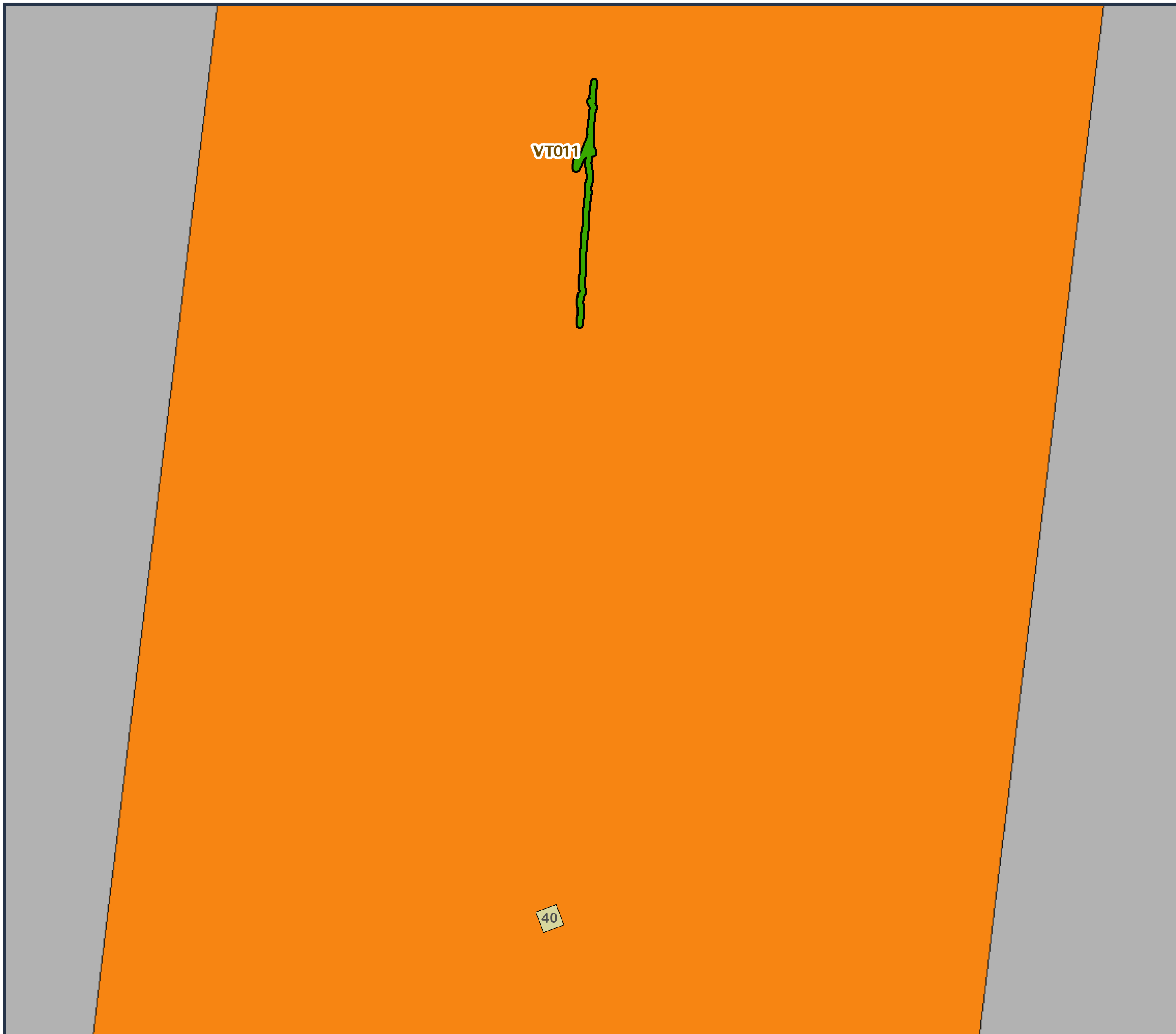
Scale 1:5,000
1 inch = 0 km

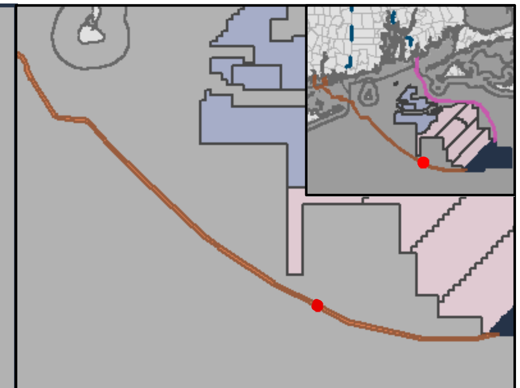
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Bottom Station - Video Transect

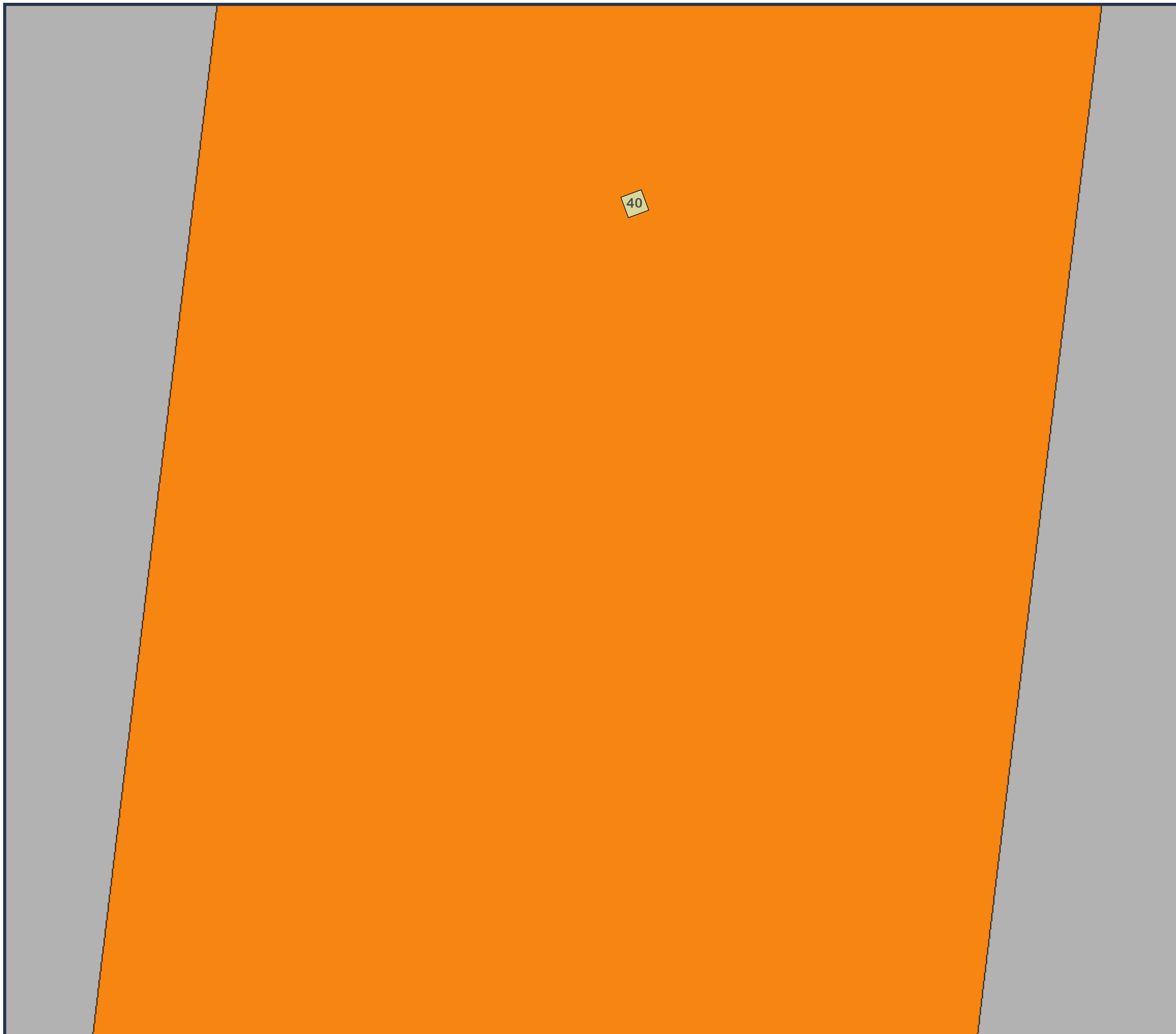
Scale 1:5,000
1 inch = 0 km

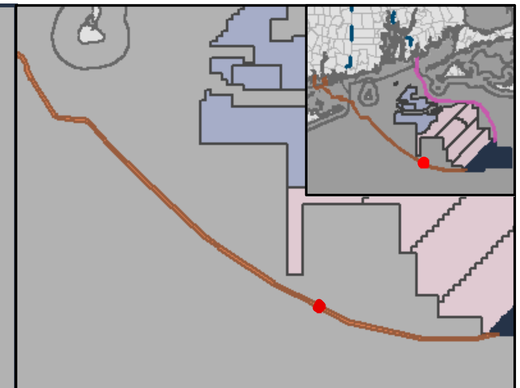
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat

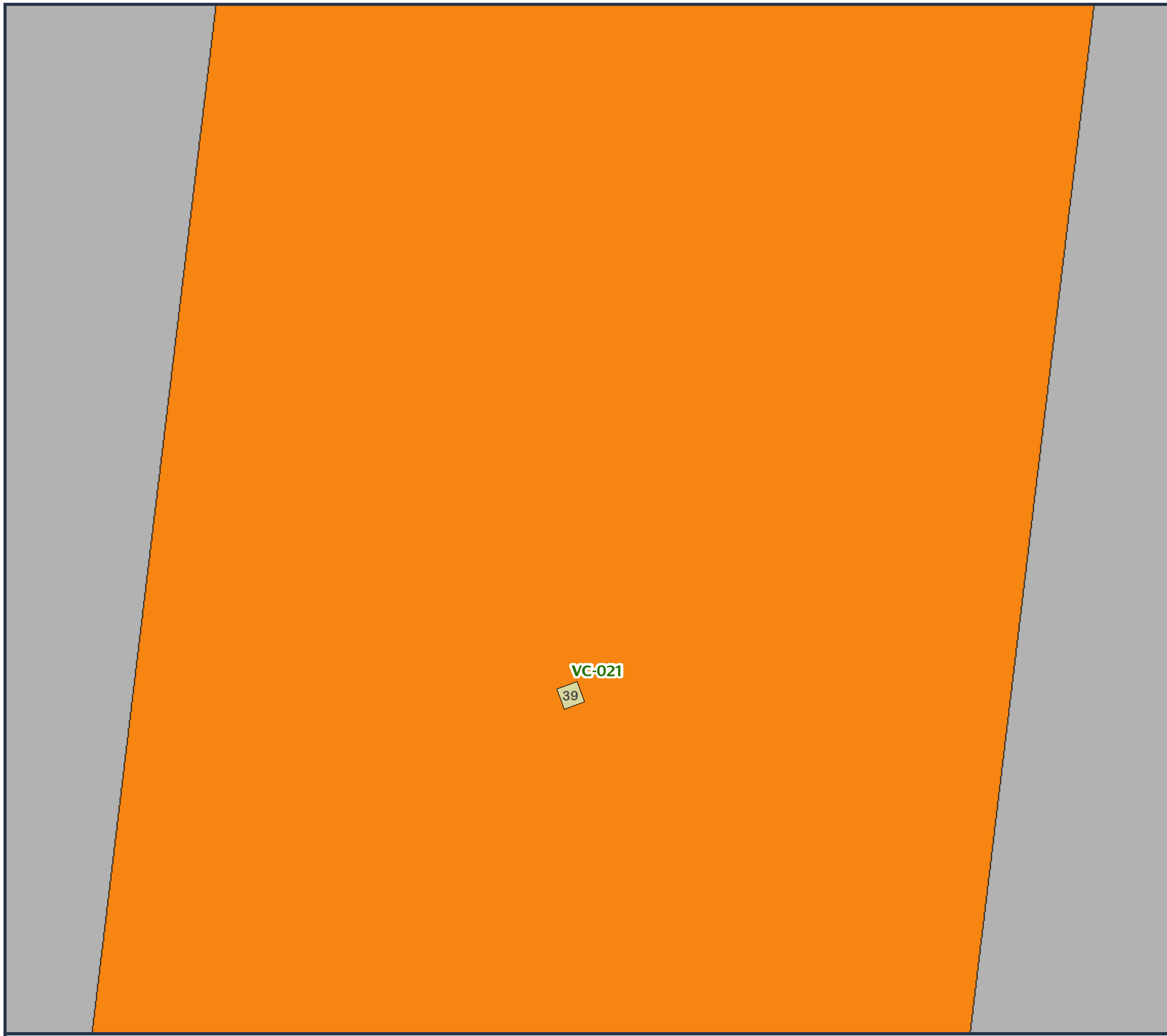
Scale 1:5,000
1 inch = 0 km

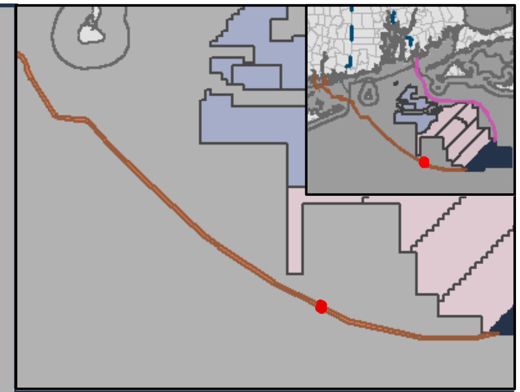
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





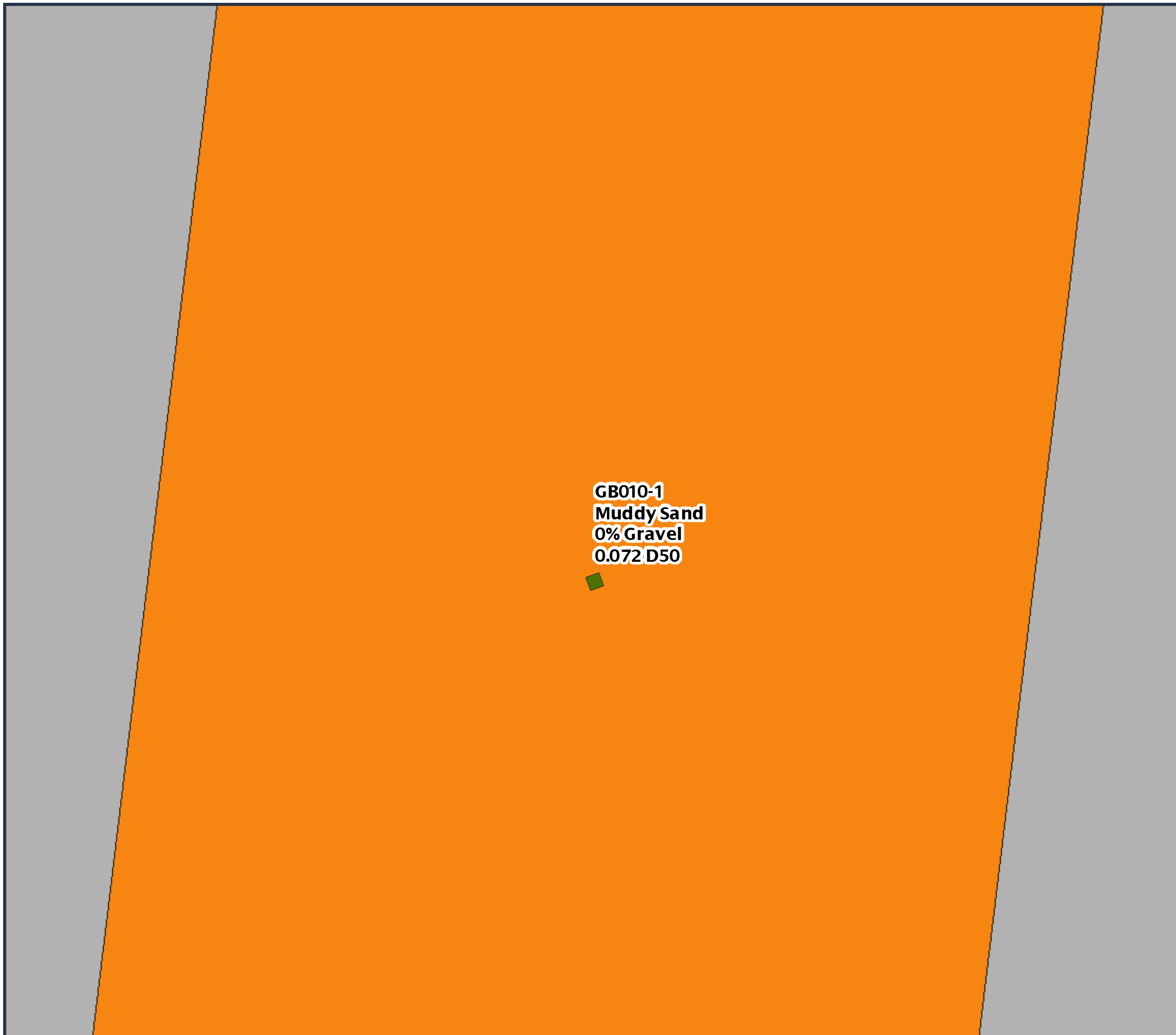
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Soft Station - Vibracore

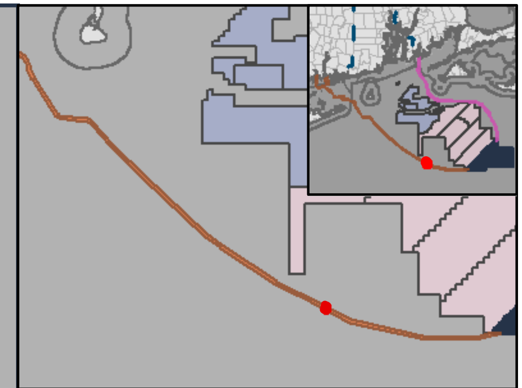
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





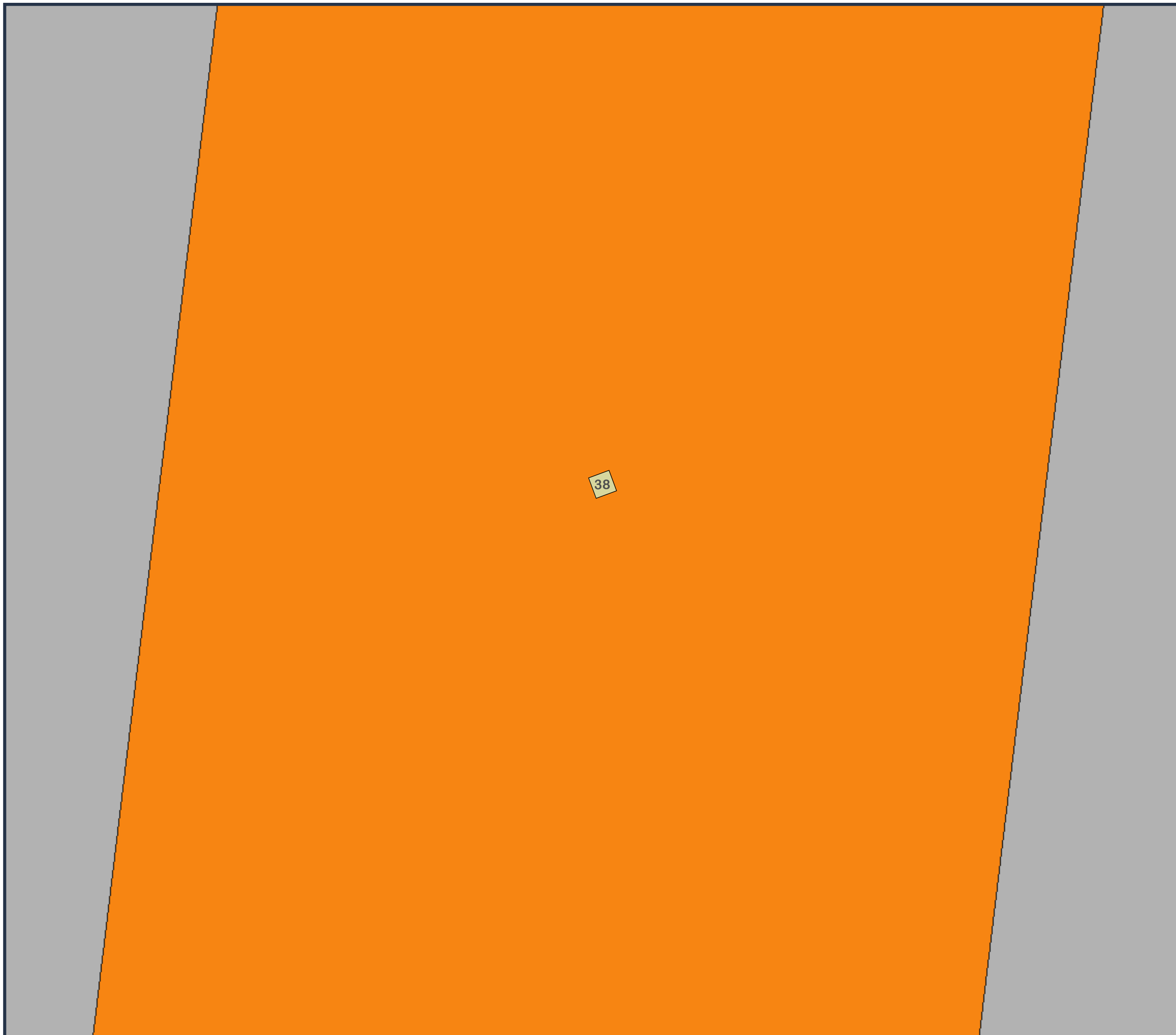
LEGEND

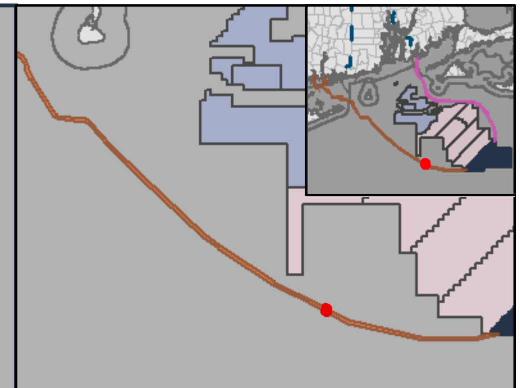
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat

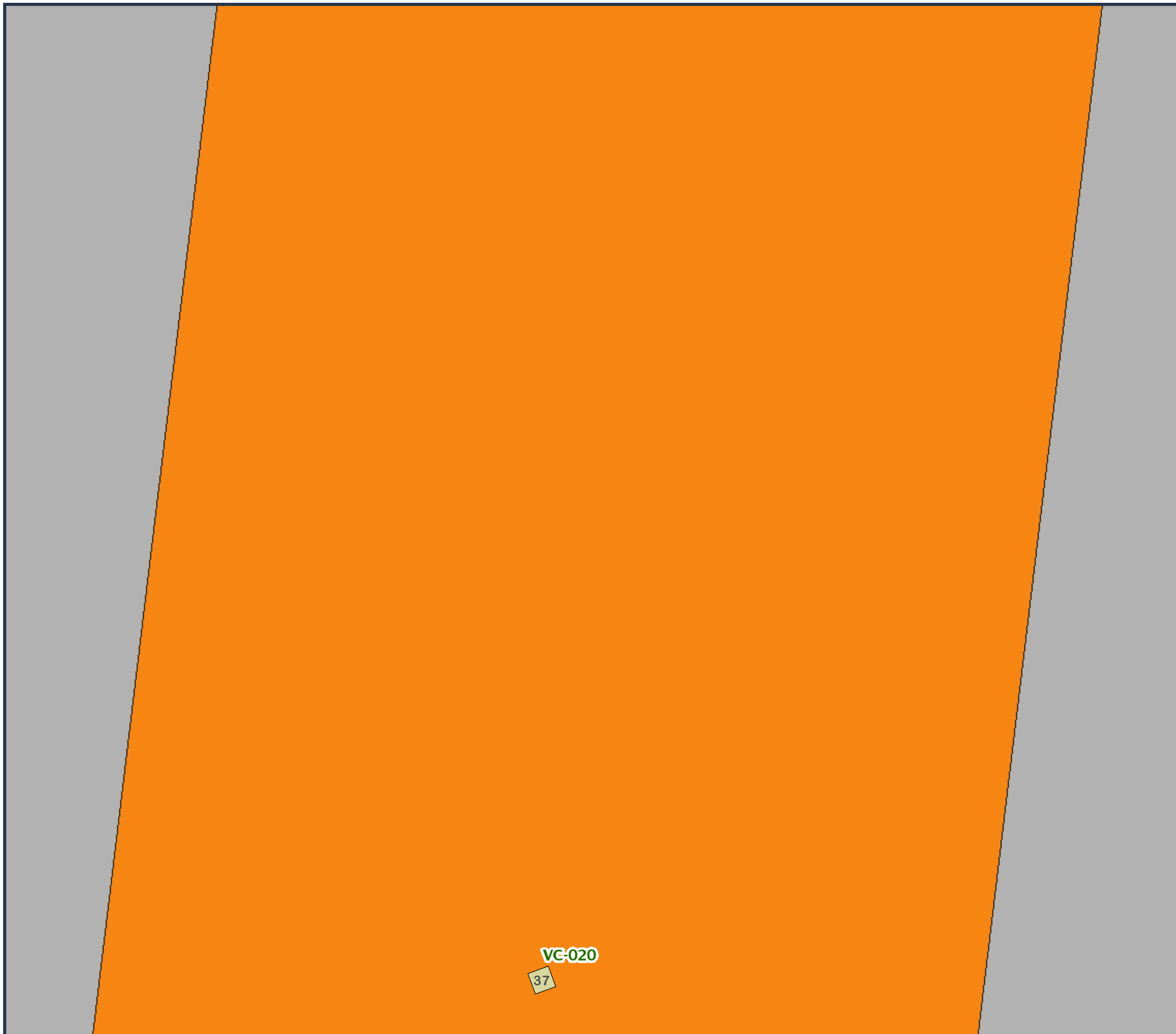
Scale 1:5,000
1 inch = 0 km

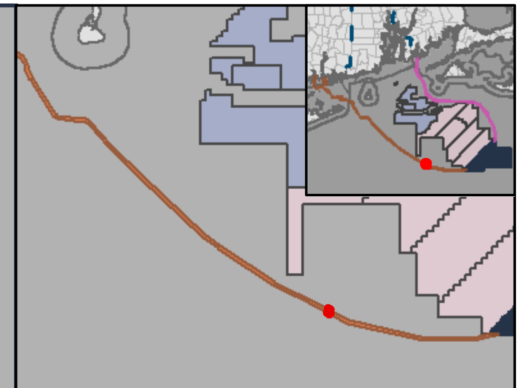
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

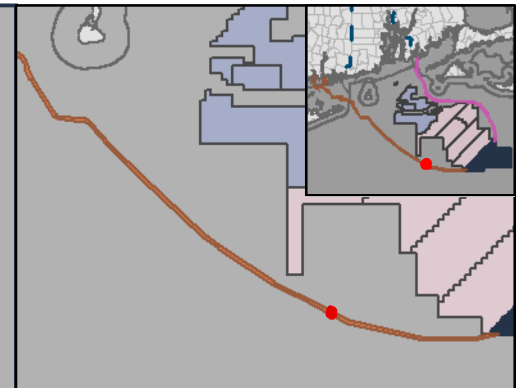
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



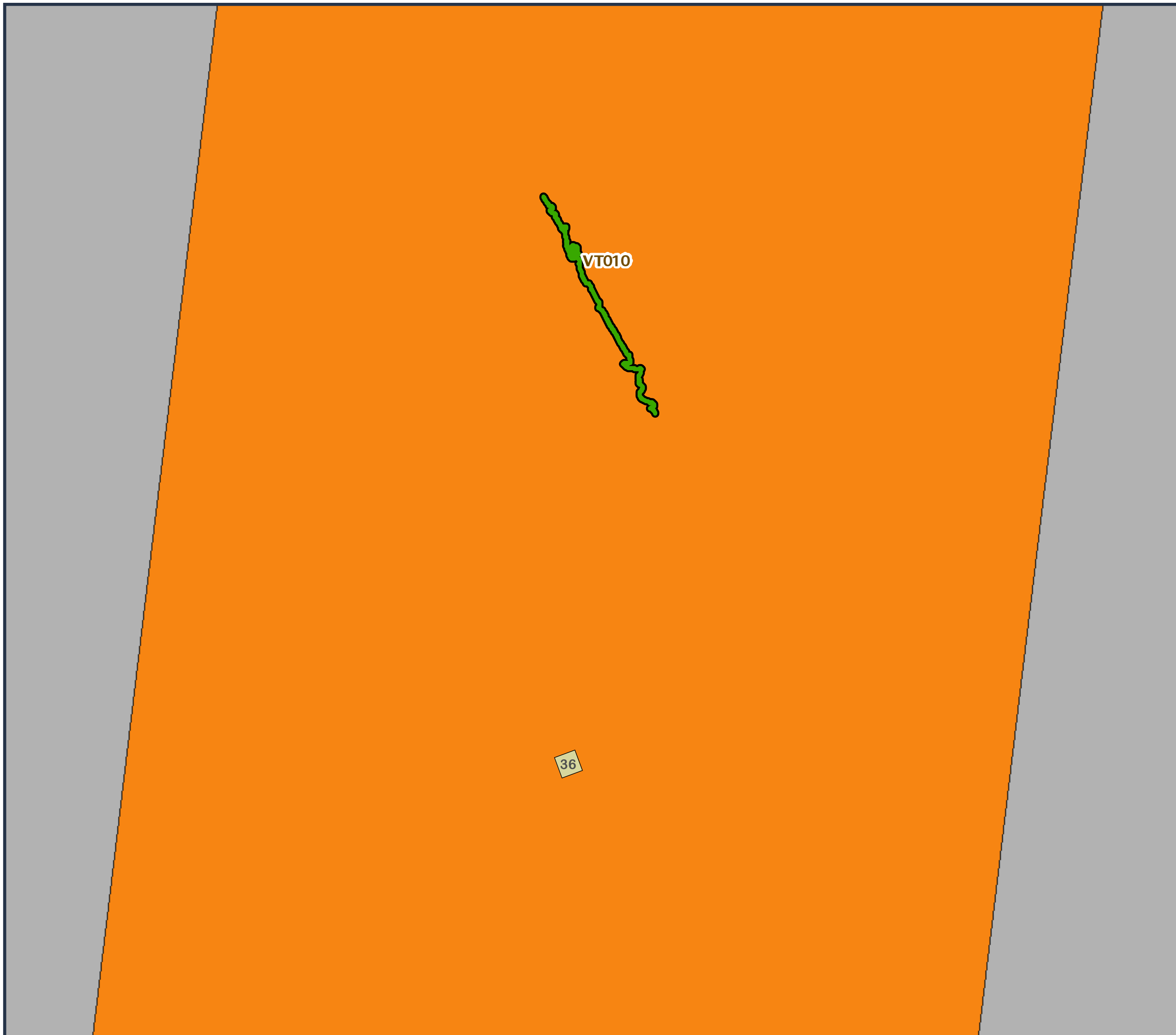
LEGEND

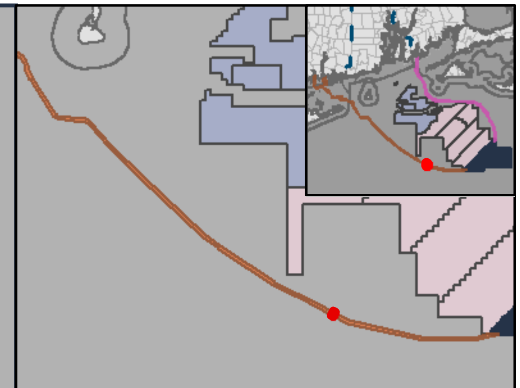
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI





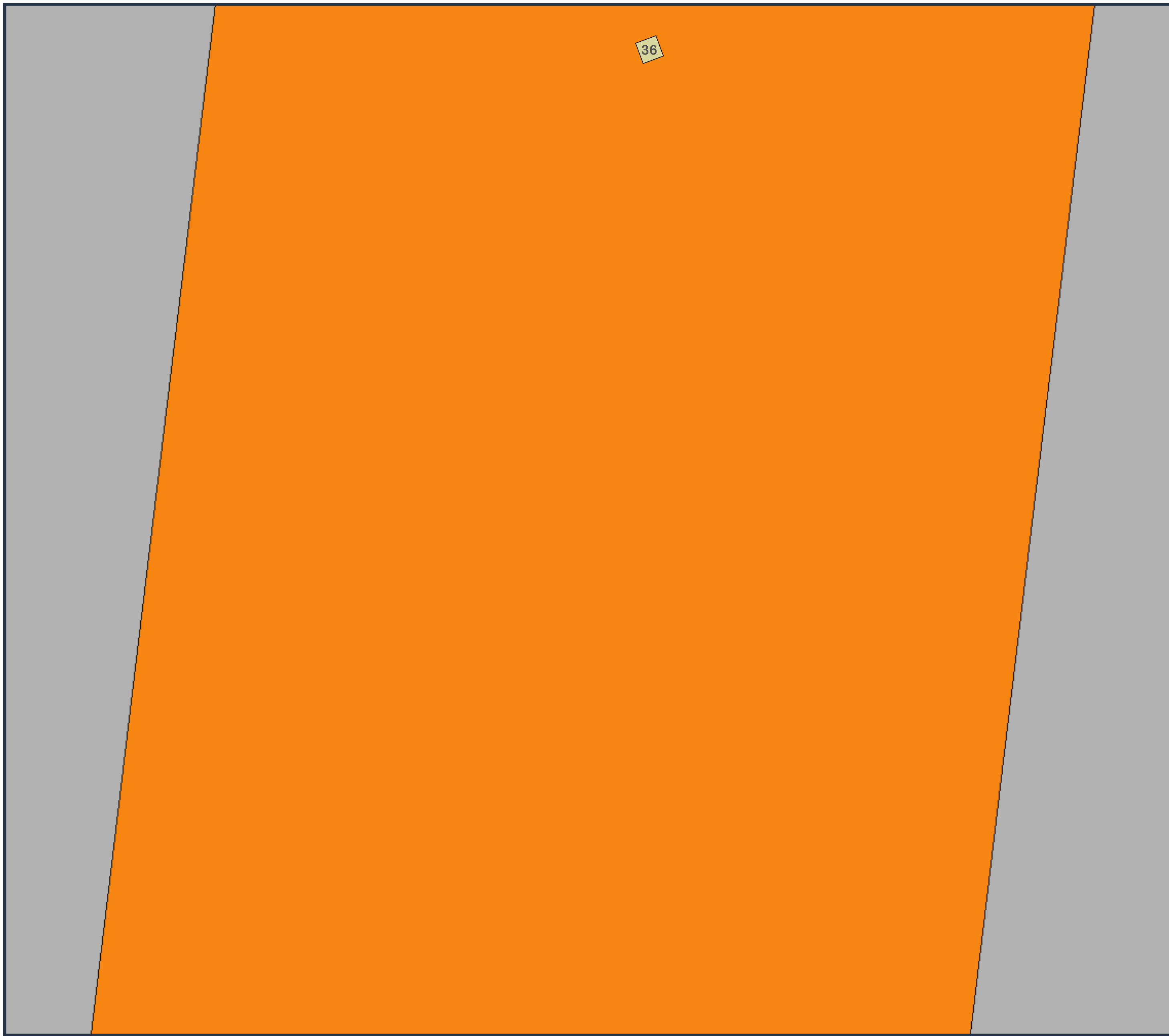
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Soft Bottom Station - Video Transect

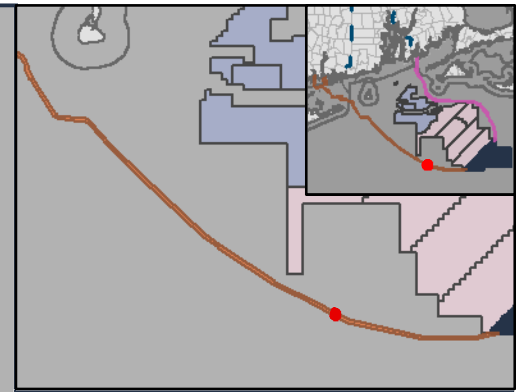
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat

