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-B1 Figures

Prepared by:
Geo SubSea

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	May 2023	Updated to include all data collected in 2022.
3	November 2023	Removed the potential New York Offshore Export Cable Corridor (OECC) figures. Removed onshore facilities from figures.
3	March 2024	Resubmitted without revisions.

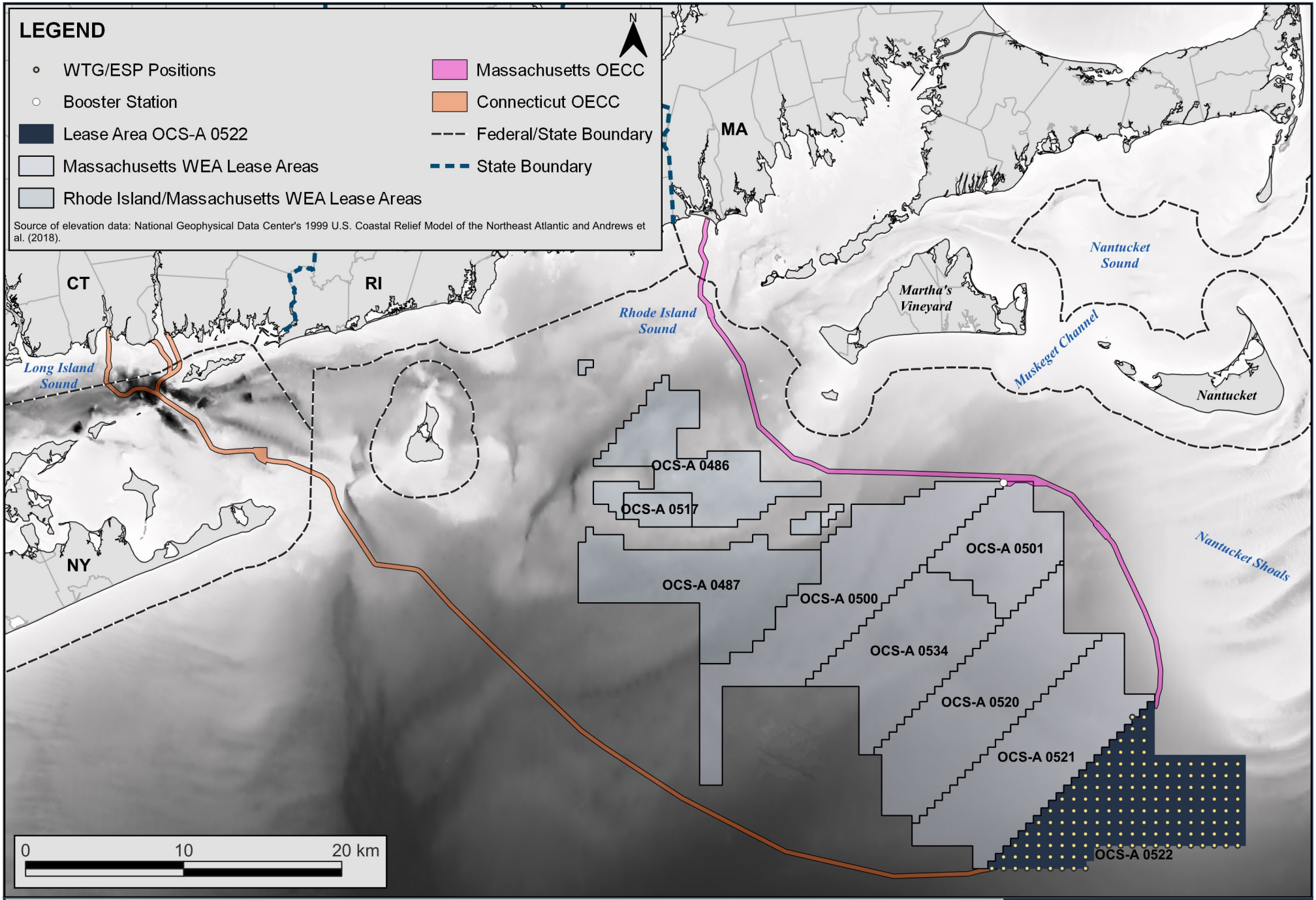


Figure 1.1-1
Overview of Vineyard Northeast Offshore Development Area

VINEYARD NORTHEAST
VINEYARD OFFSHORE

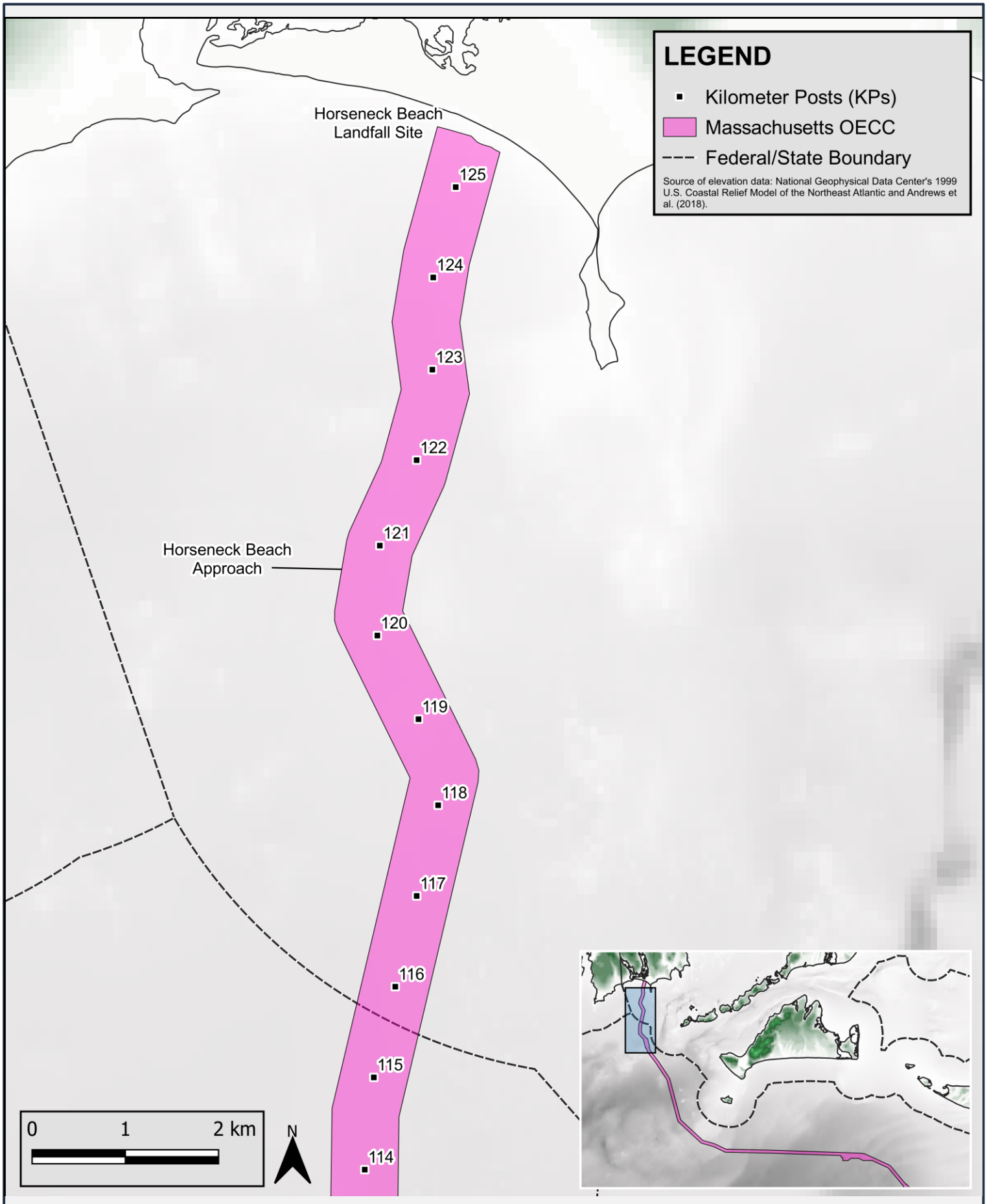


Figure 1.1-2
Massachusetts OECC Landfall Site

VINEYARD NORTHEAST
VINEYARD OFFSHORE

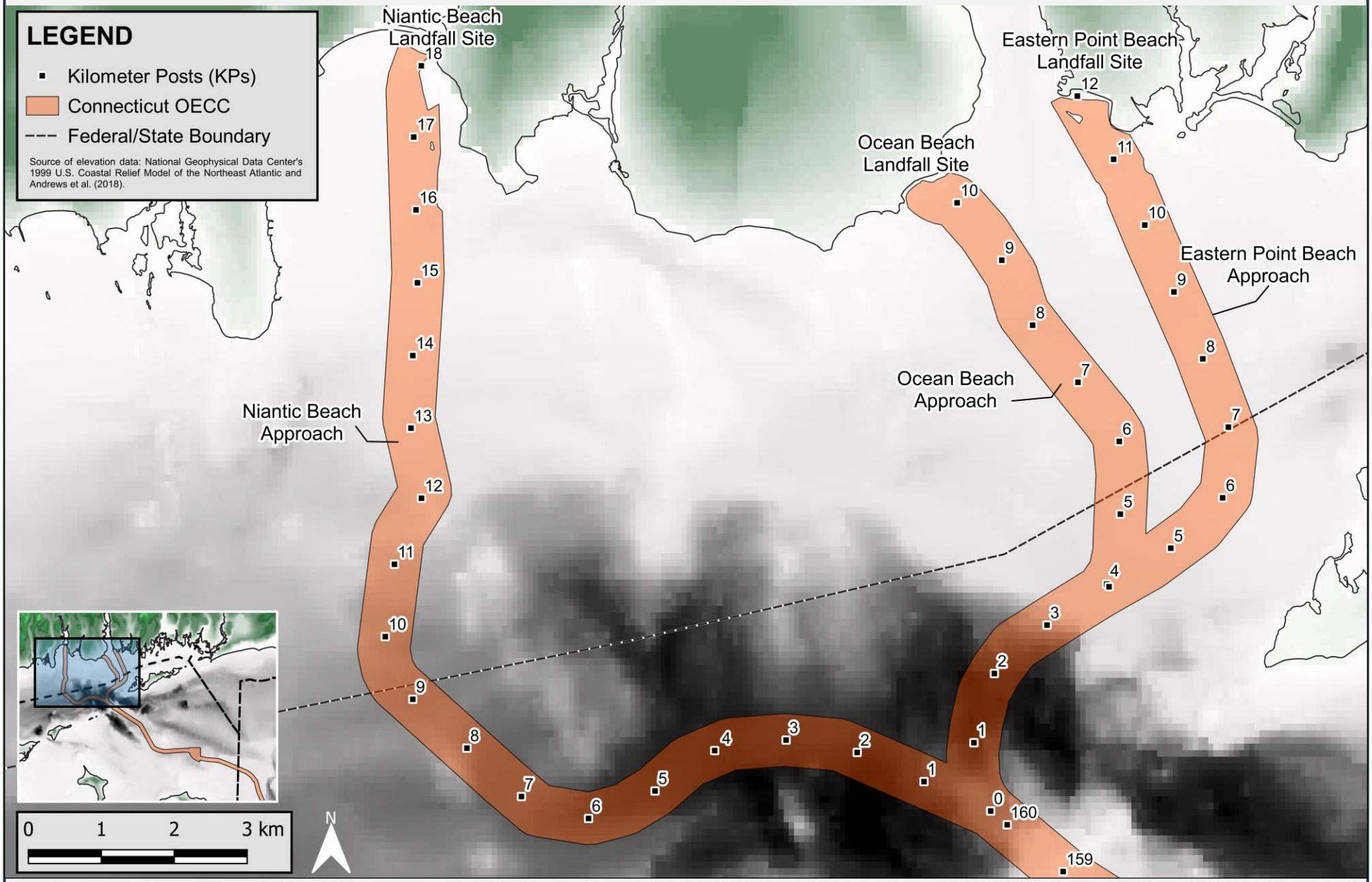


Figure 1.1-3
Connecticut OECC Landfall Sites

VINEYARD NORTHEAST