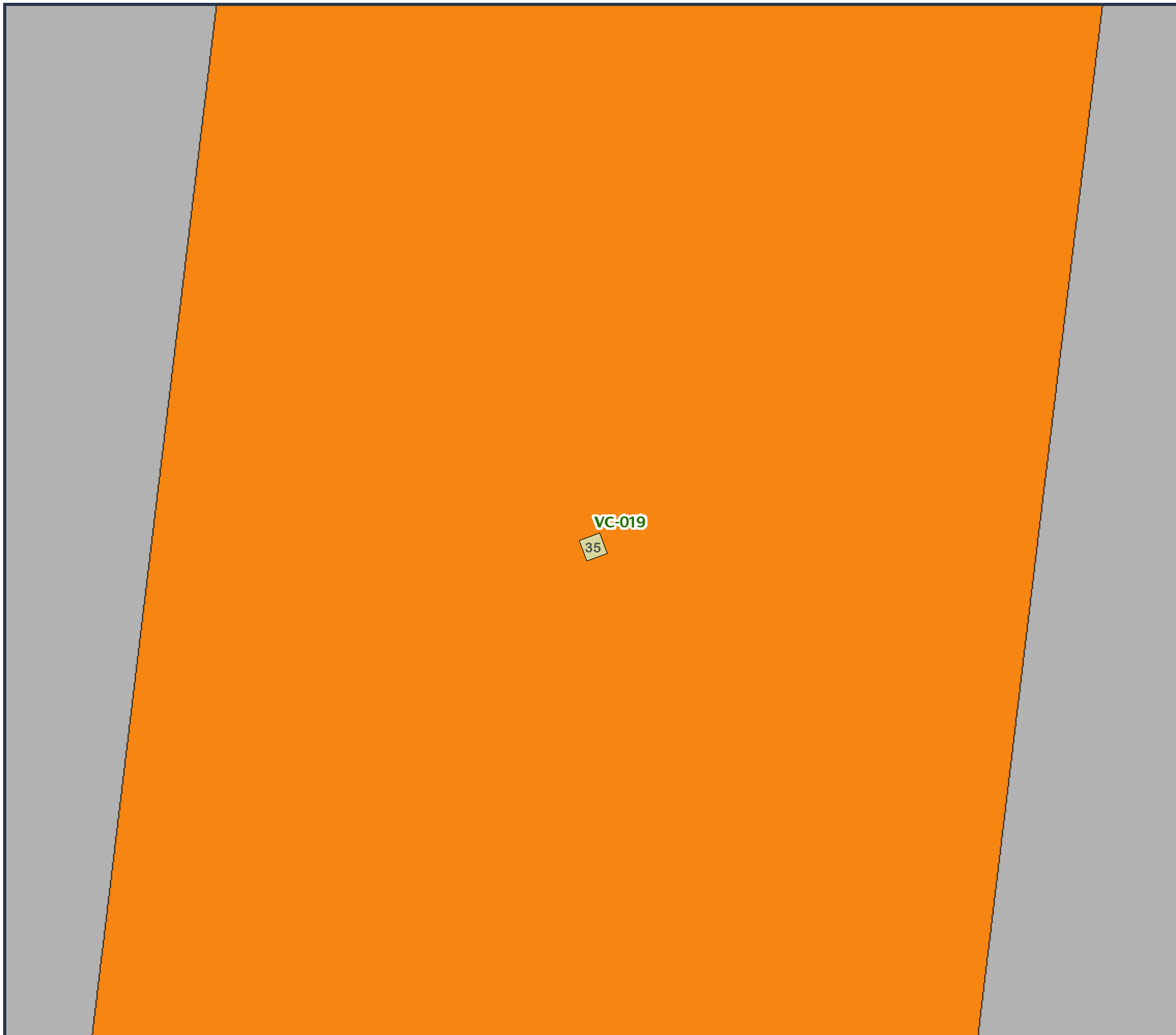
Scale 1:5,000
1 inch = 0 km

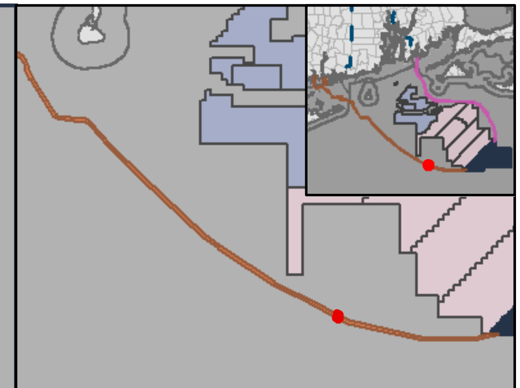
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

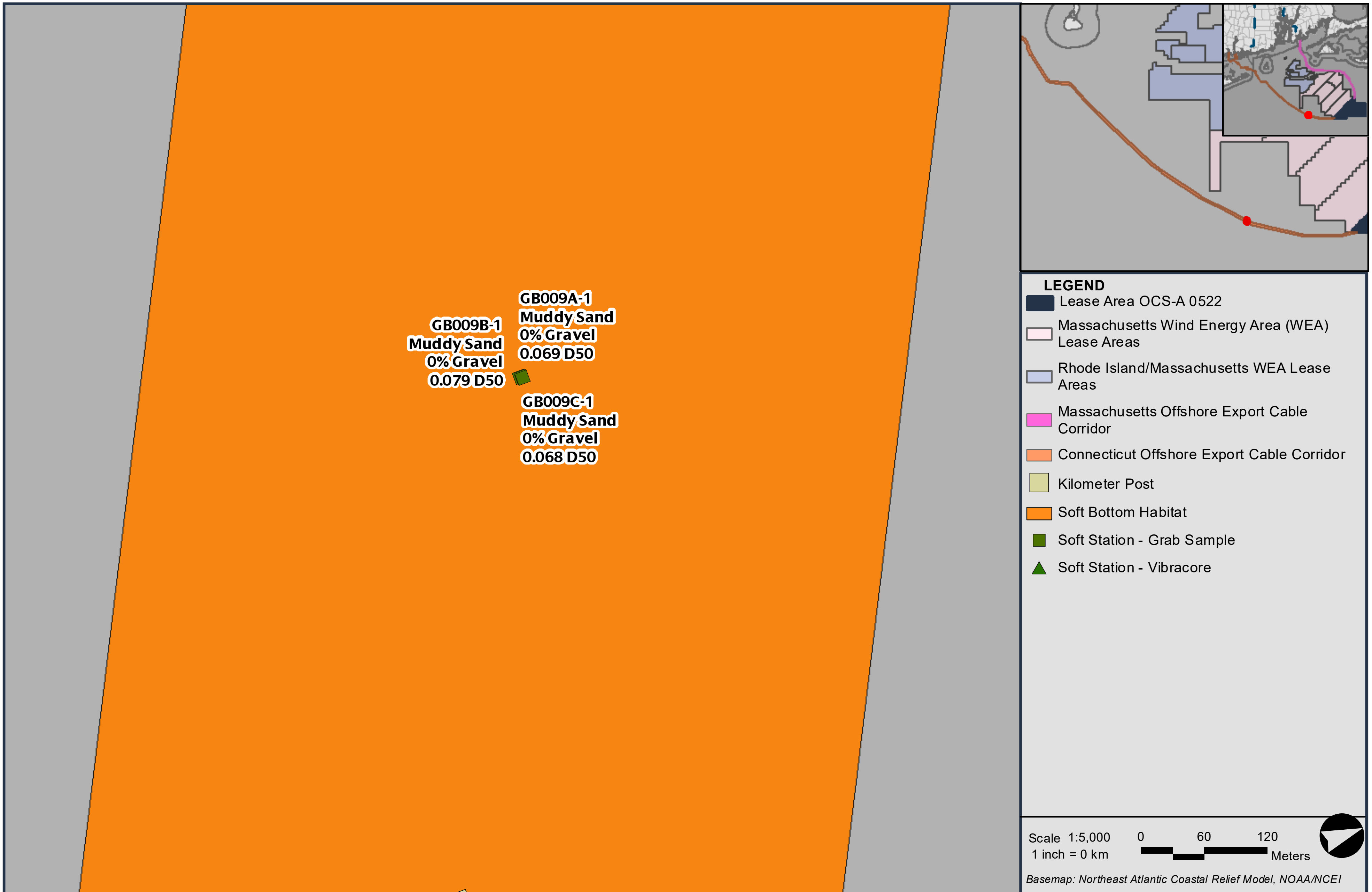
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

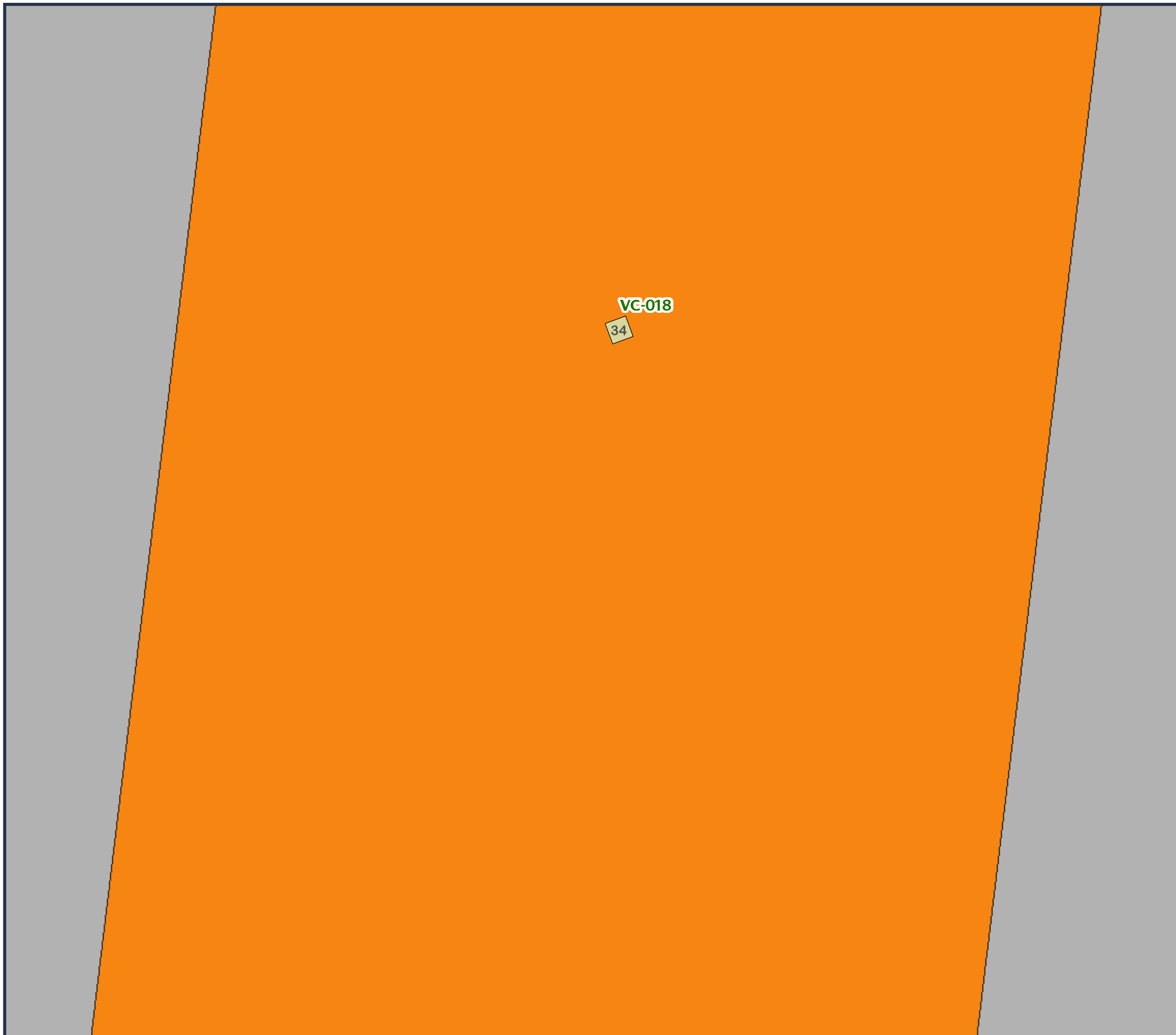
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

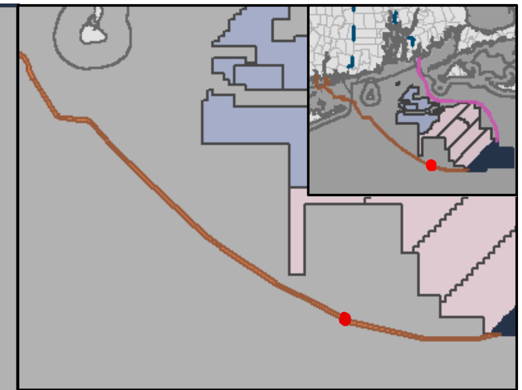
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

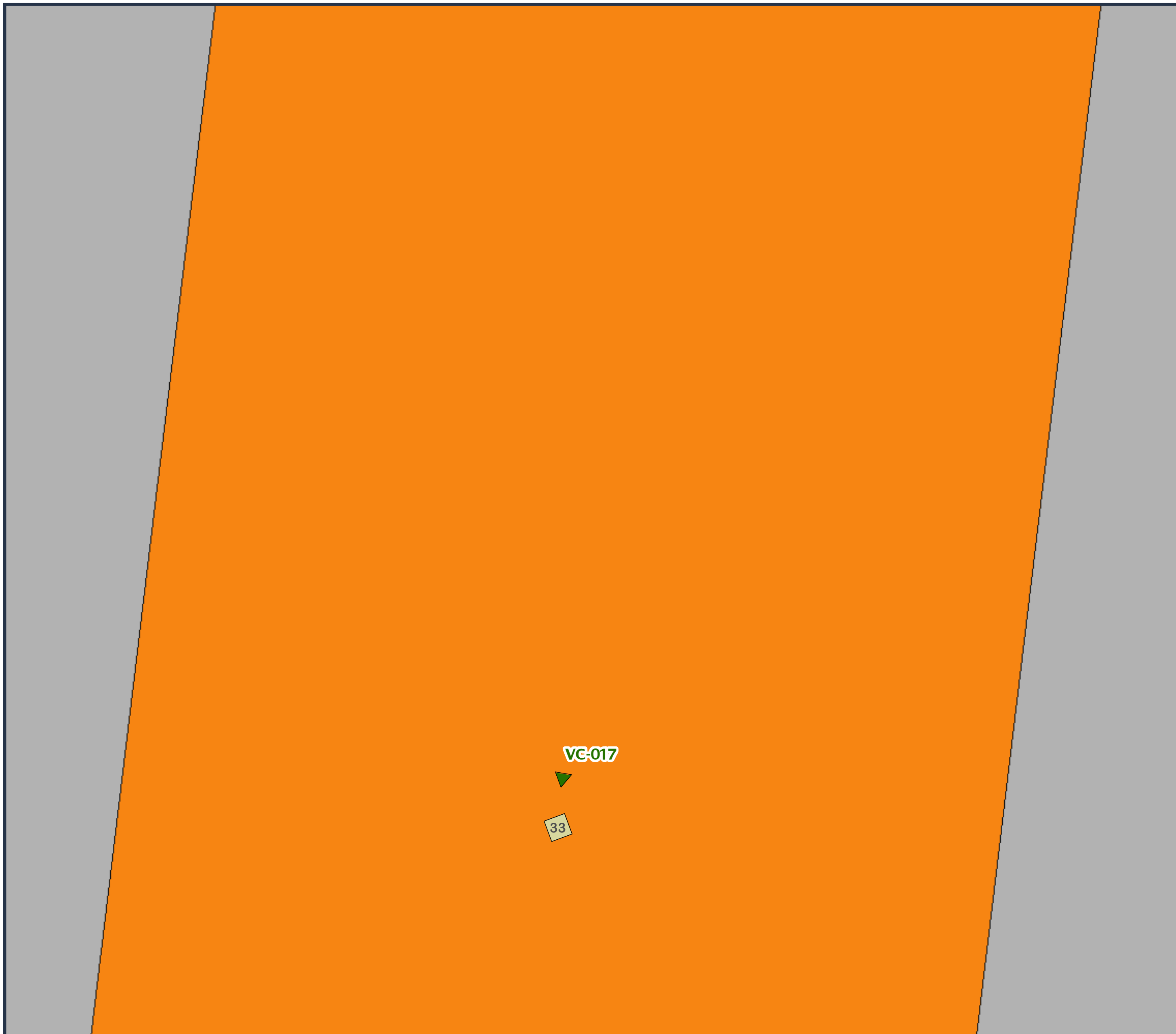
Scale 1:5,000
1 inch = 0 km

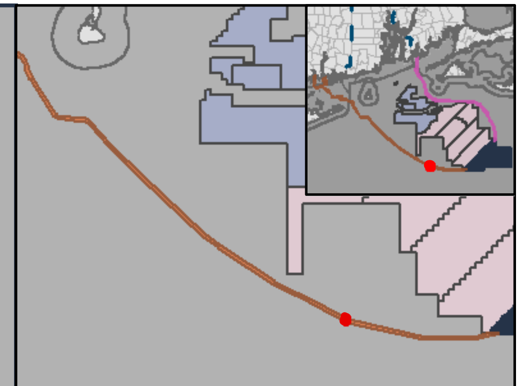
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

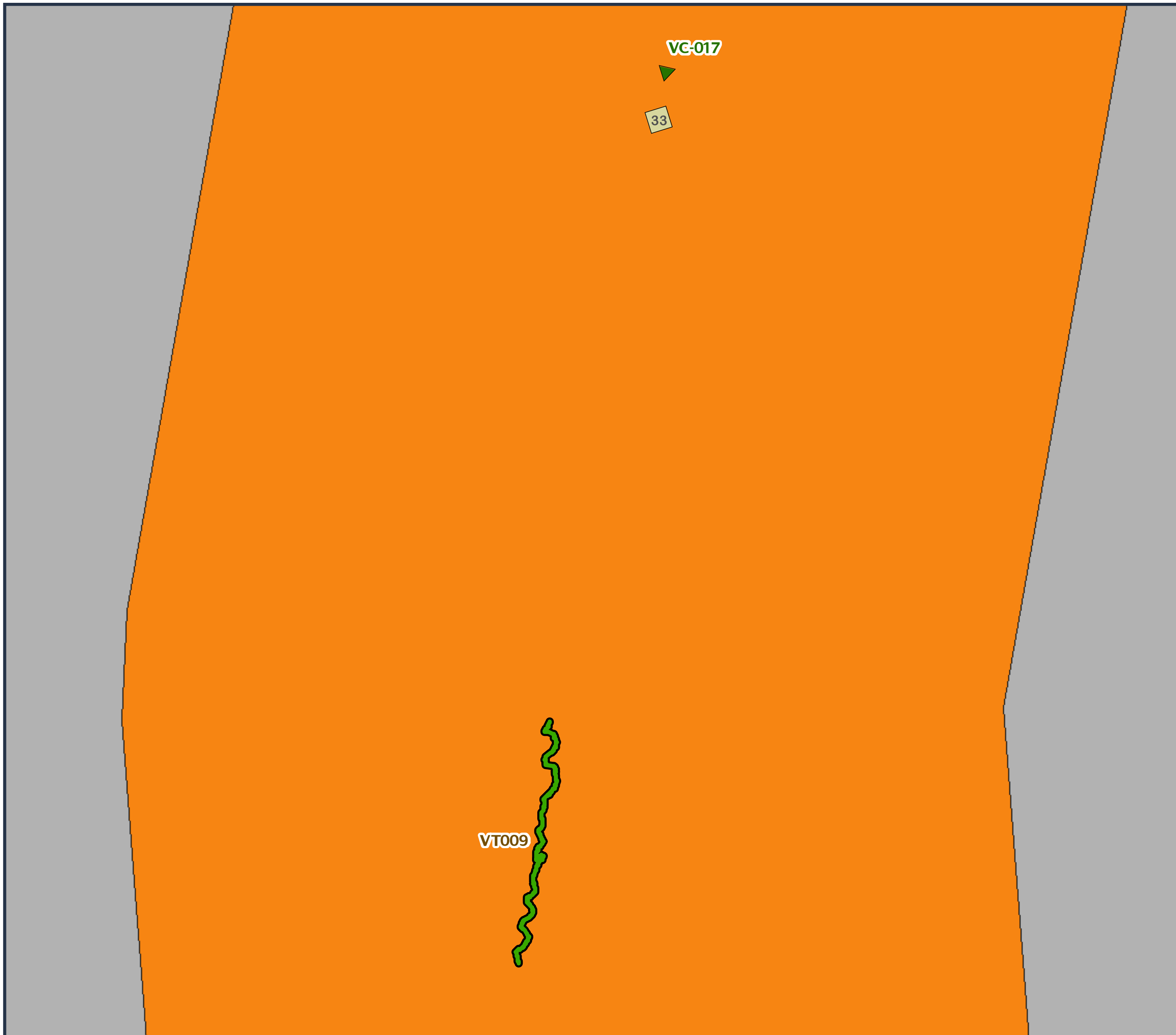
Scale 1:5,000
1 inch = 0 km

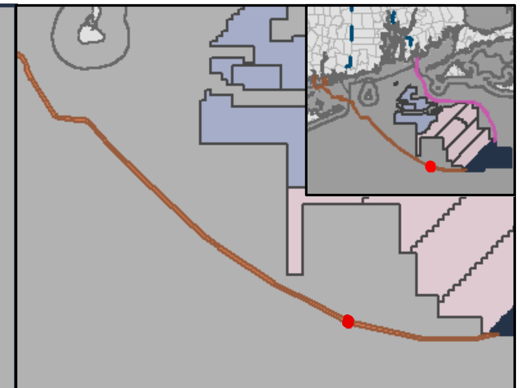
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





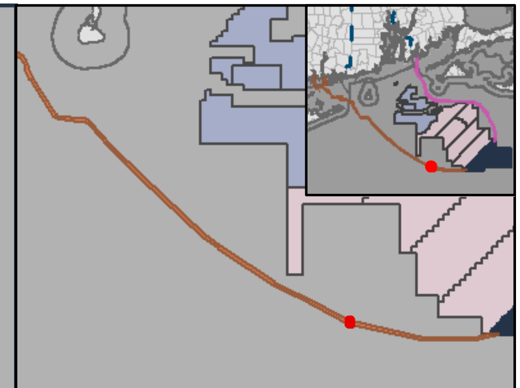
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Soft Station - Vibracore
Soft Bottom Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

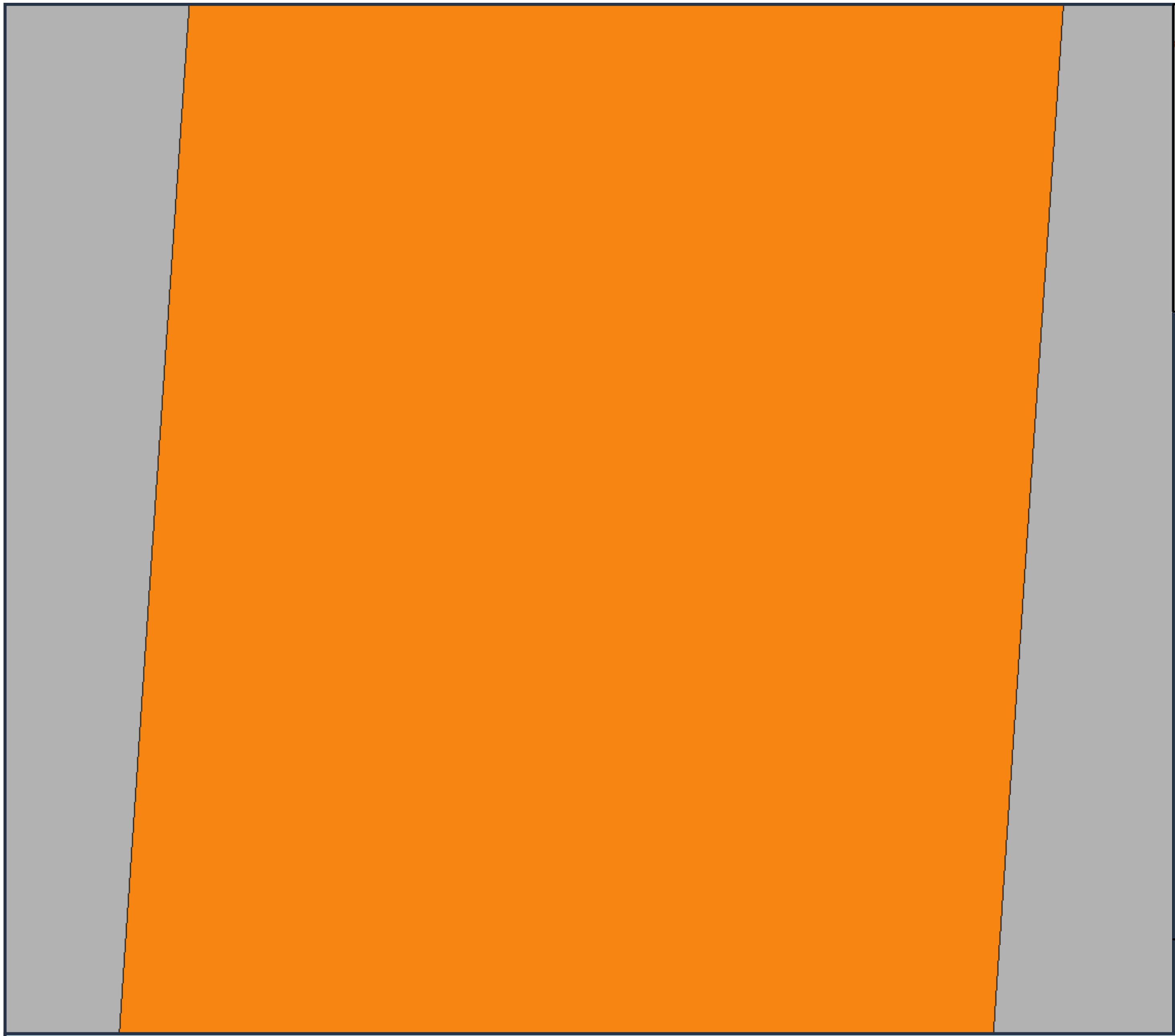
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Bottom Station - Video Transect

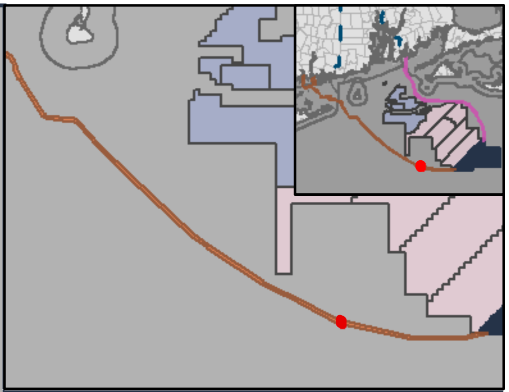
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Soft Bottom Habitat

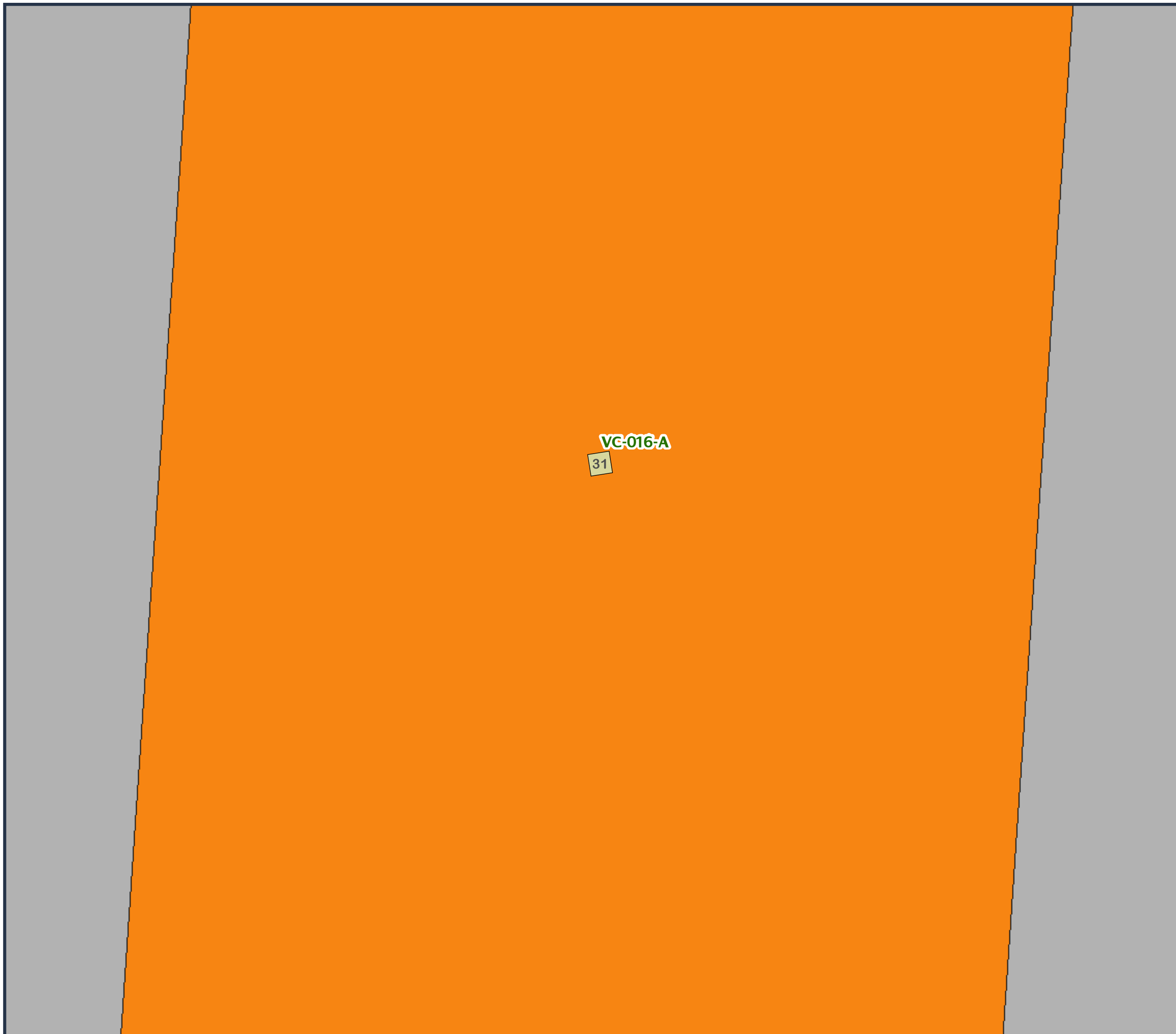
Scale 1:5,000
1 inch = 0 km

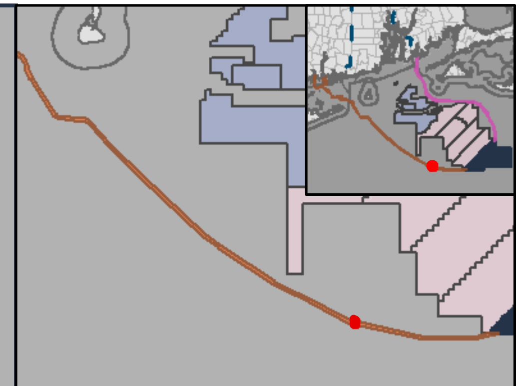
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

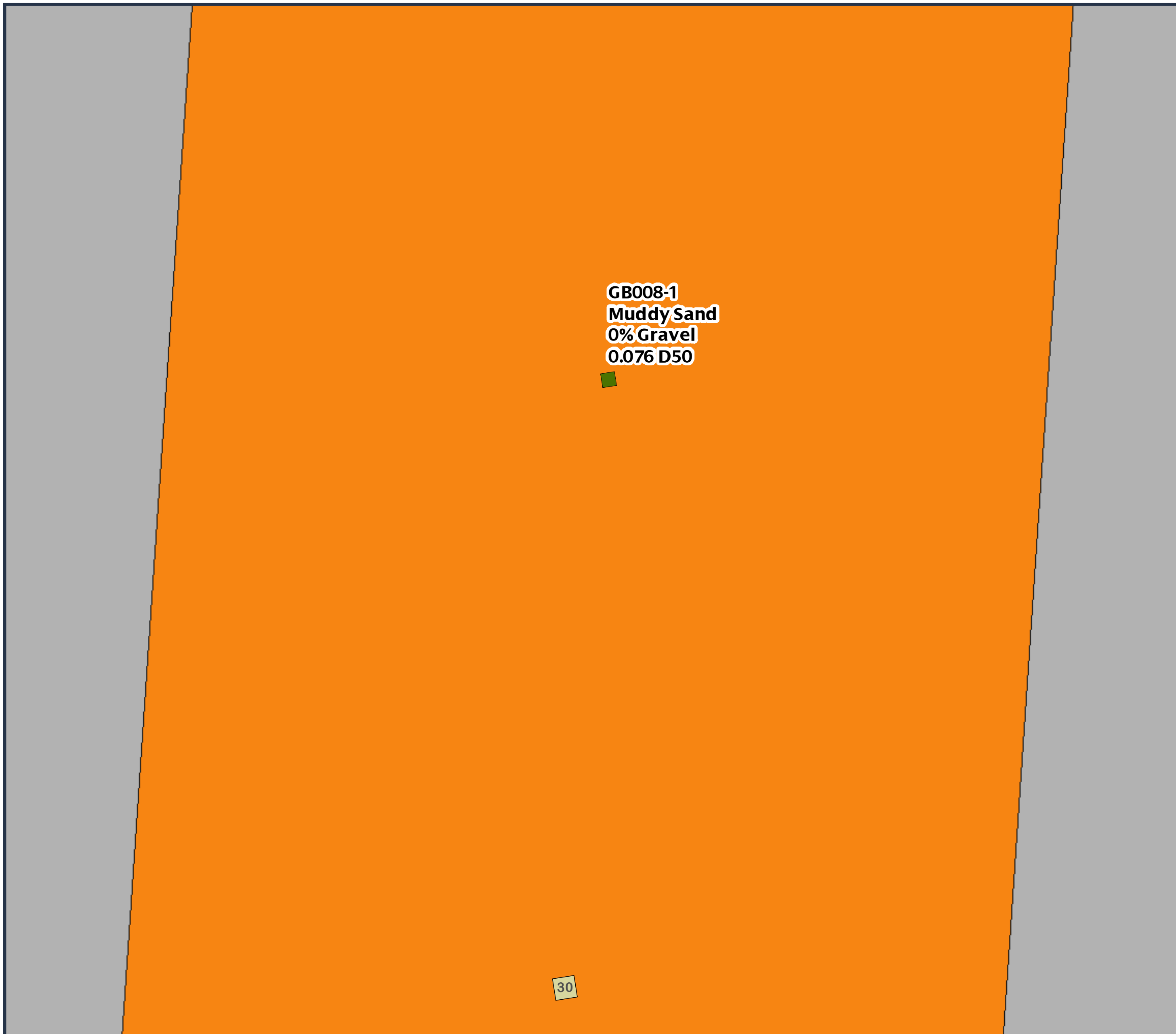
Scale 1:5,000
1 inch = 0 km

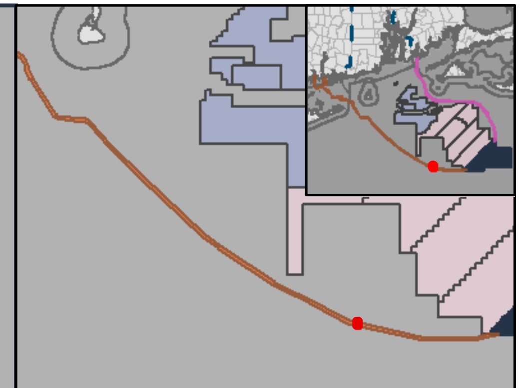
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample

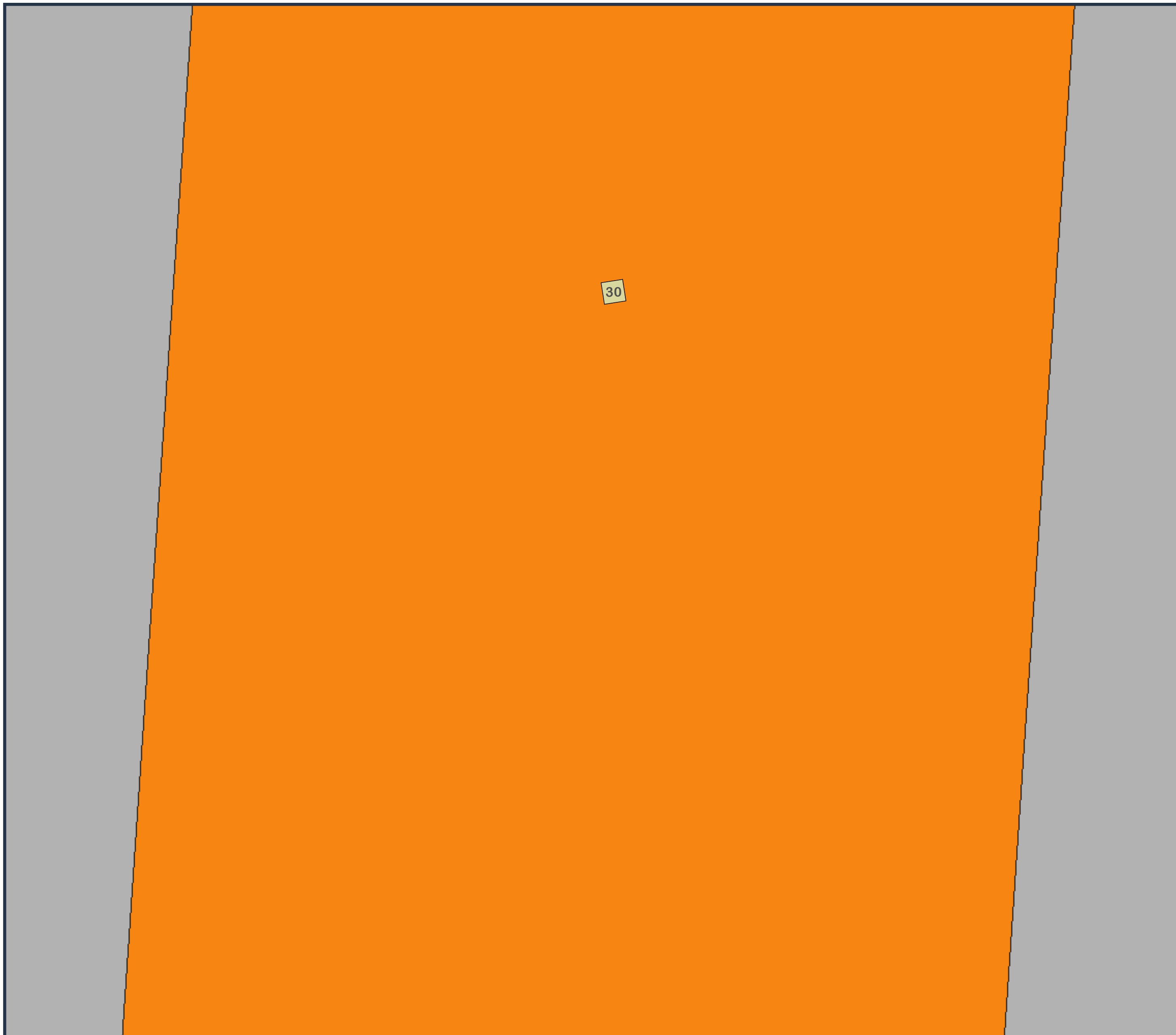
Scale 1:5,000
1 inch = 0 km

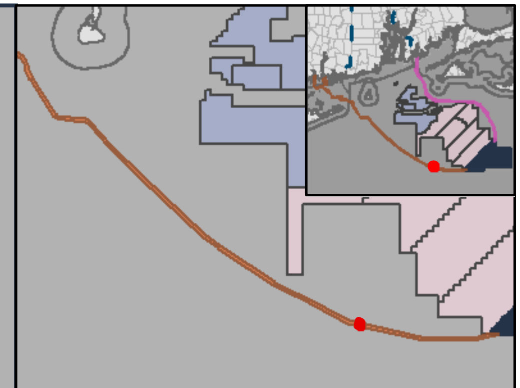
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





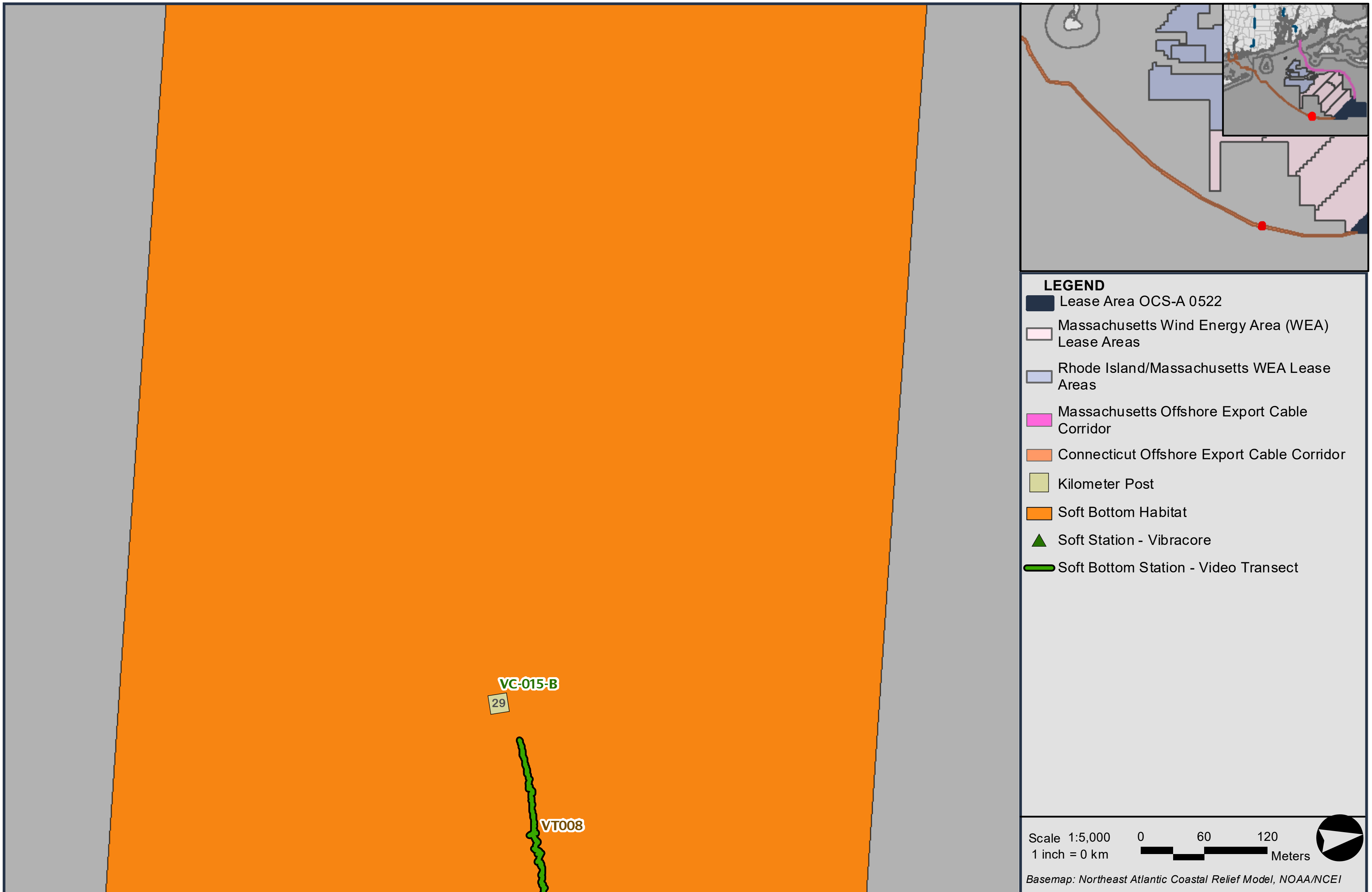
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat

Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

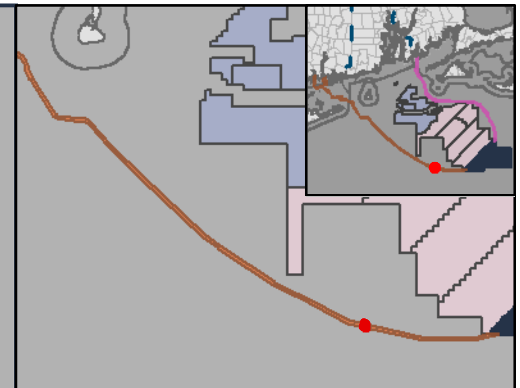
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

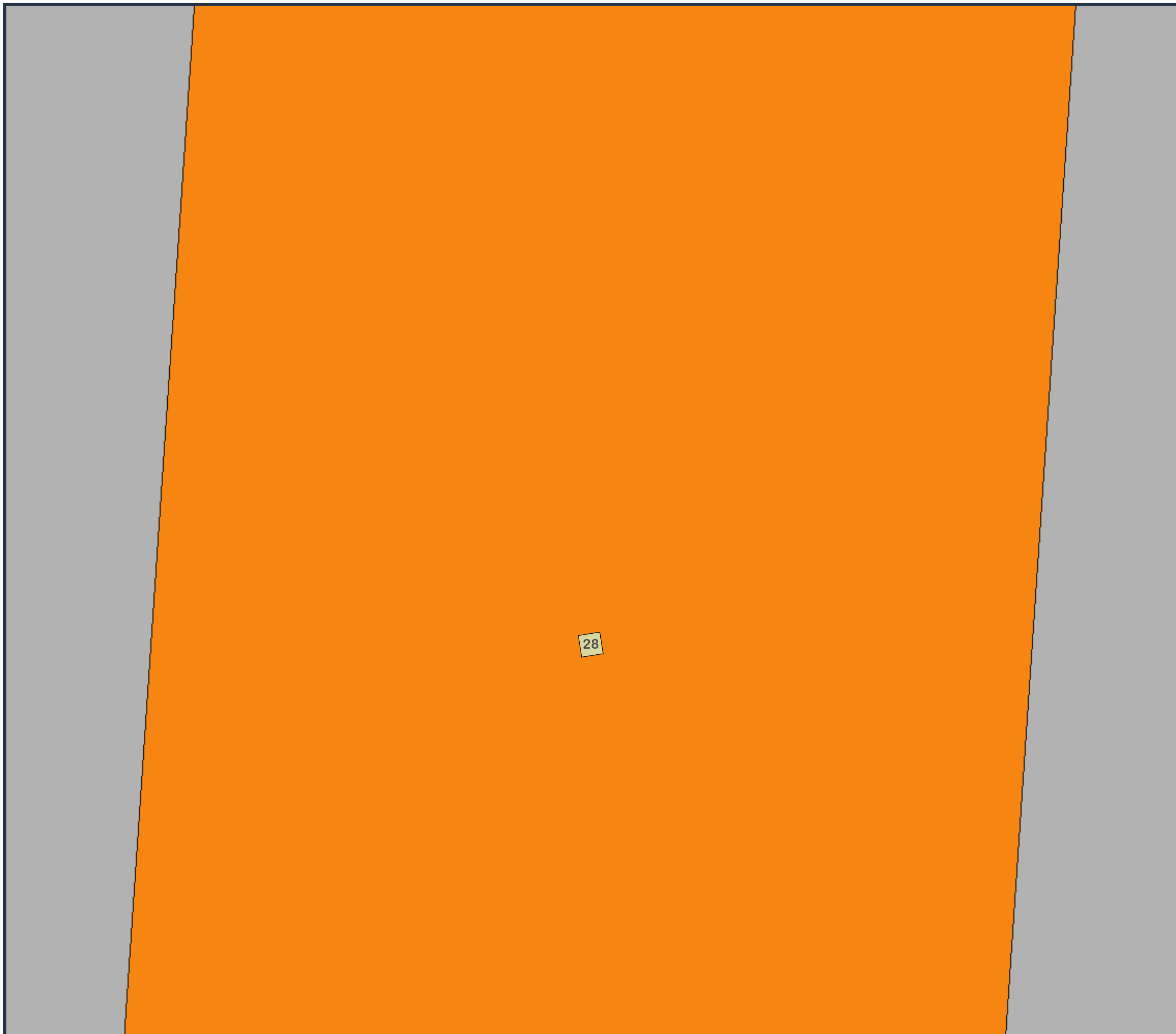
Scale 1:5,000
1 inch = 0 km

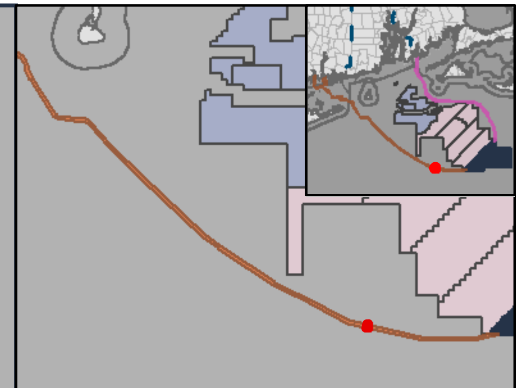
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

Lease Area OCS-A 0522

Massachusetts Wind Energy Area (WEA) Lease Areas

Rhode Island/Massachusetts WEA Lease Areas

Massachusetts Offshore Export Cable Corridor

Connecticut Offshore Export Cable Corridor

Kilometer Post

Soft Bottom Habitat

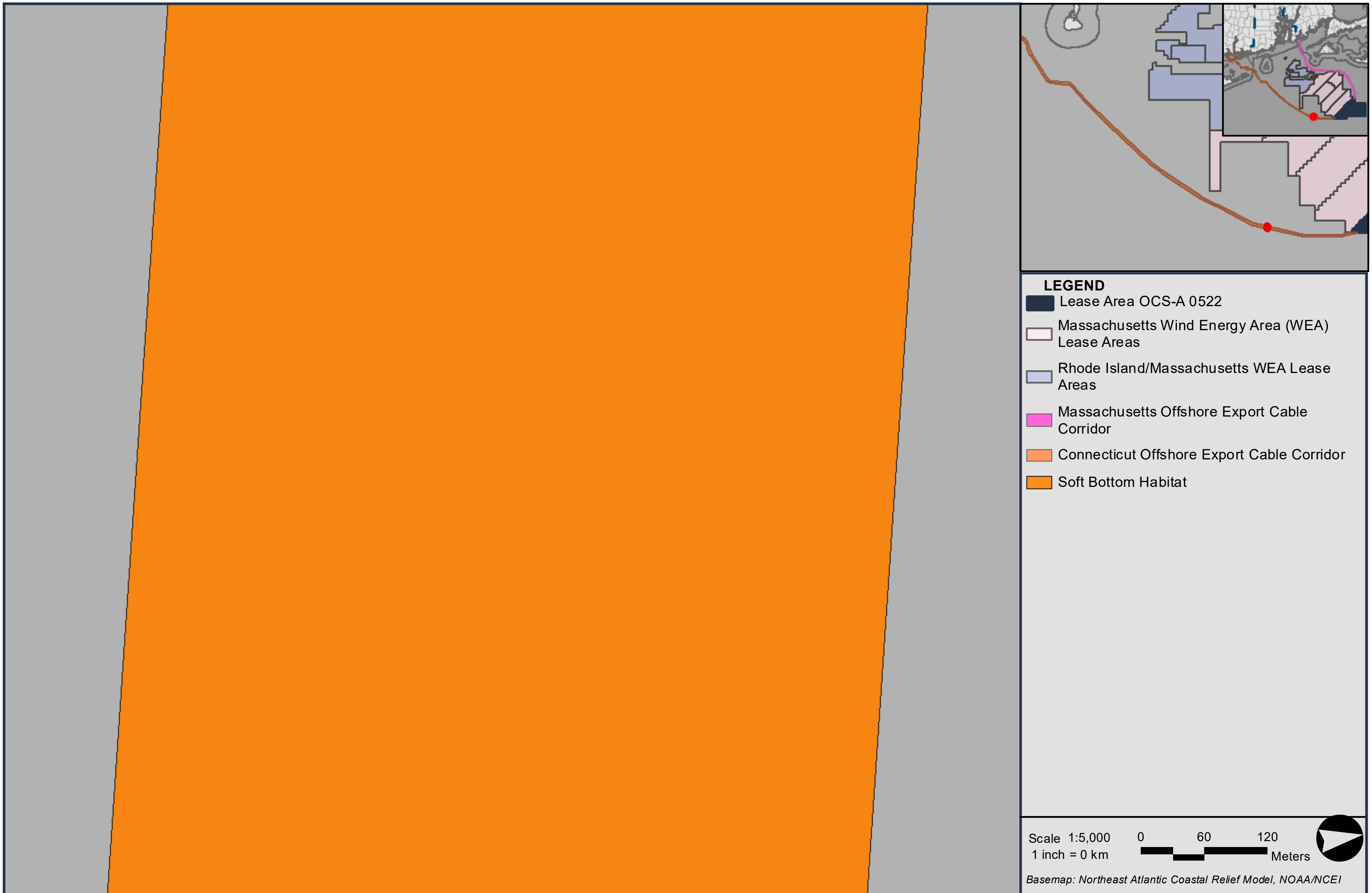
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

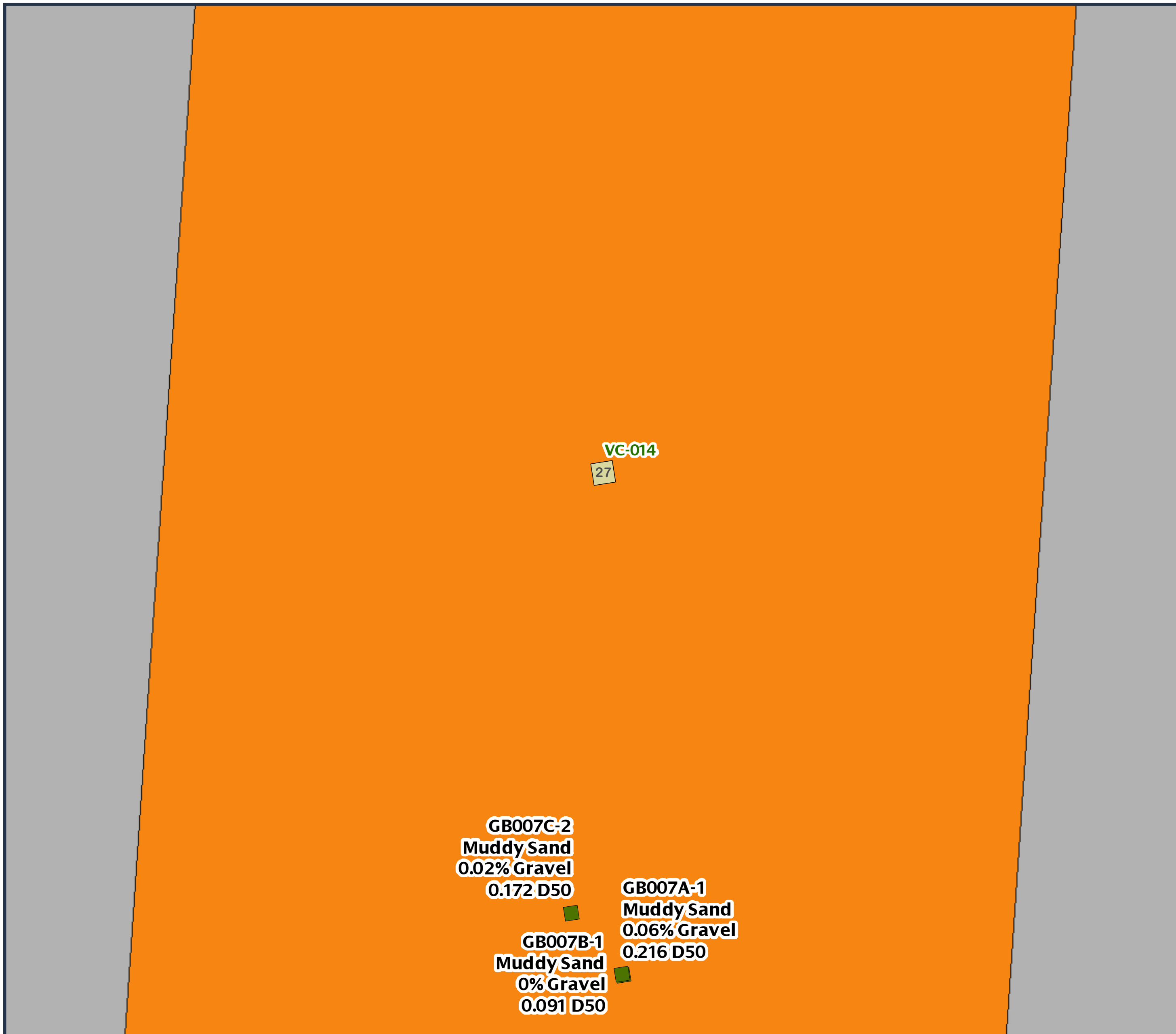
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

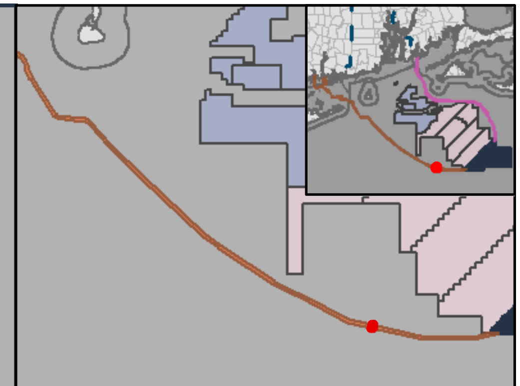
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC





LEGEND

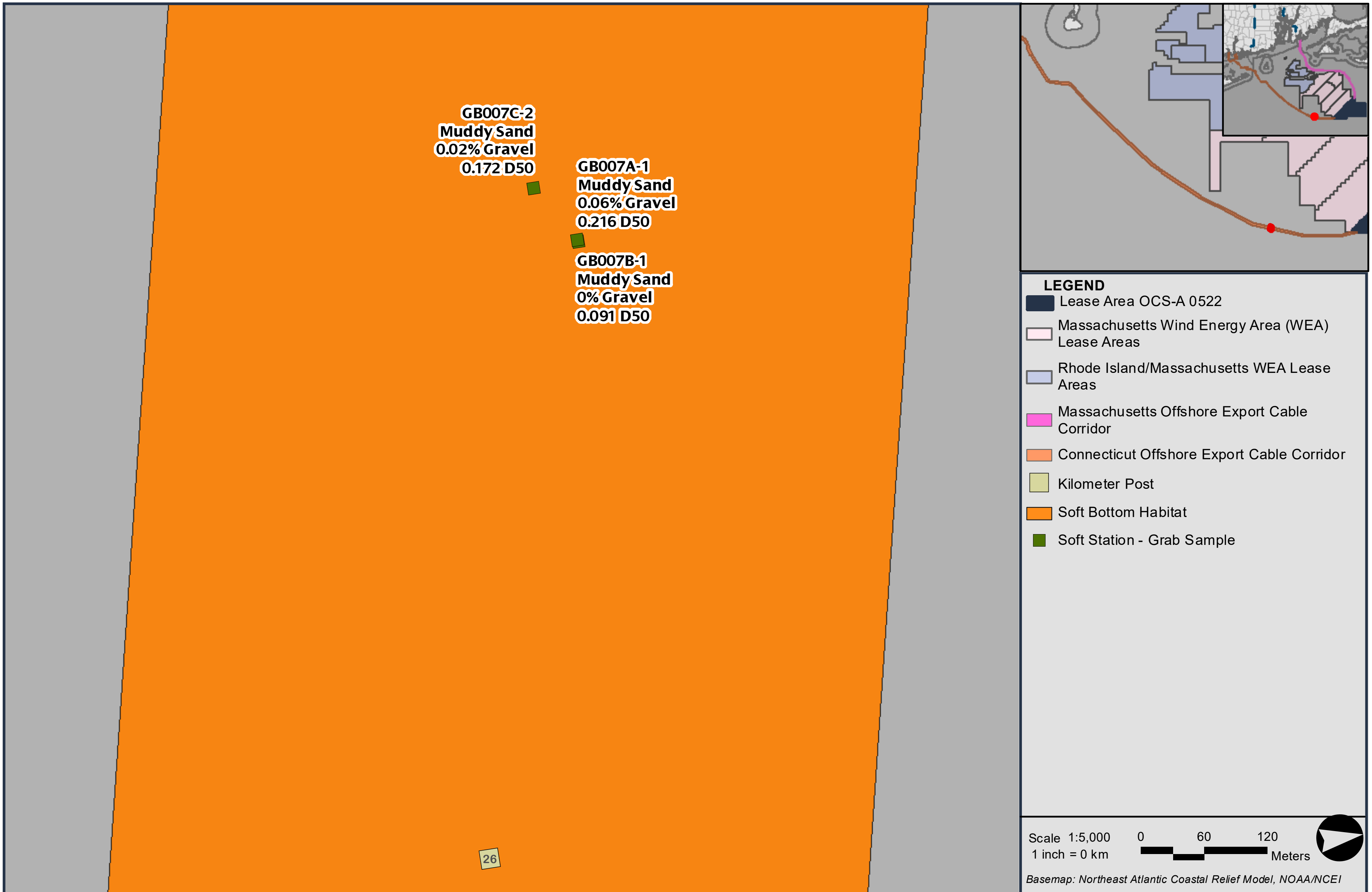
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

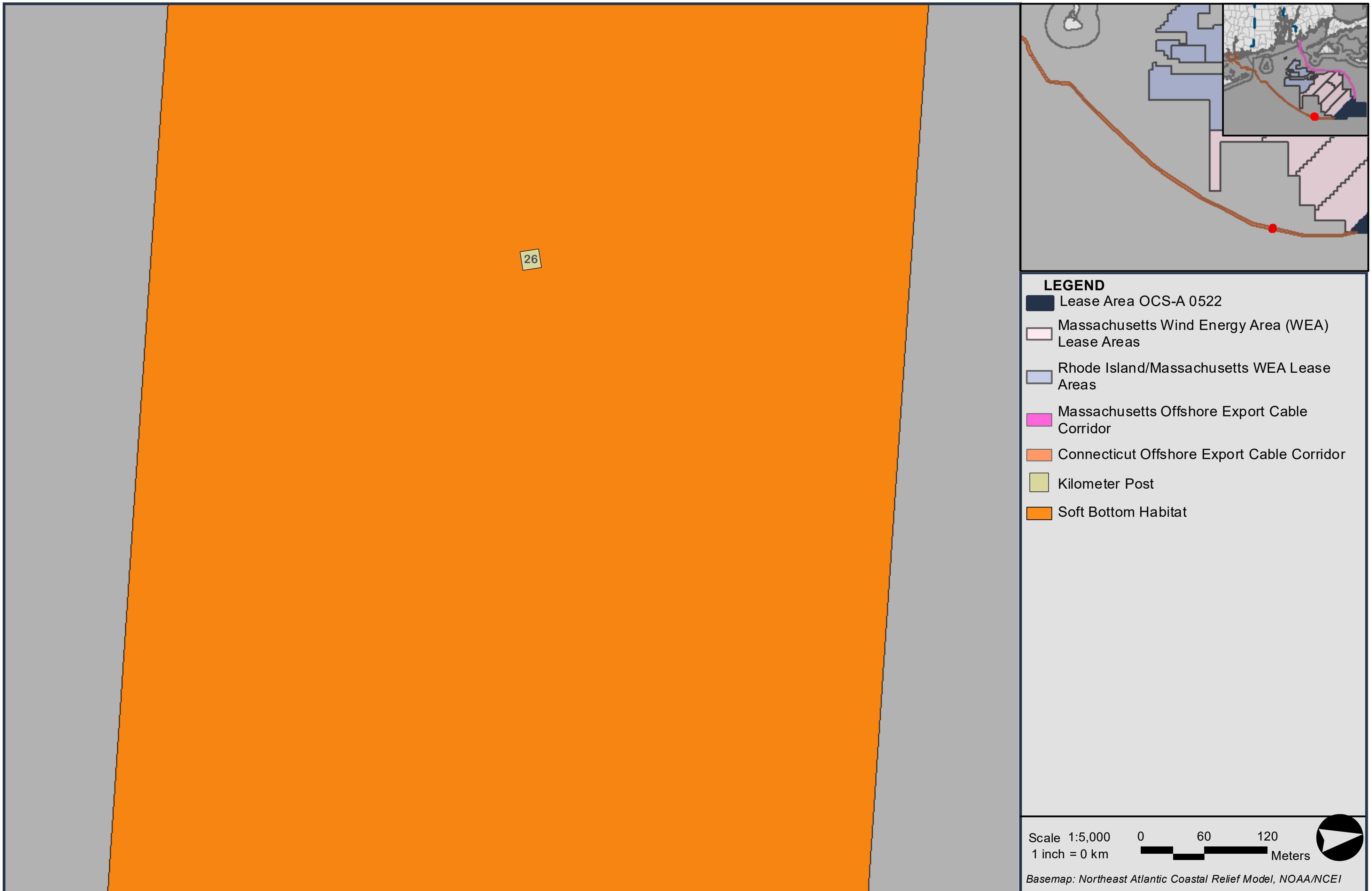
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



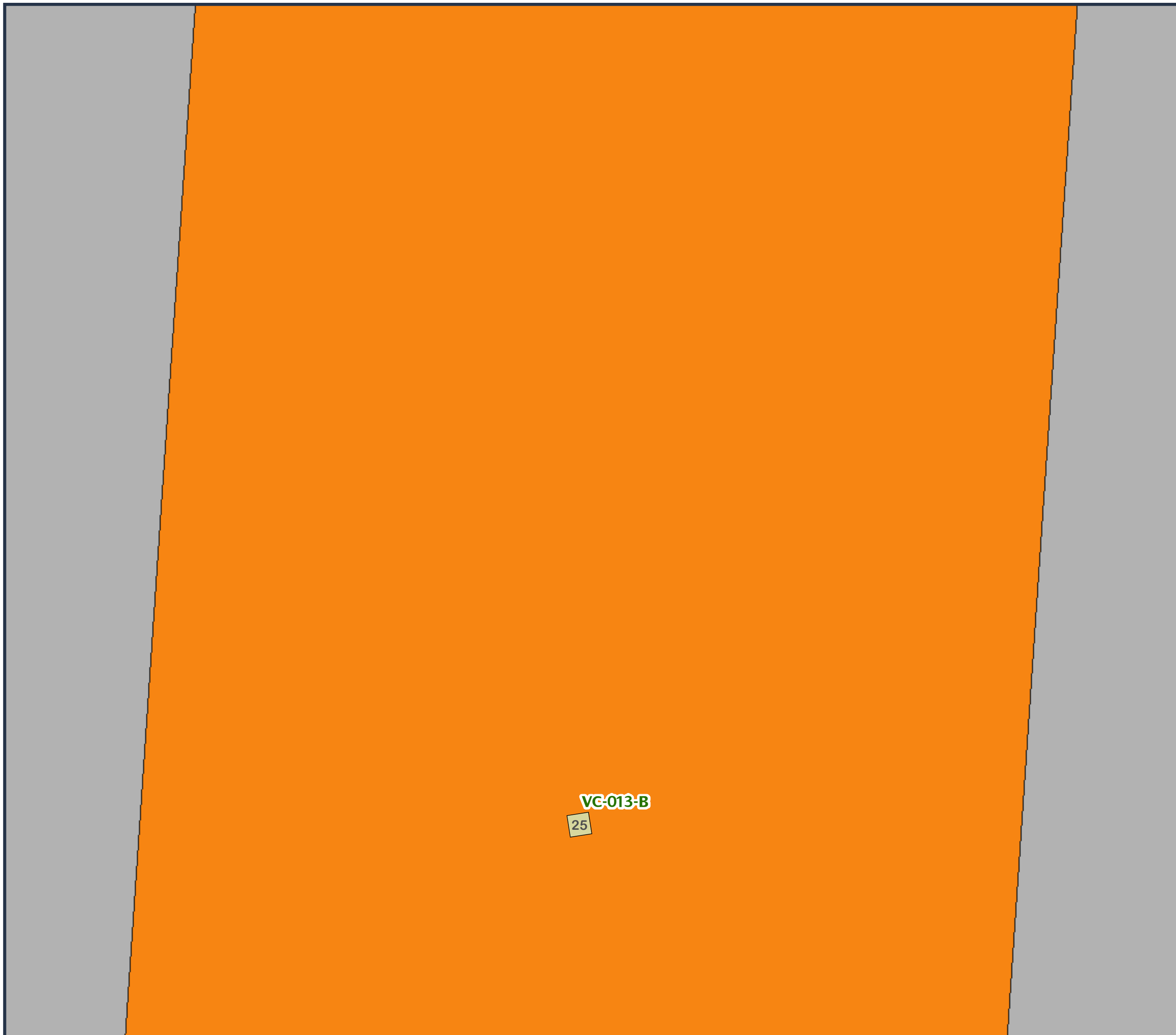
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

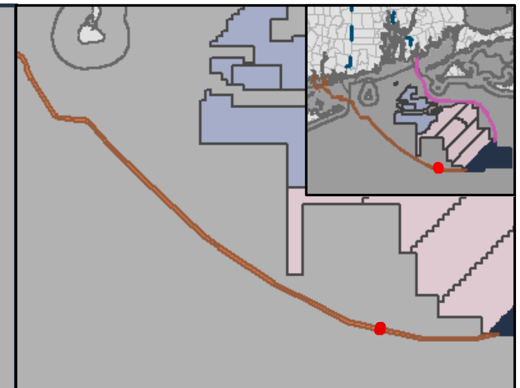
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

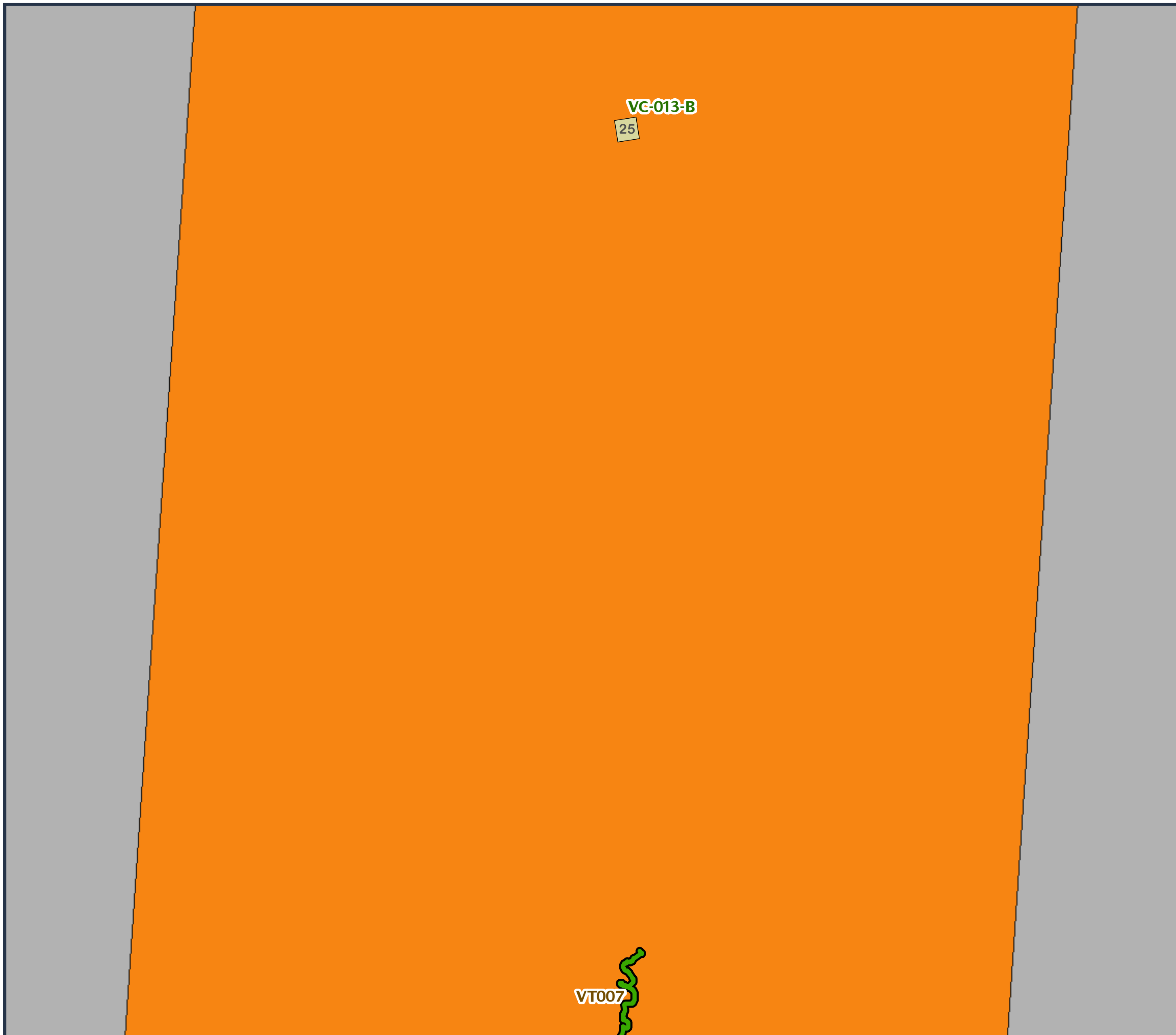
Scale 1:5,000
1 inch = 0 km

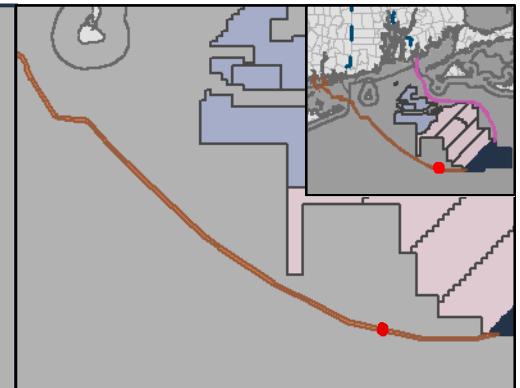
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