VINEYARD OFFSHORE

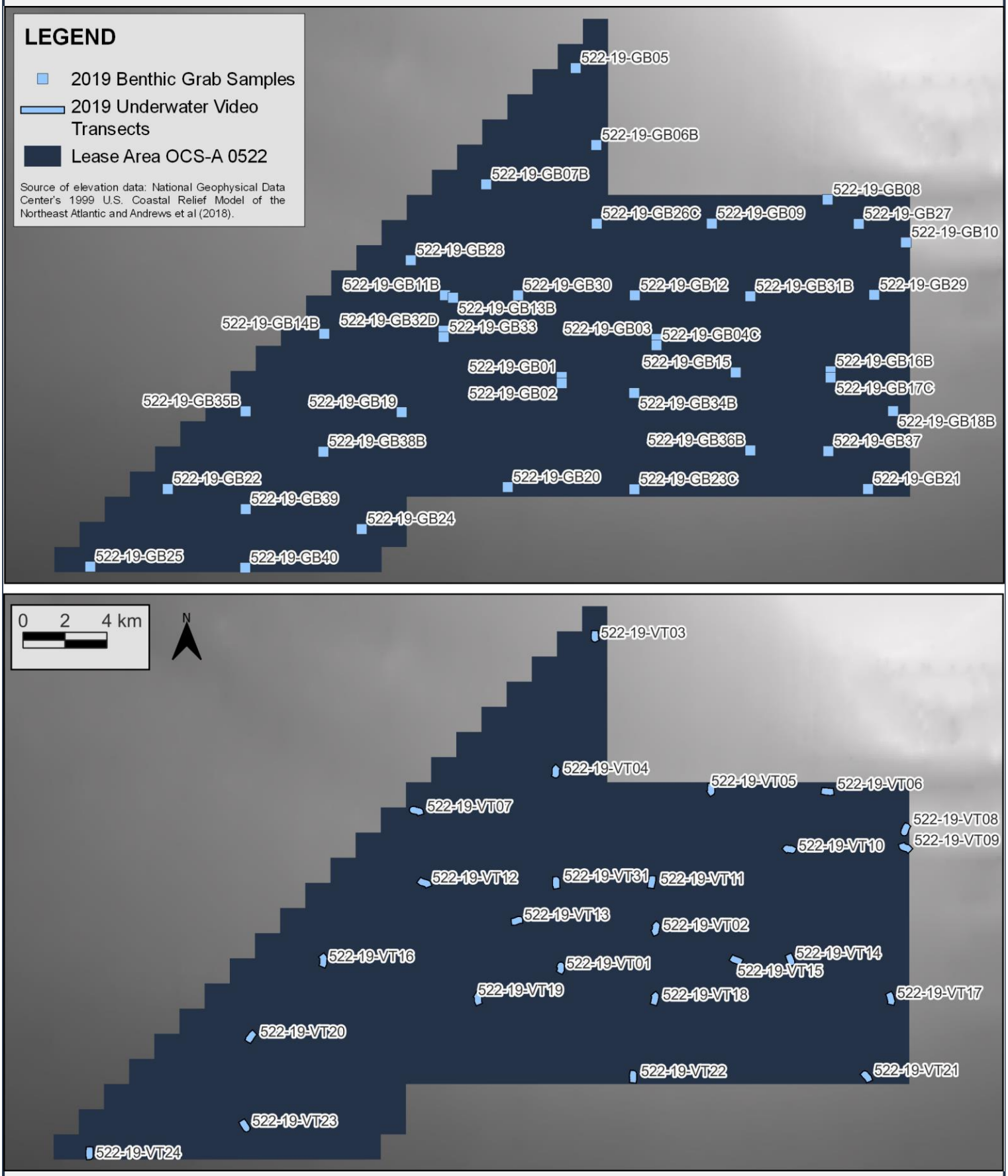


Figure 1.3-4

2019 Benthic Grab Sample Locations and Underwater Video Transects, Lease Area

VINEYARD NORTHEAST

VINEYARD OFFSHORE

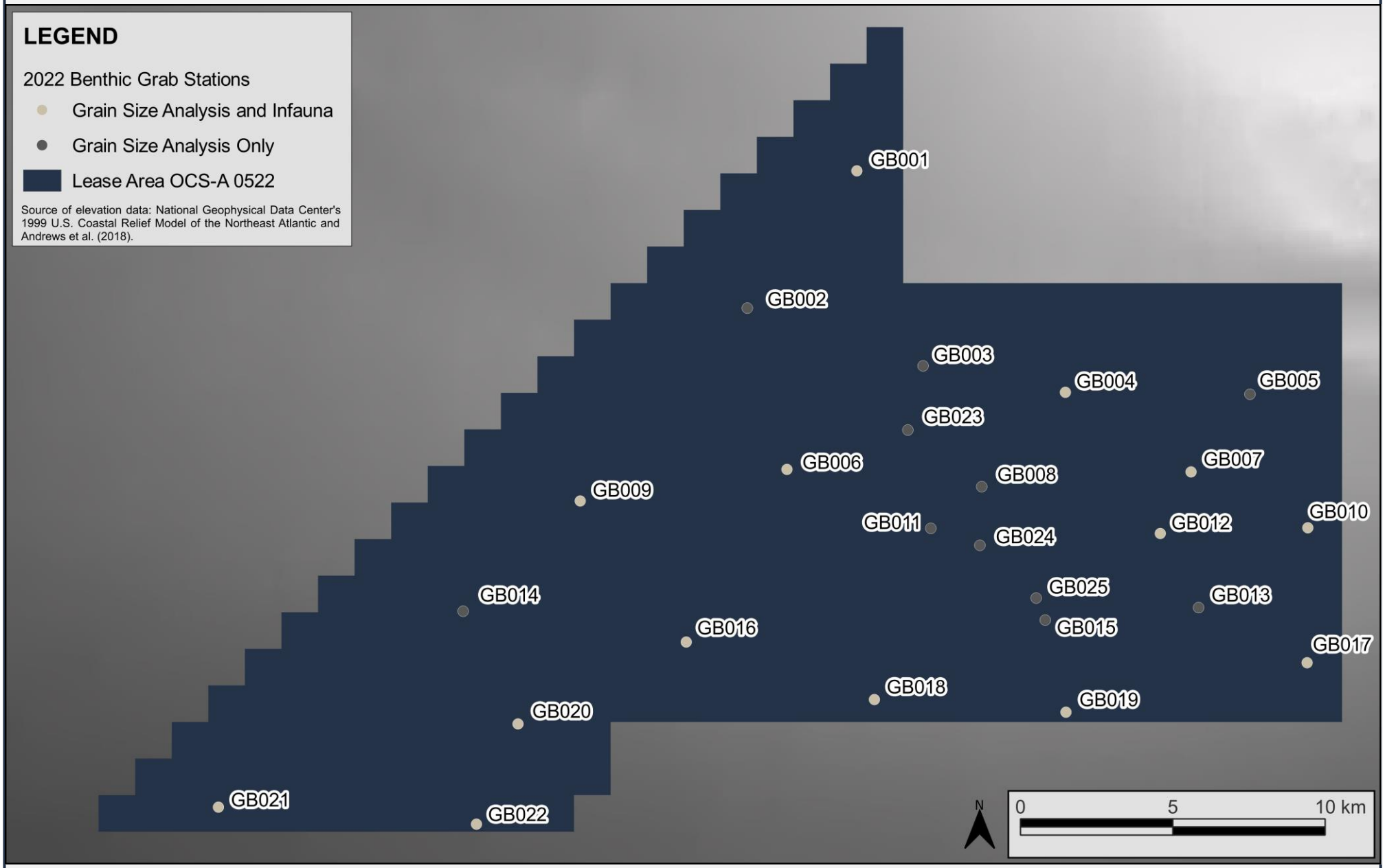


Figure 1.3-7
2022 Benthic Grab Sample Locations, Lease Area

VINEYARD NORTHEAST
VINEYARD OFFSHORE

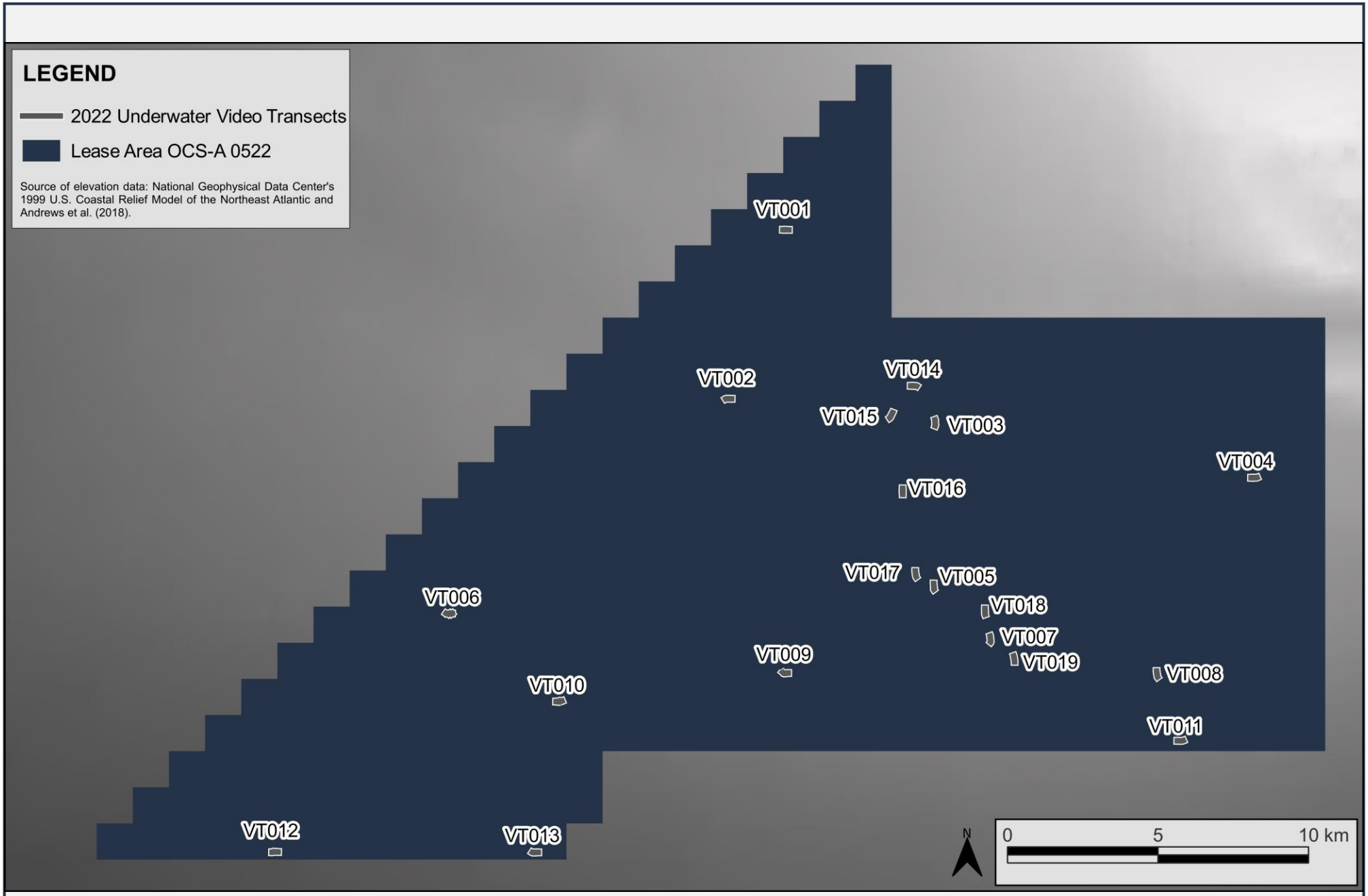


Figure 1.3-8
2022 Underwater Video Transect Locations, Lease Area

VINEYARD NORTHEAST
VINEYARD OFFSHORE

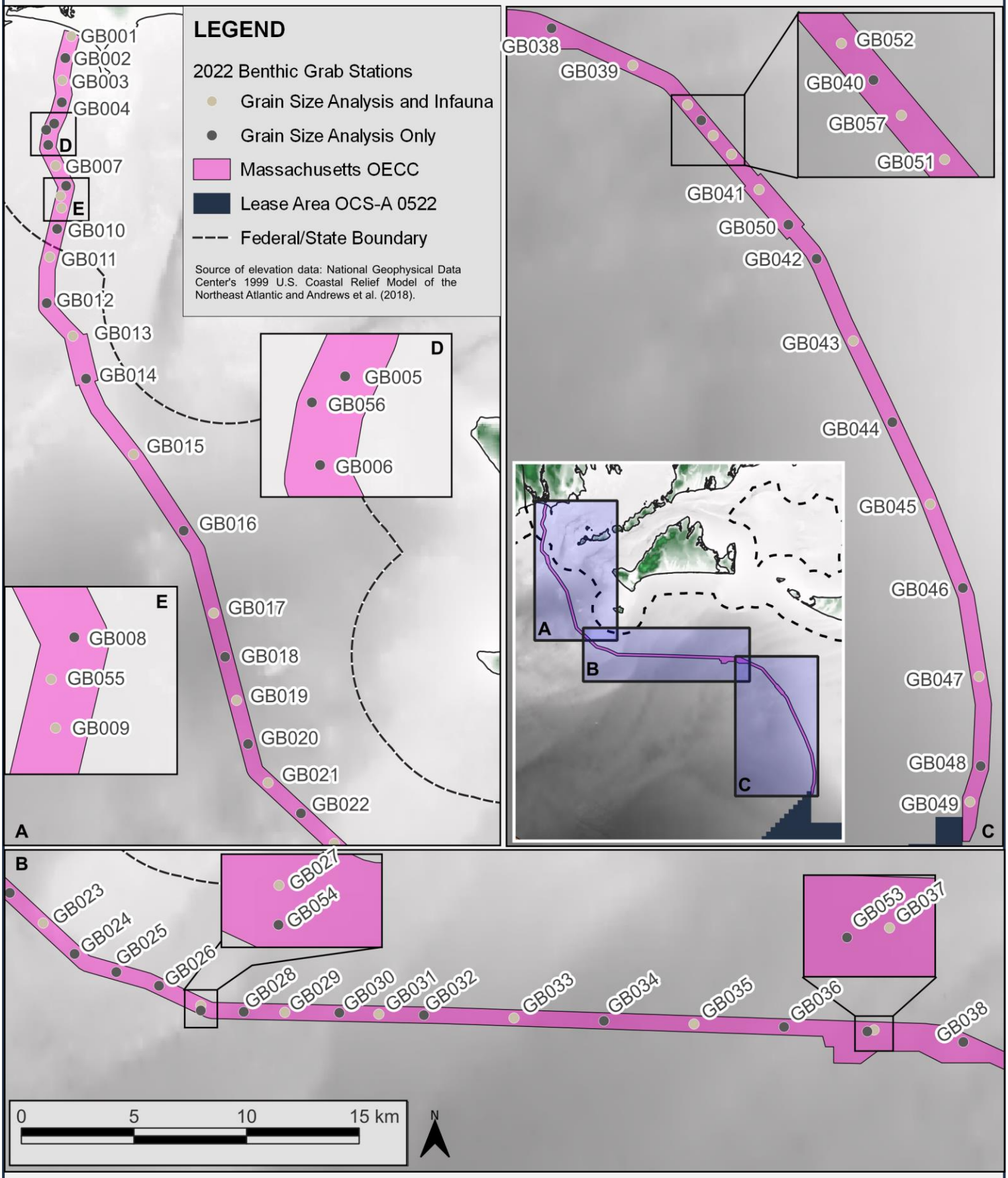


Figure 1.3-12
2022 Benthic Grab Sample Locations, Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE

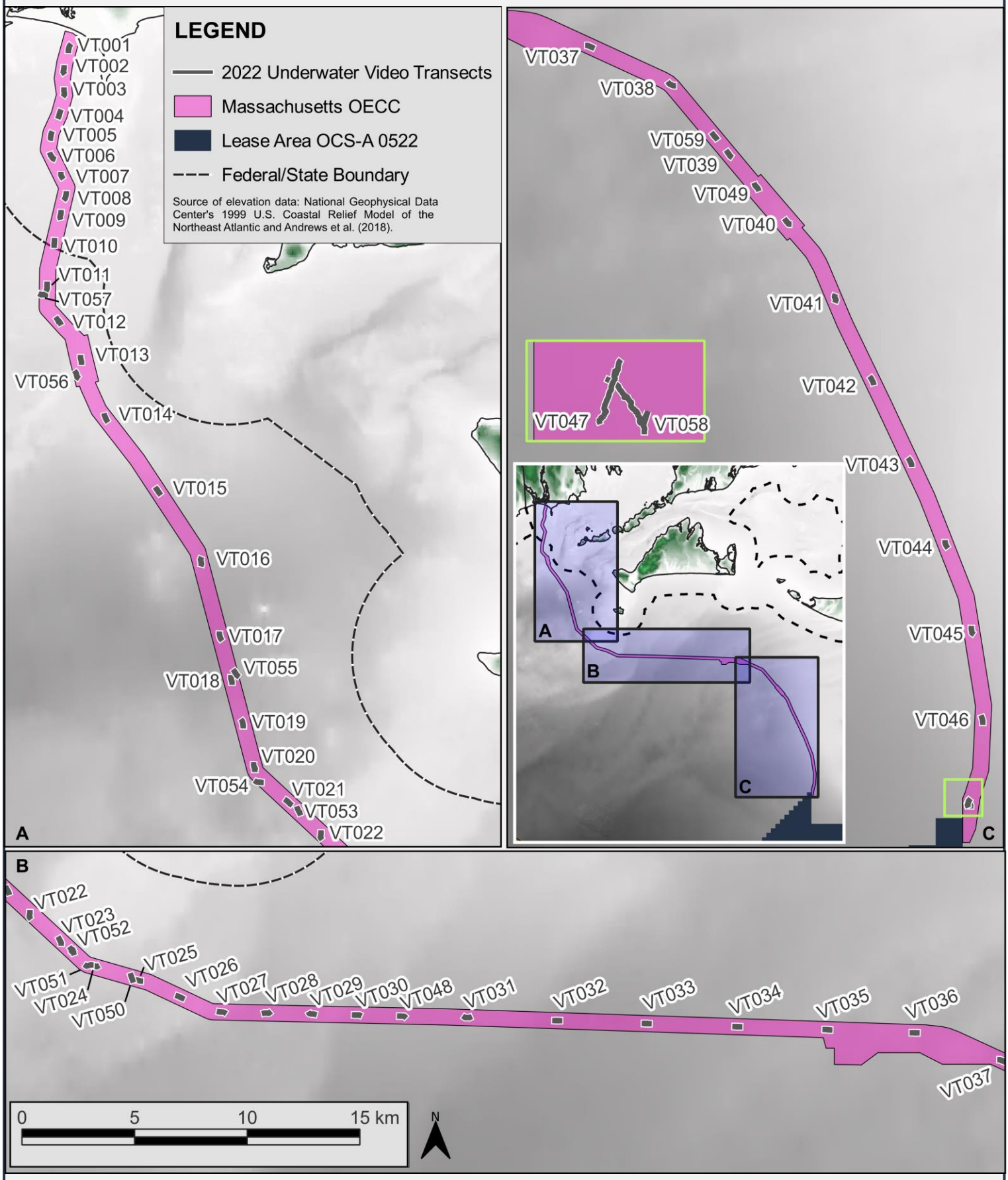


Figure 1.3-13
2022 Underwater Video Transect Locations, Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE