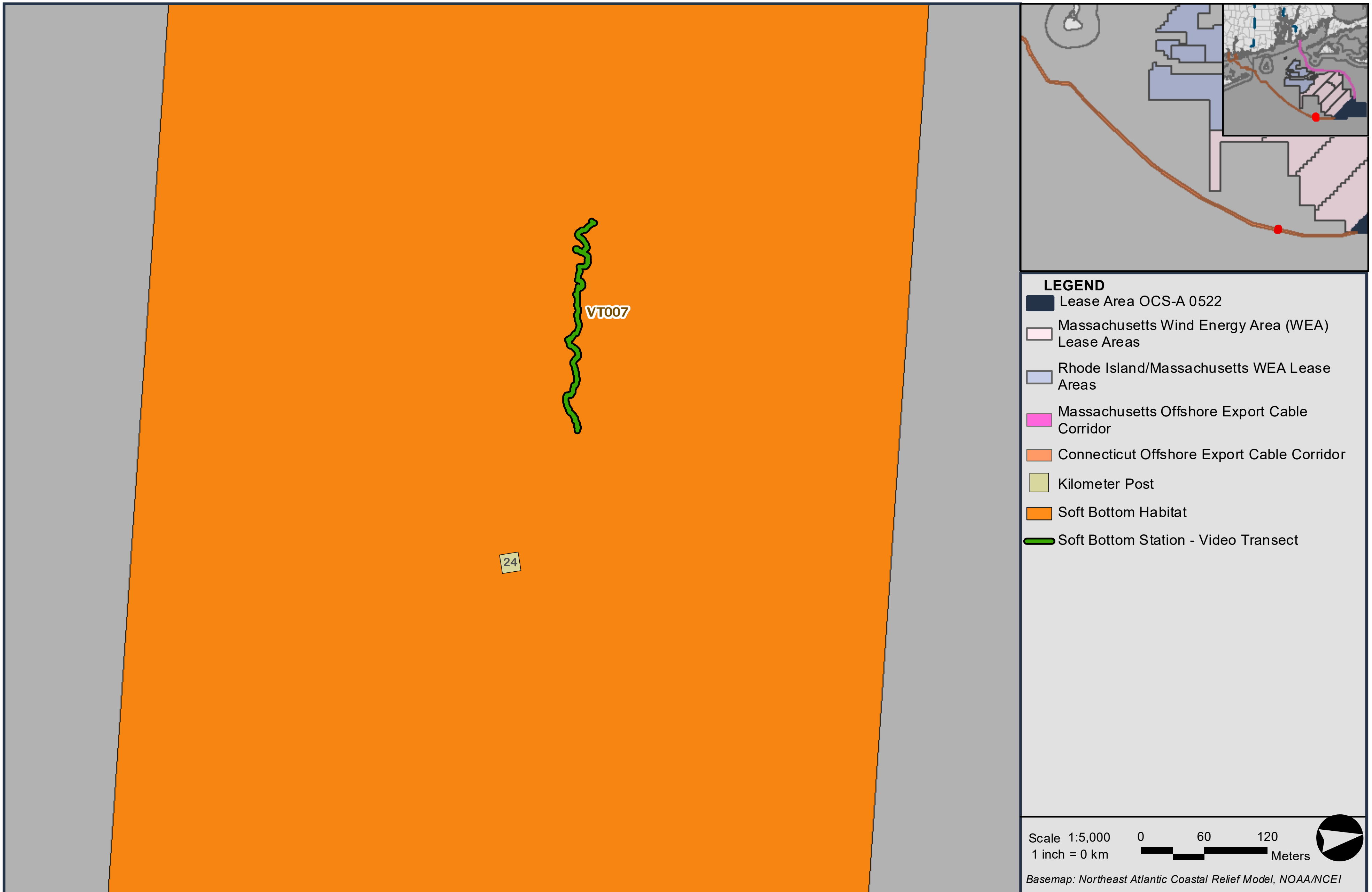
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

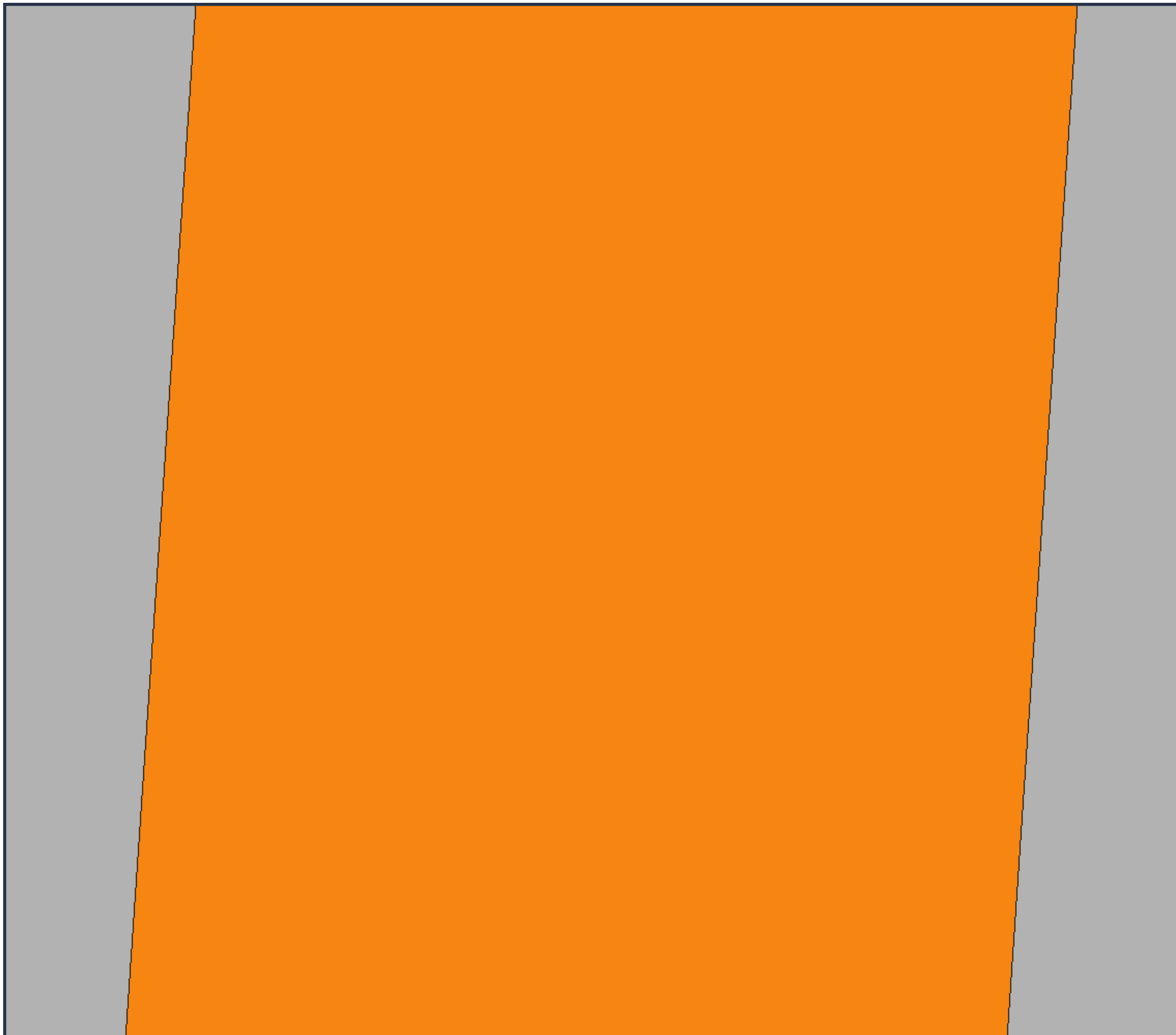
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

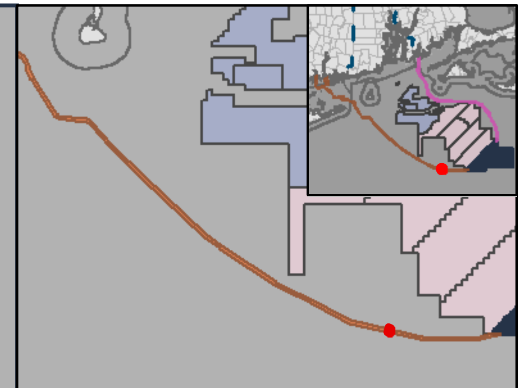
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Soft Bottom Habitat

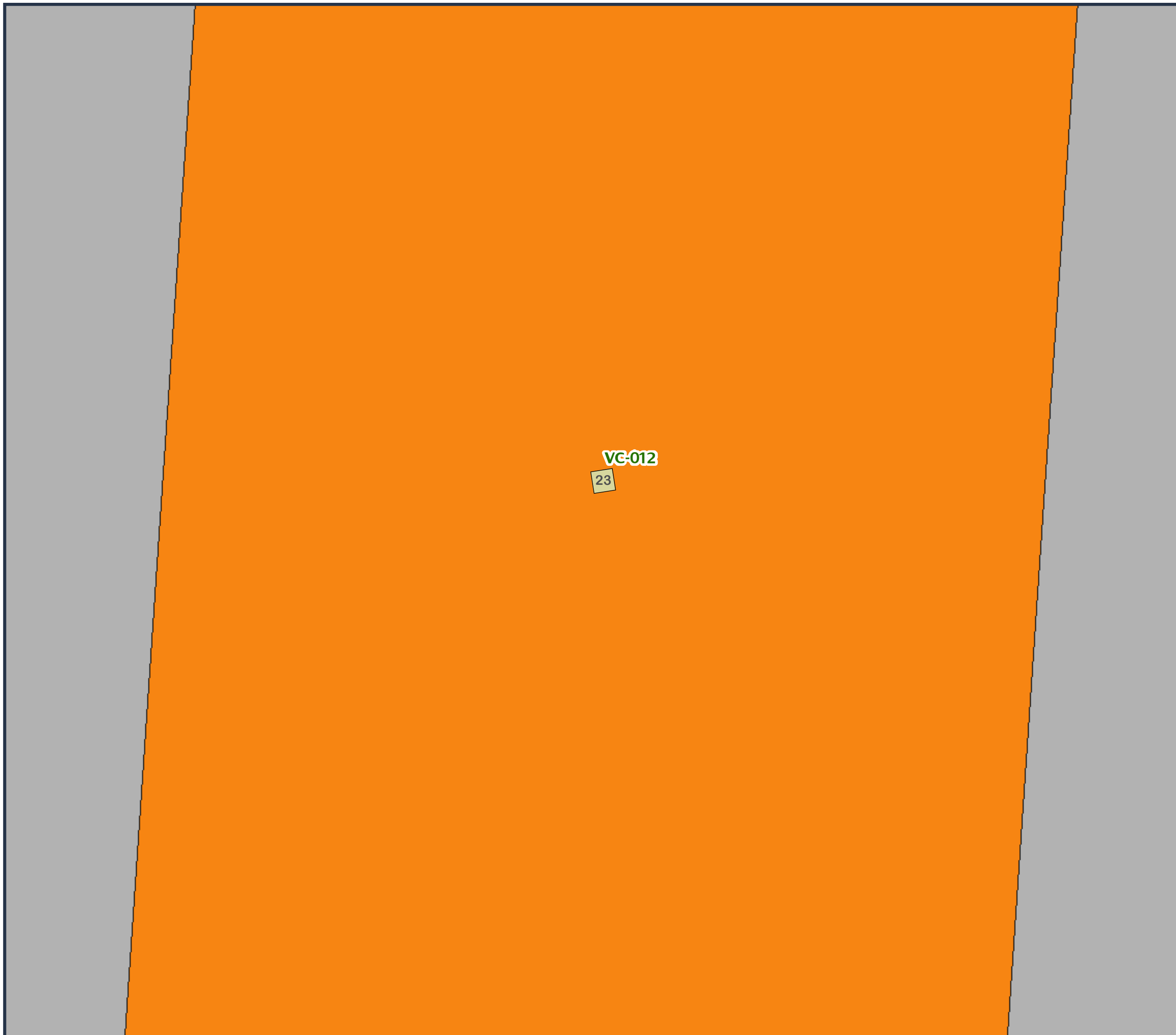
Scale 1:5,000
1 inch = 0 km

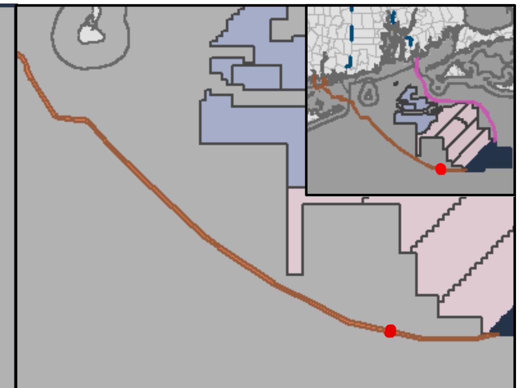
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

Lease Area OCS-A 0522

Massachusetts Wind Energy Area (WEA) Lease Areas

Rhode Island/Massachusetts WEA Lease Areas

Massachusetts Offshore Export Cable Corridor

Connecticut Offshore Export Cable Corridor

Kilometer Post

Soft Bottom Habitat

Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km

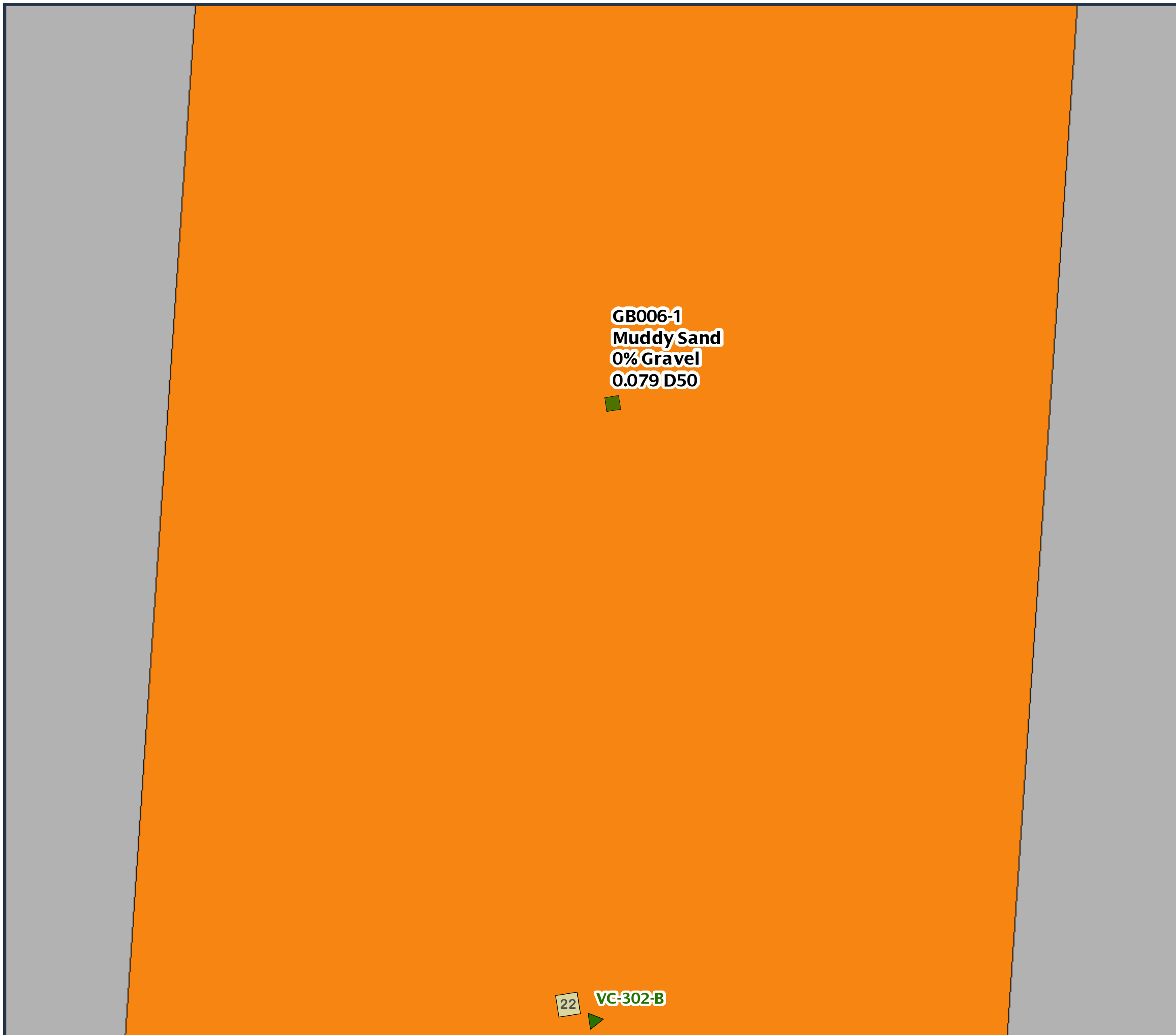
0 60 120 Meters

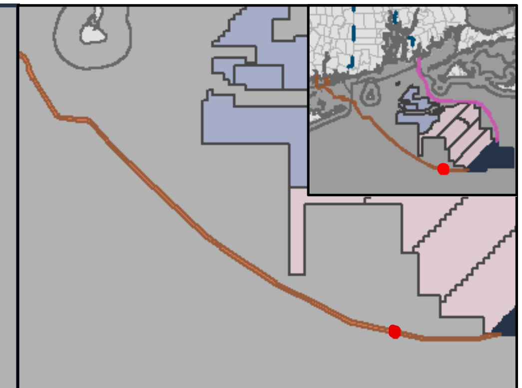
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

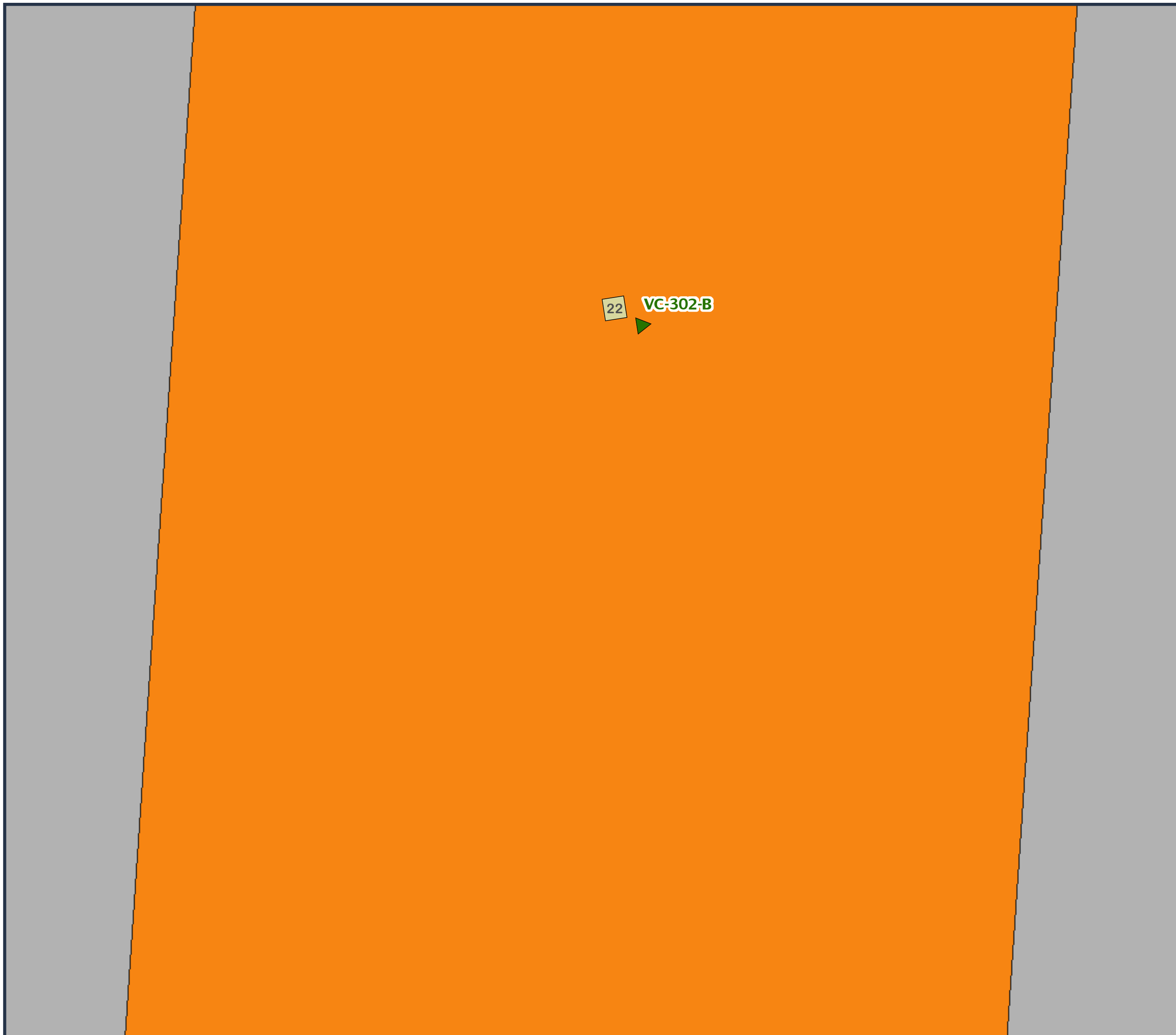
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample
- Soft Station - Vibracore

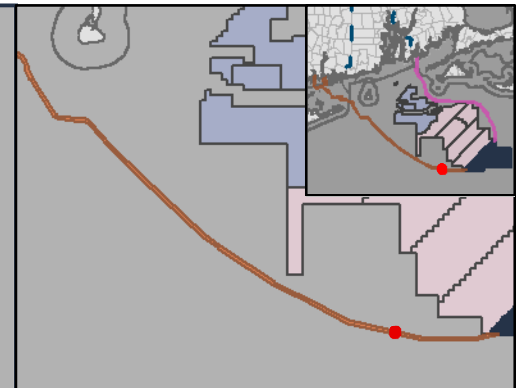
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

VINEYARD NORTHEAST
VINEYARD OFFSHORE





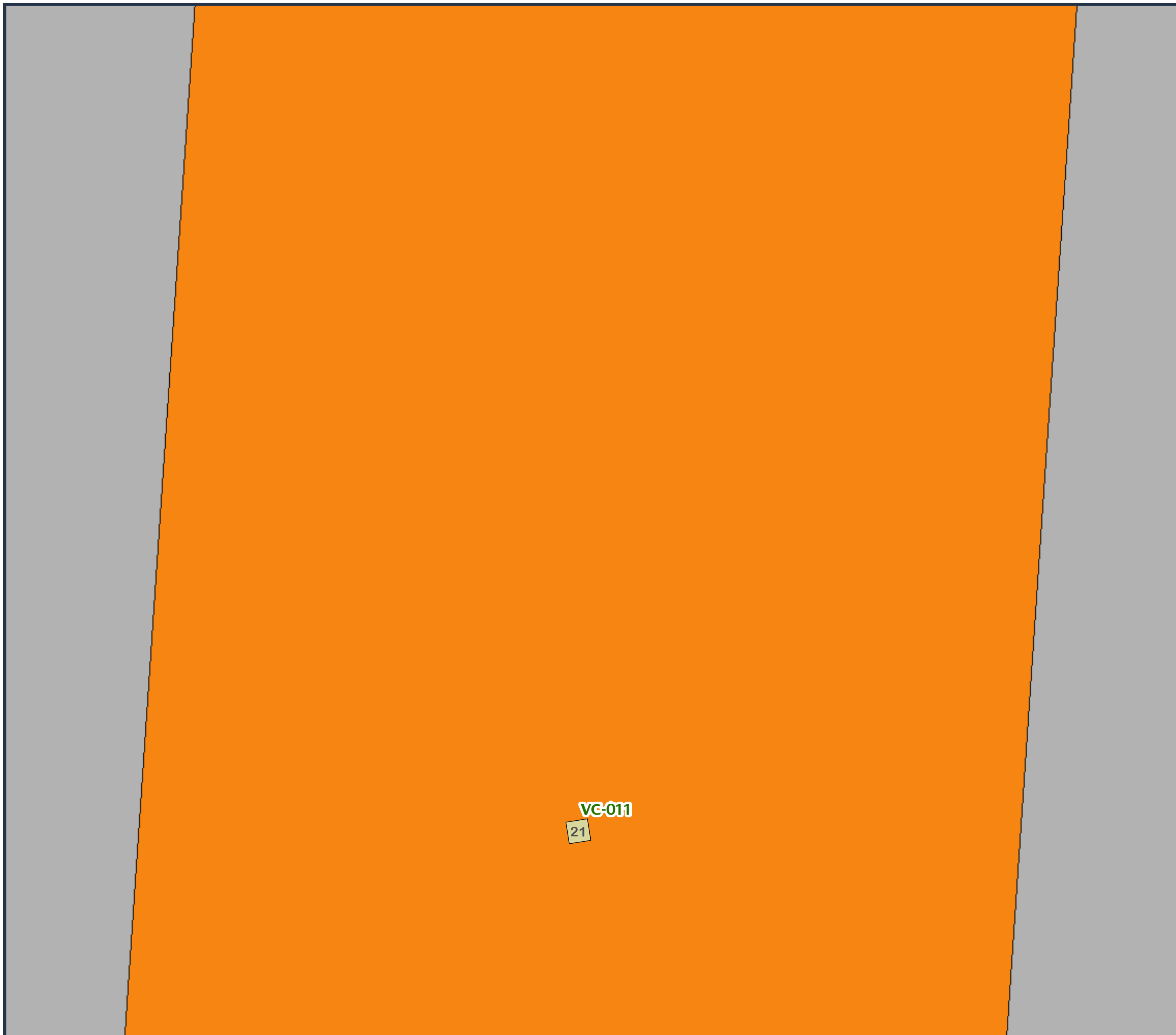
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Soft Station - Vibracore

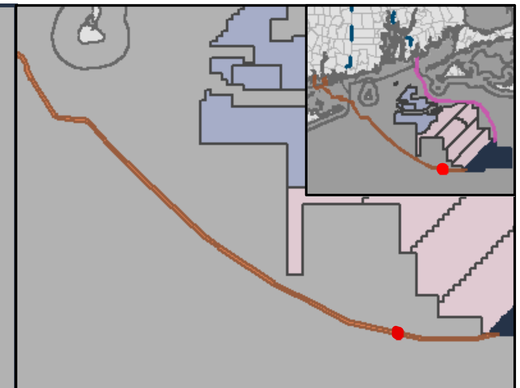
Scale 1:5,000
1 inch = 0 km
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





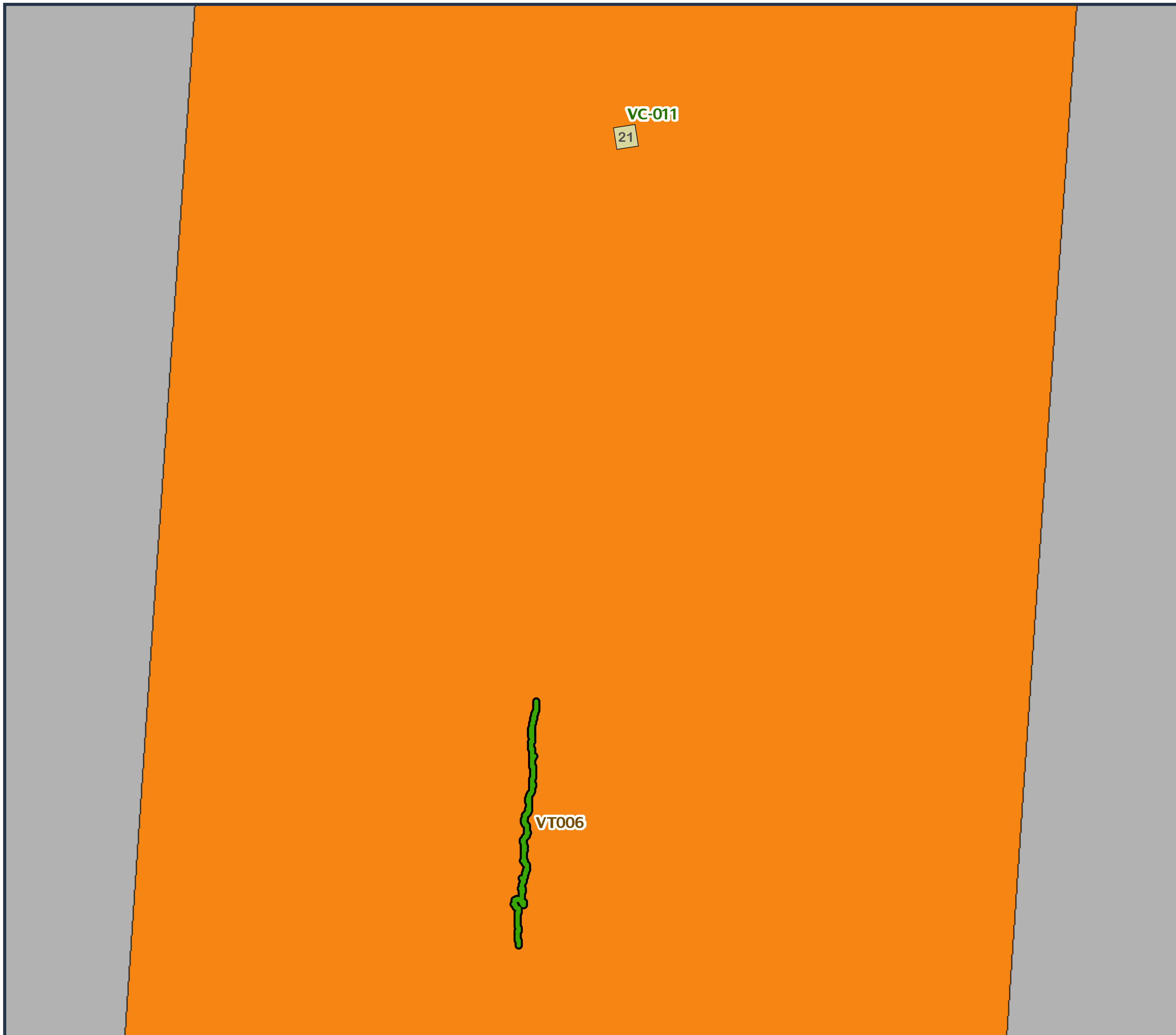
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

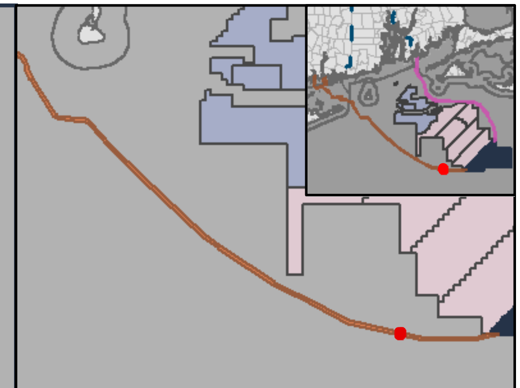
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

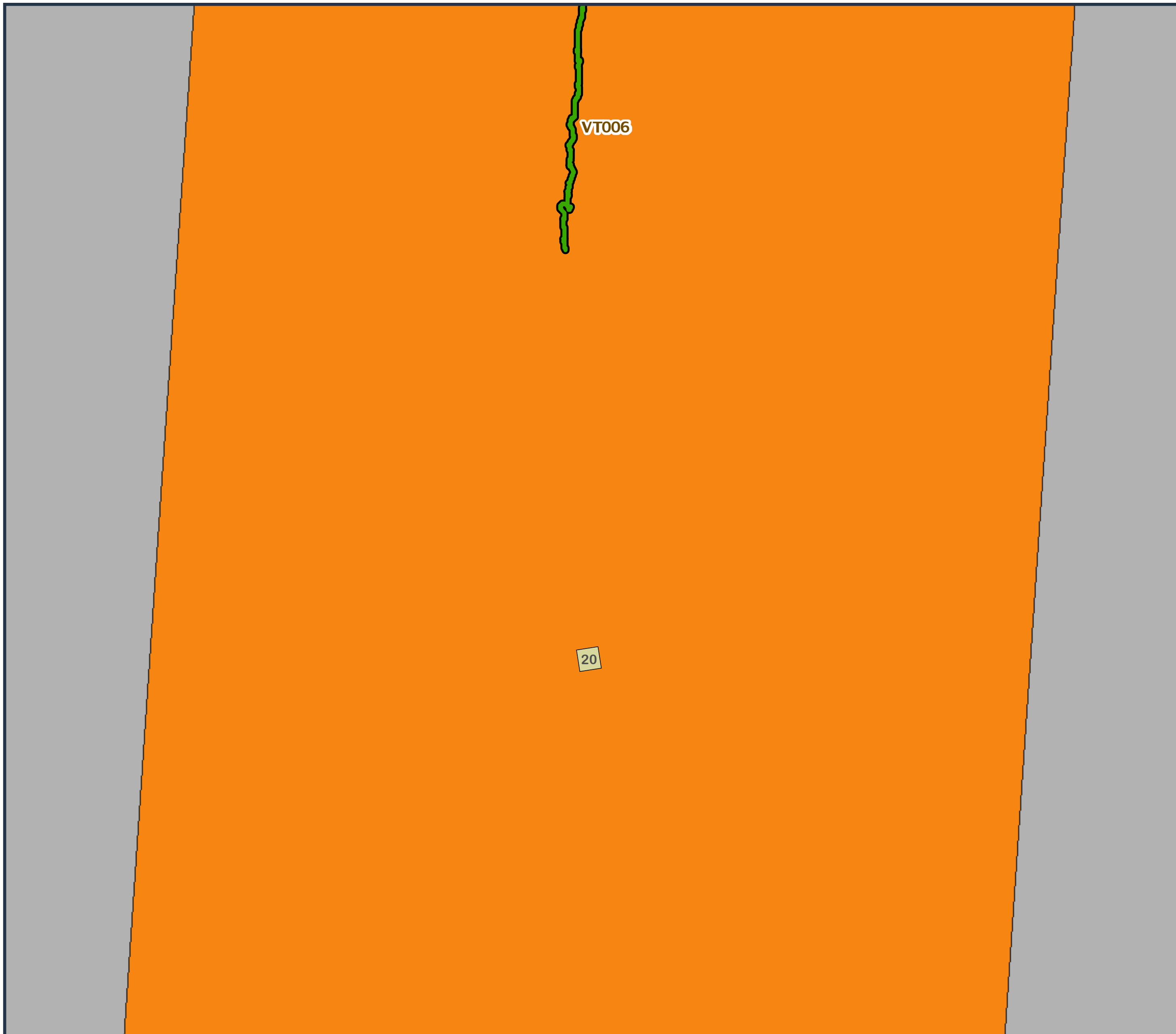
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

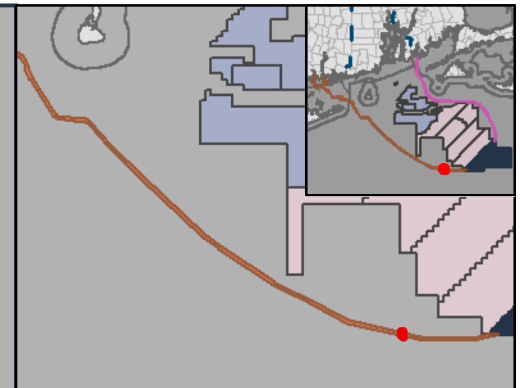
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

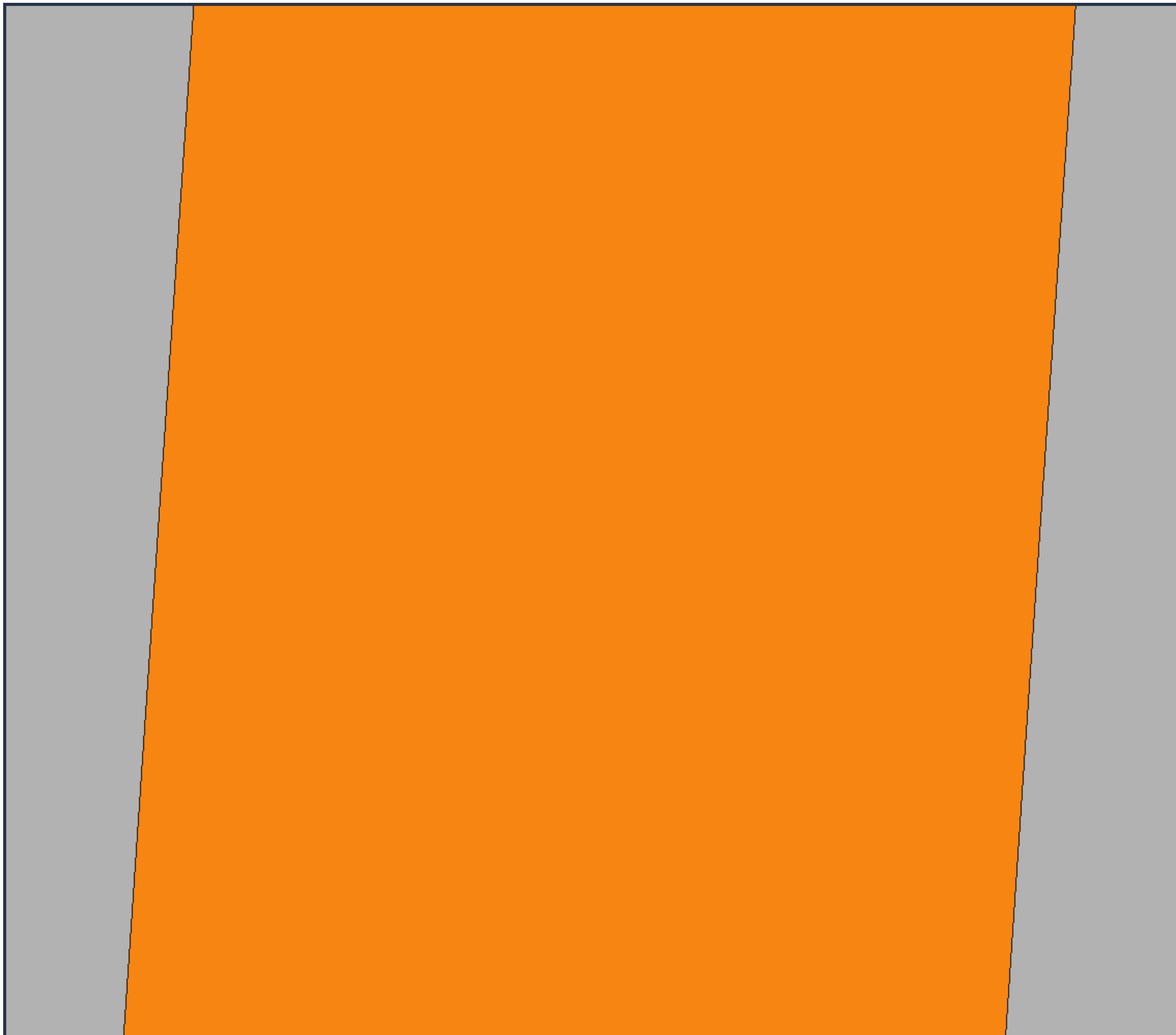
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Bottom Station - Video Transect