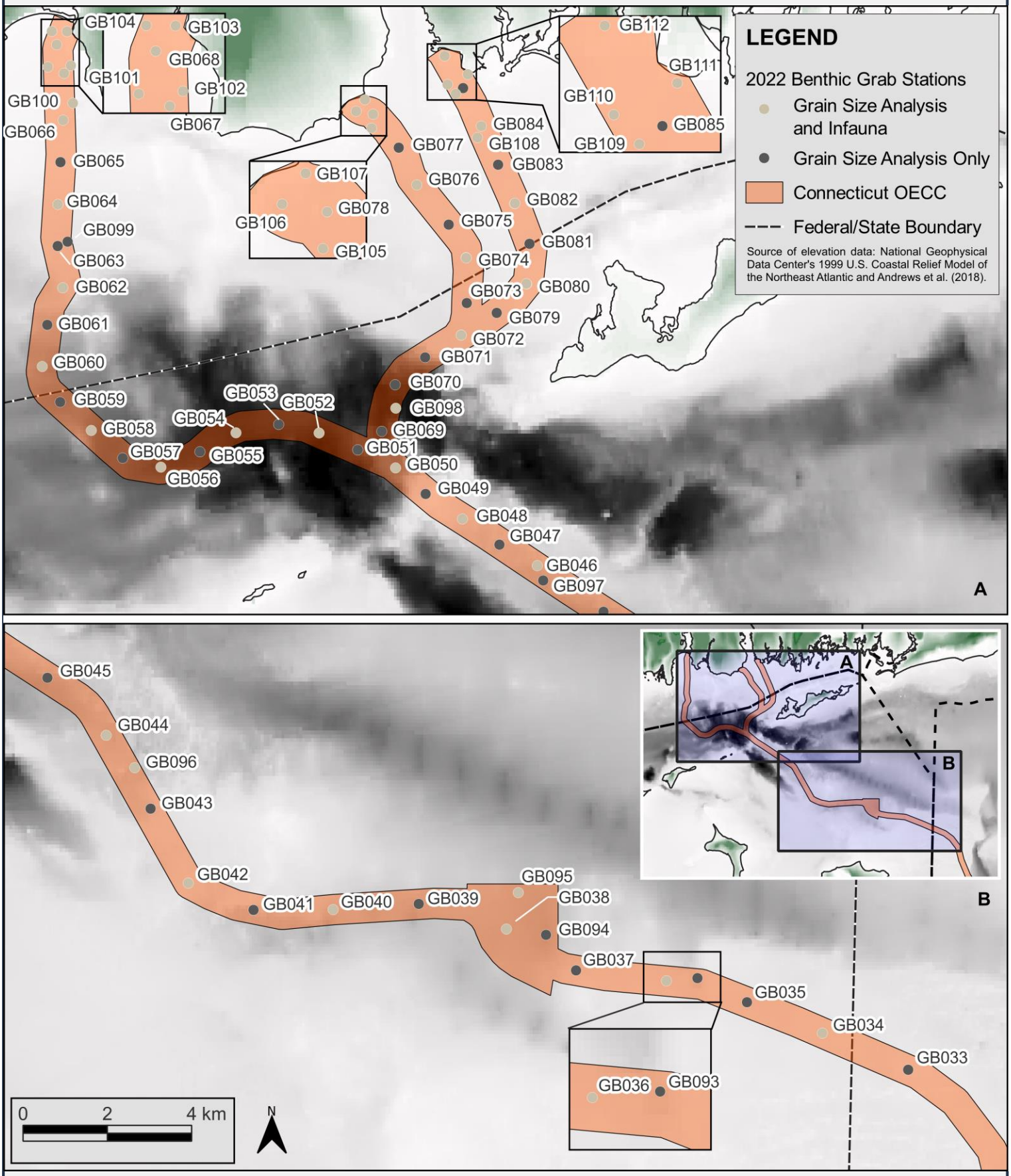


Figure 1.3-22

2022 Benthic Grab Sample Locations, Connecticut OECC Nearshore

VINEYARD NORTHEAST
VINEYARD OFFSHORE

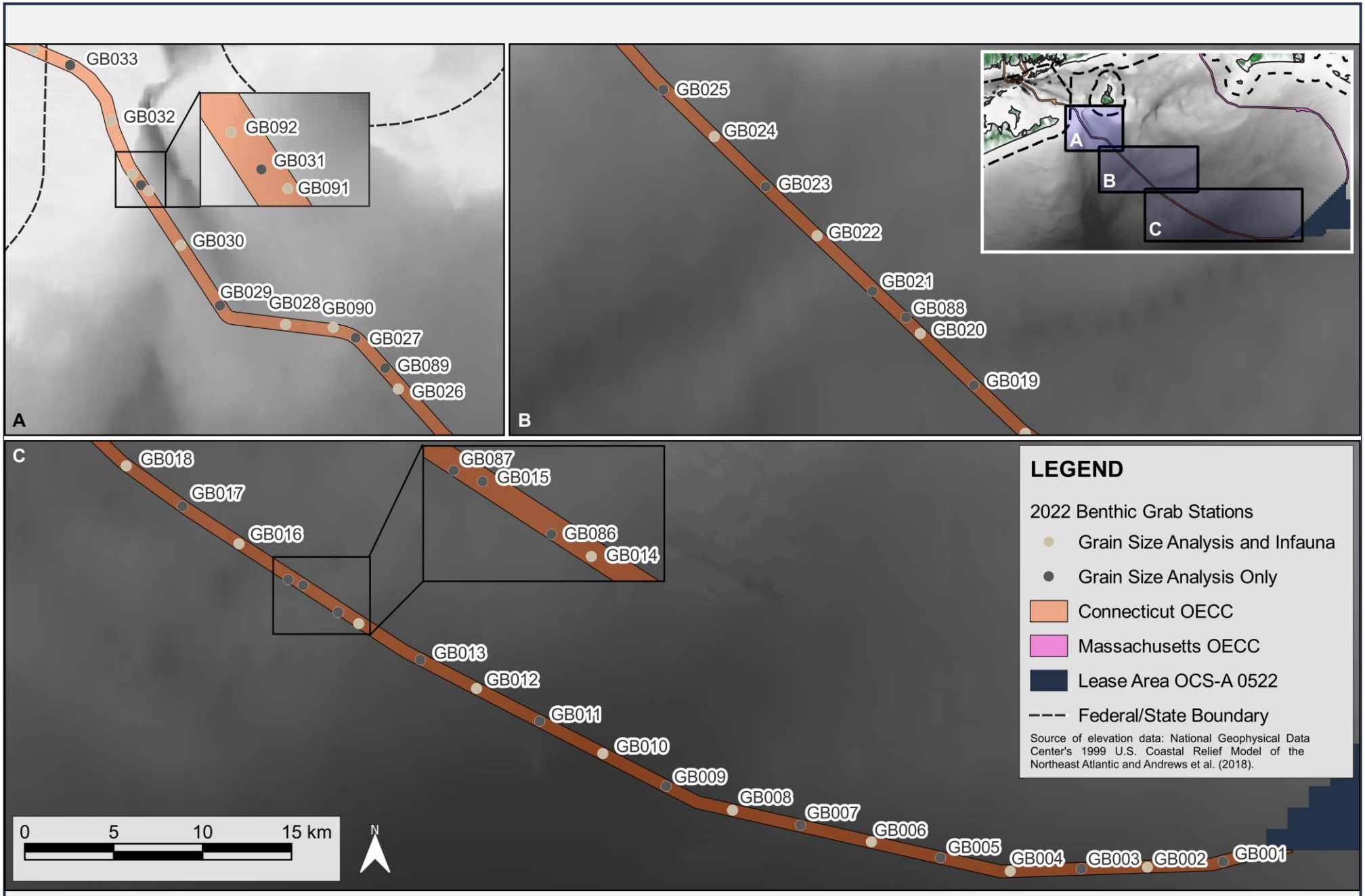


Figure 1.3-23
2022 Benthic Grab Sample Locations, Connecticut OECC Offshore

VINEYARD NORTHEAST
VINEYARD OFFSHORE

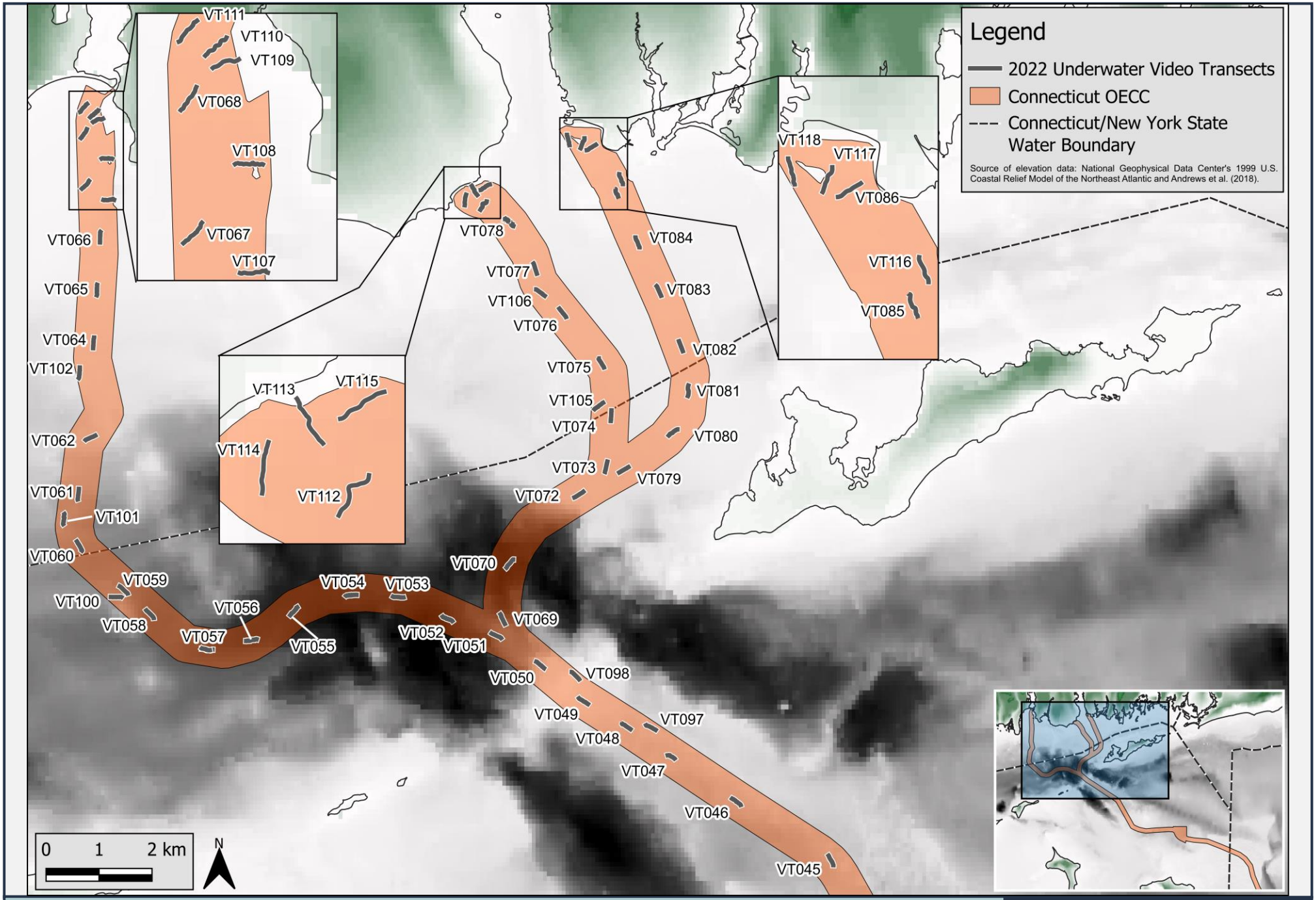


Figure 1.3-24
2022 Underwater Video Transect Locations, Connecticut OECC Landfall

VINEYARD NORTHEAST
VINEYARD OFFSHORE

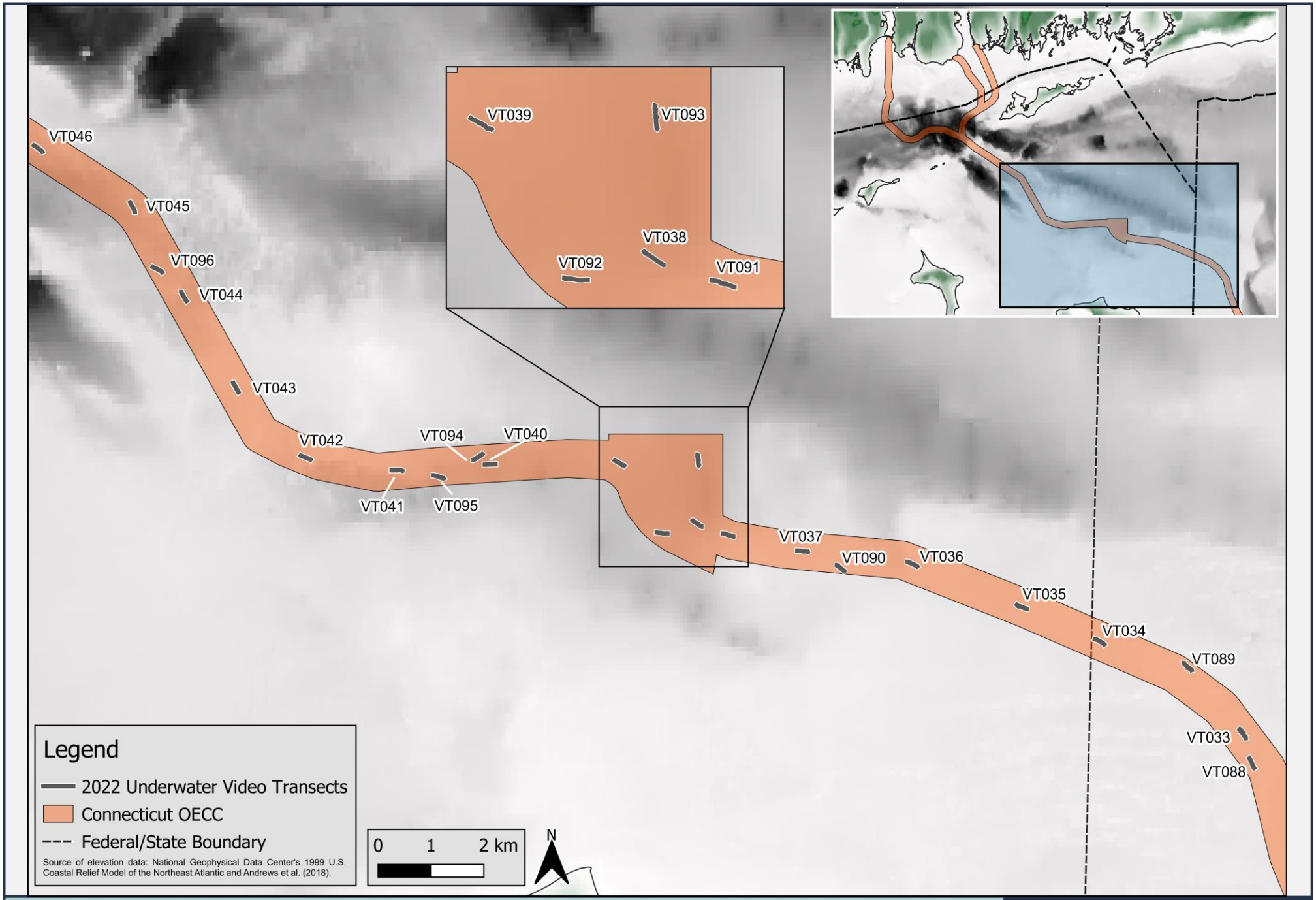


Figure 1.3-25
2022 Underwater Video Transect Locations, Connecticut OECC Nearshore

VINEYARD NORTHEAST
VINEYARD OFFSHORE

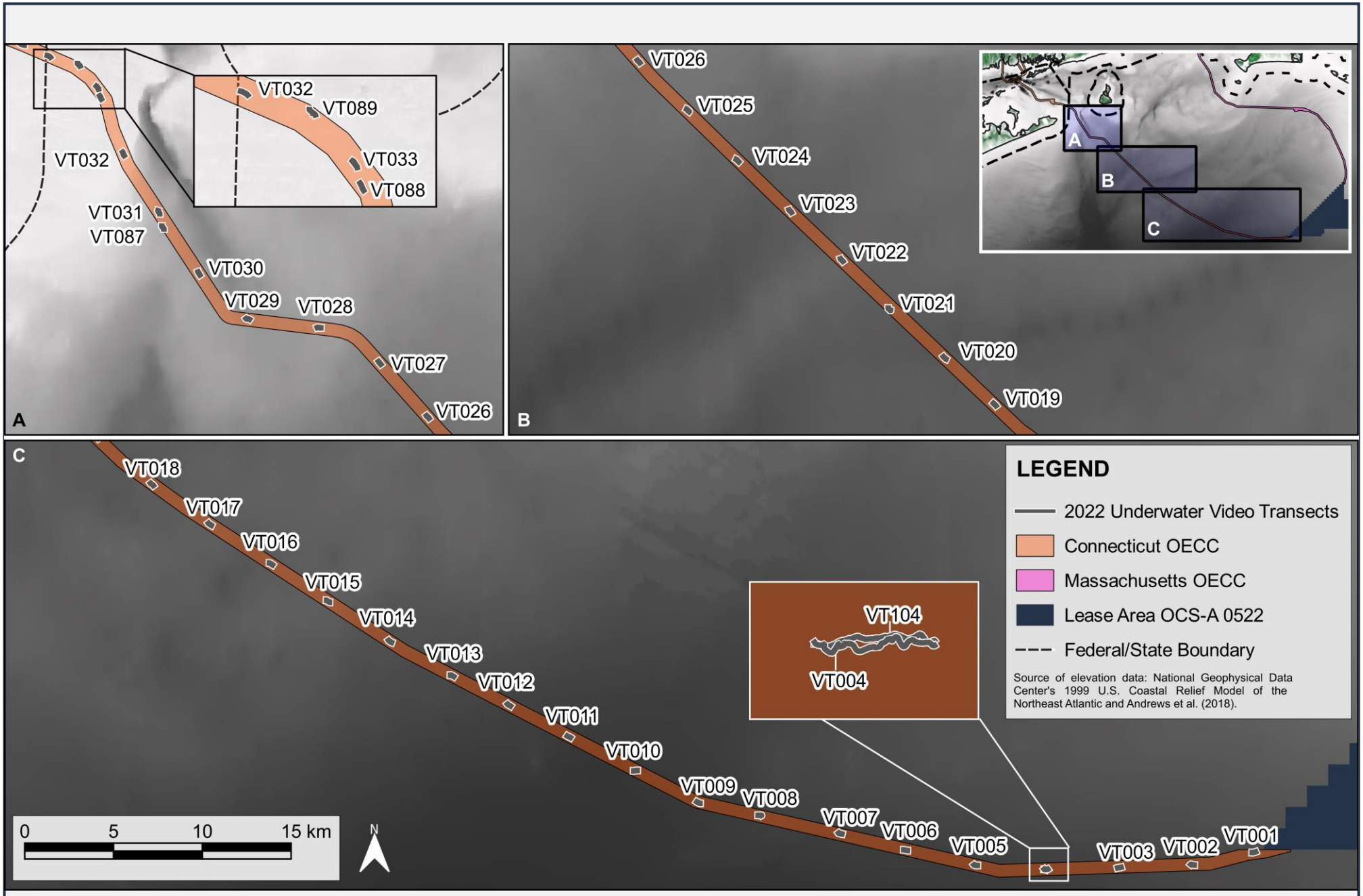


Figure 1.3-26
2022 Underwater Video Transect Locations, Connecticut OECC Offshore

VINEYARD NORTHEAST
VINEYARD OFFSHORE

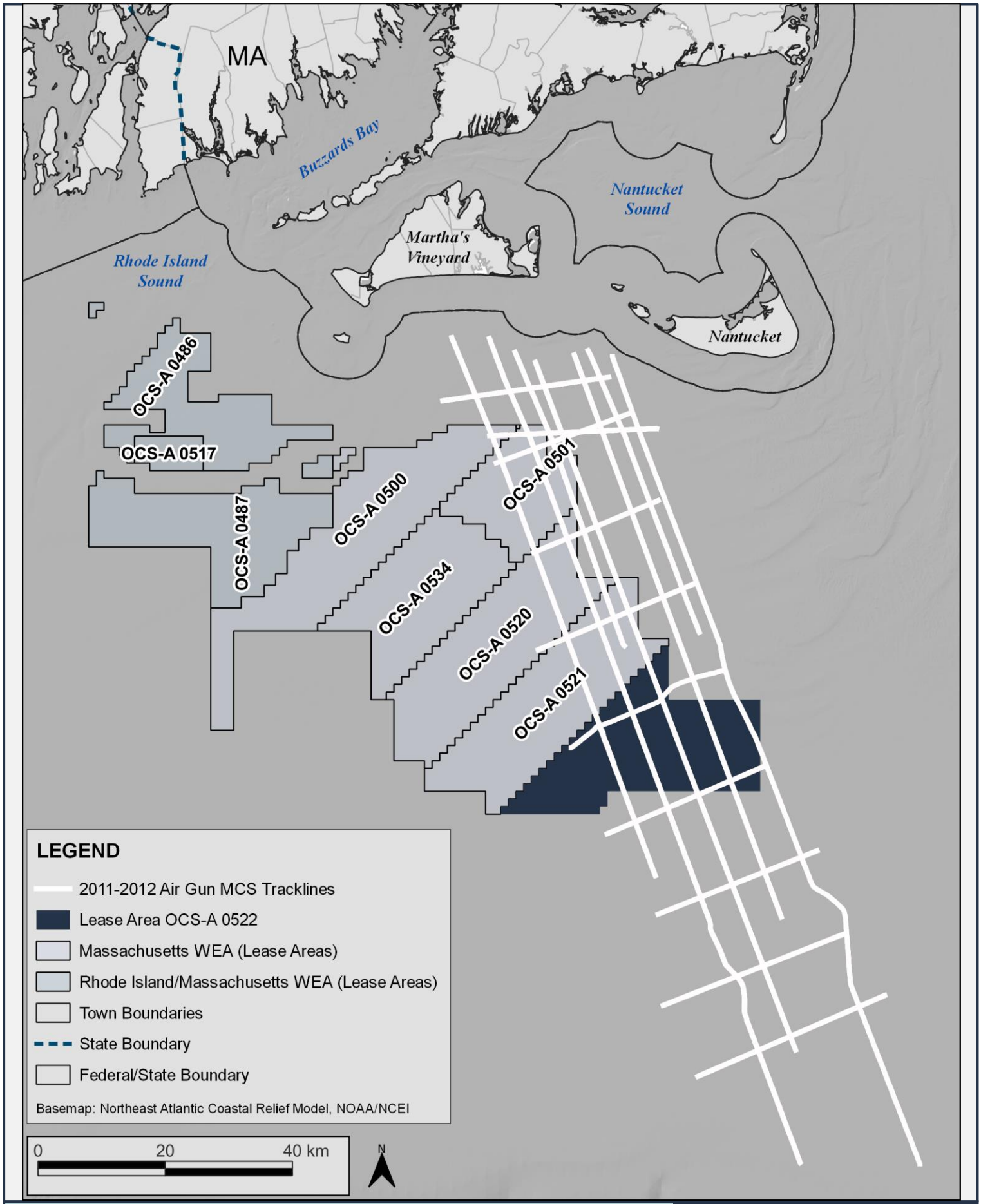


Figure 1.4-1

MCS Tracks from Air Gun Seismic Collected on the OCS (Siegel et al. 2012)

VINEYARD NORTHEAST
VINEYARD OFFSHORE

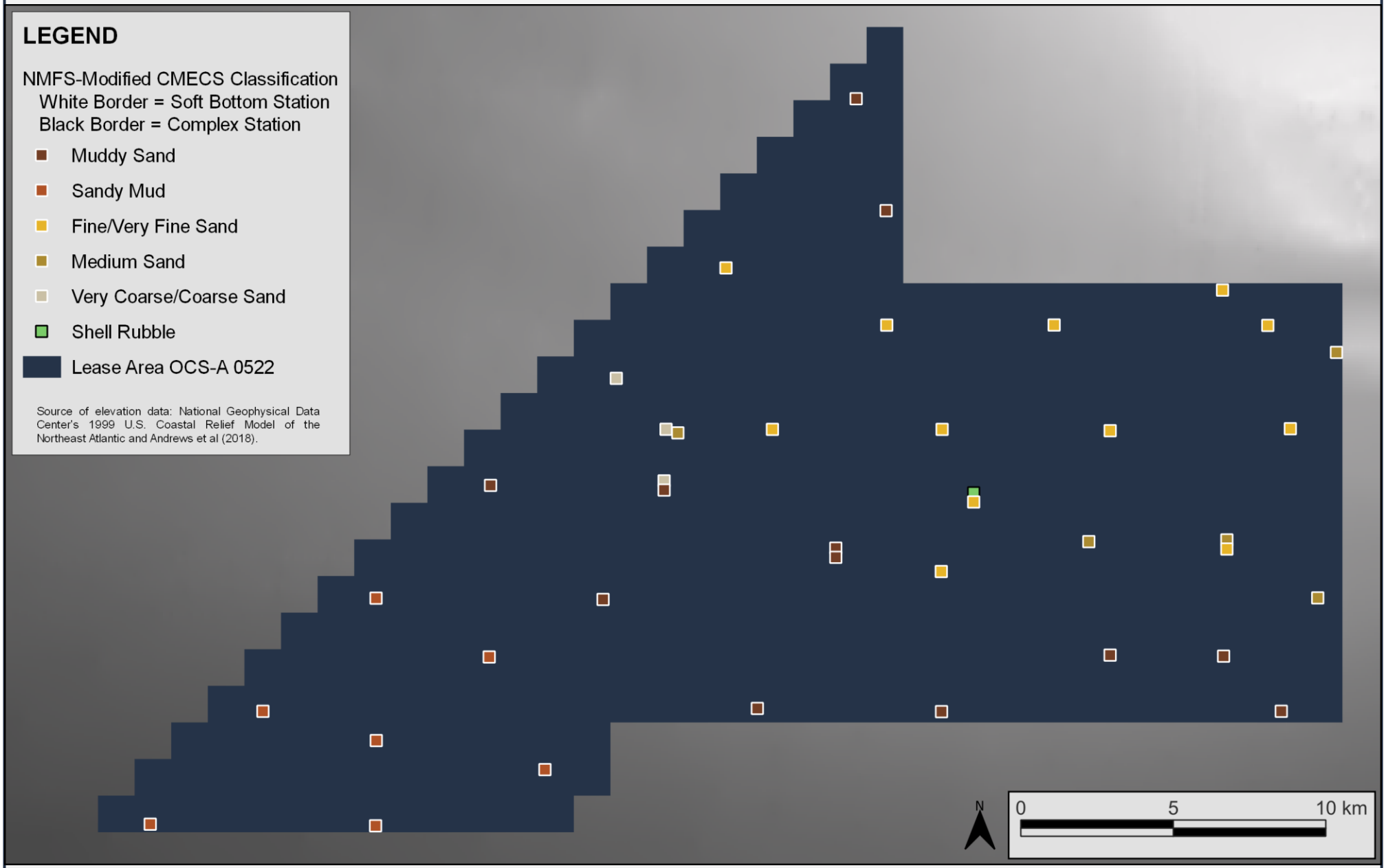


Figure 5.1-1
2019 Lease Area Benthic Grabs CMECS

VINEYARD NORTHEAST
VINEYARD OFFSHORE

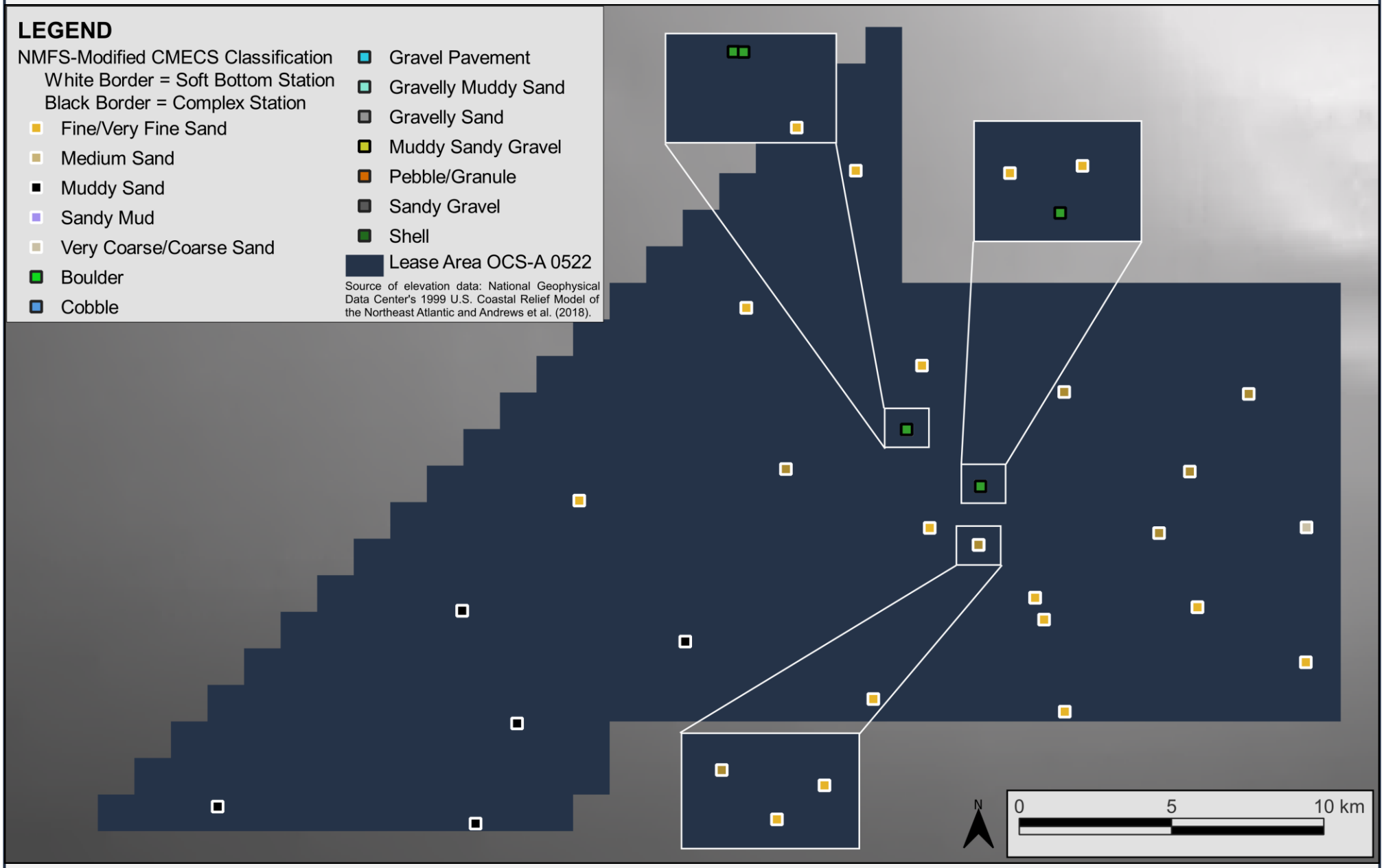


Figure 5.1-2
2022 Lease Area Benthic Grabs CMECS

VINEYARD NORTHEAST
VINEYARD OFFSHORE

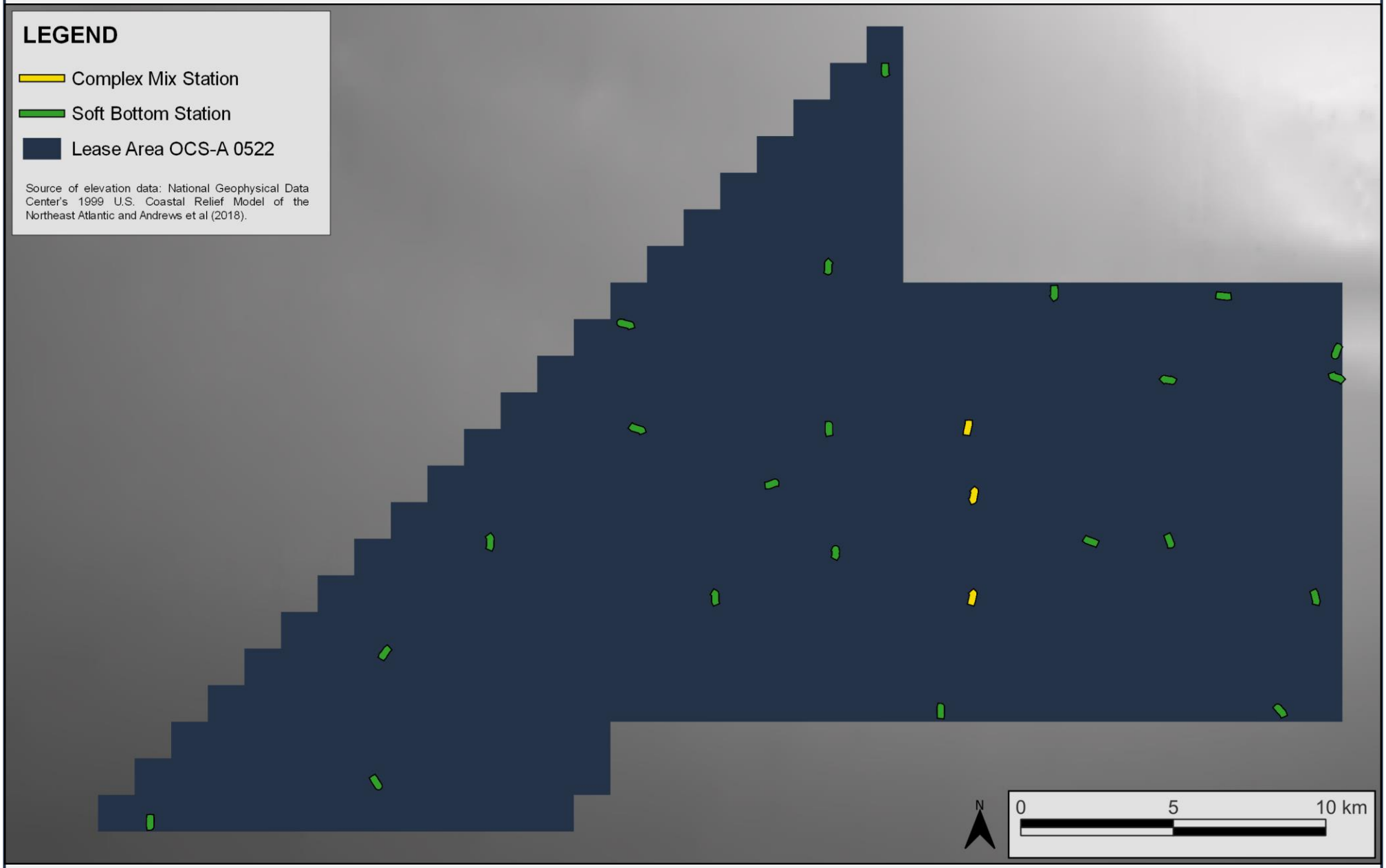


Figure 5.1-3
2019 Lease Area Video Transects NMFS Classifications

VINEYARD NORTHEAST
VINEYARD OFFSHORE

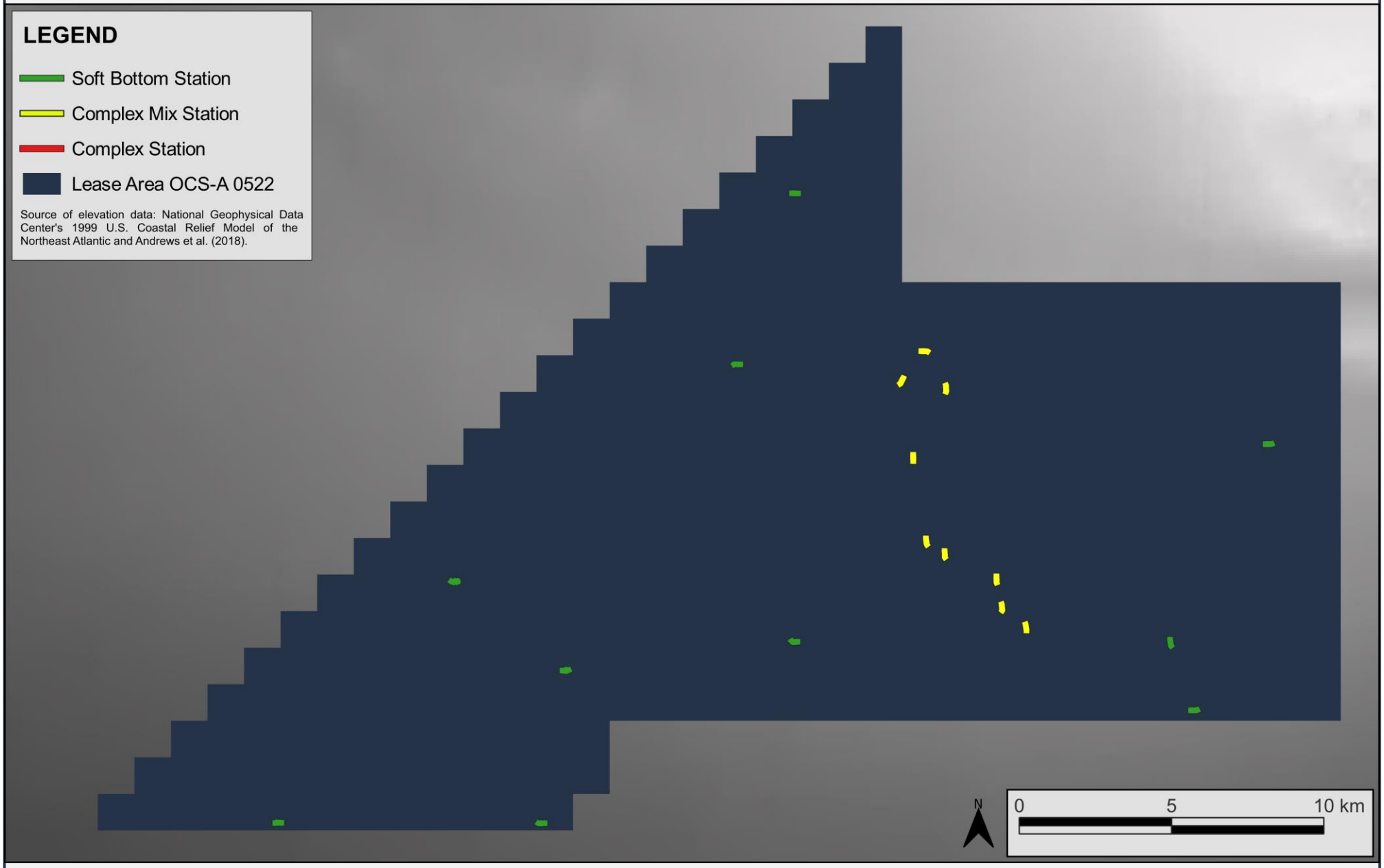


Figure 5.1-4
2022 Lease Area Video Transects NMFS Classifications

VINEYARD NORTHEAST
VINEYARD OFFSHORE

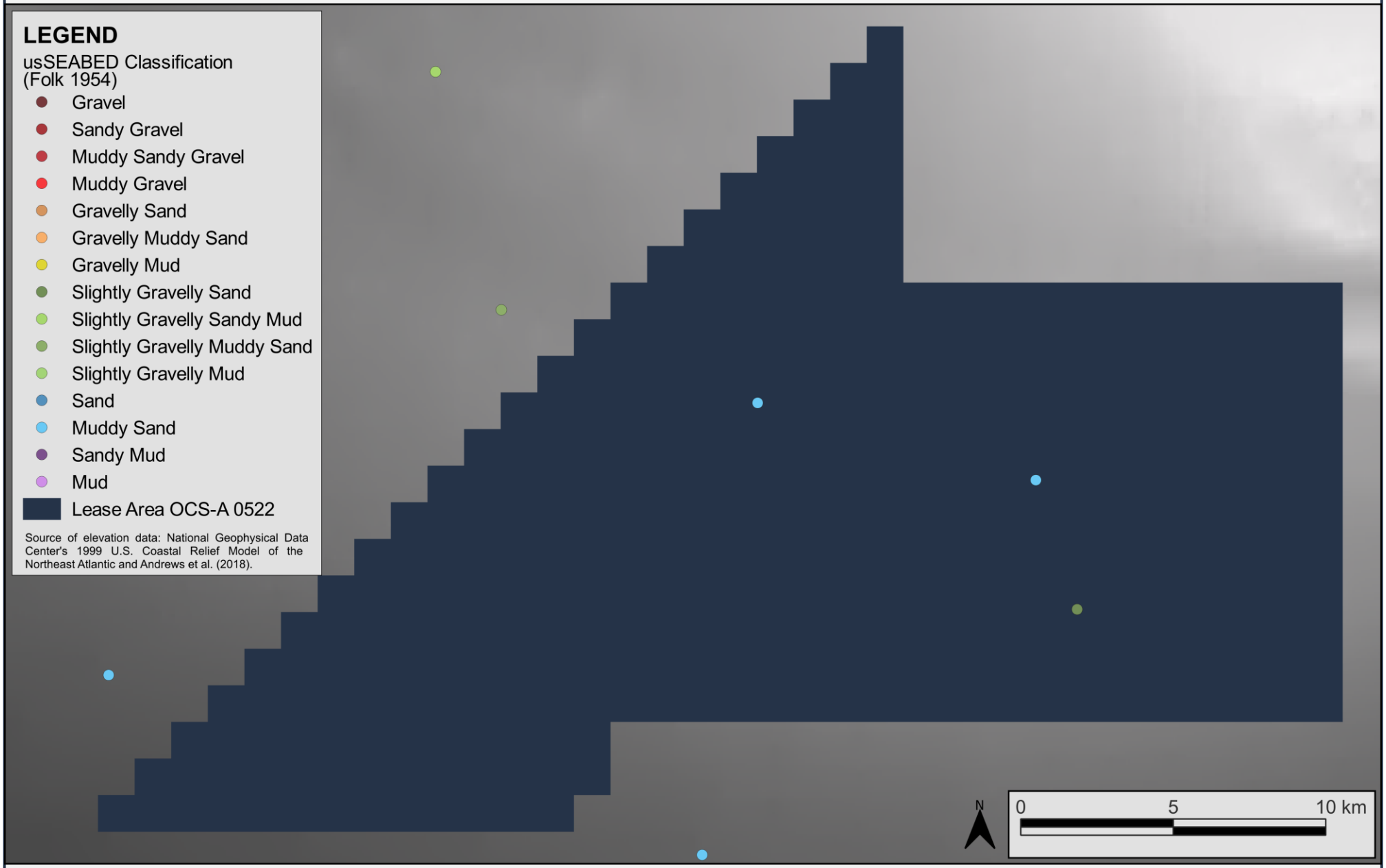


Figure 5.1-5
usSEABED Classification Within the Lease Area

VINEYARD NORTHEAST
VINEYARD OFFSHORE