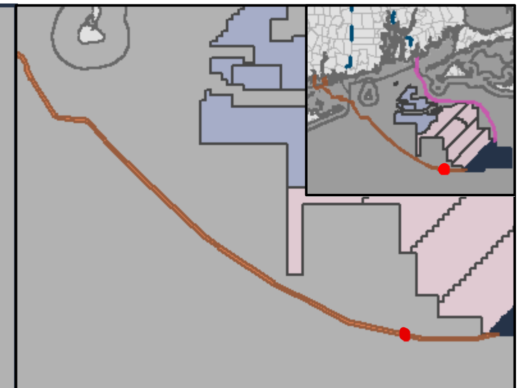
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Soft Bottom Habitat

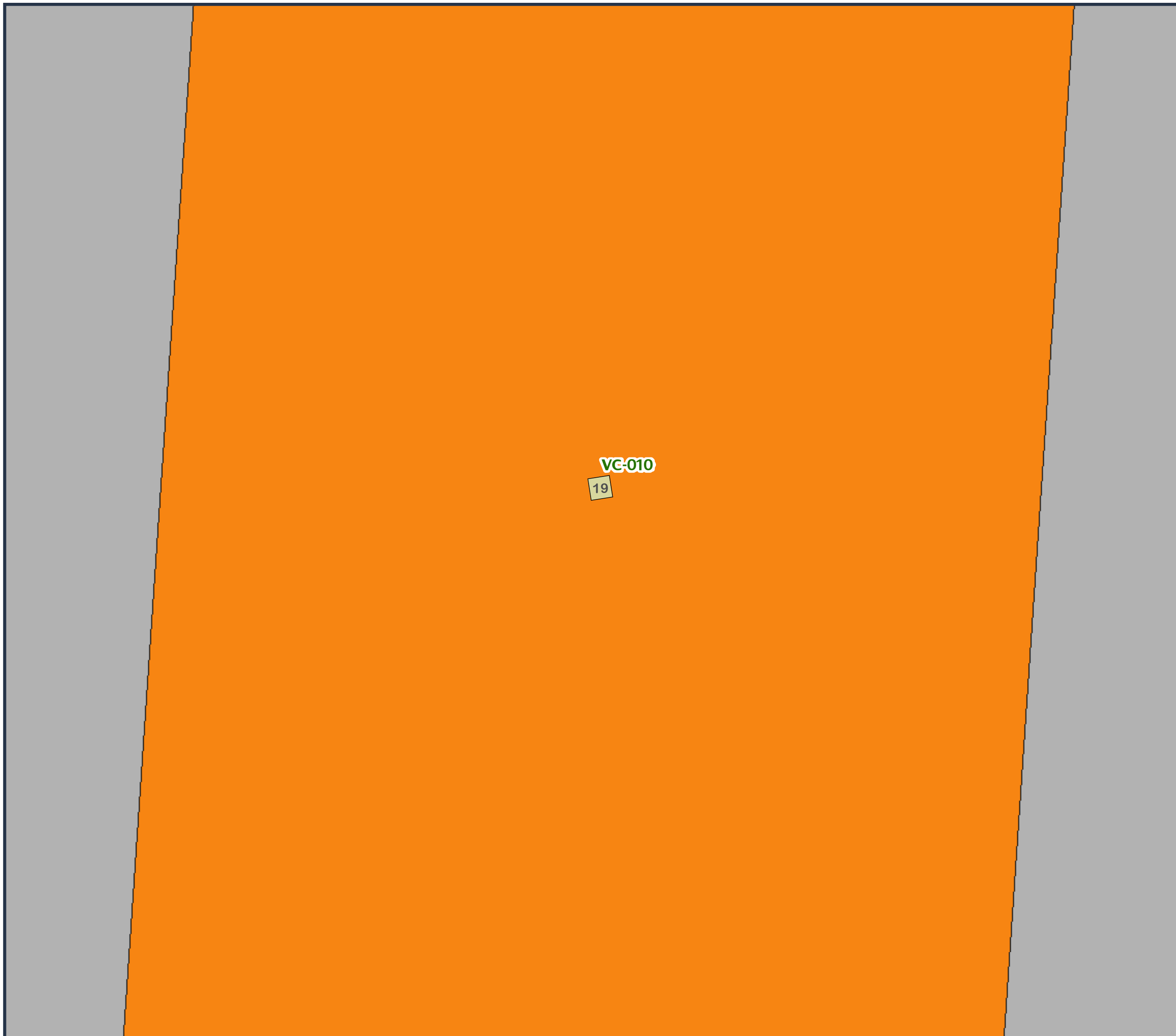
Scale 1:5,000
1 inch = 0 km

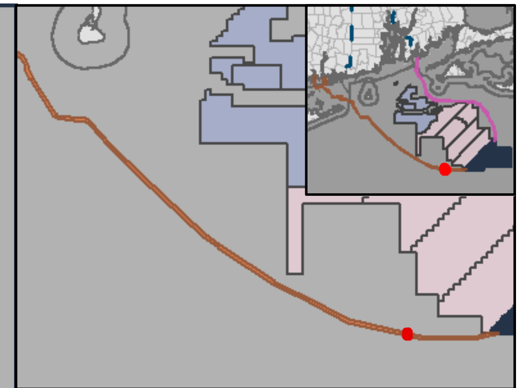
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

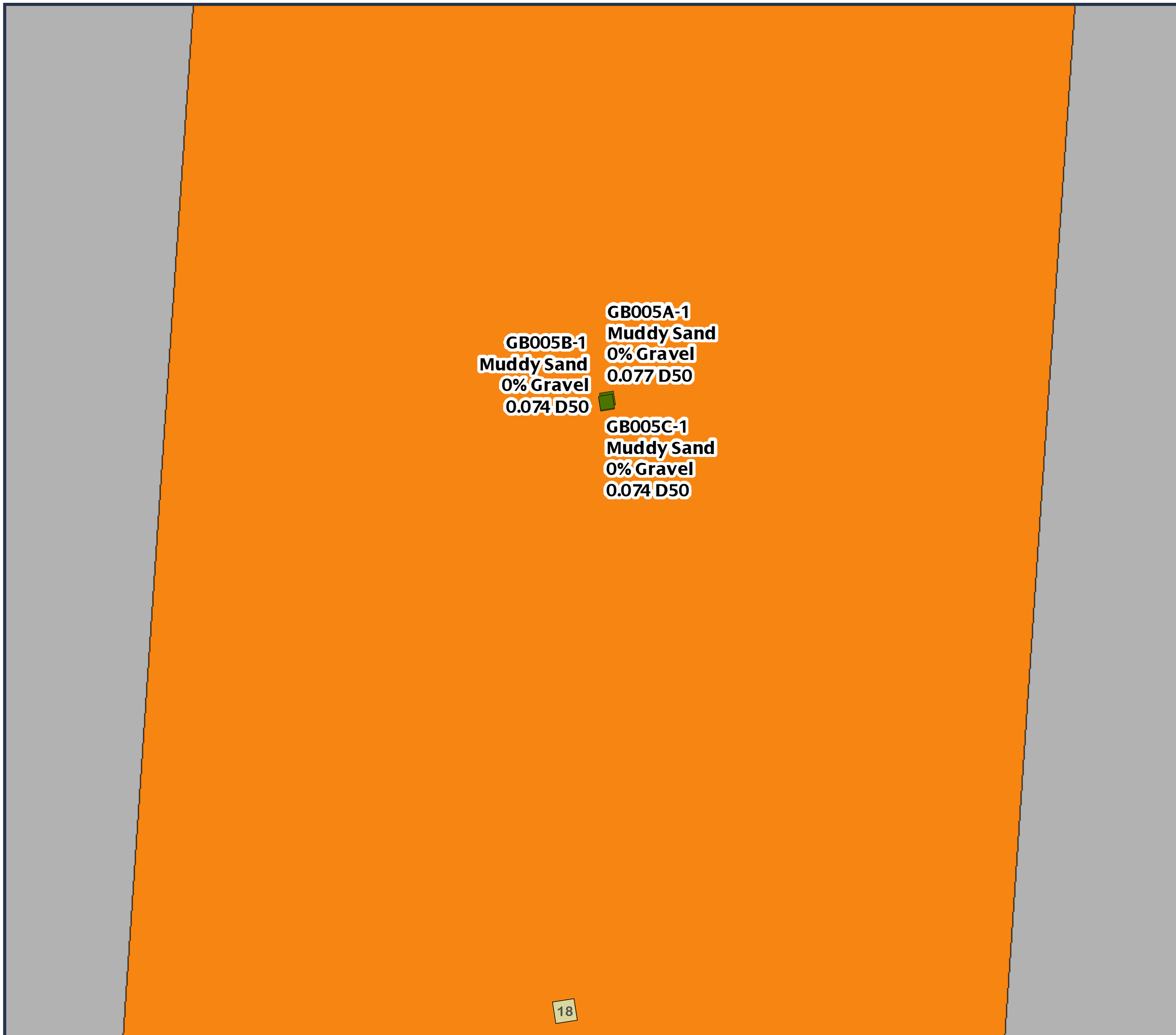
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

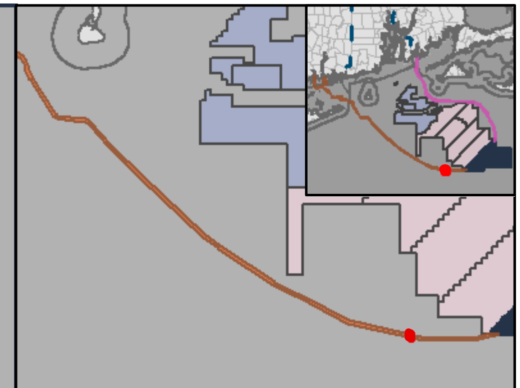
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample

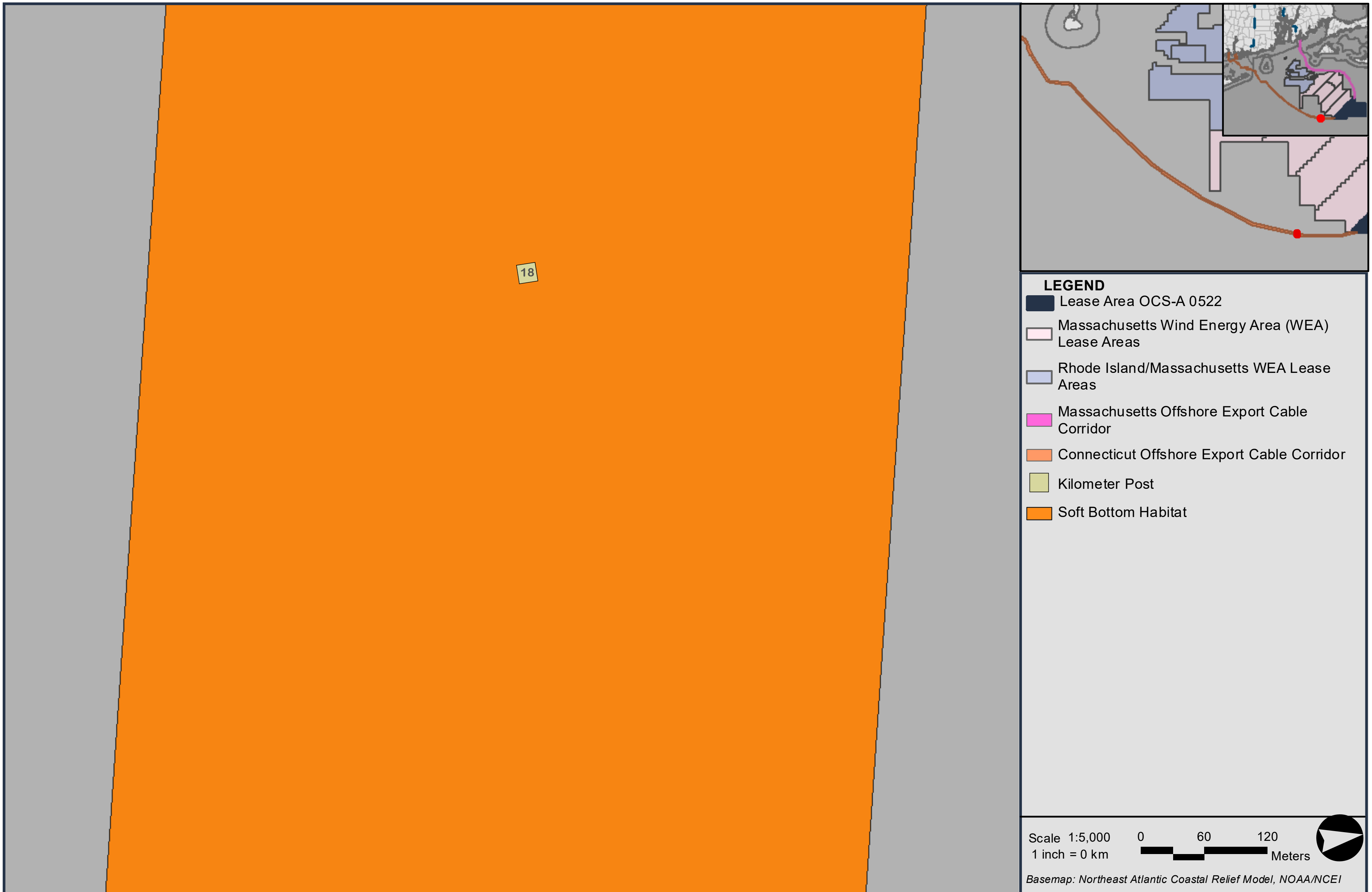
Scale 1:5,000
1 inch = 0 km

0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

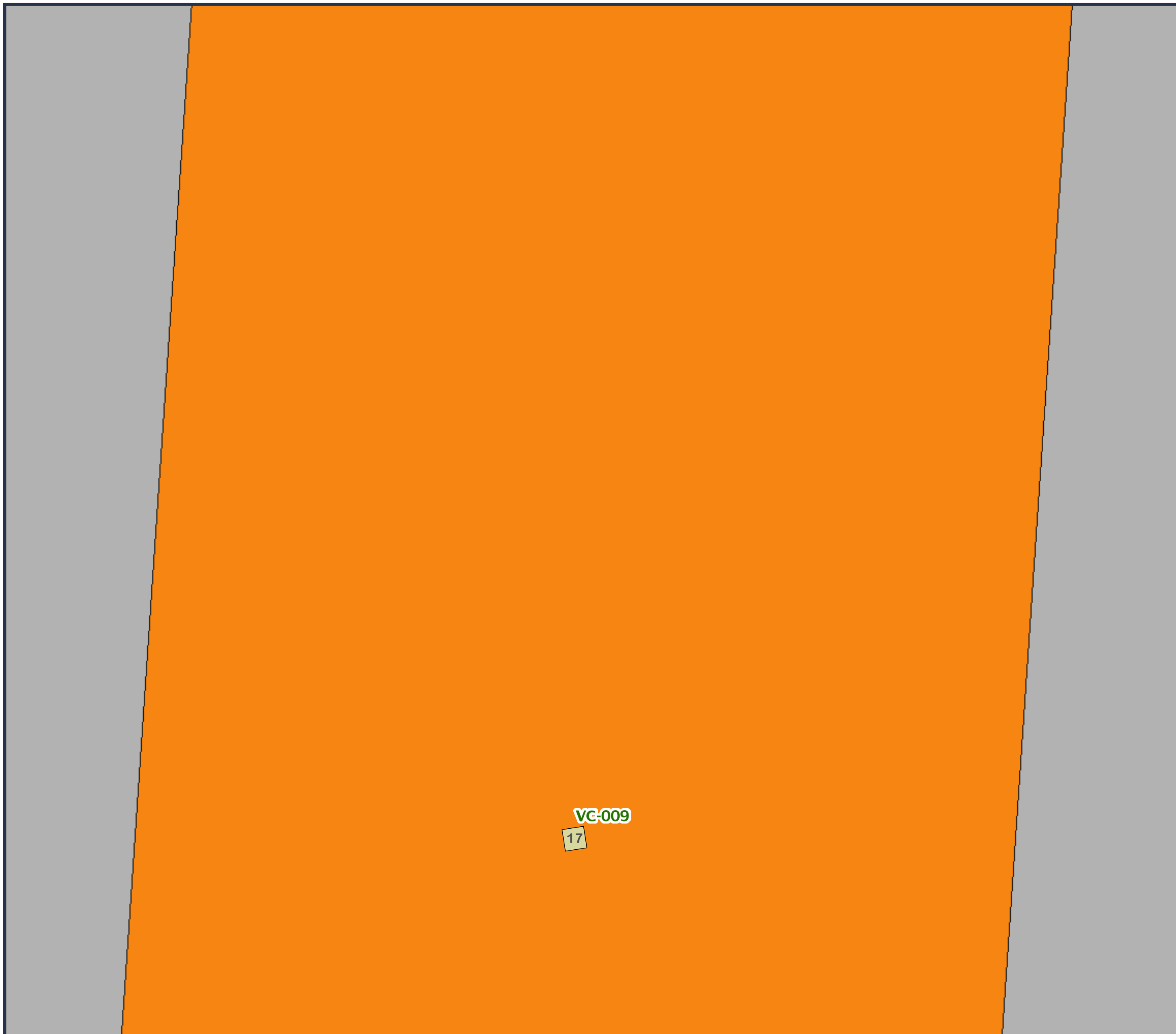
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

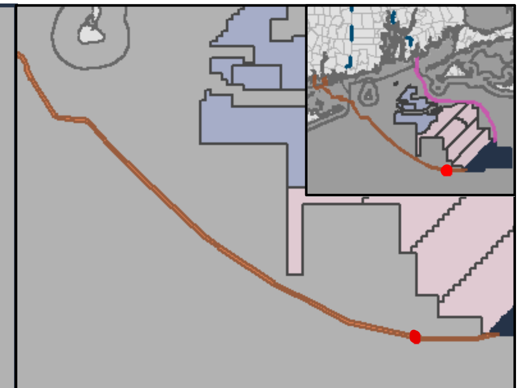
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

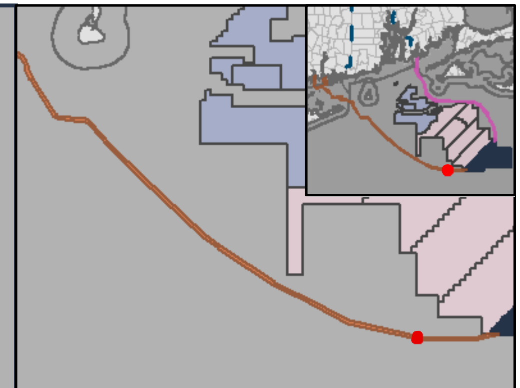
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

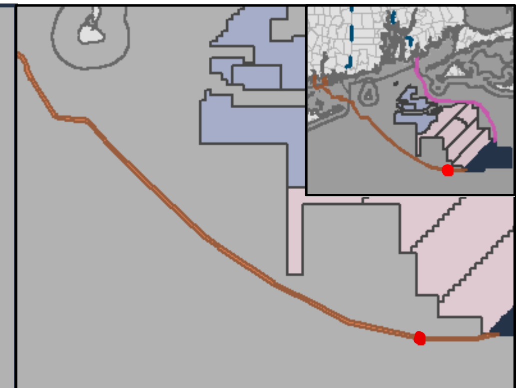
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Bottom Station - Video Transect

Scale 1:5,000
1 inch = 0 km

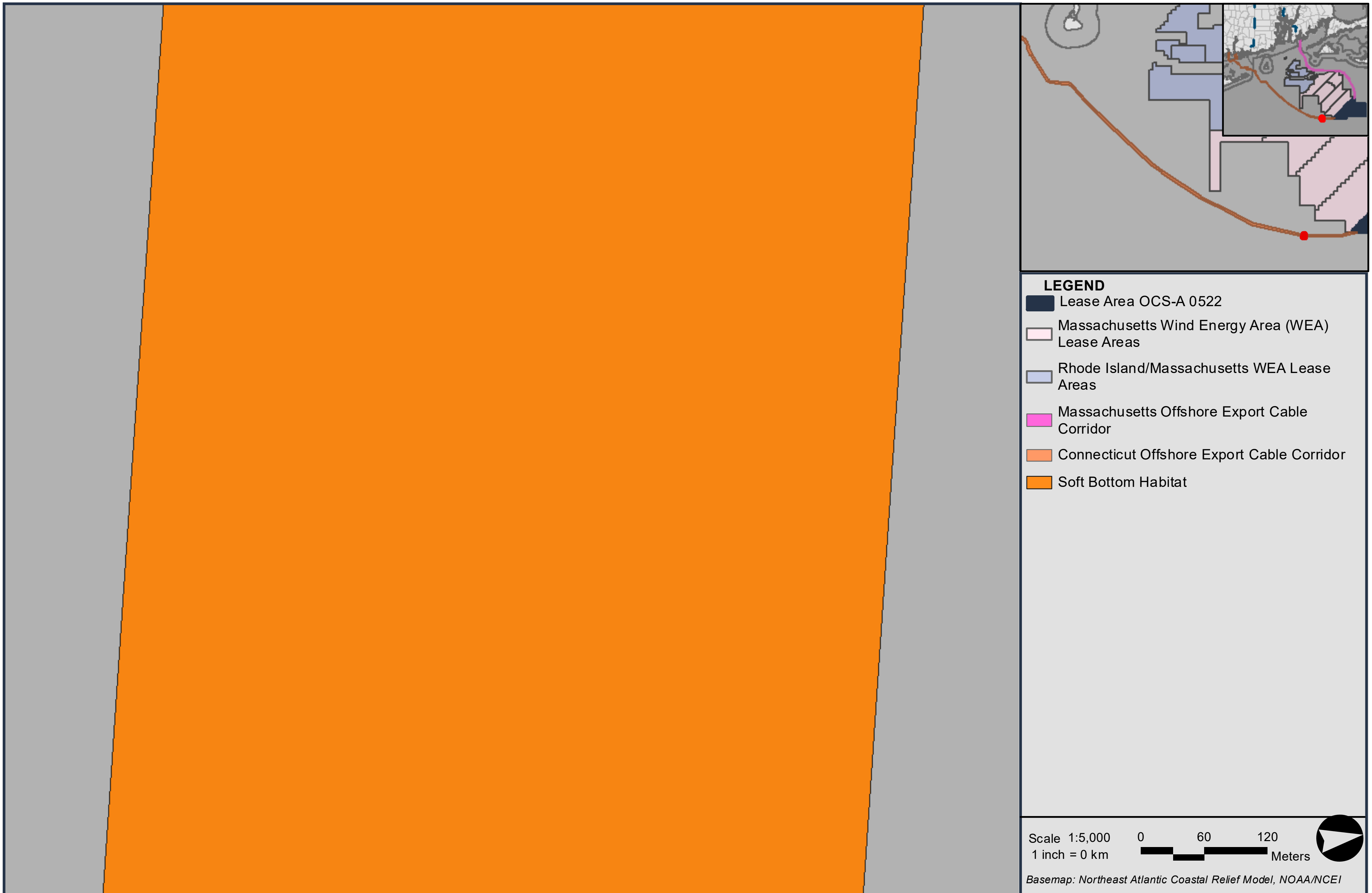
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

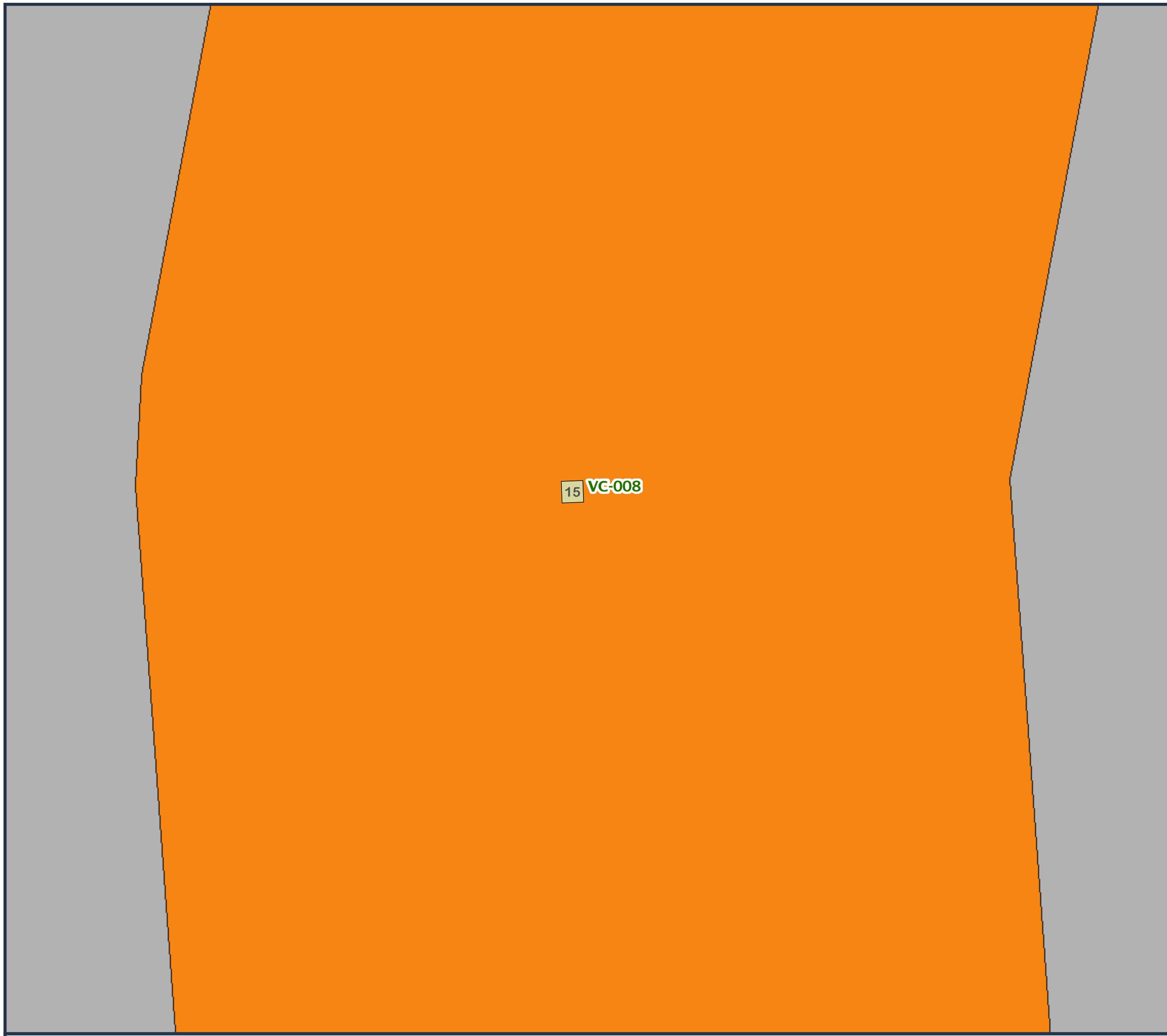
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

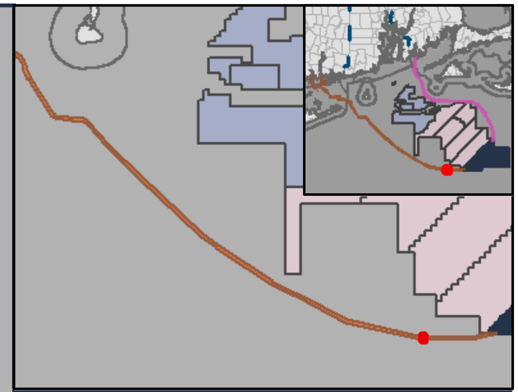
VINEYARD NORTHEAST

VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC





LEGEND

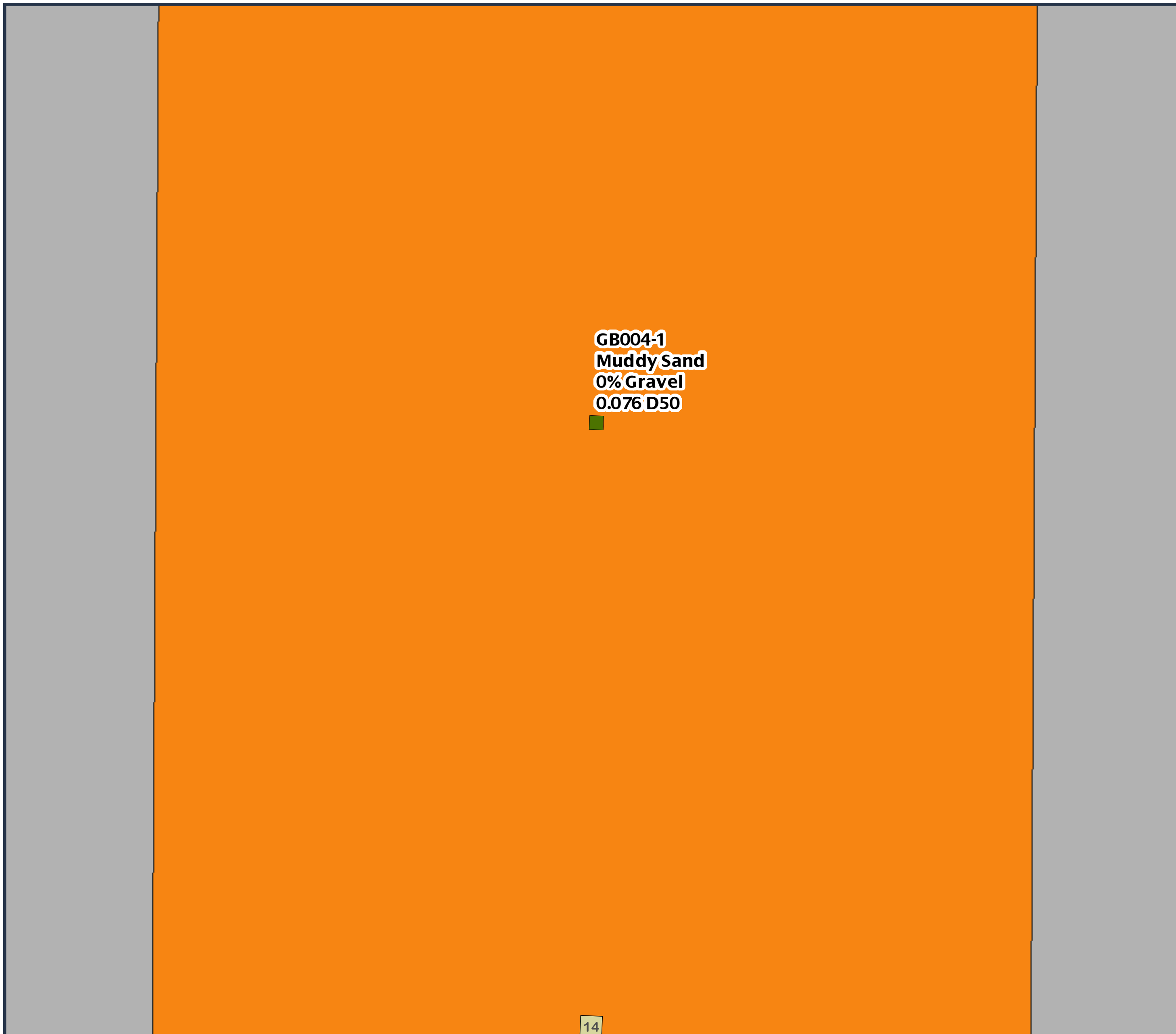
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

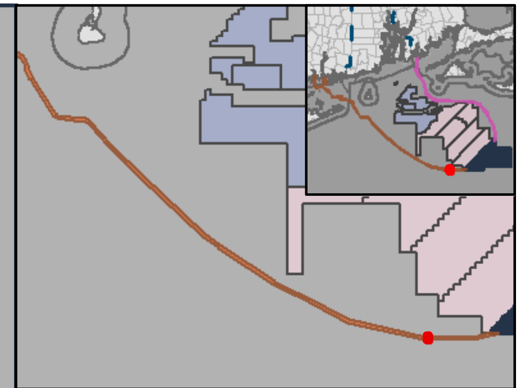
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Grab Sample

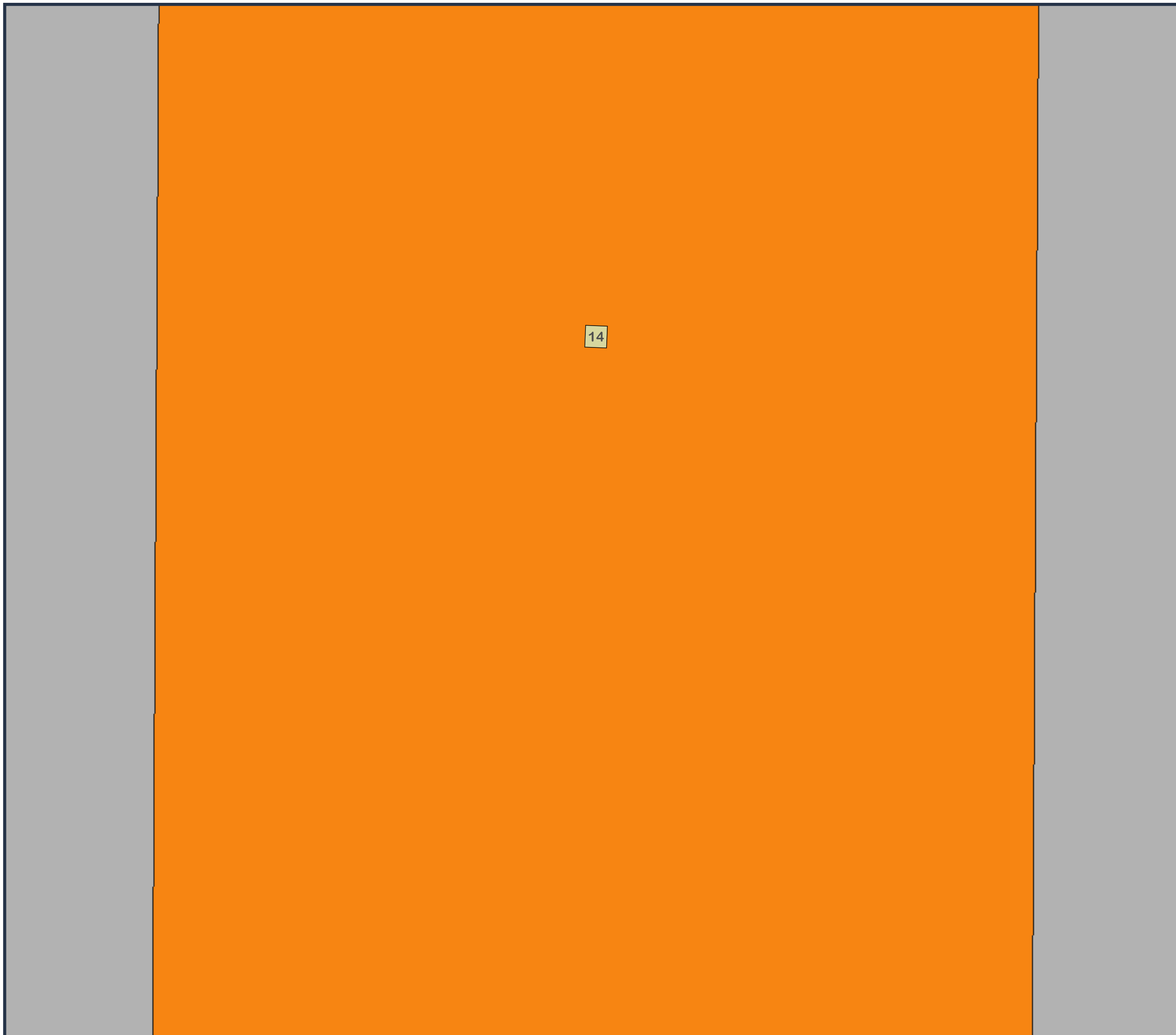
Scale 1:5,000
1 inch = 0 km

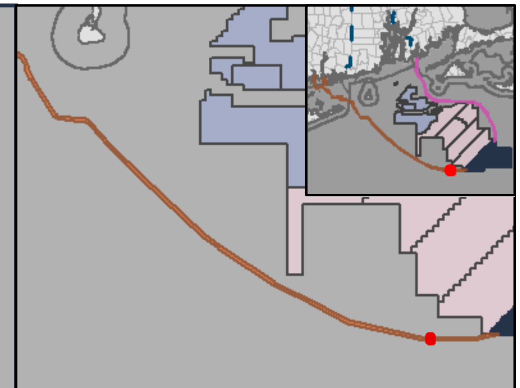
0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat

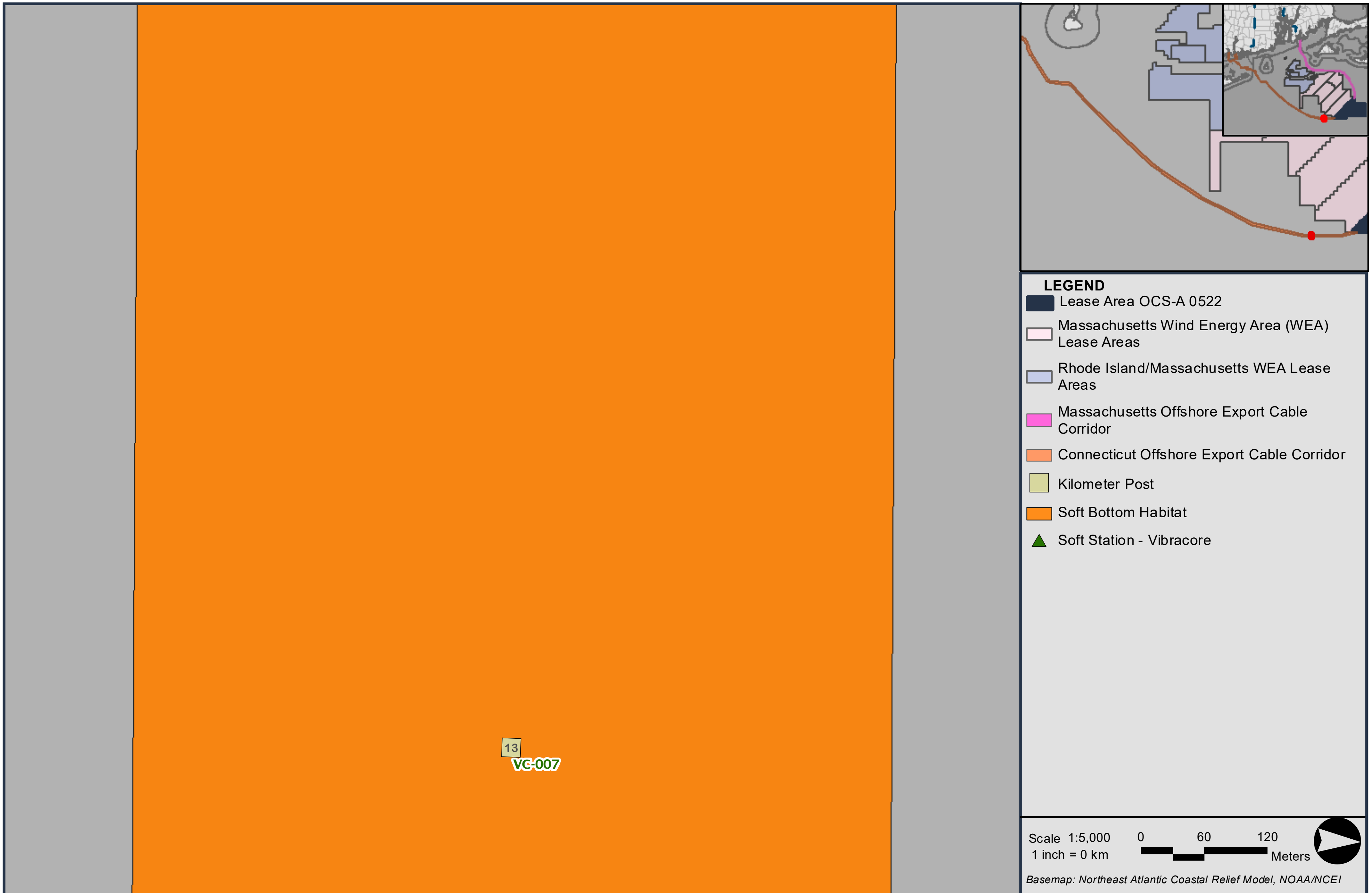
Scale 1:5,000
1 inch = 0 km

0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

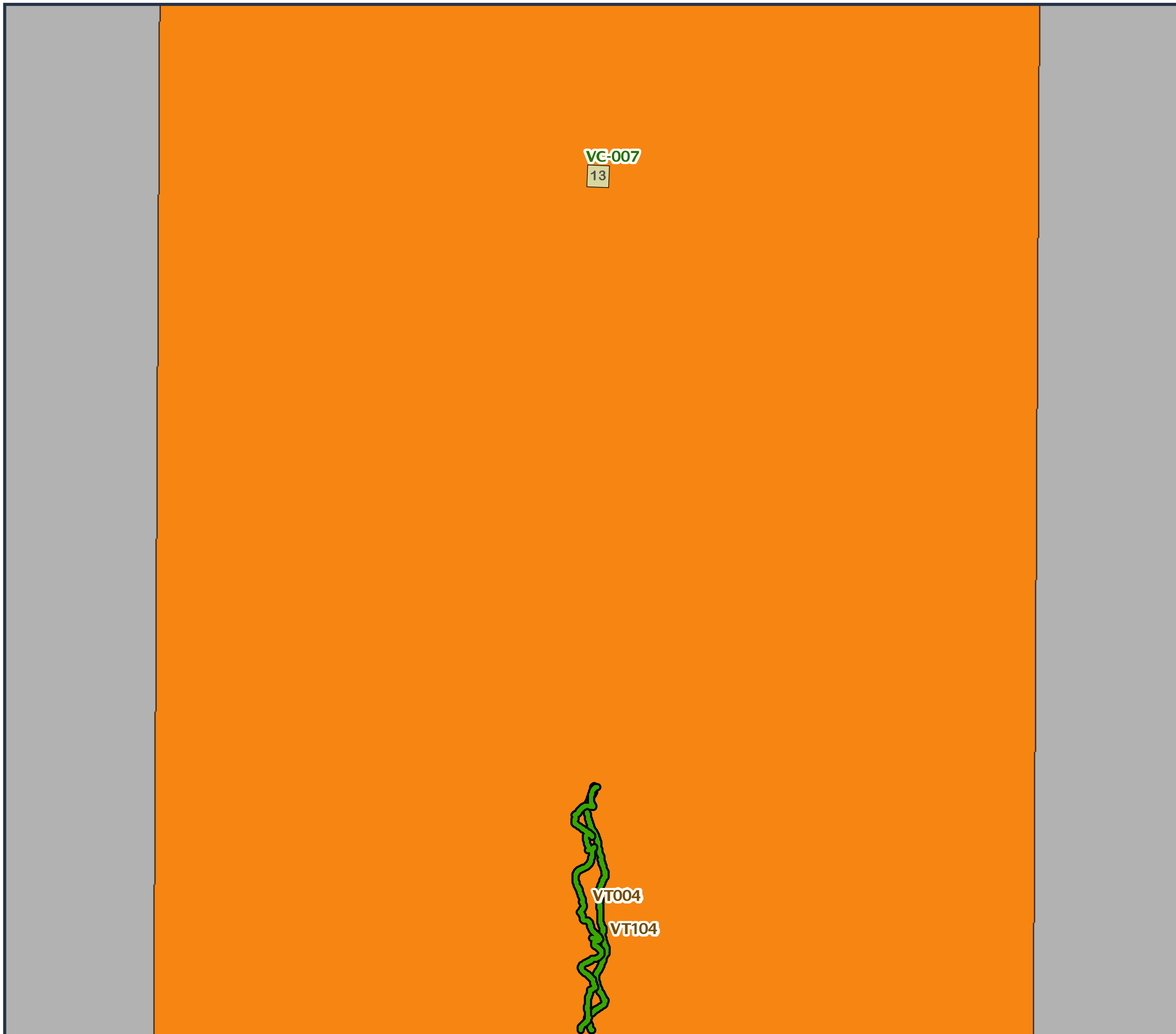
VINEYARD NORTHEAST
VINEYARD OFFSHORE

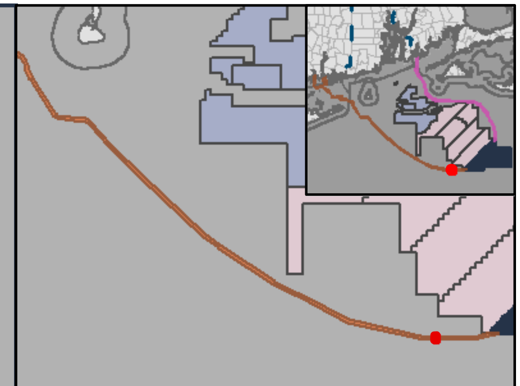


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE



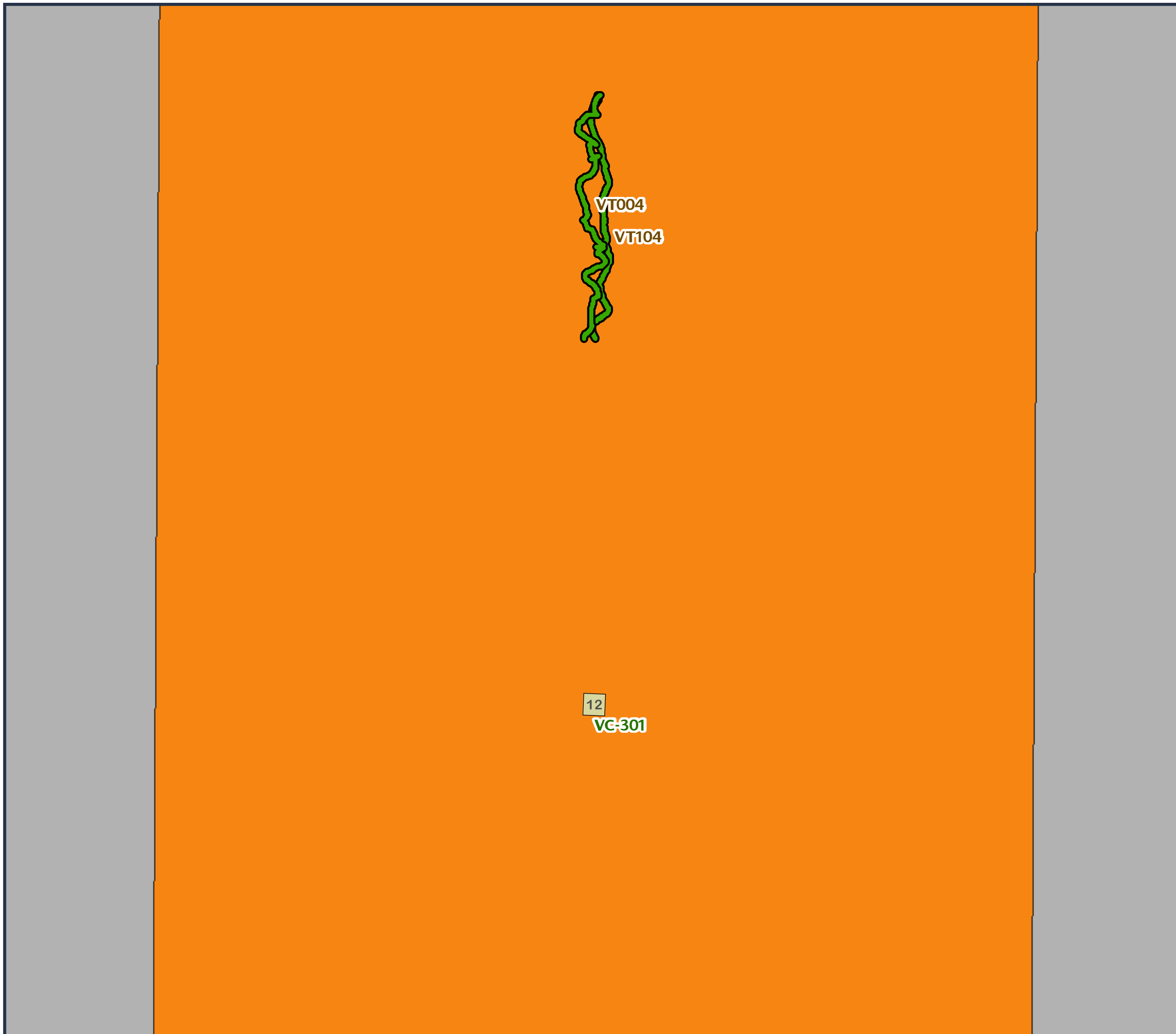


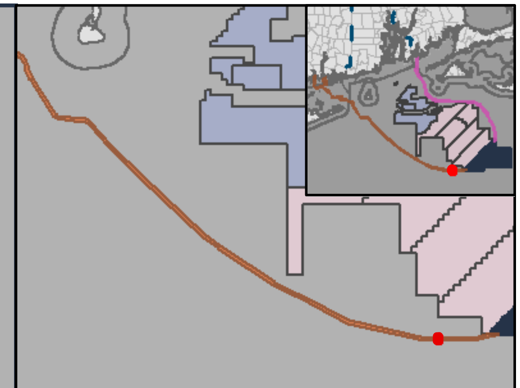
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Soft Station - Vibracore
Soft Bottom Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

Scale 1:5,000
1 inch = 0 km

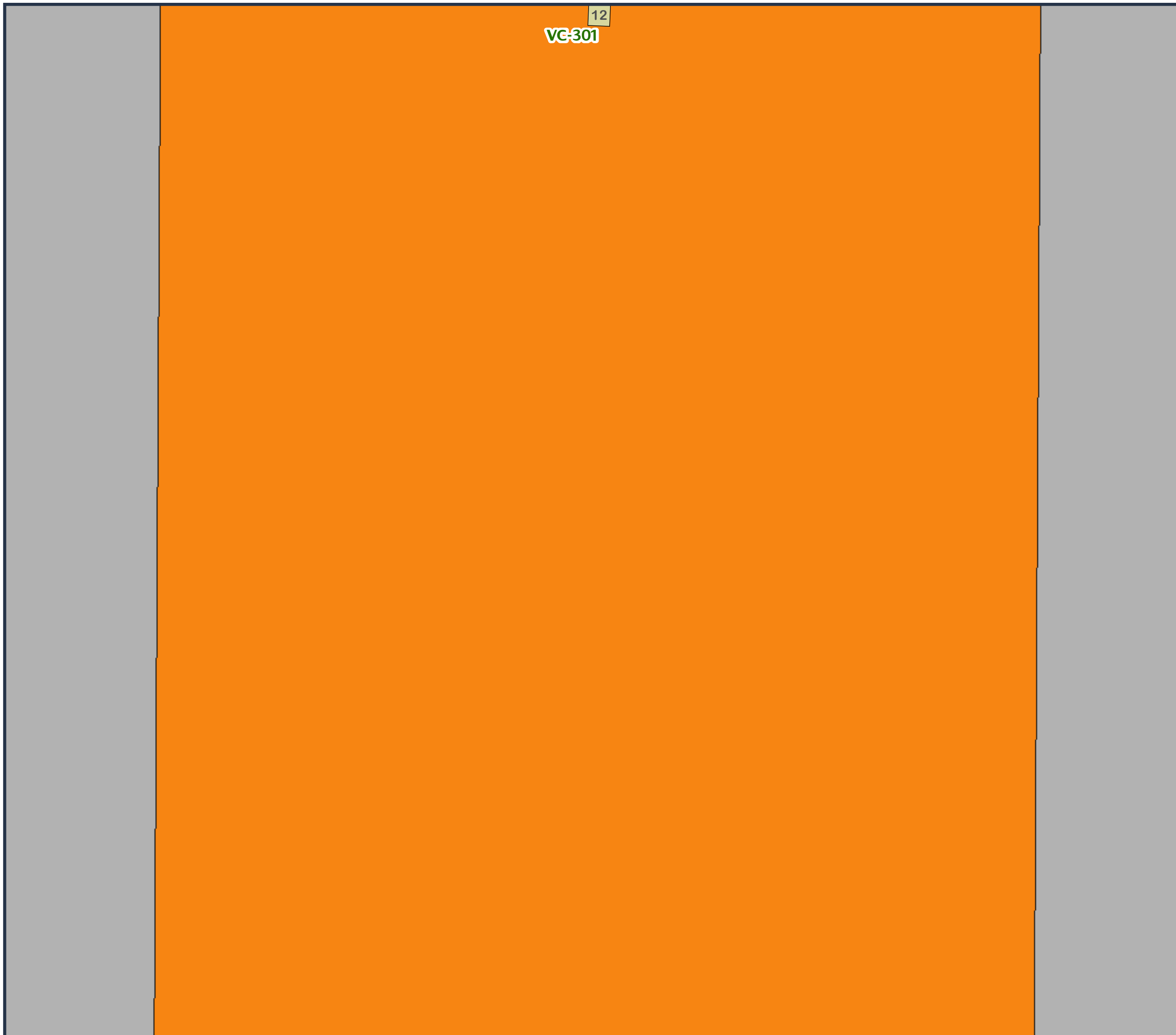
0 60 120
Meters

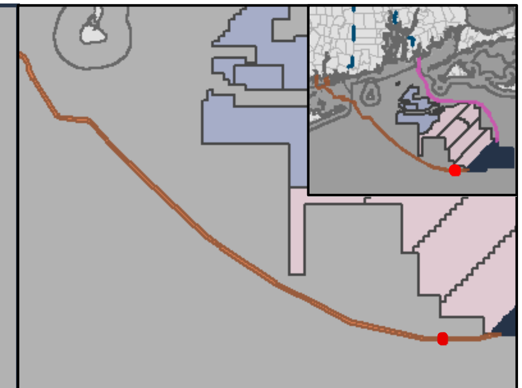
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

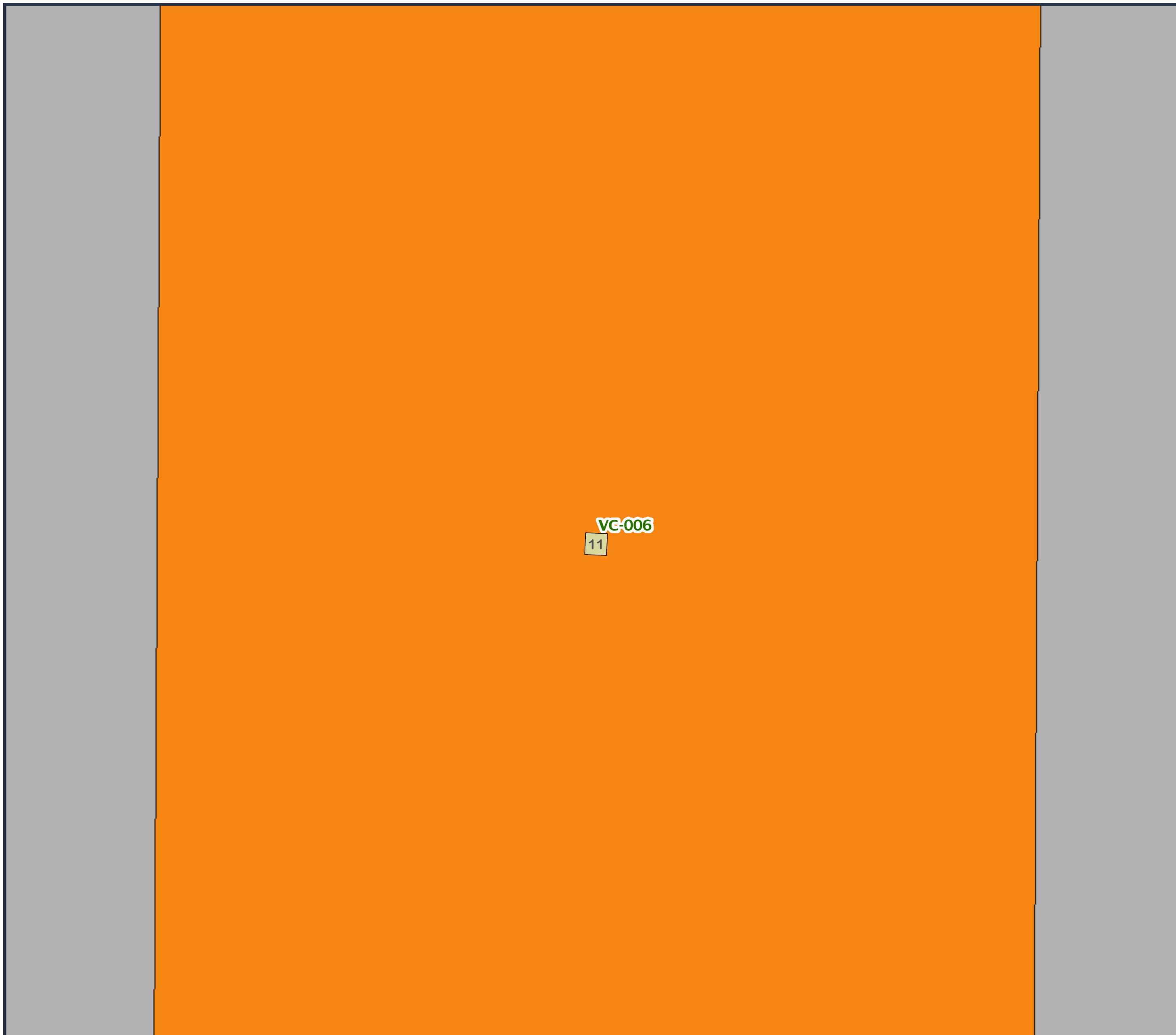
Scale 1:5,000
1 inch = 0 km

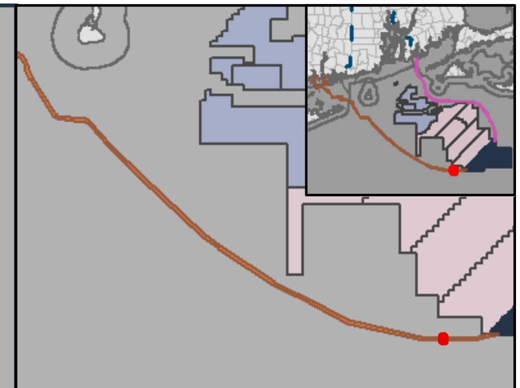
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

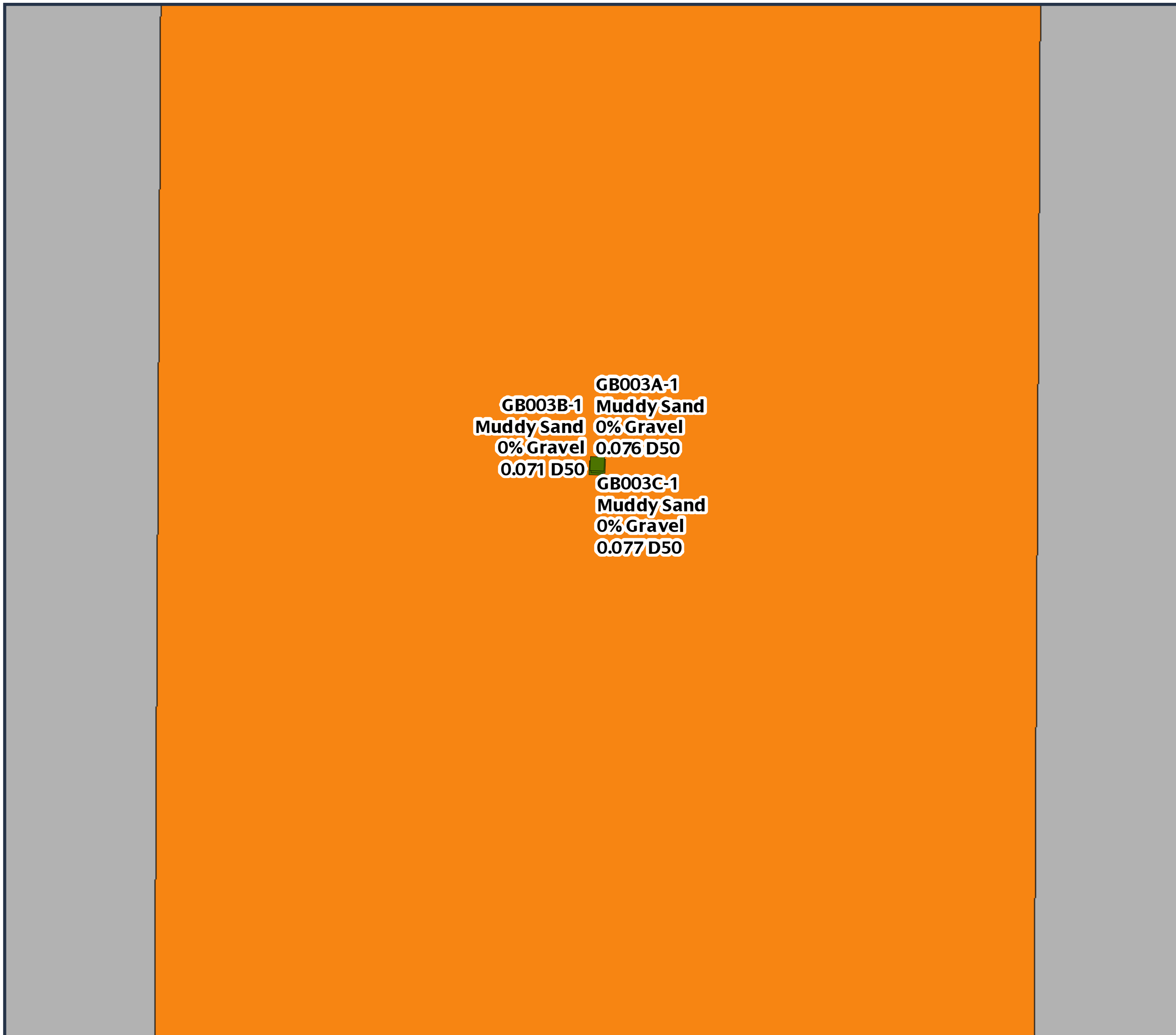
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

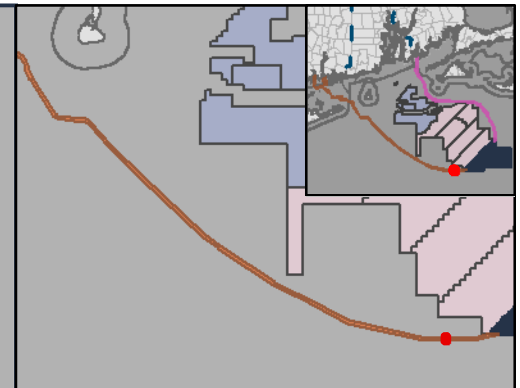
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Soft Bottom Habitat
- Soft Station - Grab Sample

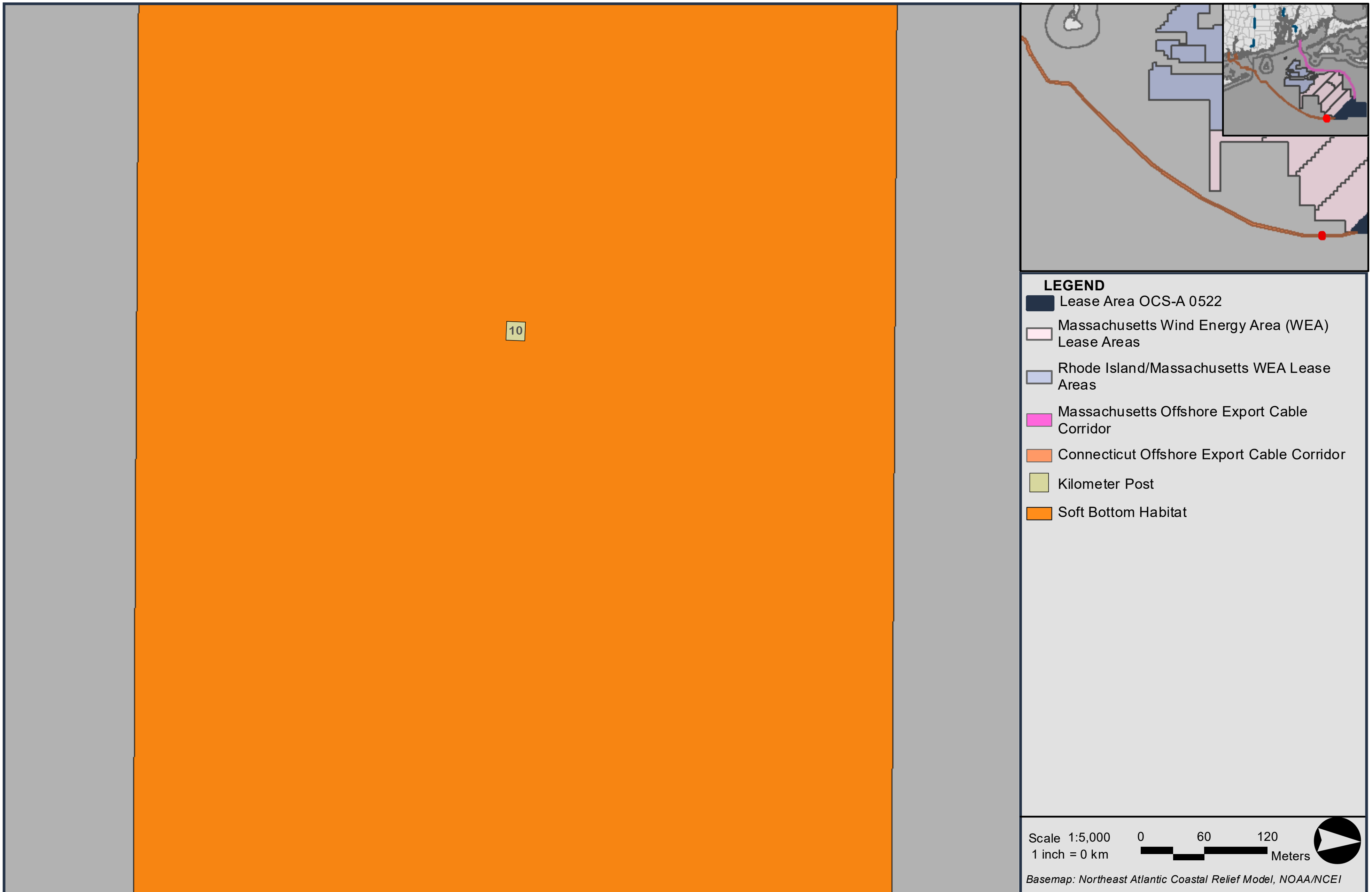
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

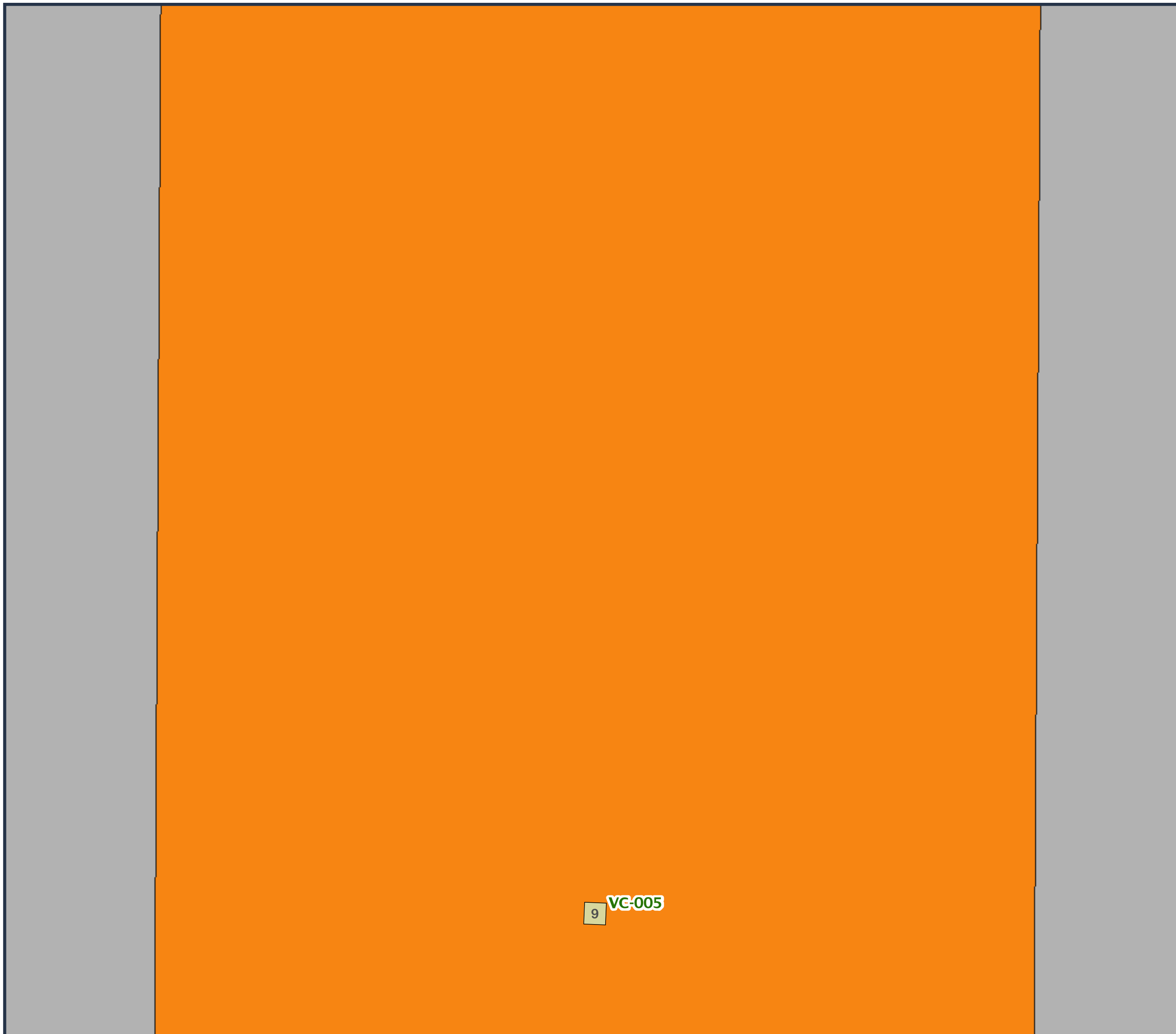
VINEYARD NORTHEAST
VINEYARD OFFSHORE

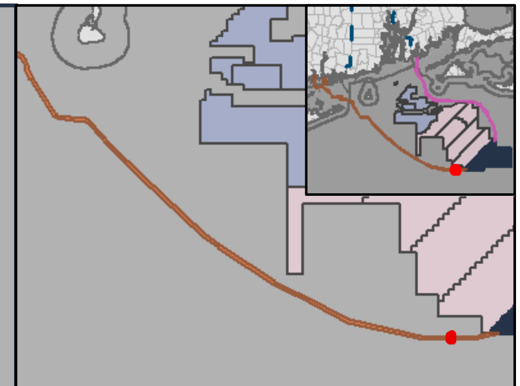


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Soft Station - Vibracore

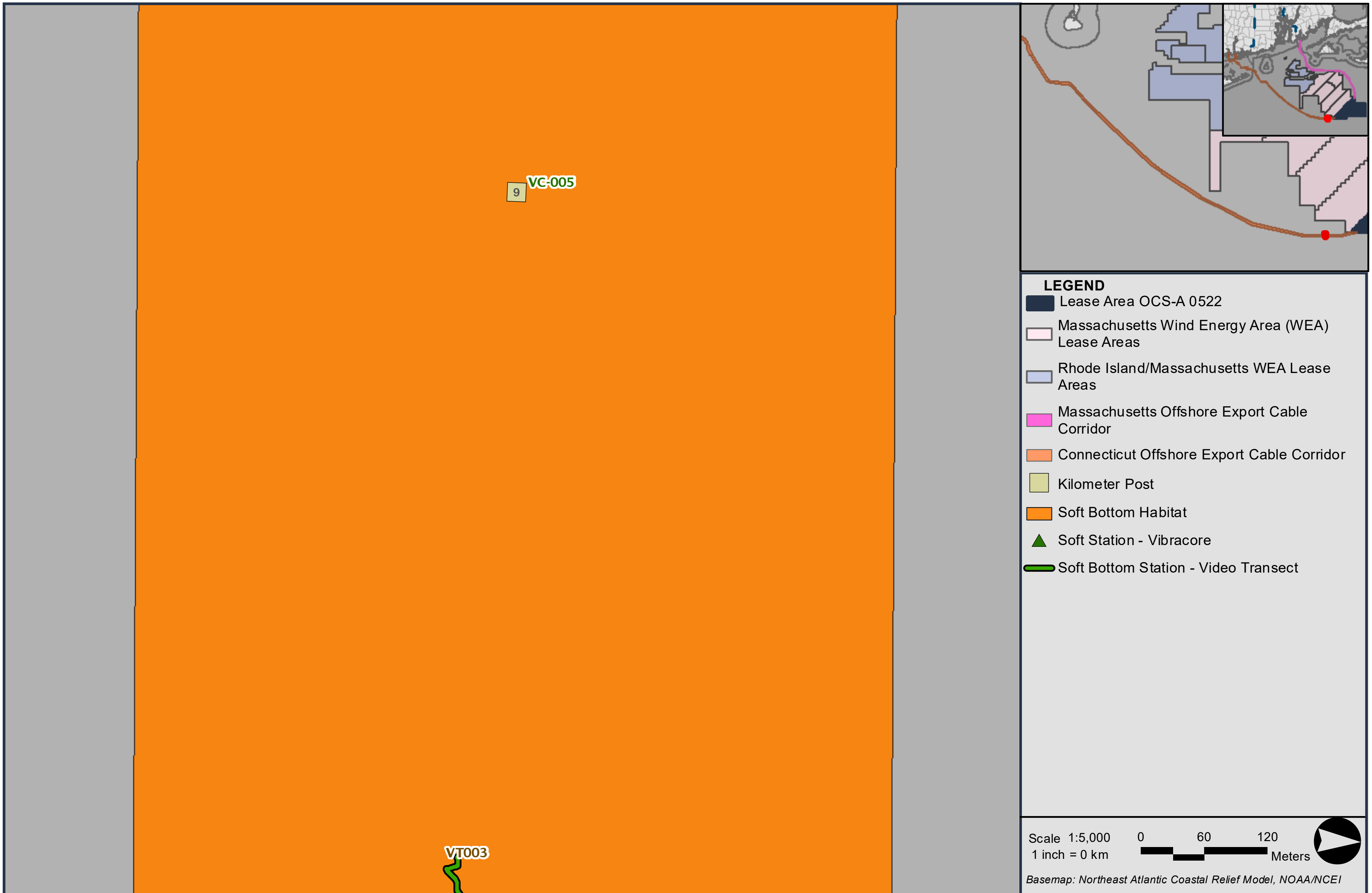
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

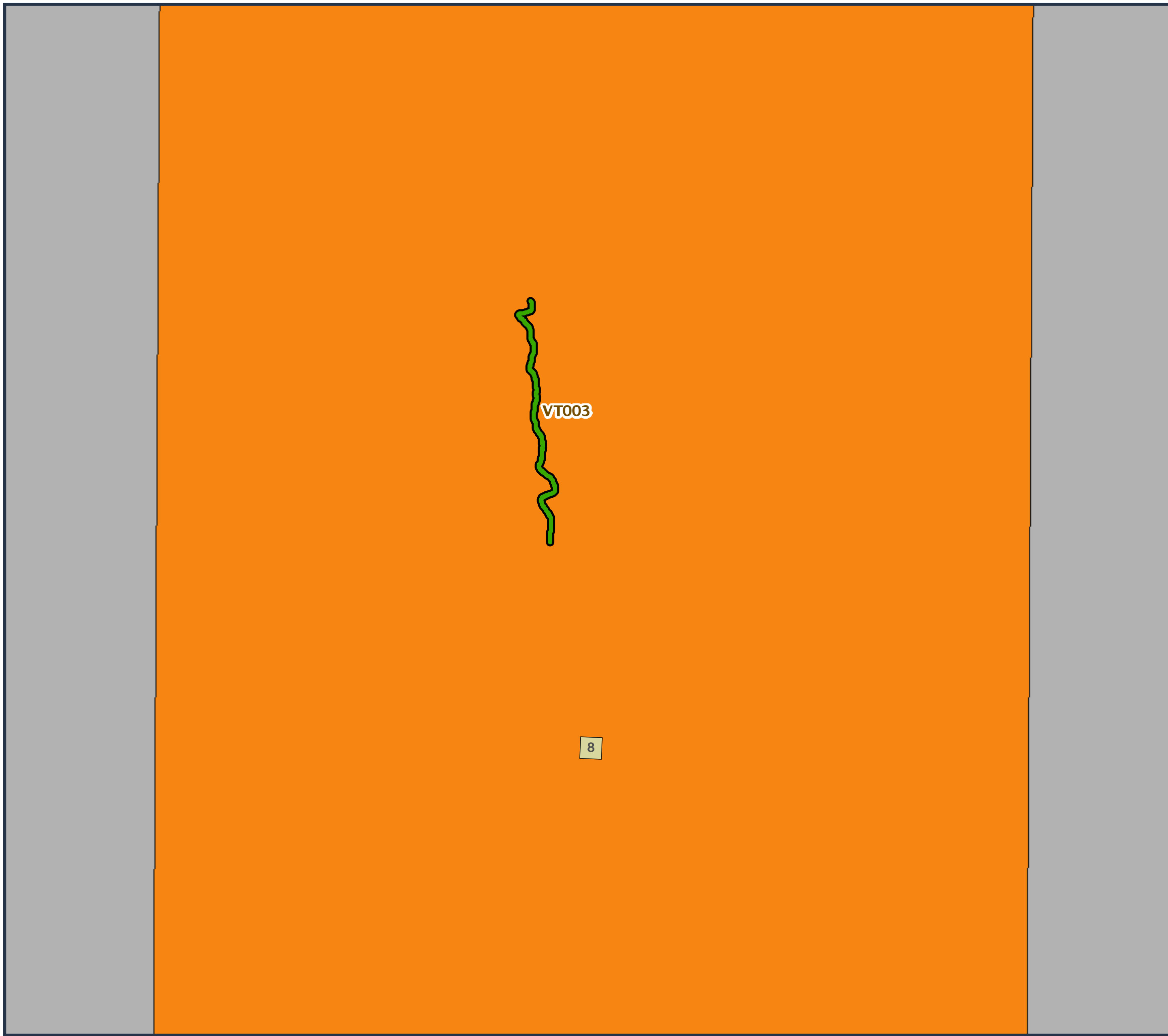
VINEYARD NORTHEAST
VINEYARD OFFSHORE

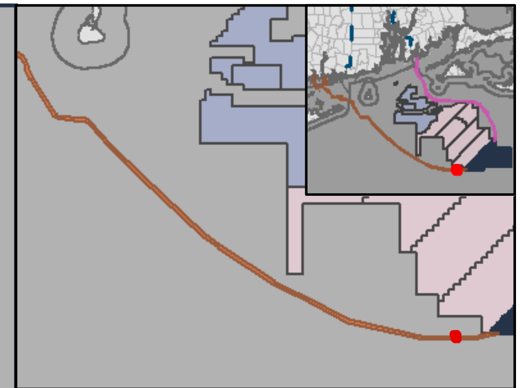


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





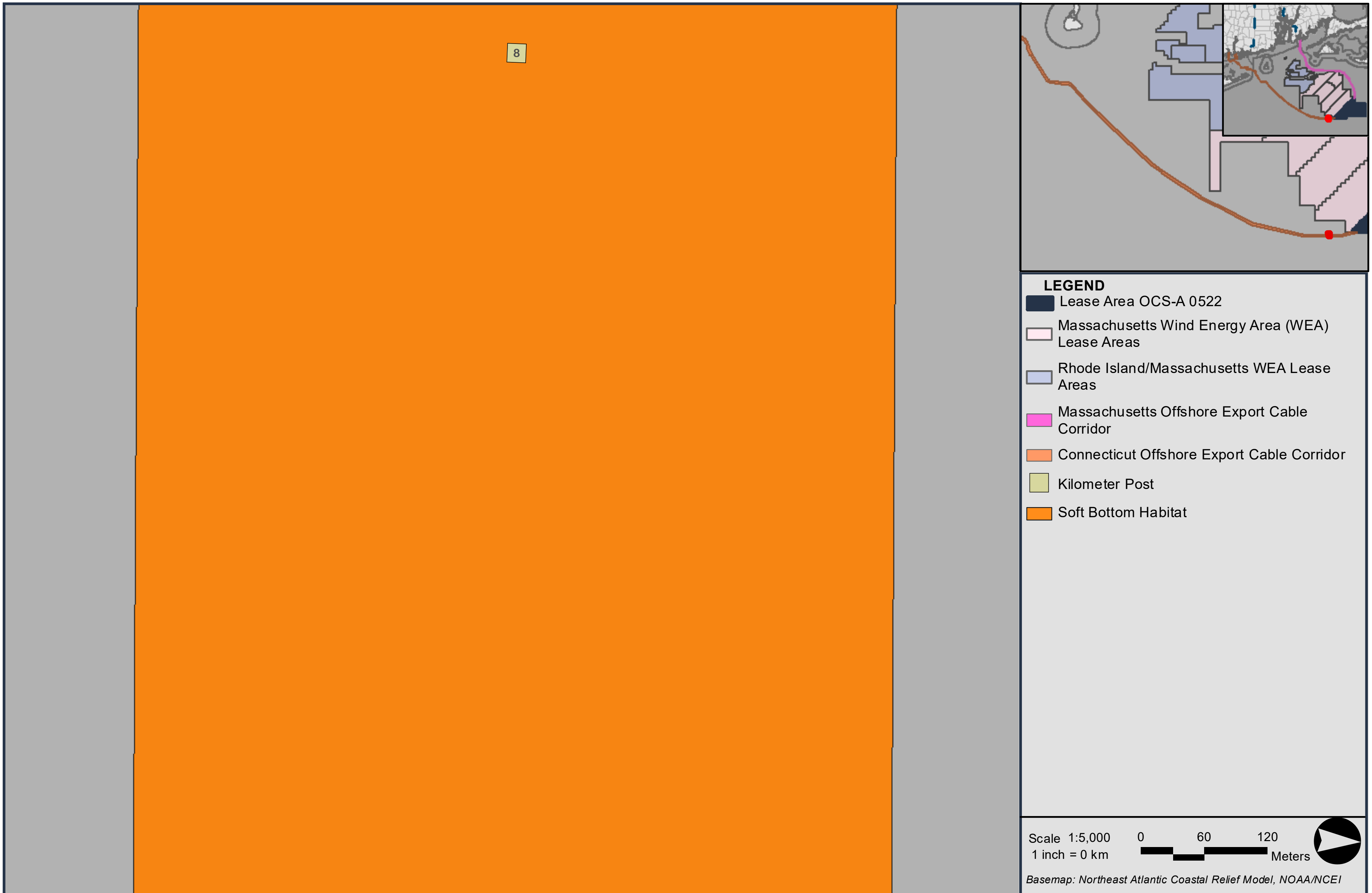
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Soft Bottom Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

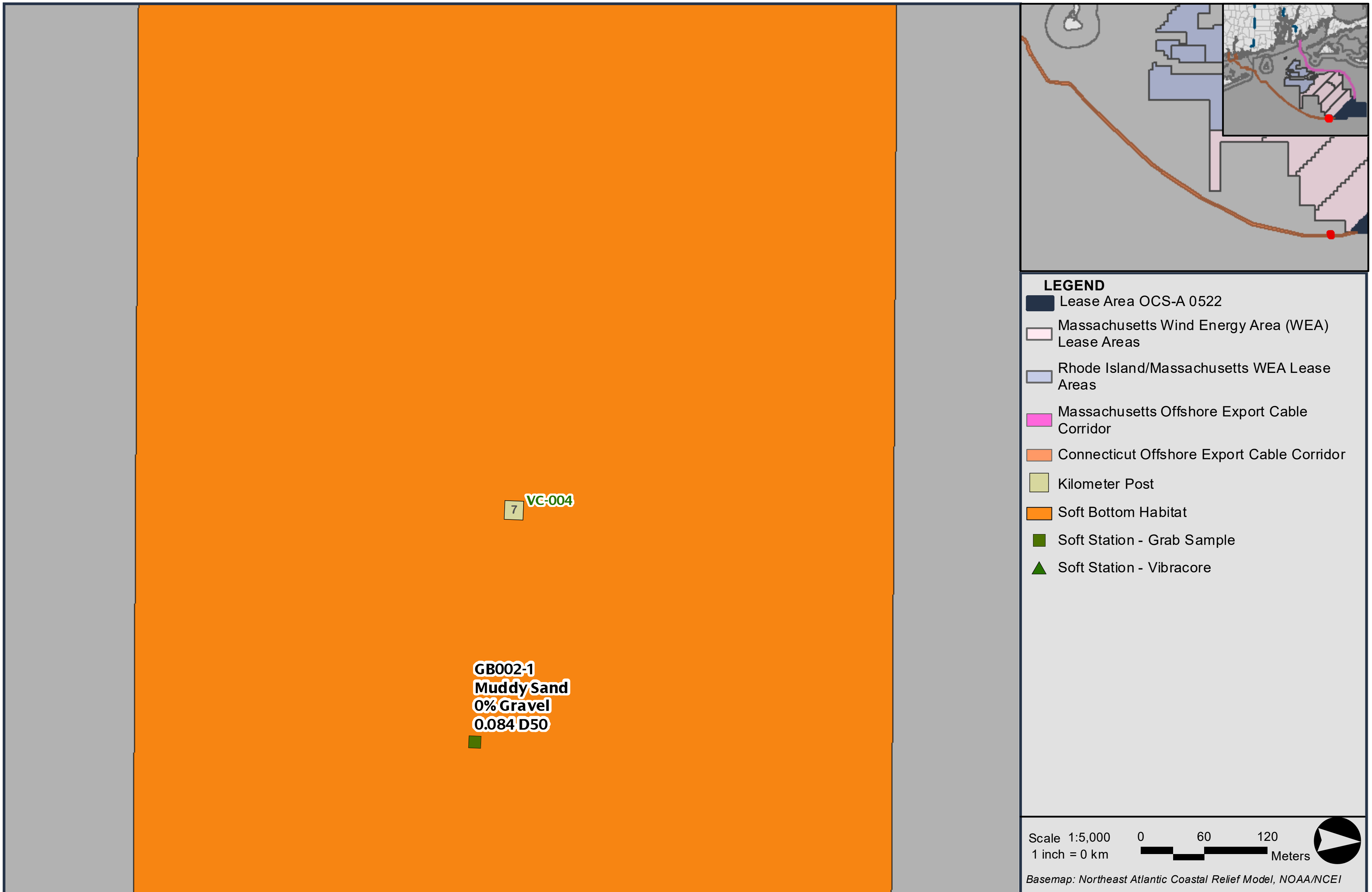
Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE

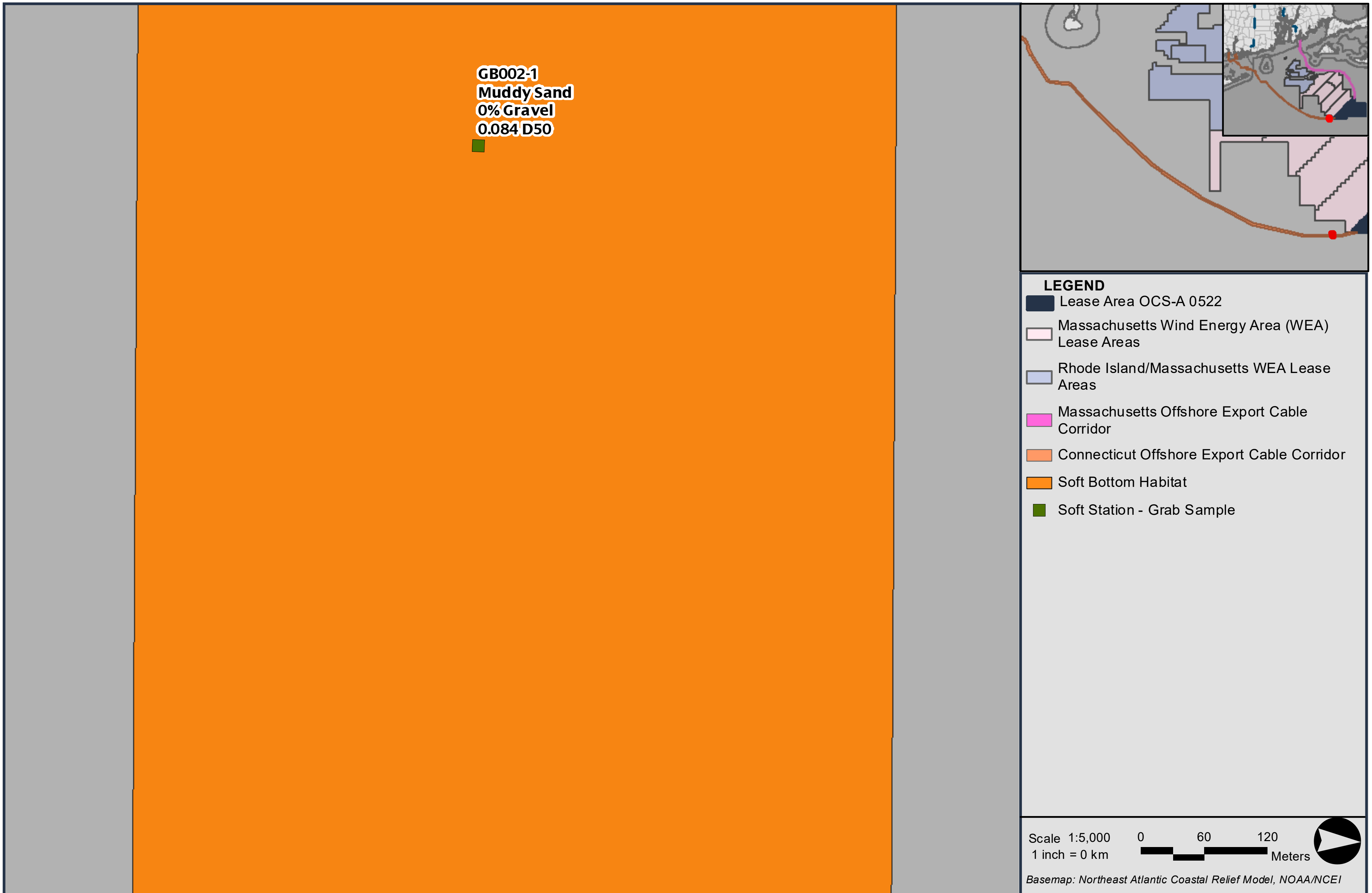


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

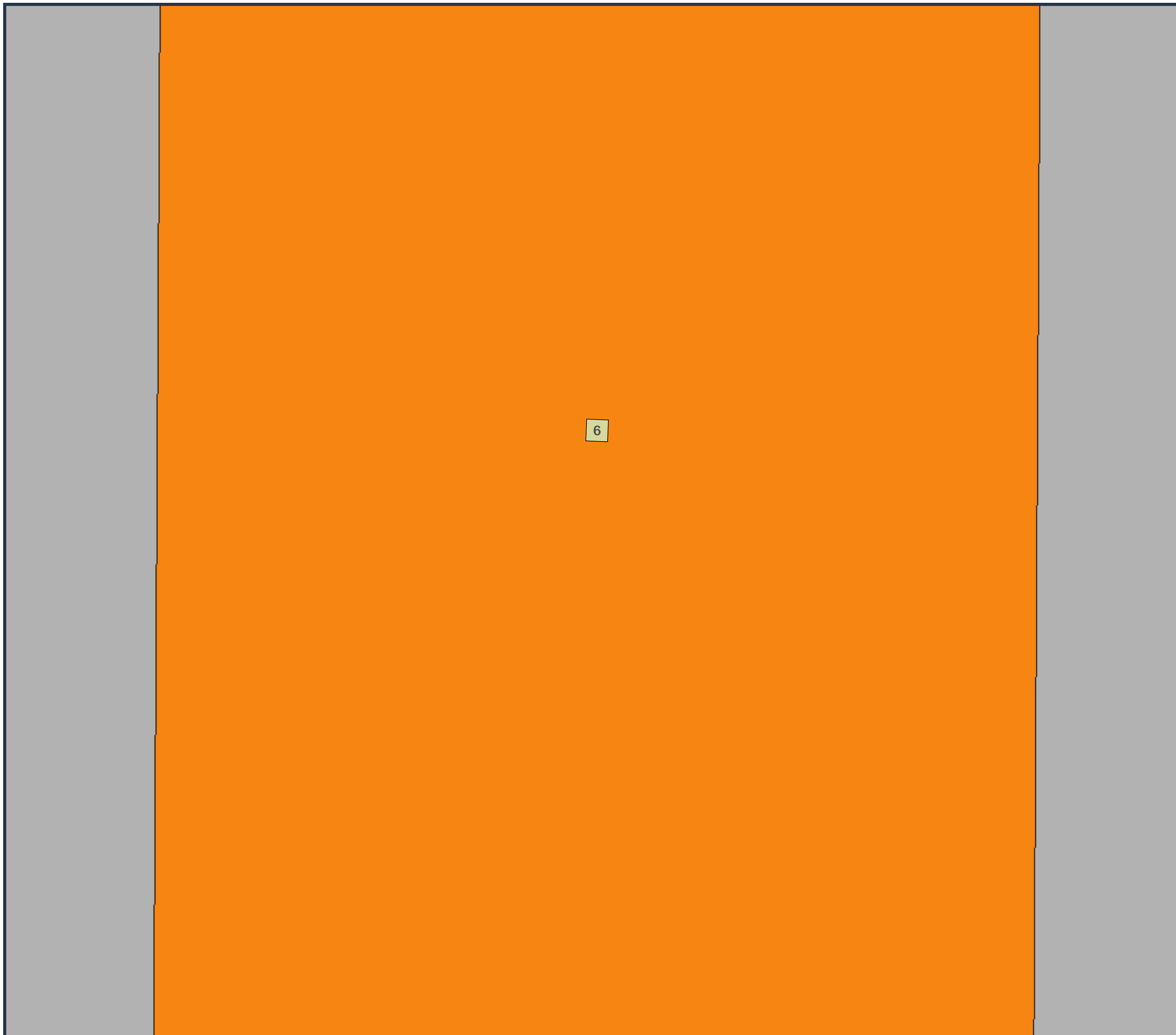


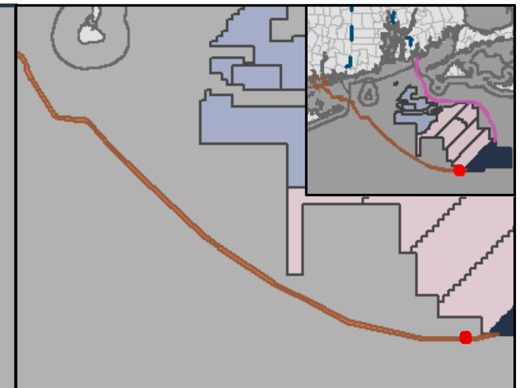
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC





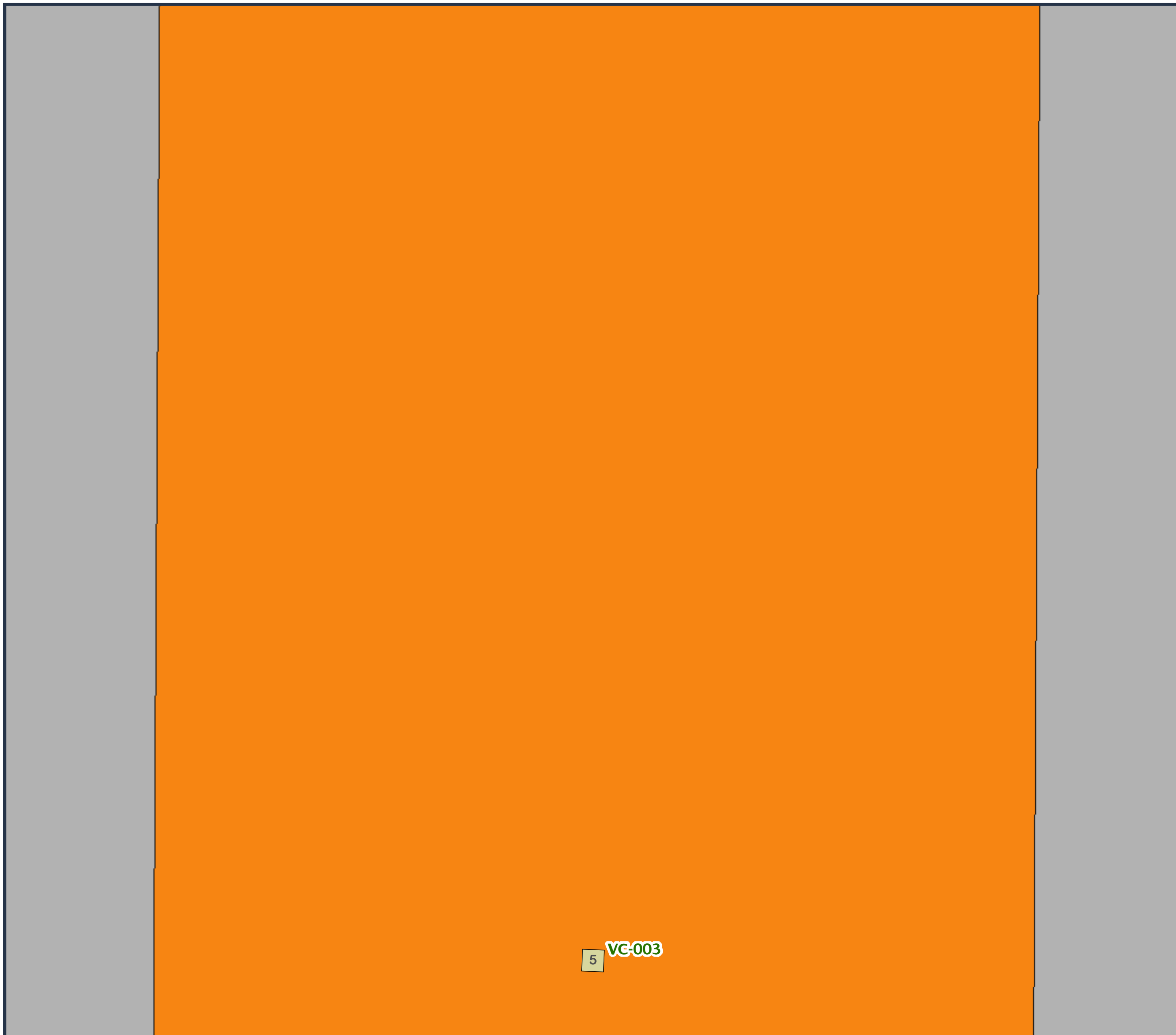
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat

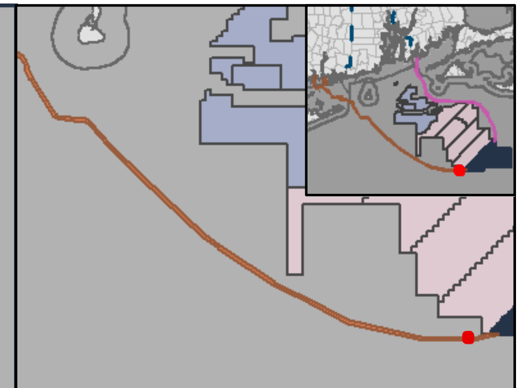
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

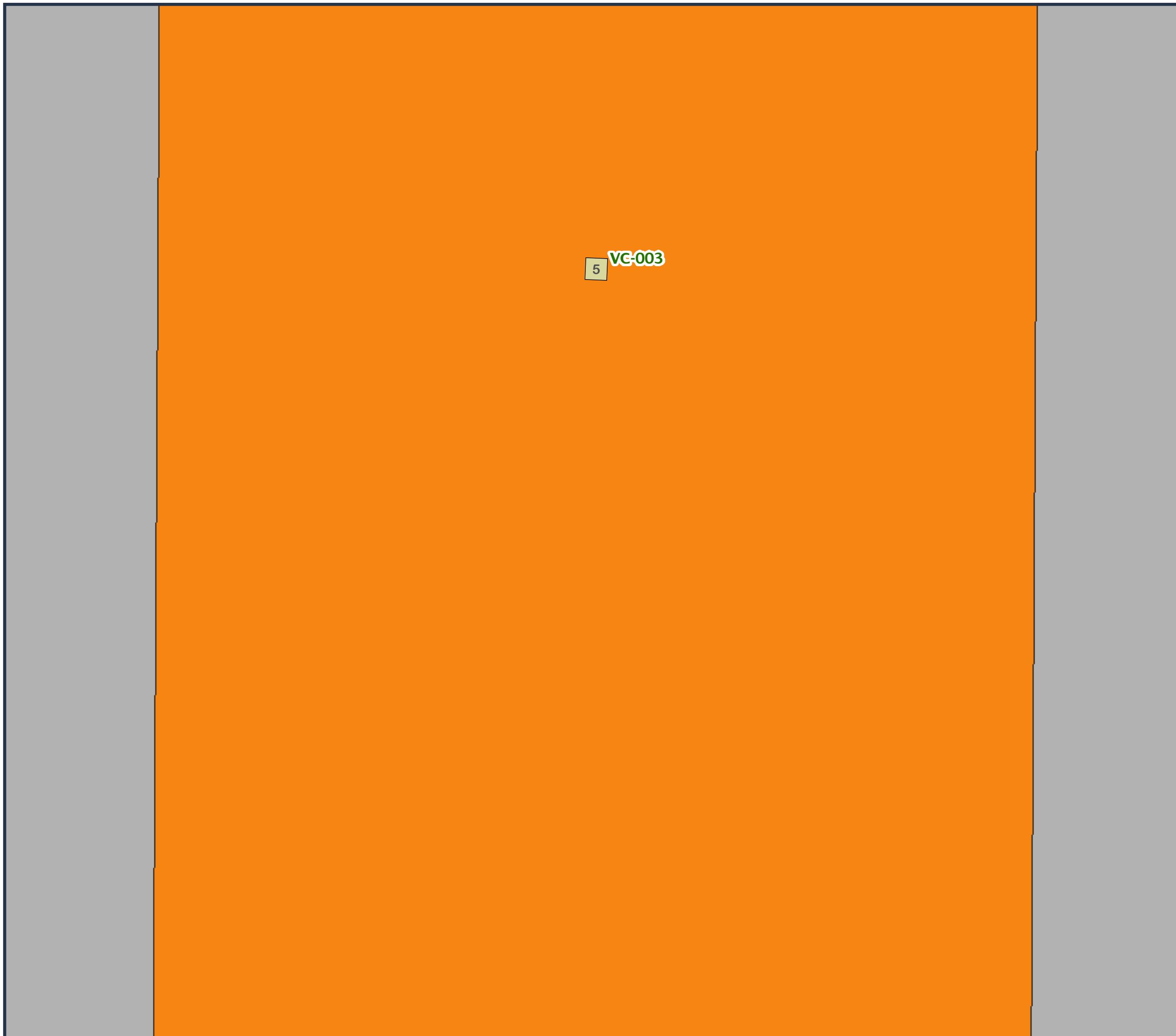
Scale 1:5,000
1 inch = 0 km

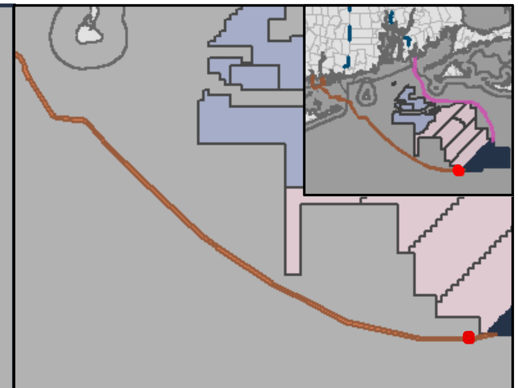
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

Lease Area OCS-A 0522

Massachusetts Wind Energy Area (WEA) Lease Areas

Rhode Island/Massachusetts WEA Lease Areas

Massachusetts Offshore Export Cable Corridor

Connecticut Offshore Export Cable Corridor

Kilometer Post

Soft Bottom Habitat

Soft Station - Vibracore

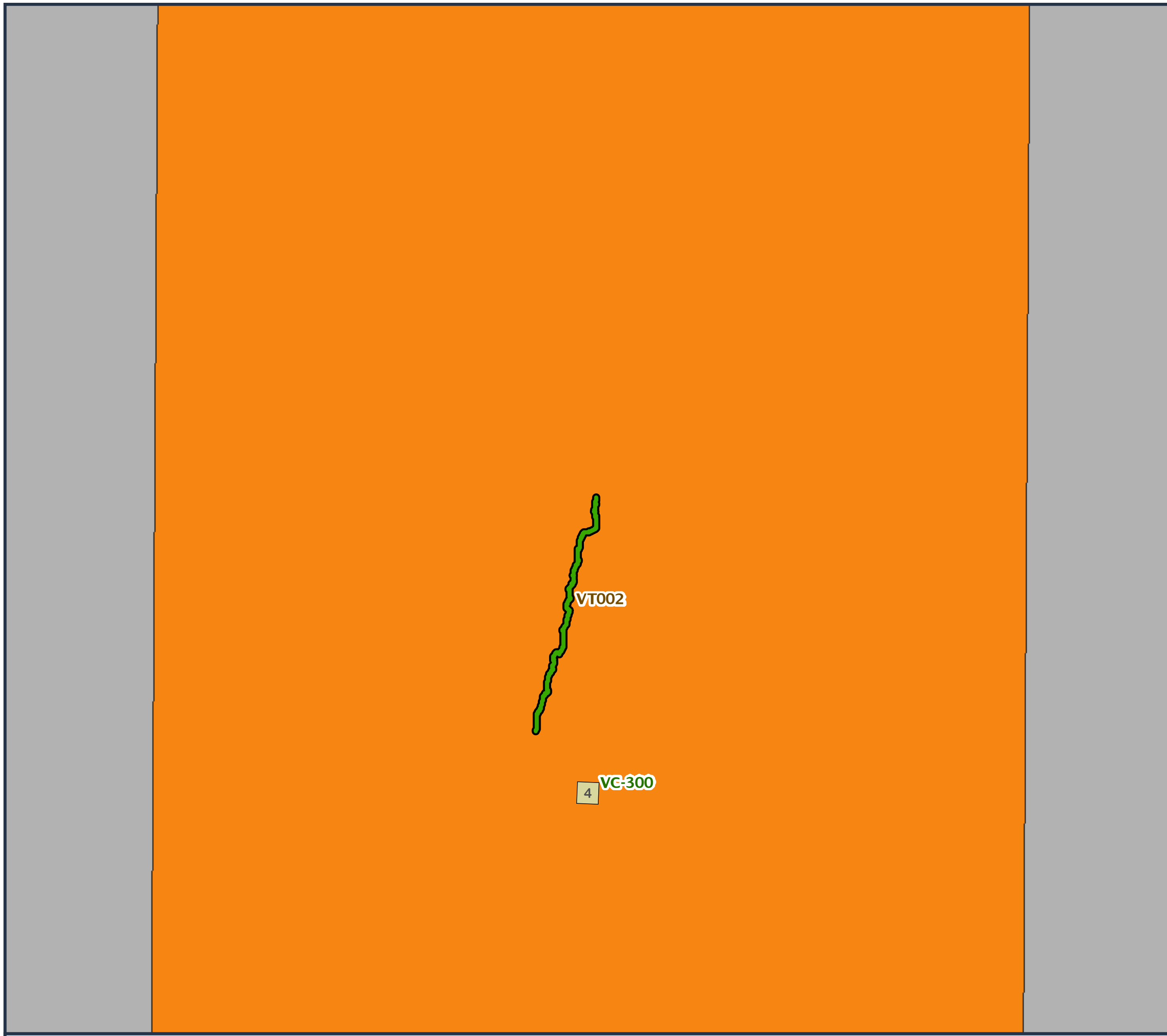
Scale 1:5,000
1 inch = 0 km

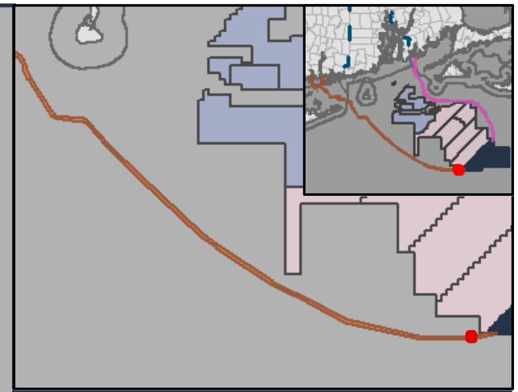
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