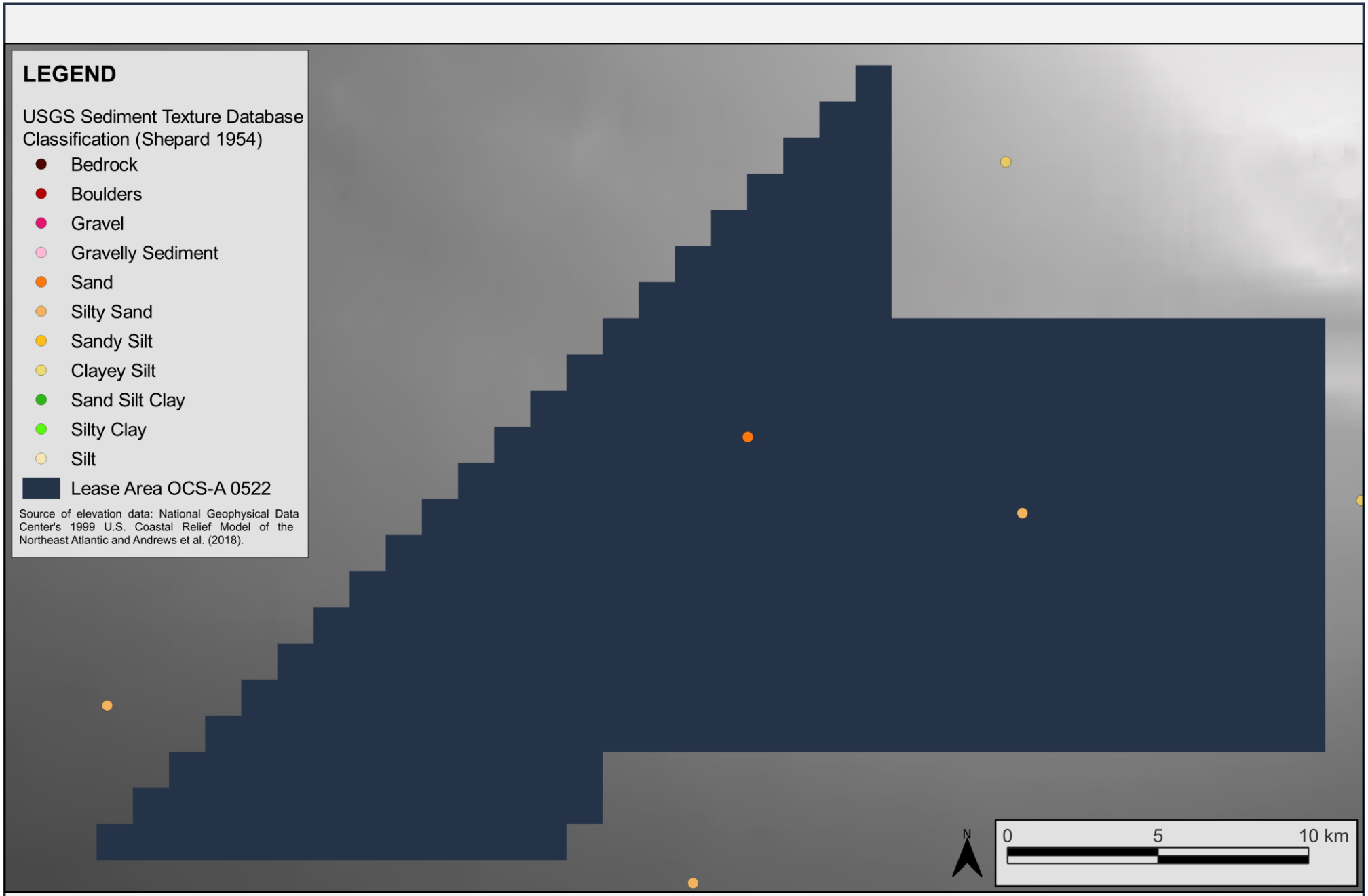


Figure 5.1-6
USGS Sediment Texture Within the Lease Area

VINEYARD NORTHEAST
VINEYARD OFFSHORE

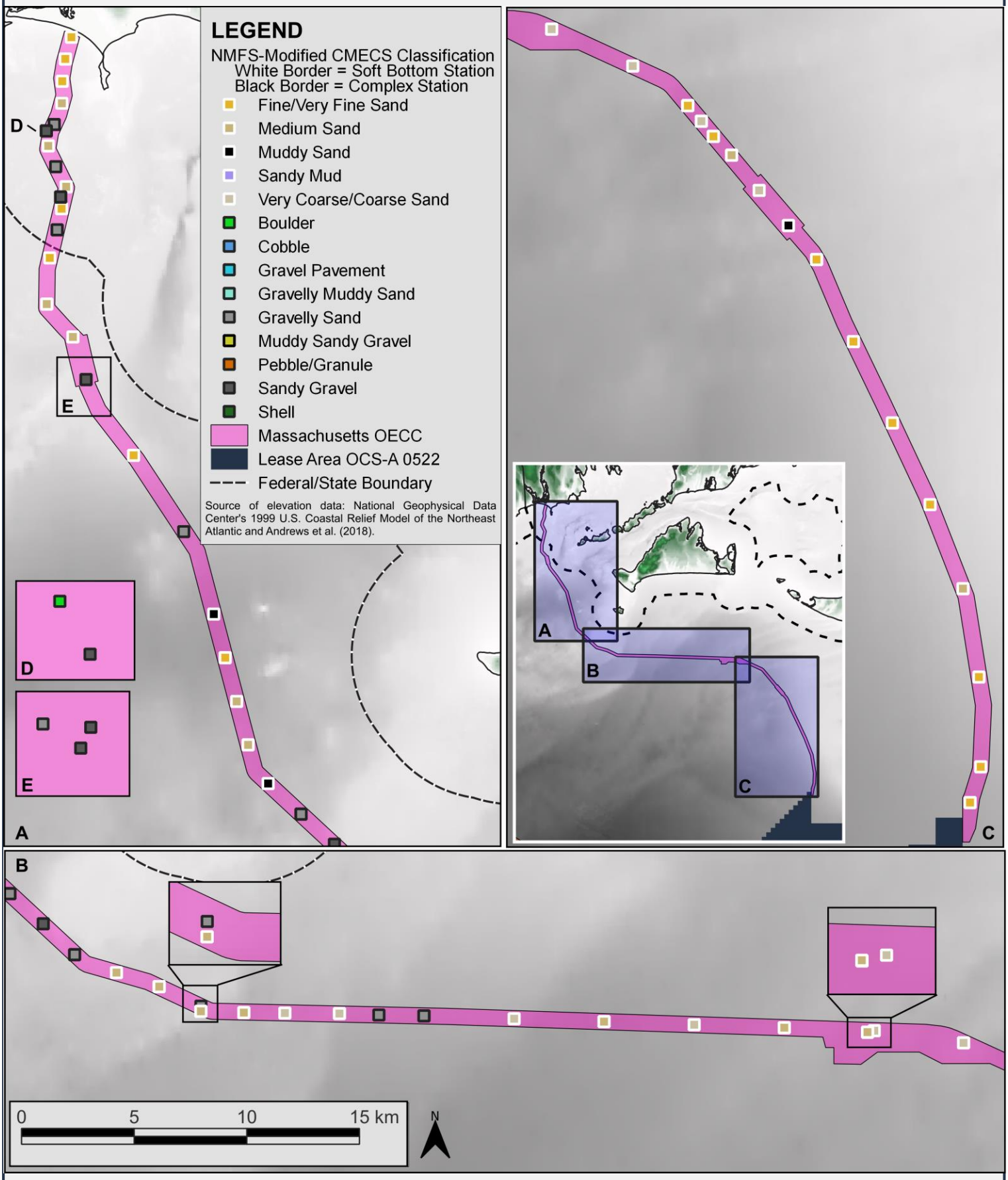


Figure 5.1-7
2022 Massachusetts OECC Benthic Grabs CMECS

VINEYARD NORTHEAST
VINEYARD OFFSHORE

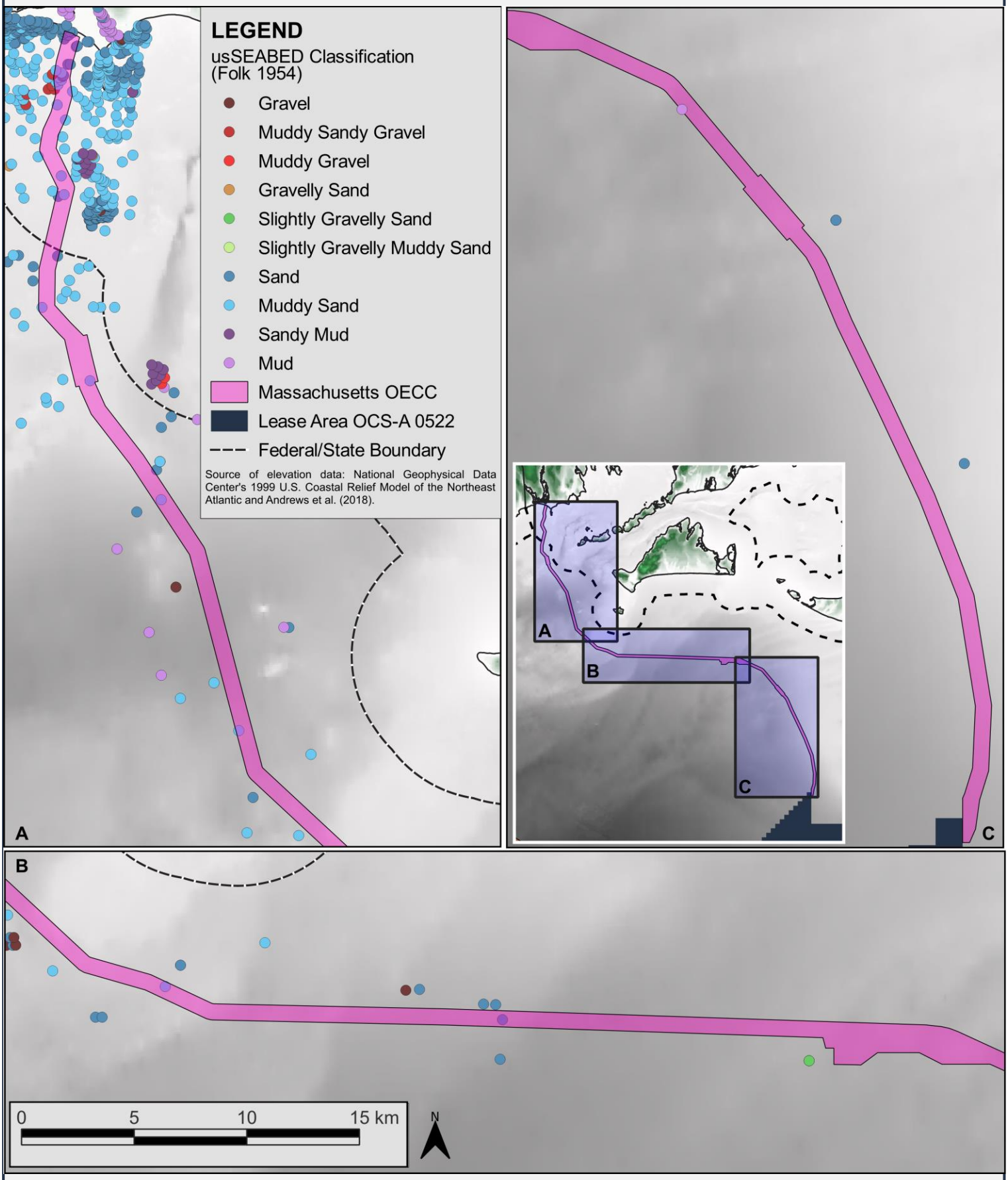


Figure 5.1-8
usSEABED Classification Along Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE

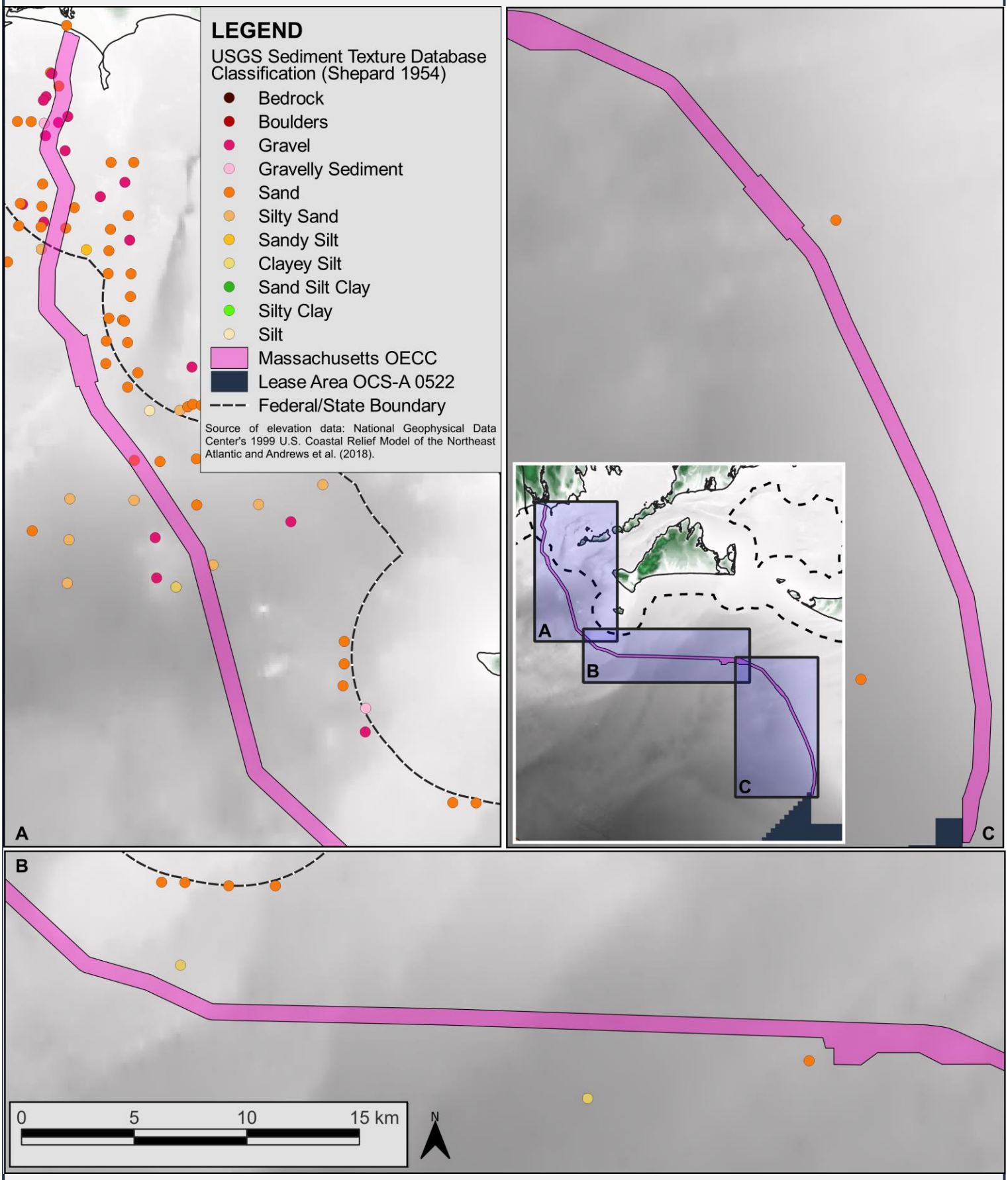
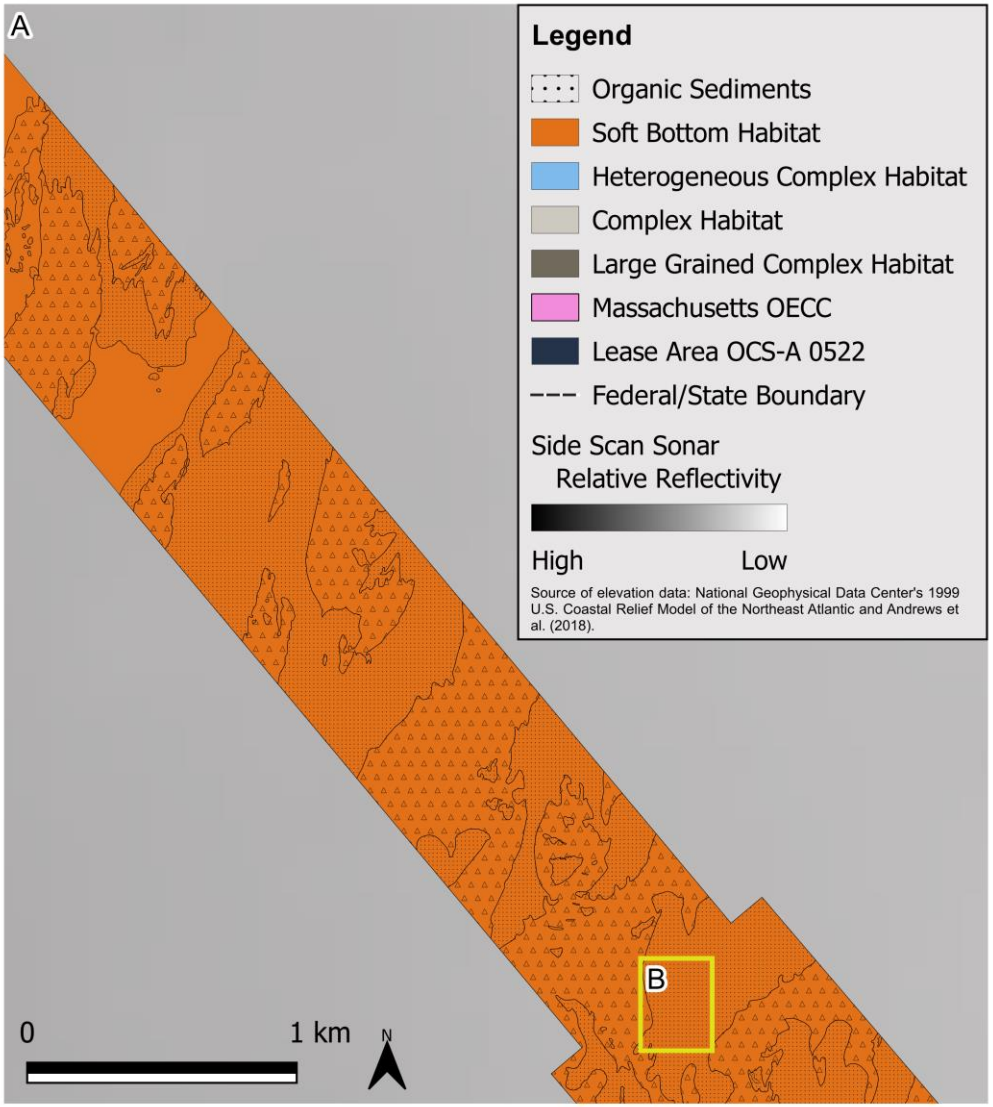


Figure 5.1-9
USGS Sediment Texture Along Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE



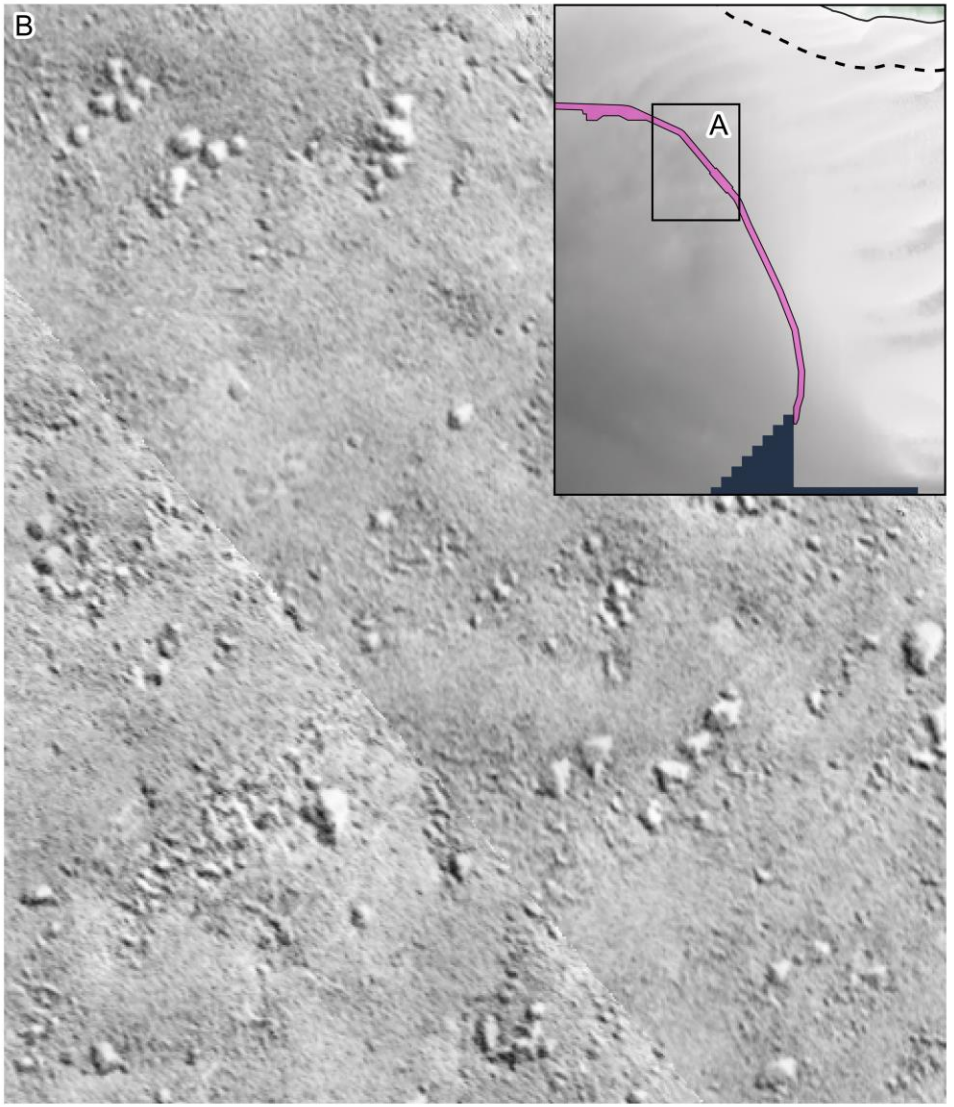


Figure 5.1-10
Organic Mounds in Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE

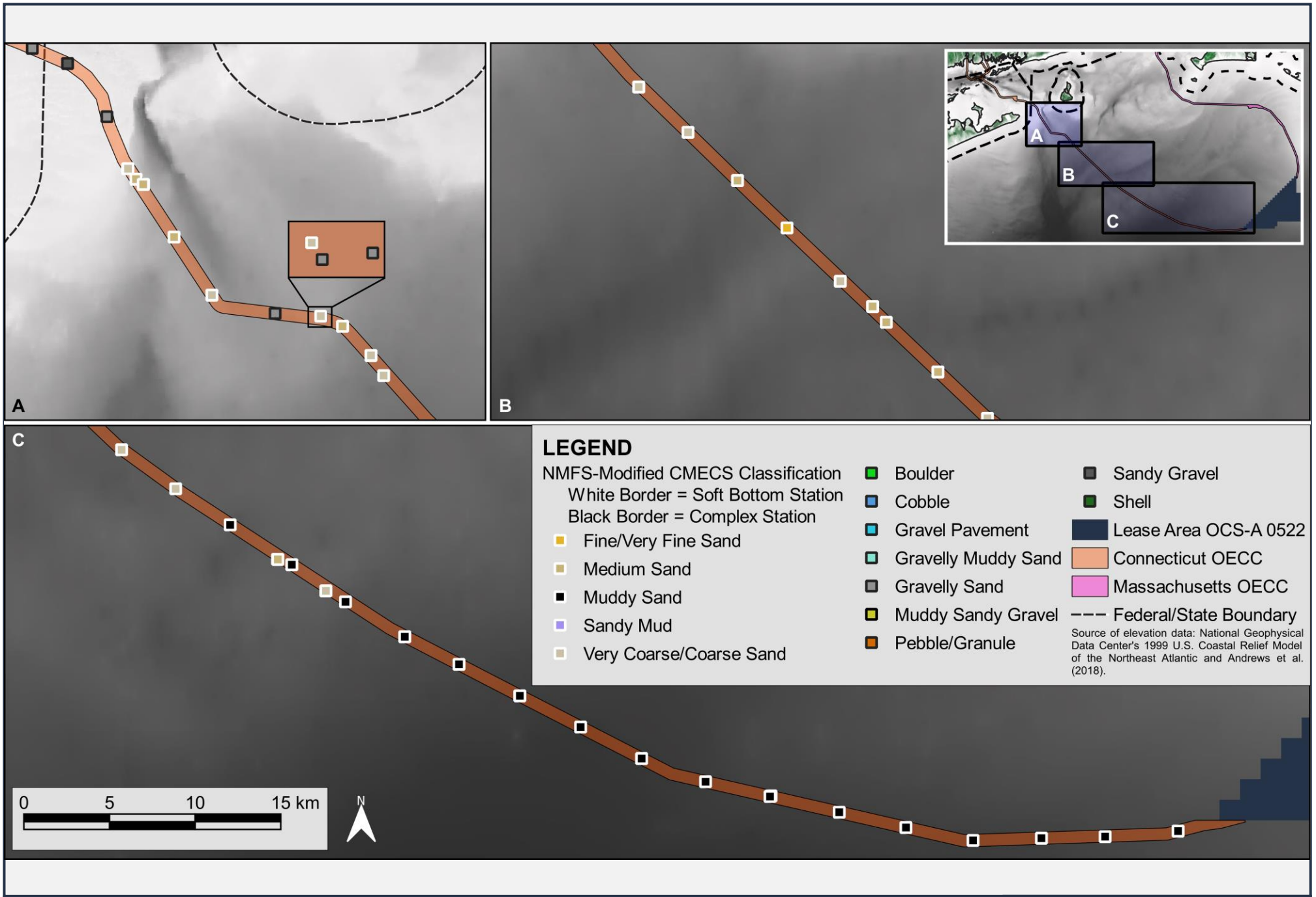


Figure 5.1-11a
2022 Connecticut OECC Offshore Benthic Grabs CMECS

VINEYARD NORTHEAST
VINEYARD OFFSHORE

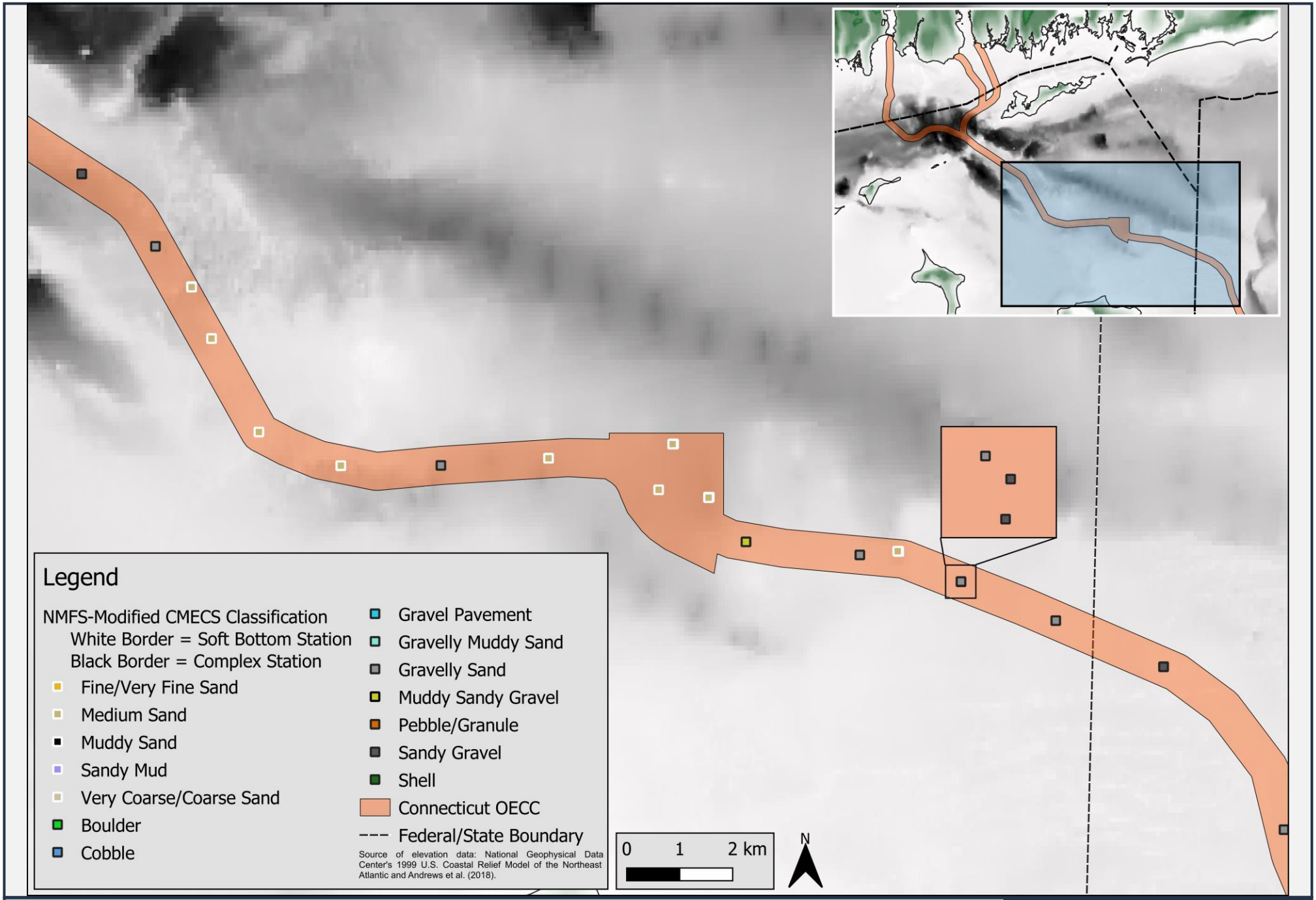


Figure 5.1-11b
2022 Connecticut OECC Nearshore Benthic Grabs CMECS

VINEYARD NORTHEAST
VINEYARD OFFSHORE

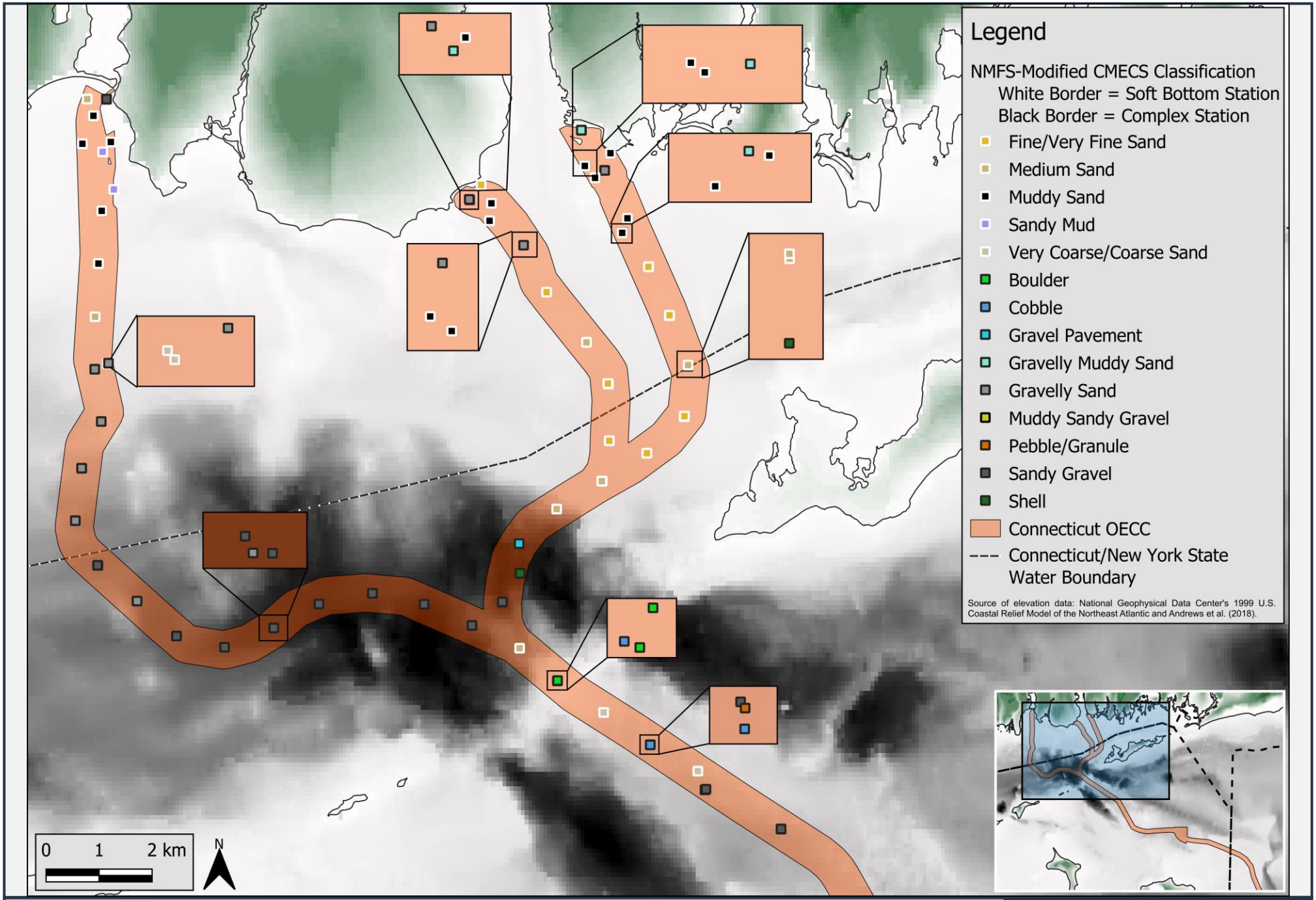


Figure 5.1-11c

2022 Connecticut OECC Landfall Benthic Grabs CMECS

VINEYARD NORTHEAST
VINEYARD OFFSHORE

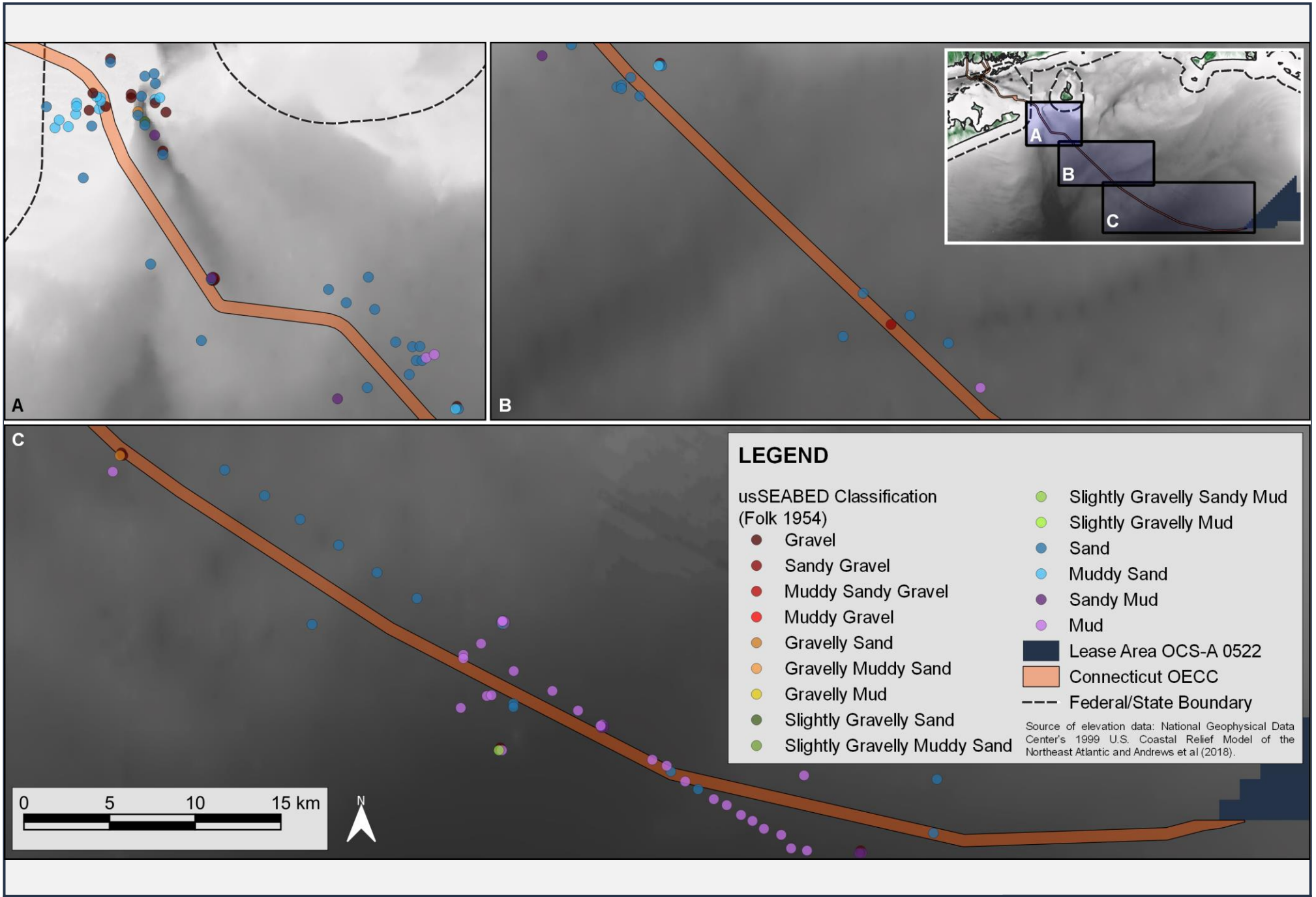


Figure 5.1-12a
usSEABED Classification Along Connecticut OECC Offshore

VINEYARD NORTHEAST
VINEYARD OFFSHORE

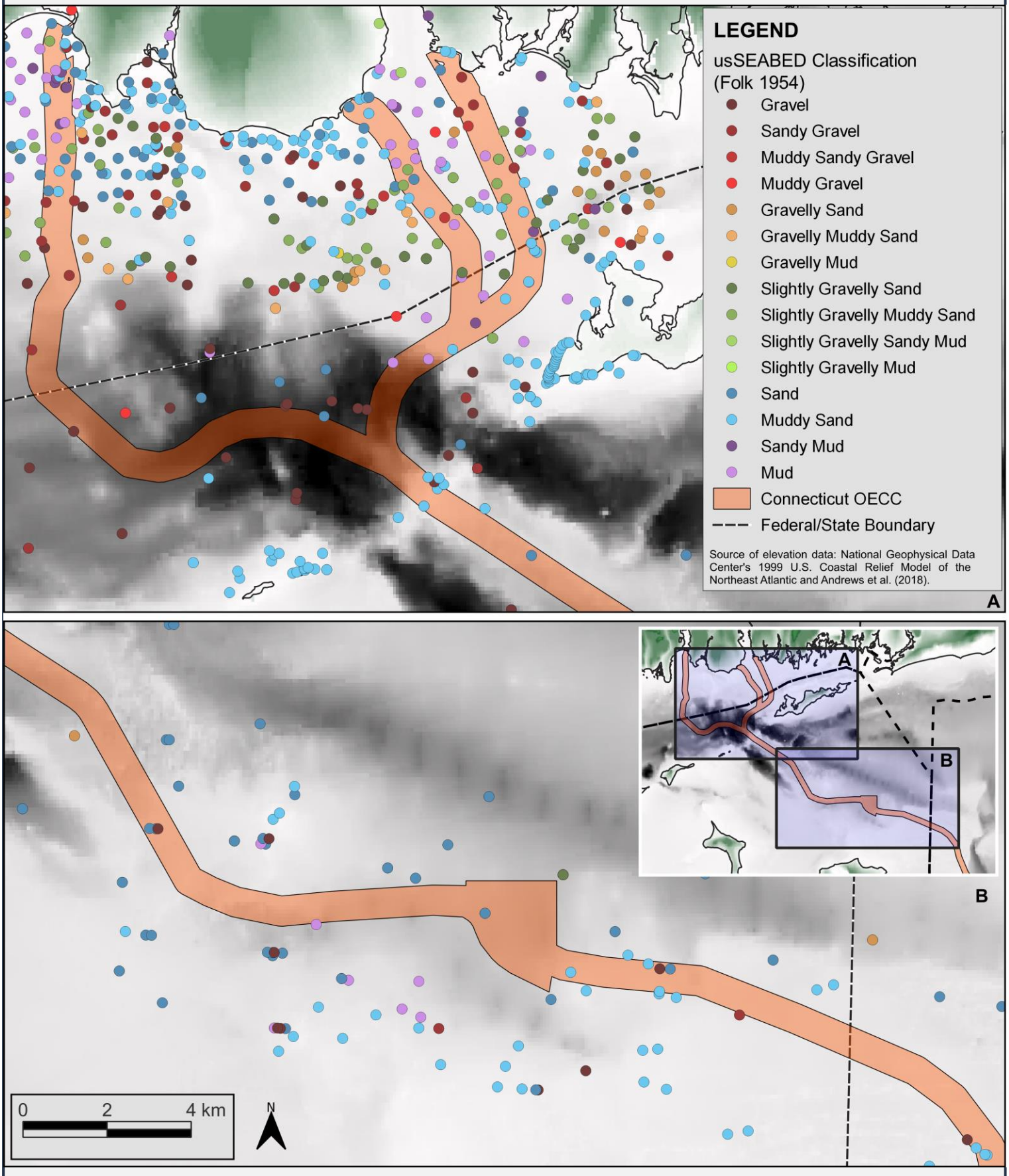


Figure 5.1-12b
usSEABED Classification Along Connecticut OECC Nearshore

VINEYARD NORTHEAST
VINEYARD OFFSHORE

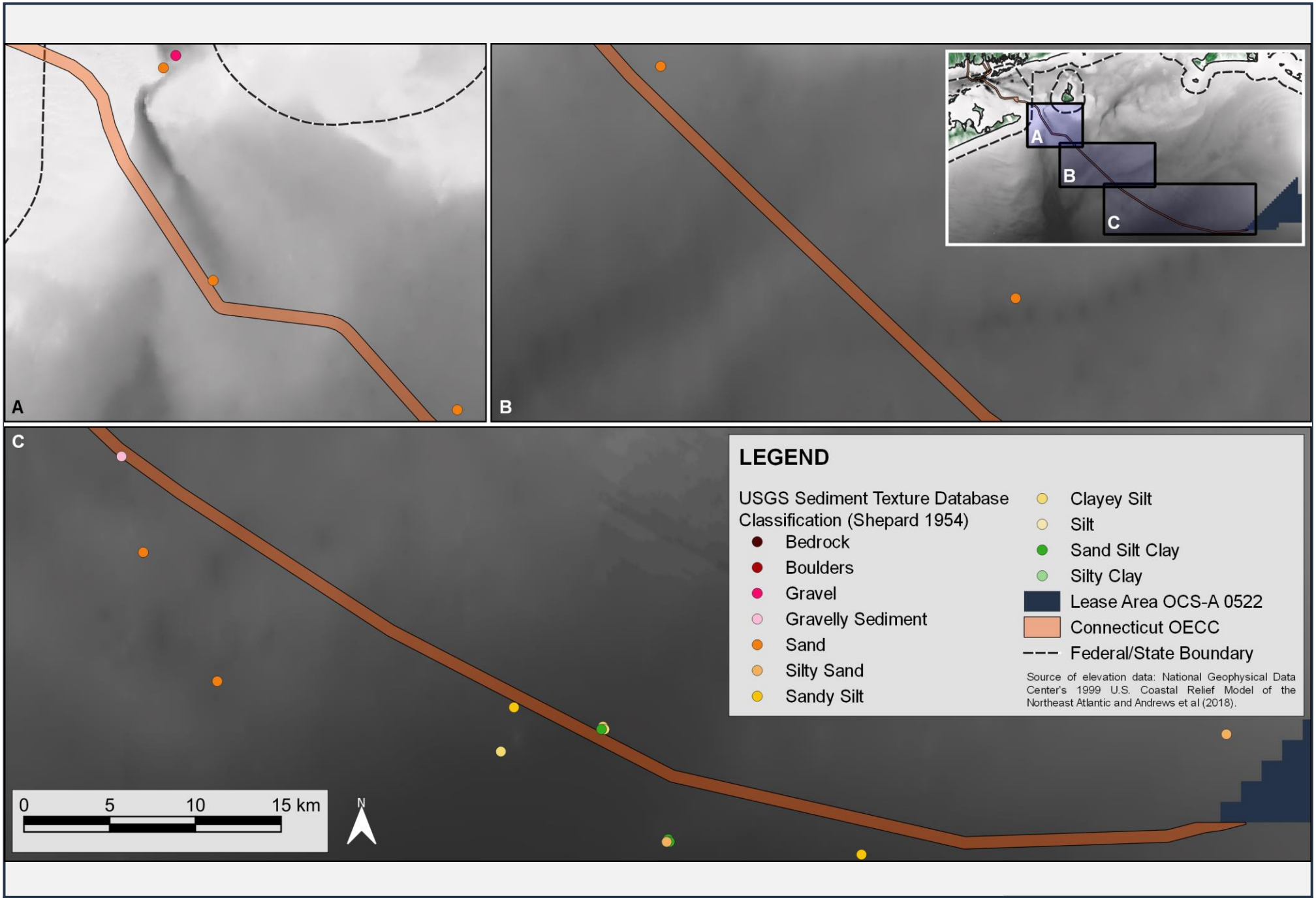


Figure 5.1-13a
USGS Sediment Texture Along Connecticut OECC Offshore

VINEYARD NORTHEAST
VINEYARD OFFSHORE

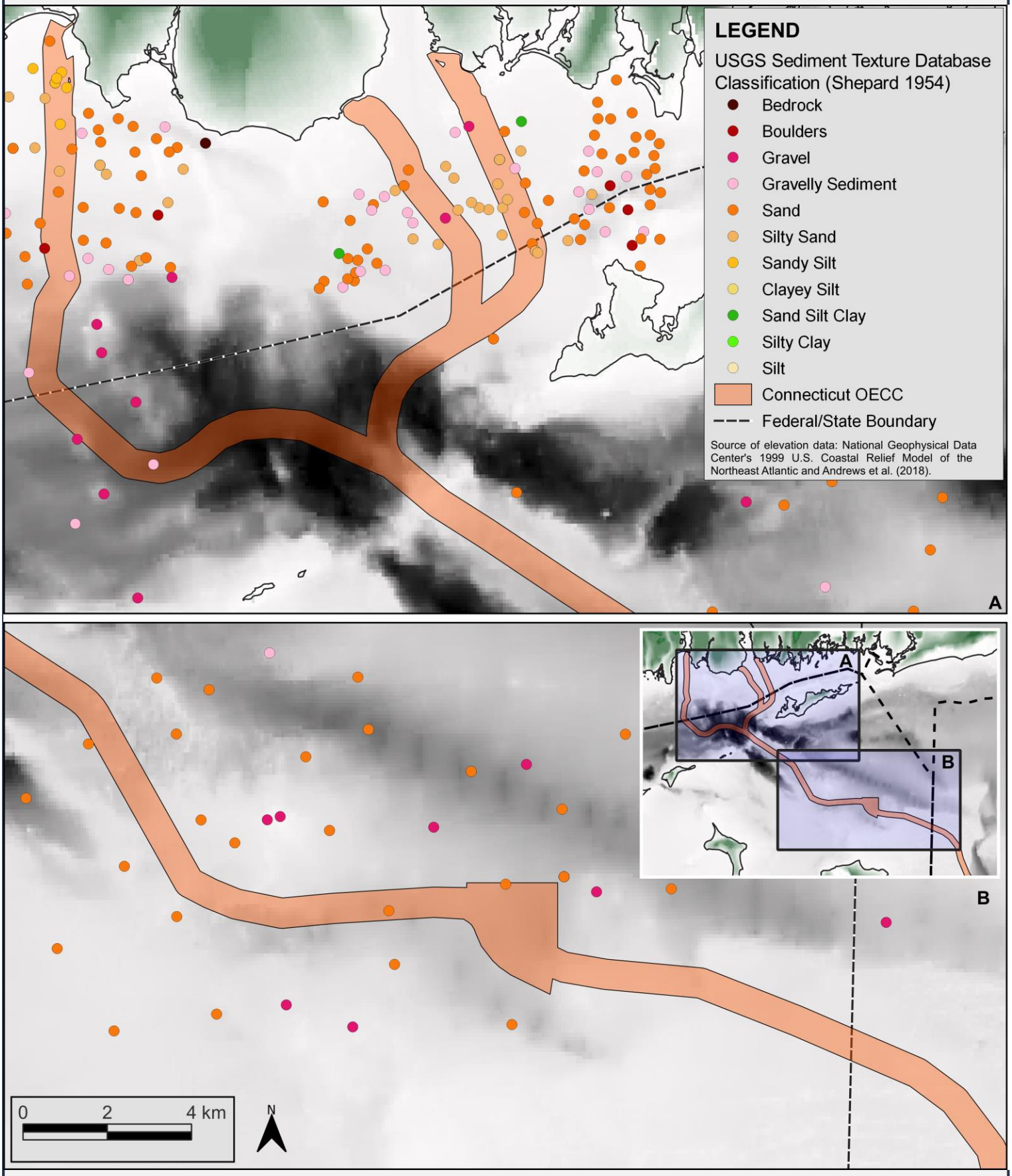


Figure 5.1-13b
USGS Sediment Texture Along Connecticut OECC Nearshore

VINEYARD NORTHEAST
VINEYARD OFFSHORE

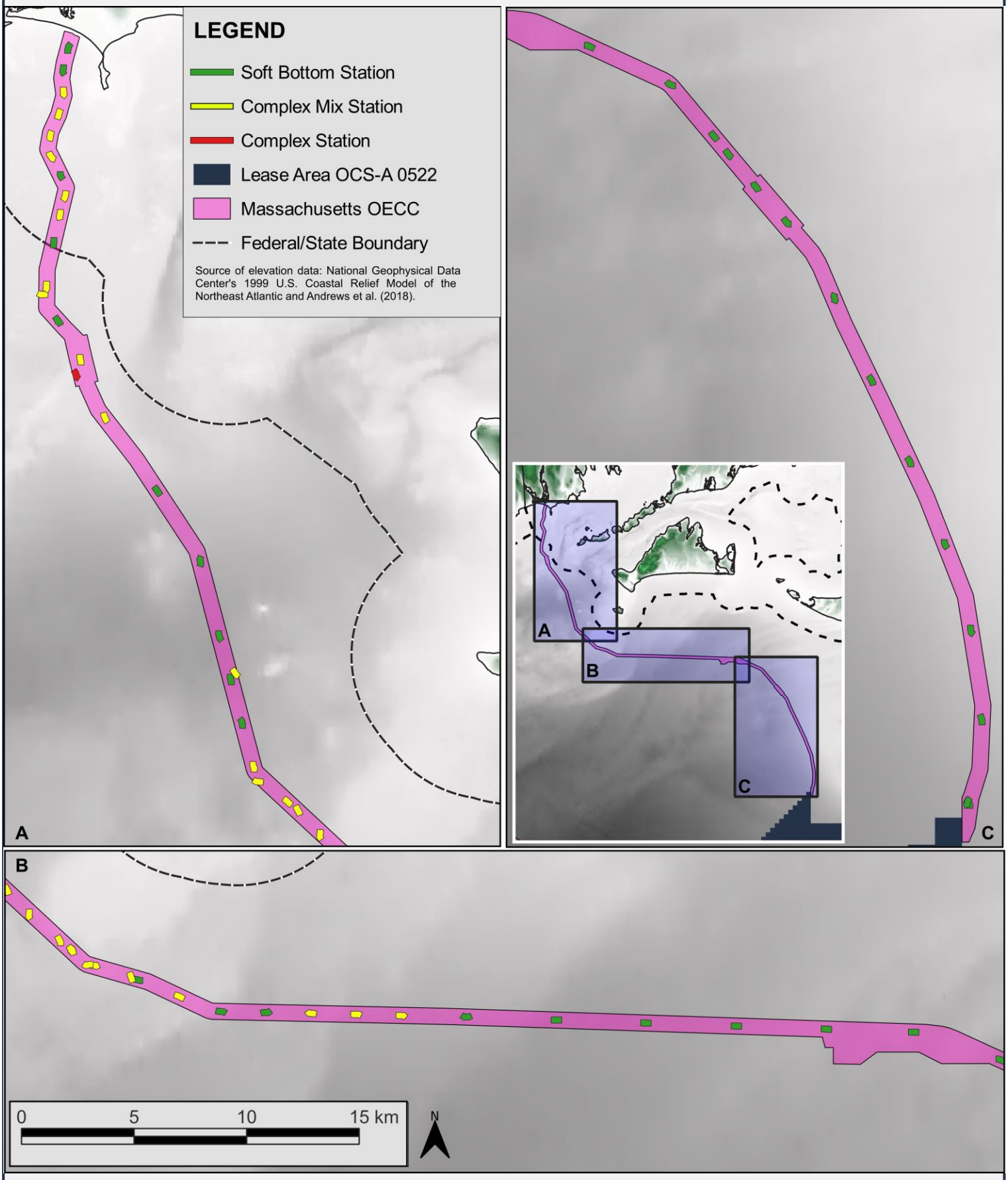


Figure 5.1-14
2022 Massachusetts OECC Video Transects NMFS Classifications

VINEYARD NORTHEAST
VINEYARD OFFSHORE

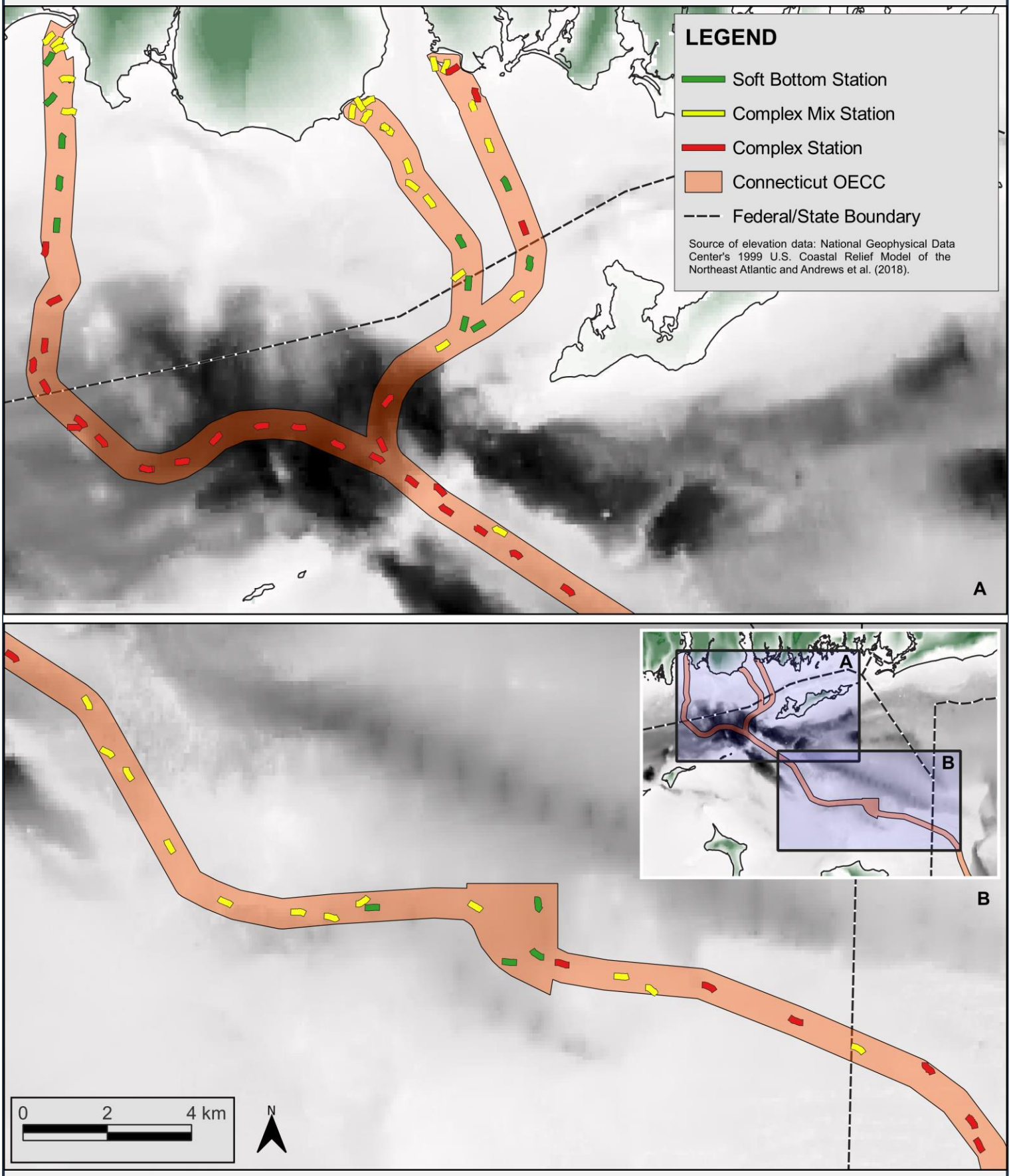


Figure 5.1-15a
2022 Connecticut OECC Nearshore Video Transects NMFS Classifications

VINEYARD NORTHEAST
VINEYARD OFFSHORE

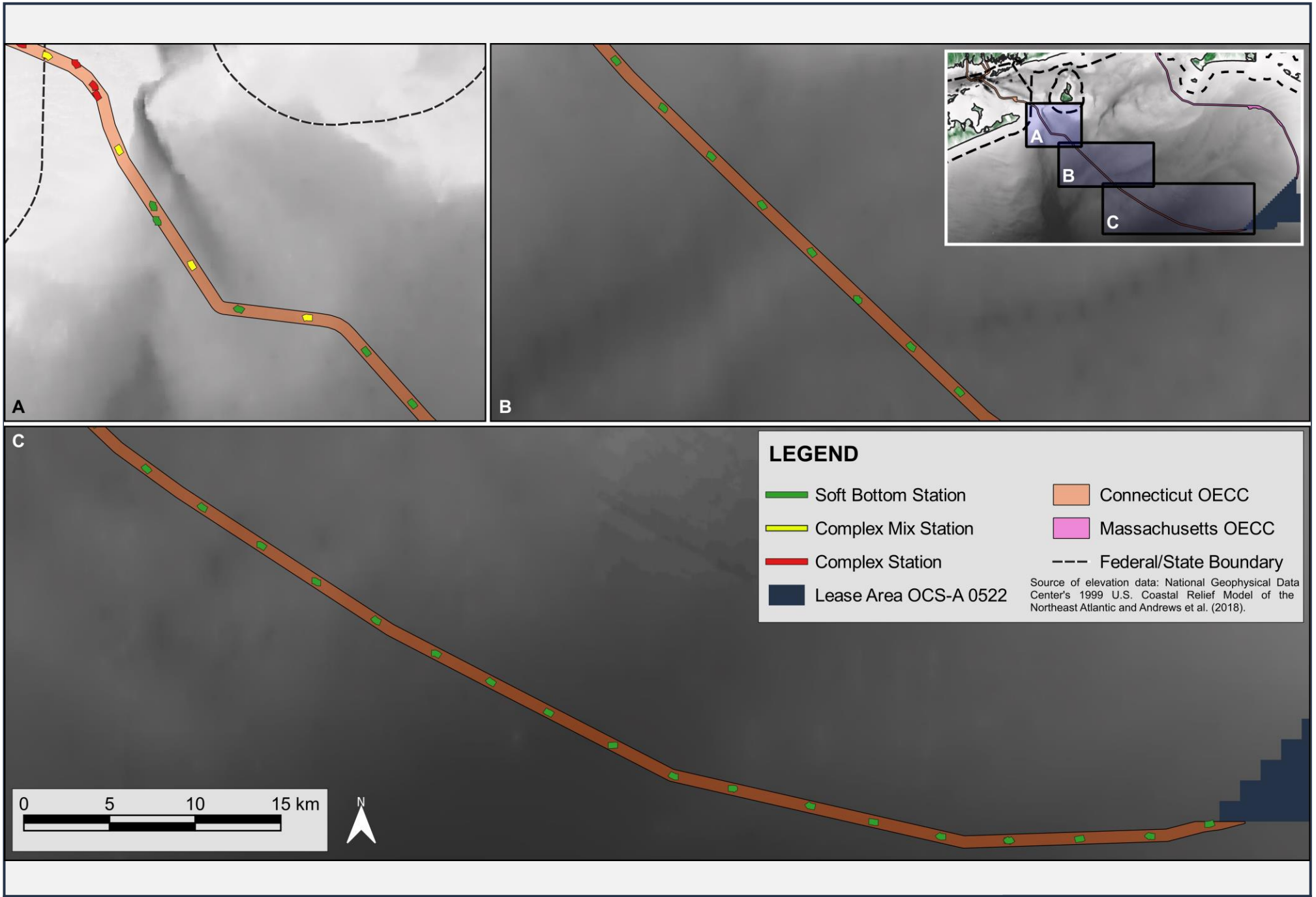
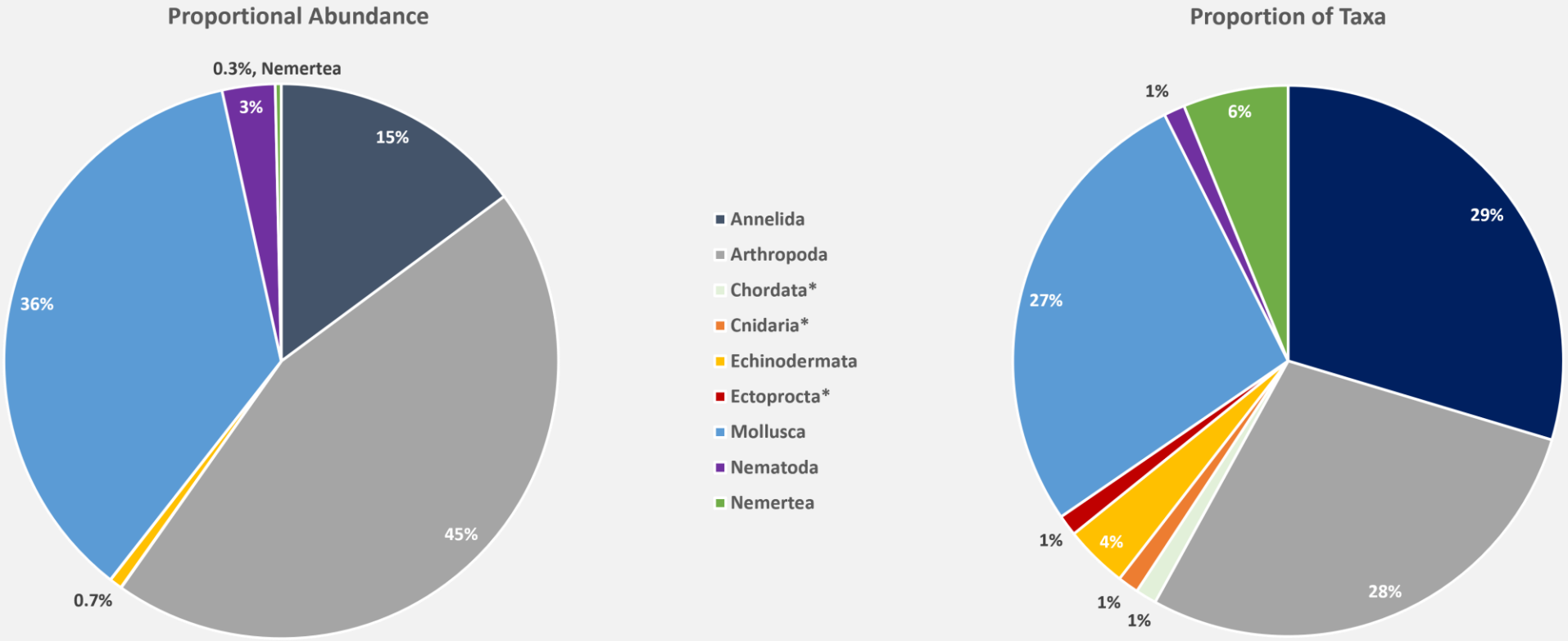


Figure 5.1-15b
2022 Connecticut OECC Offshore Video Transects NMFS Classifications

VINEYARD NORTHEAST
VINEYARD OFFSHORE



*Cnidaria, chordata, and ectoprocta are each responsible for 0.01% of total abundance

Figure 5.1-16a
Infauna Proportional Abundance by Phylum in Lease Area 2019

VINEYARD NORTHEAST
VINEYARD OFFSHORE

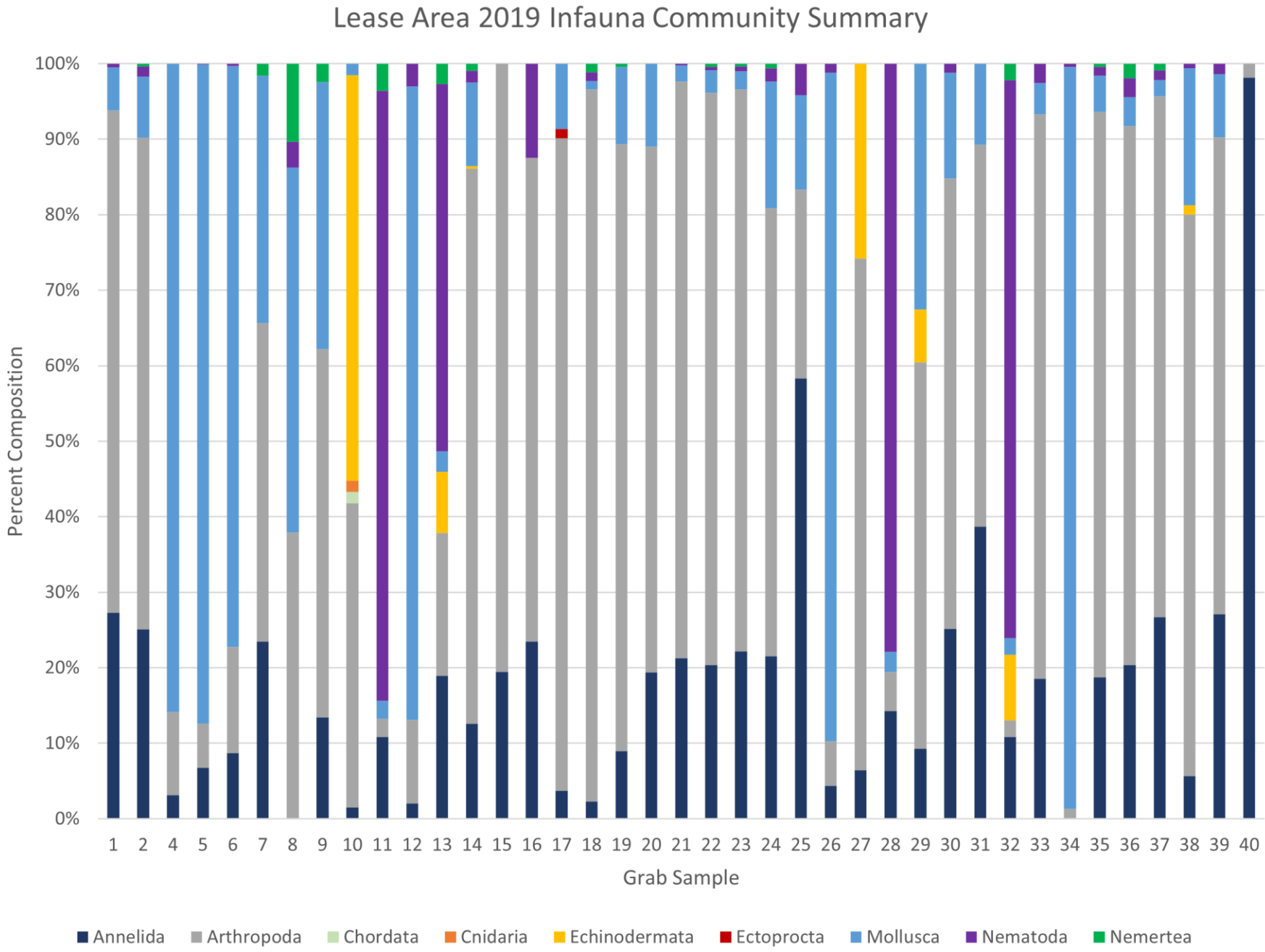


Figure 5.1-16b
Lease Area 2019 Infauna Community Summary

VINEYARD NORTHEAST
VINEYARD OFFSHORE

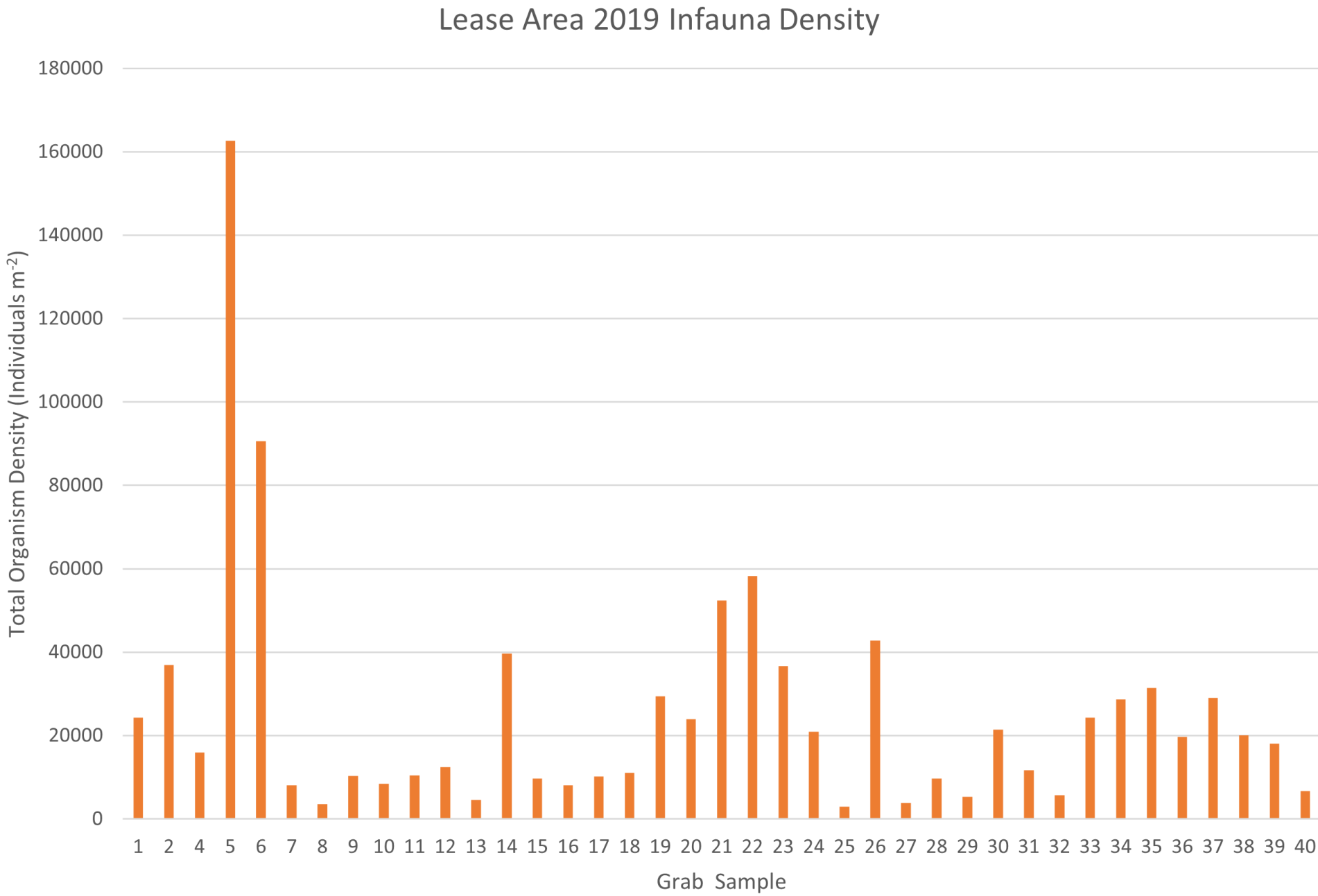


Figure 5.1-16c
Lease Area 2019 Infauna Density

VINEYARD NORTHEAST
VINEYARD OFFSHORE

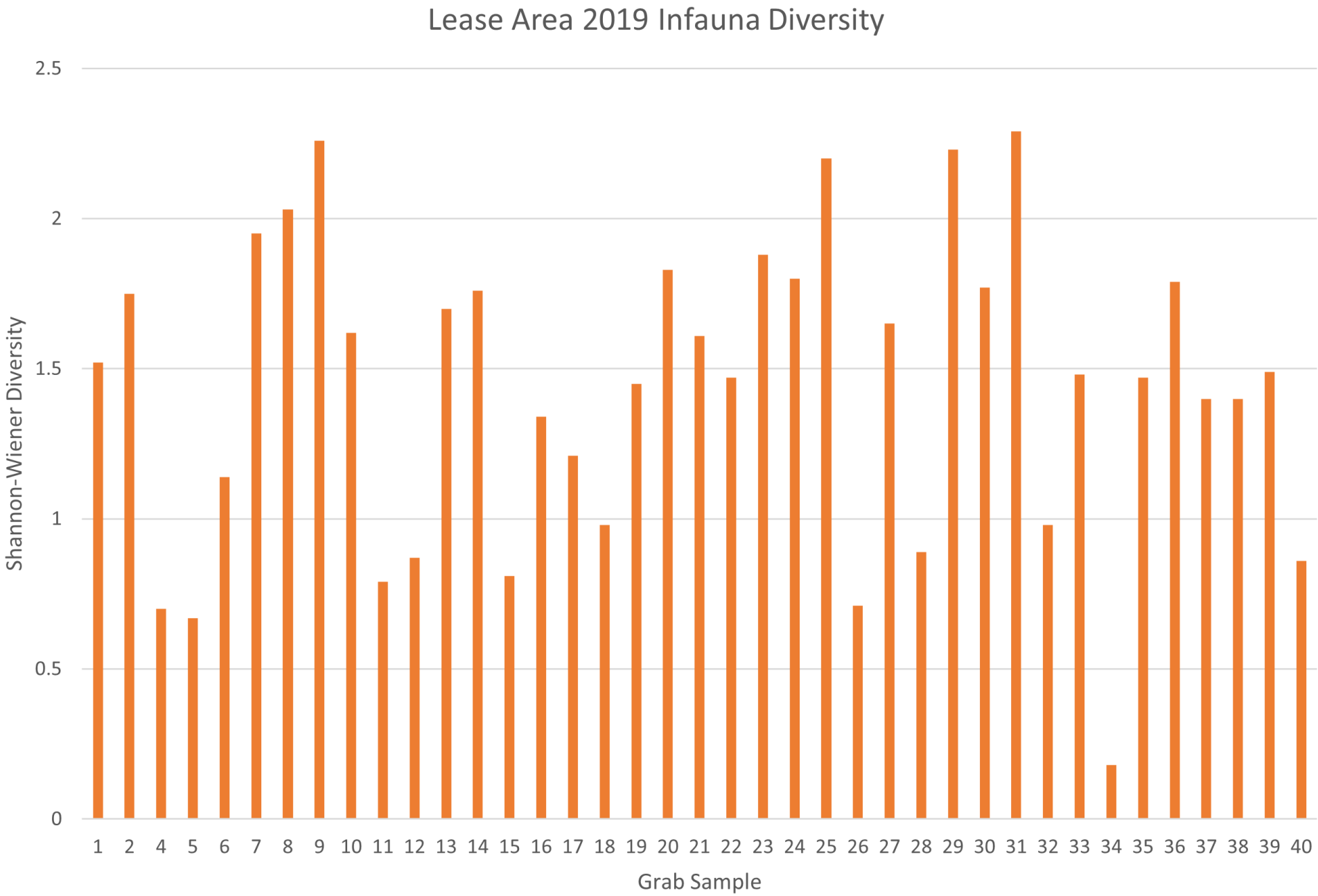


Figure 5.1-16d
Lease Area 2019 Infauna Diversity

VINEYARD NORTHEAST
VINEYARD OFFSHORE

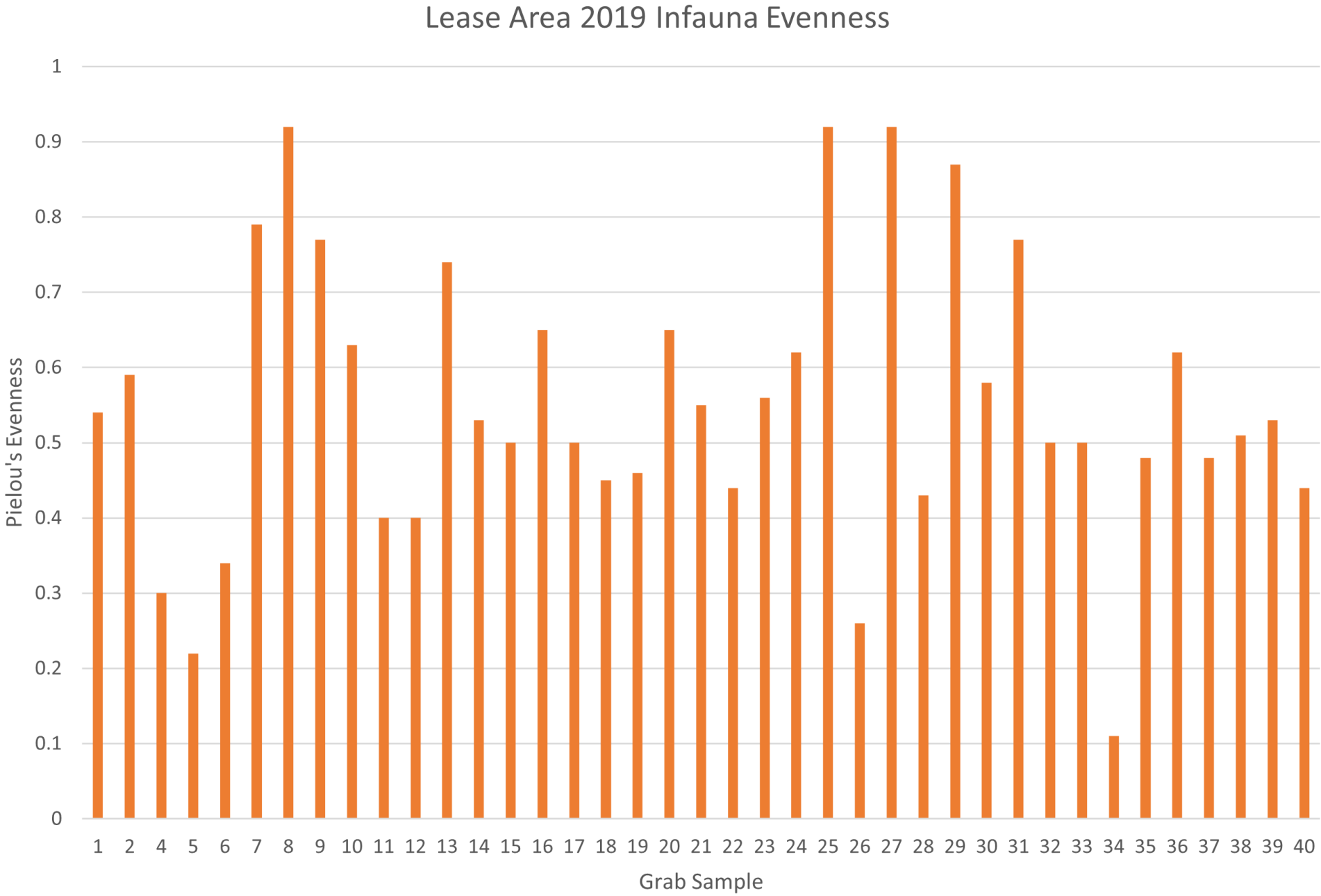


Figure 5.1-16e
Lease Area 2019 Infauna Evenness

VINEYARD NORTHEAST
VINEYARD OFFSHORE

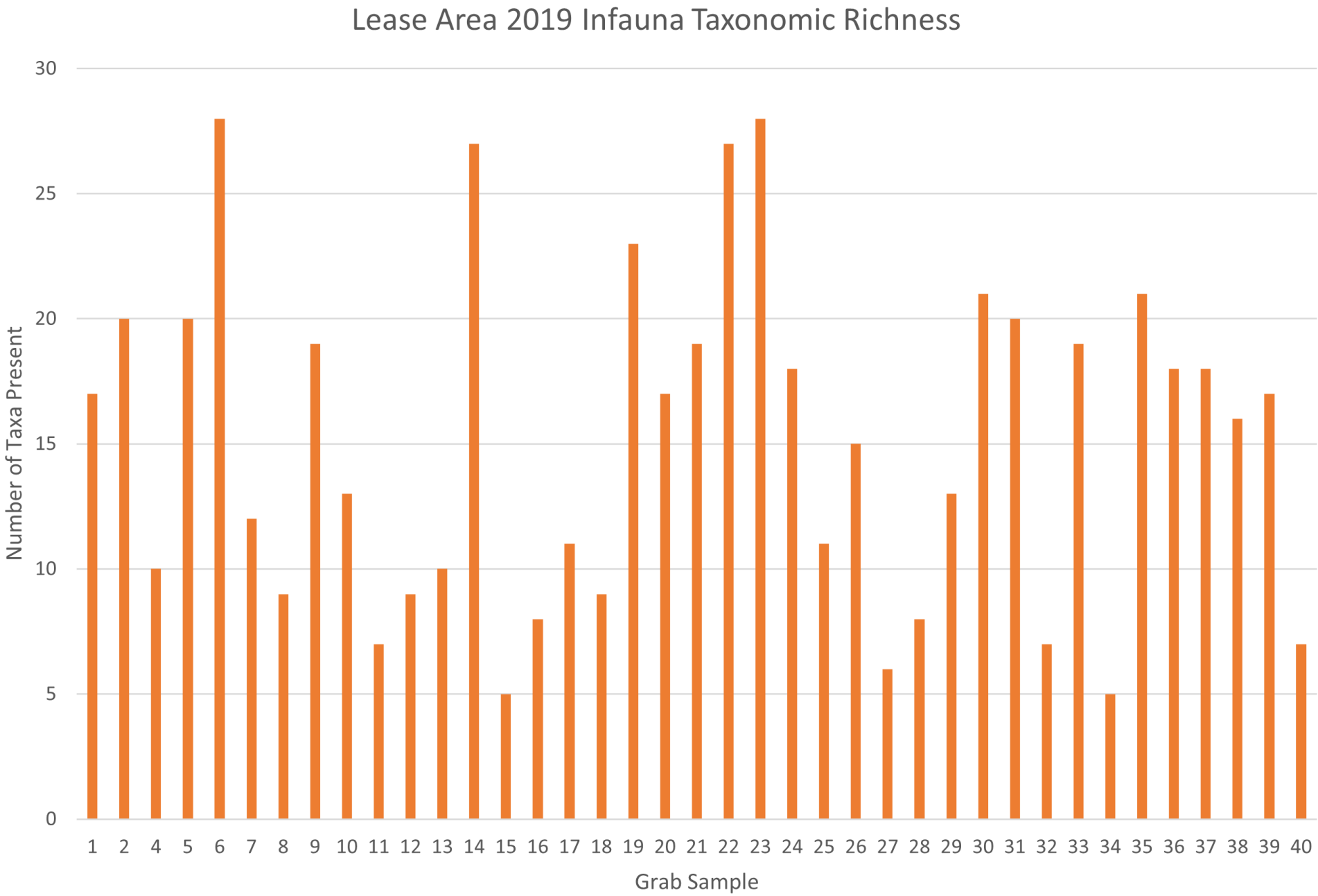


Figure 5.1-16f
Lease Area 2019 Infauna Taxonomic Richness

VINEYARD NORTHEAST
VINEYARD OFFSHORE