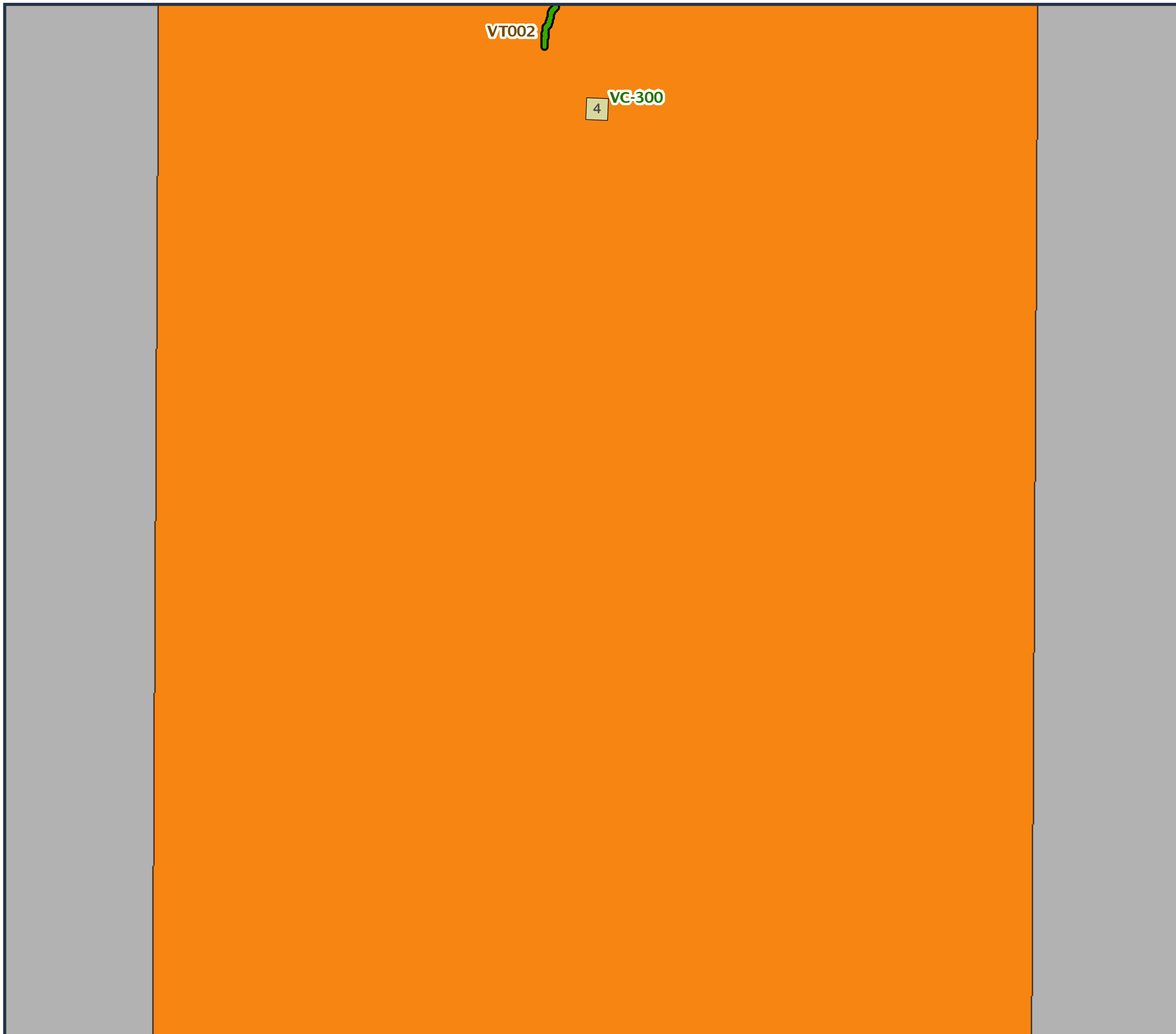
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

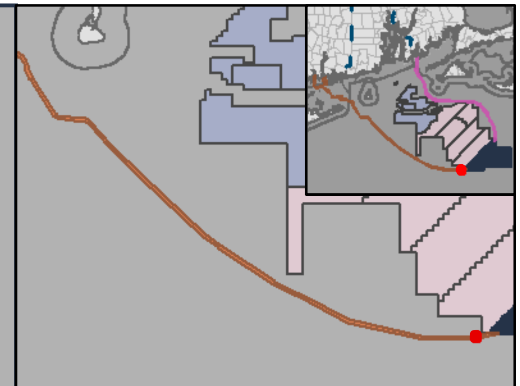
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

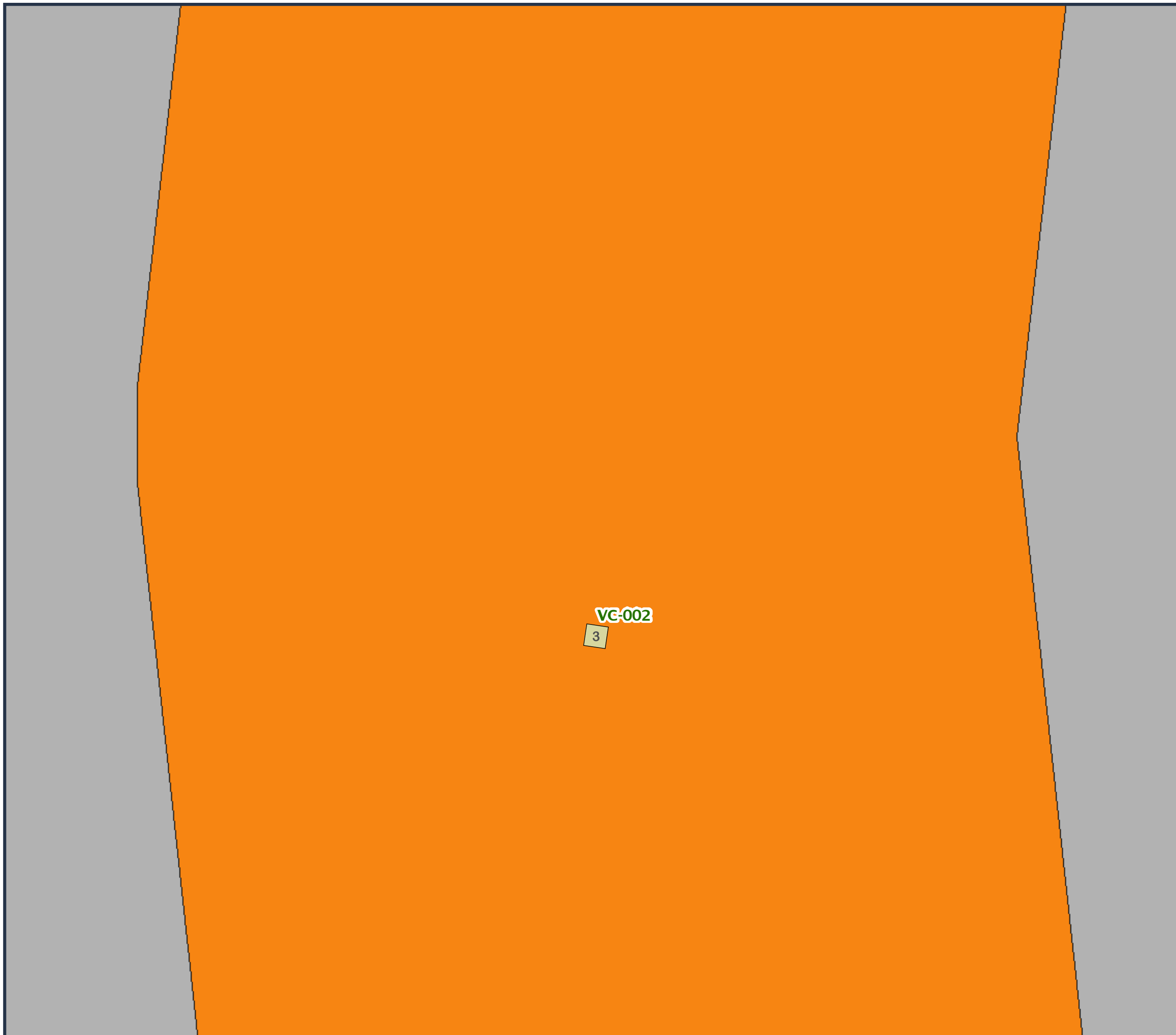
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore
- Soft Bottom Station - Video Transect

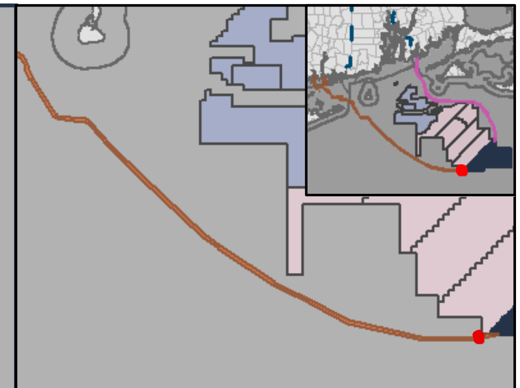
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





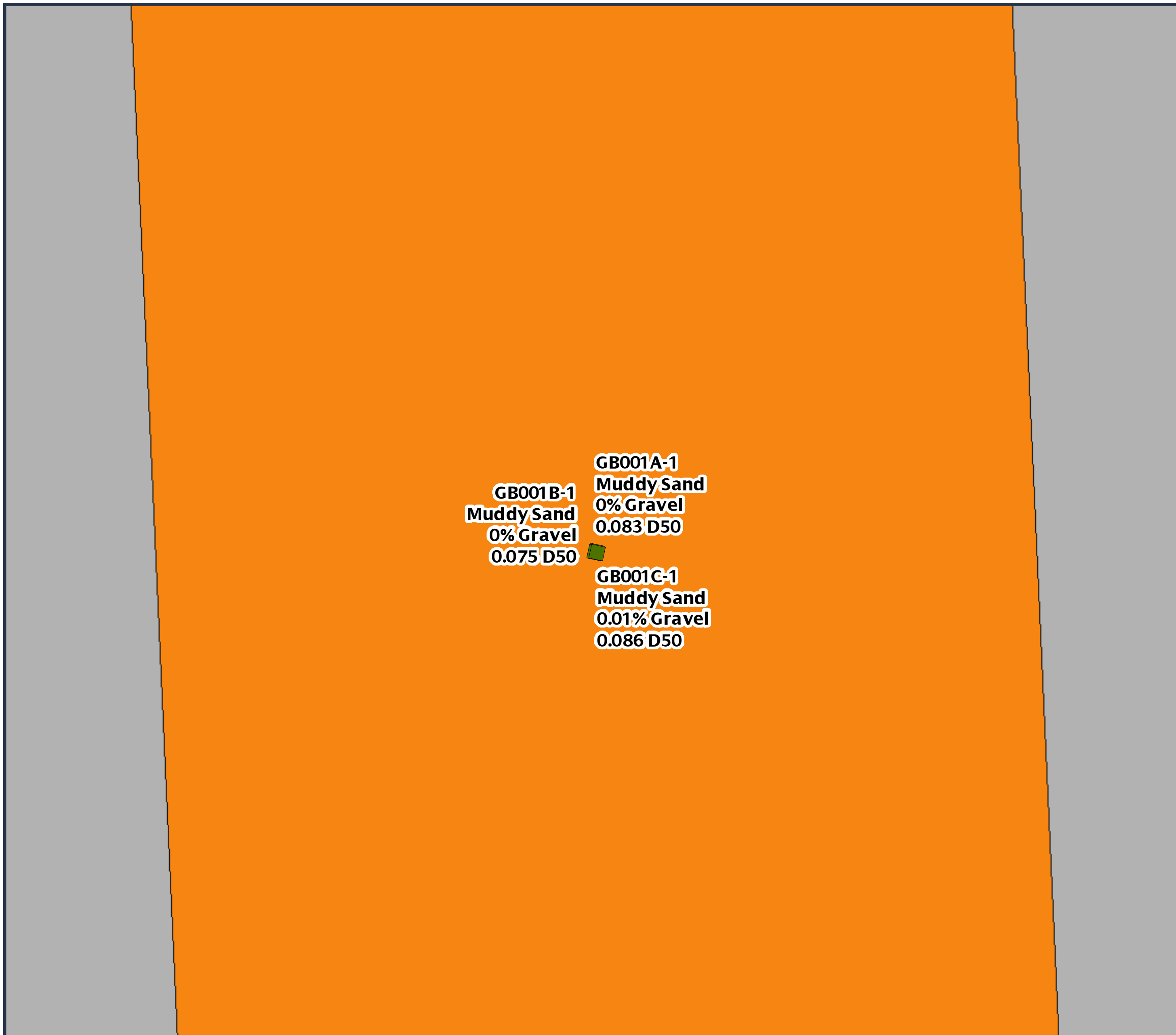
LEGEND
Lease Area OCS-A 0522
Massachusetts Wind Energy Area (WEA) Lease Areas
Rhode Island/Massachusetts WEA Lease Areas
Massachusetts Offshore Export Cable Corridor
Connecticut Offshore Export Cable Corridor
Kilometer Post
Soft Bottom Habitat
Soft Station - Vibracore

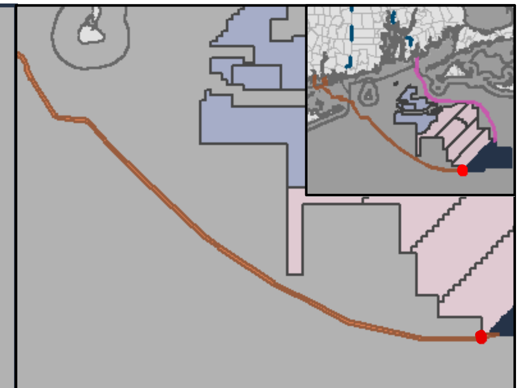
Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





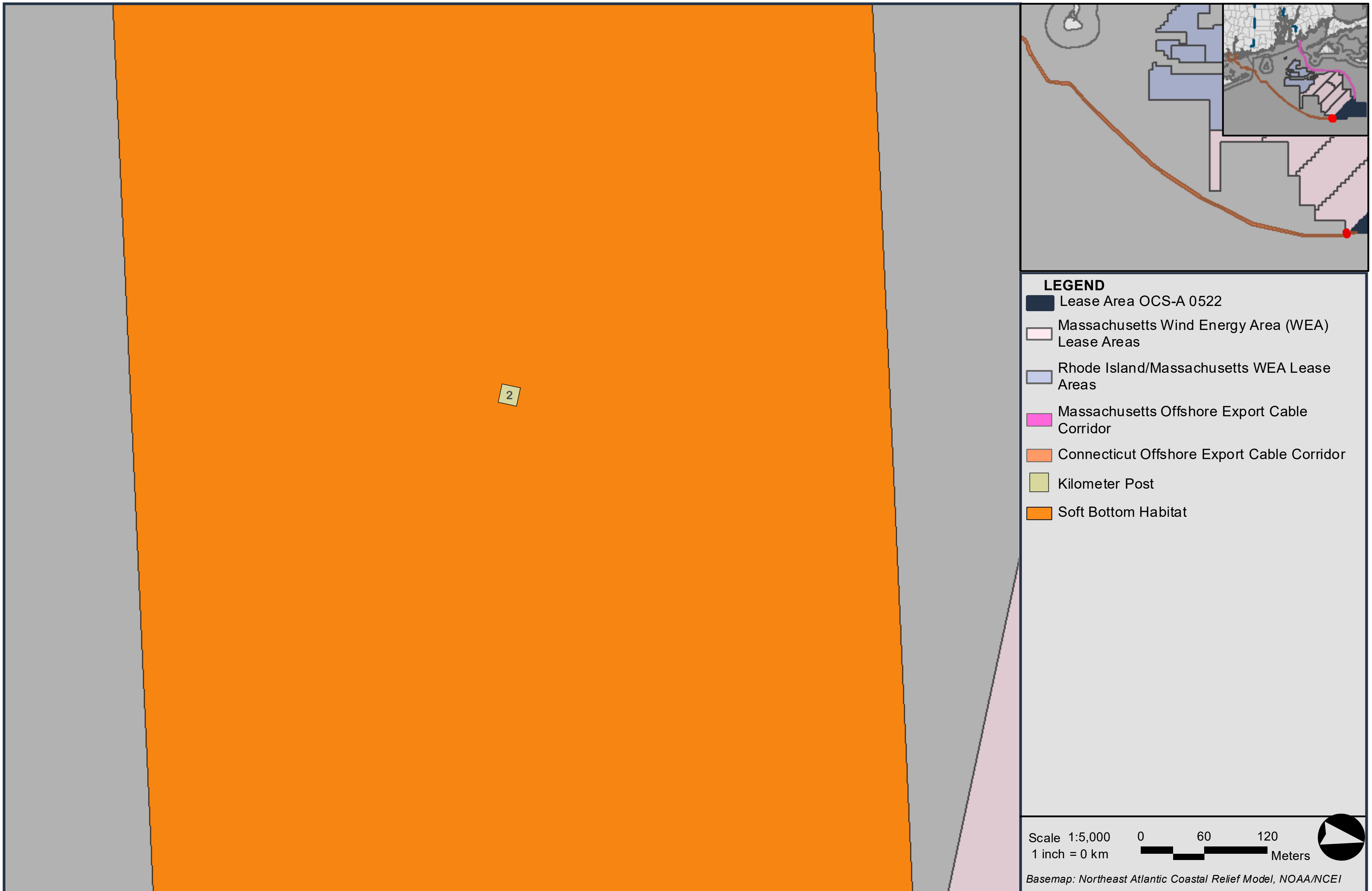
LEGEND
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Soft Bottom Habitat
- Soft Station - Grab Sample

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

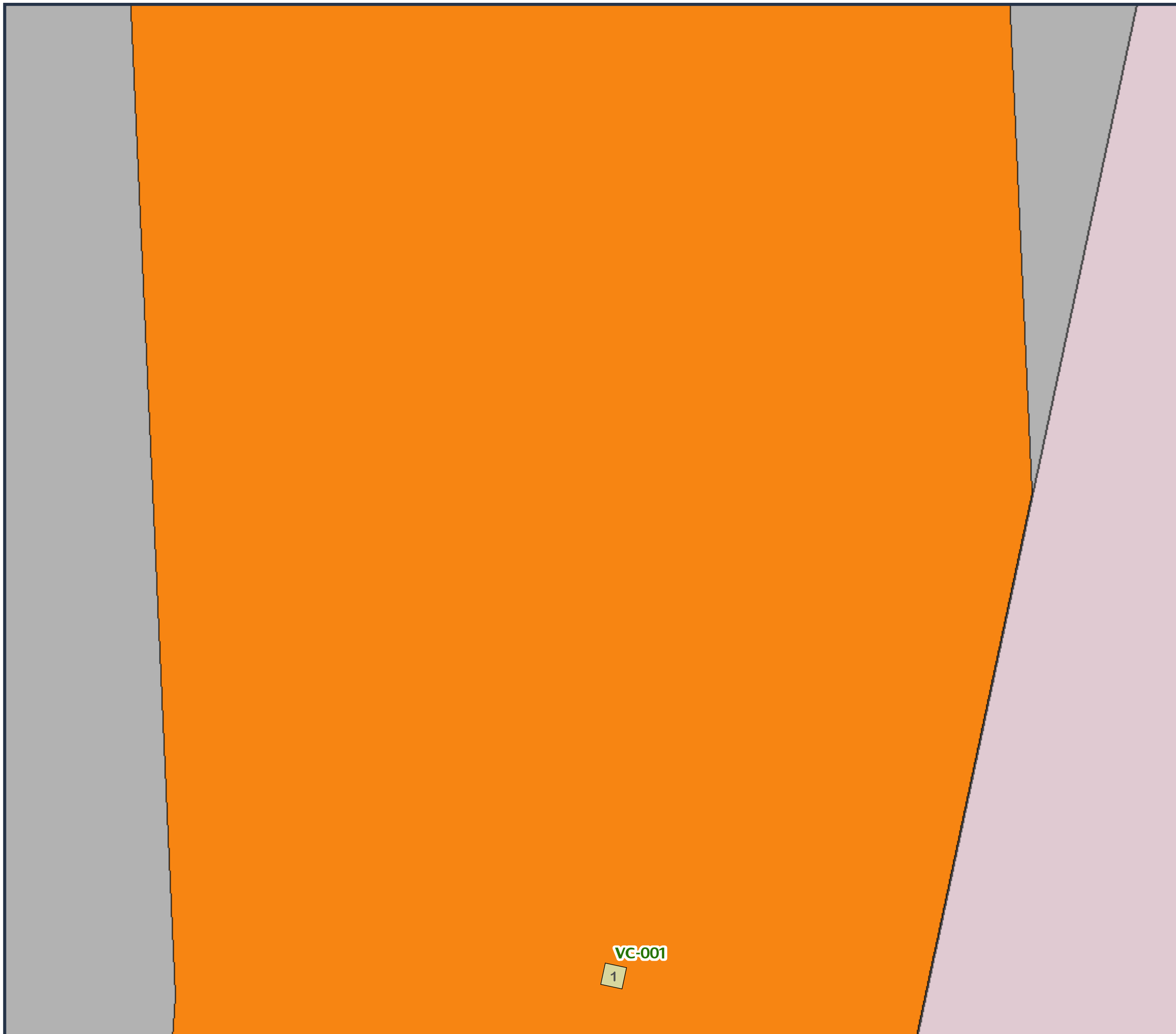
Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

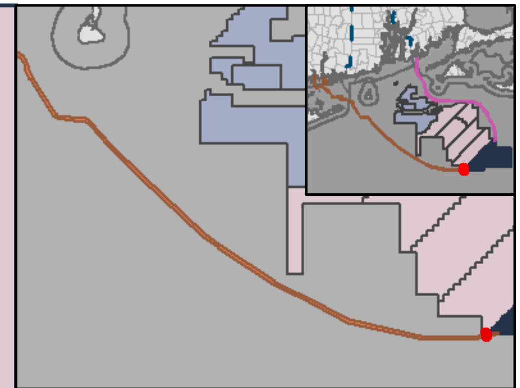
VINEYARD NORTHEAST
VINEYARD OFFSHORE



Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Station - Vibracore

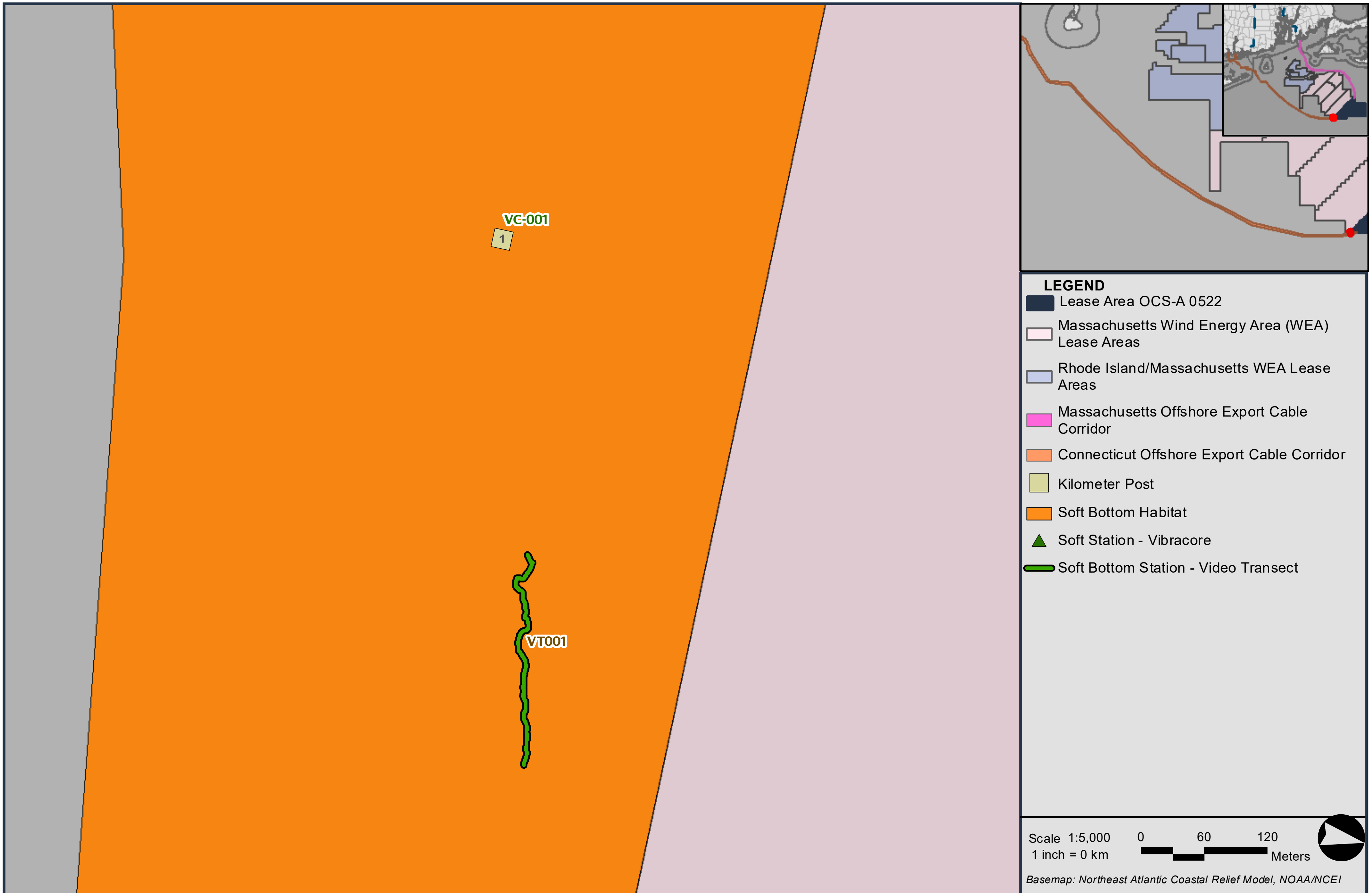
Scale 1:5,000
1 inch = 0 km

0 60 120
Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

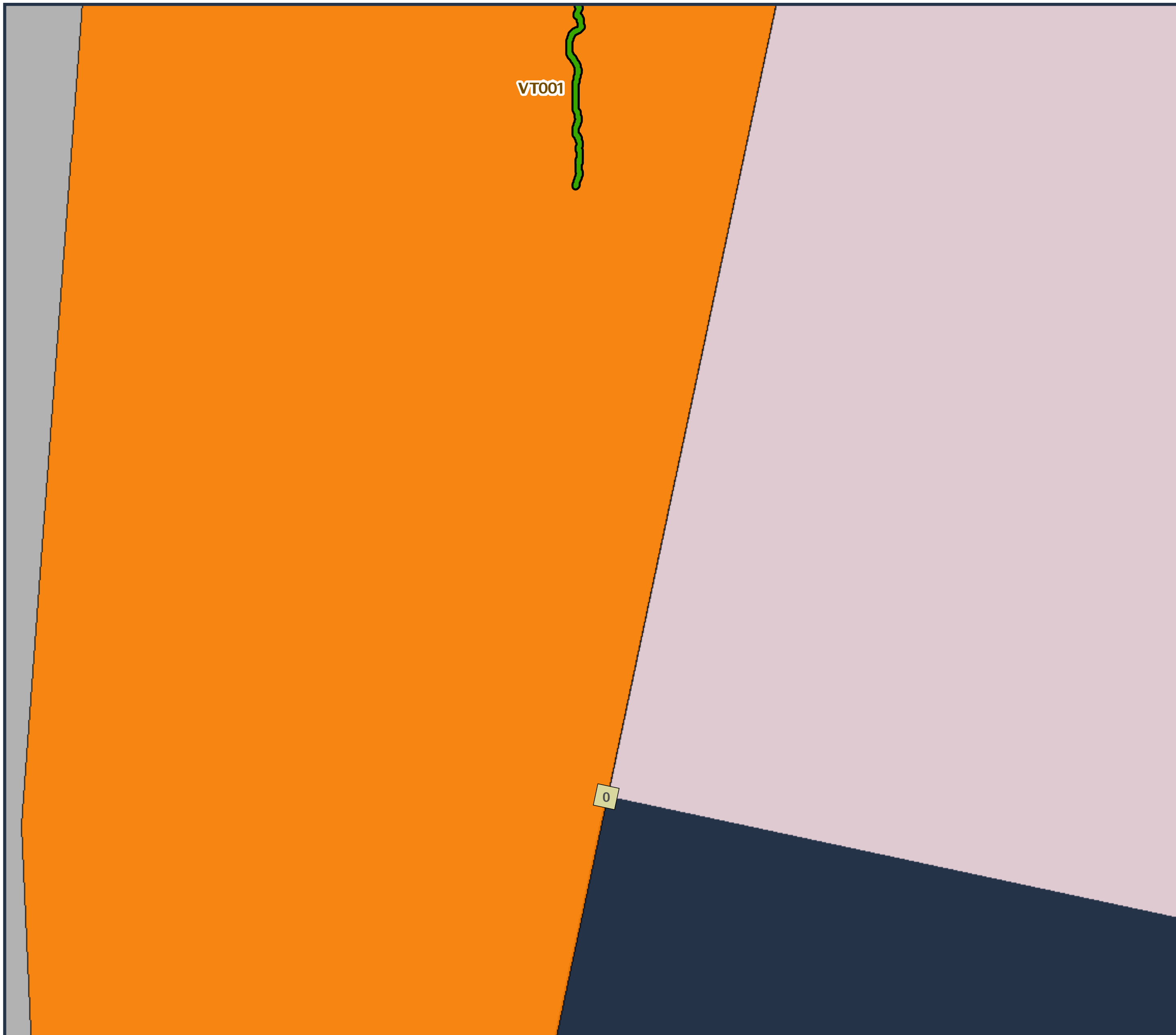
VINEYARD NORTHEAST
VINEYARD OFFSHORE

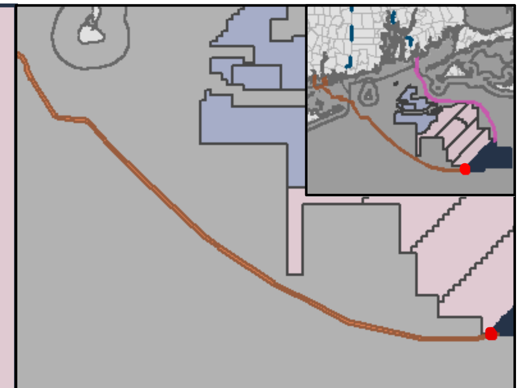


Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST

VINEYARD OFFSHORE





LEGEND

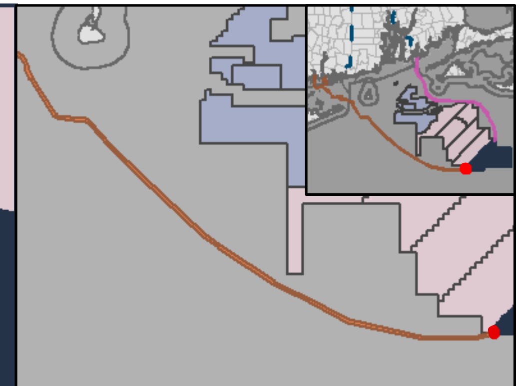
- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat
- Soft Bottom Station - Video Transect

Scale 1:5,000
1 inch = 0 km
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Kilometer Post
- Soft Bottom Habitat

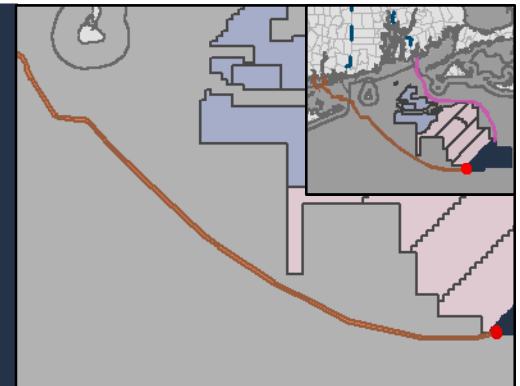
Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



LEGEND

- Lease Area OCS-A 0522
- Massachusetts Wind Energy Area (WEA) Lease Areas
- Rhode Island/Massachusetts WEA Lease Areas
- Massachusetts Offshore Export Cable Corridor
- Connecticut Offshore Export Cable Corridor
- Soft Bottom Habitat

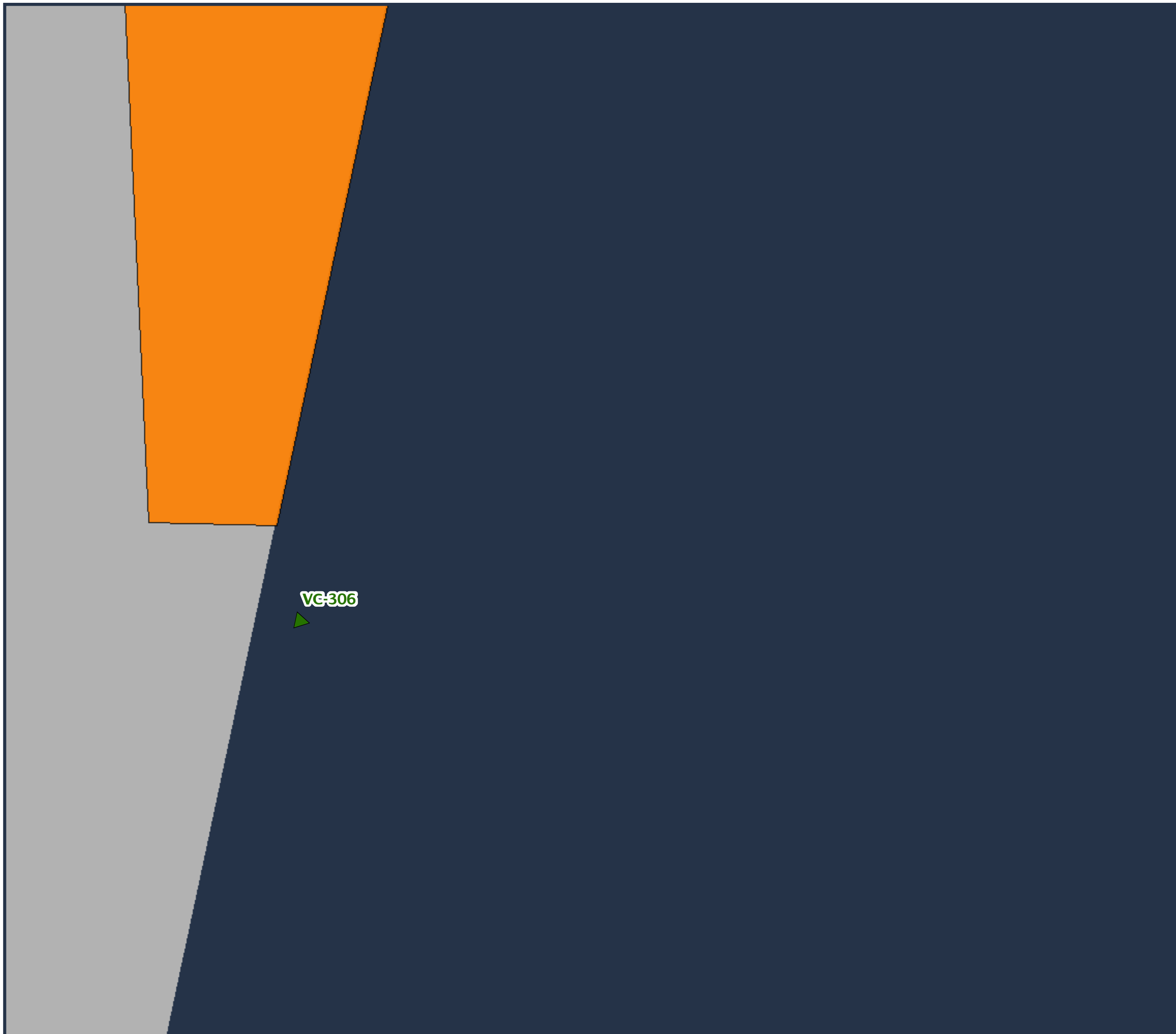
Scale 1:5,000
1 inch = 0 km

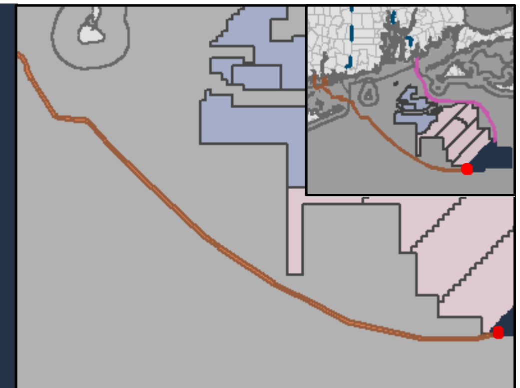
0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE





LEGEND

Lease Area OCS-A 0522

Massachusetts Wind Energy Area (WEA) Lease Areas

Rhode Island/Massachusetts WEA Lease Areas

Massachusetts Offshore Export Cable Corridor

Connecticut Offshore Export Cable Corridor

Soft Bottom Habitat

Soft Station - Vibracore

Scale 1:5,000
1 inch = 0 km

0 60 120 Meters

Basemap: Northeast Atlantic Coastal Relief Model, NOAA/NCEI

Large Scale Maps of Bottom Habitats and Benthic Features Located in the Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE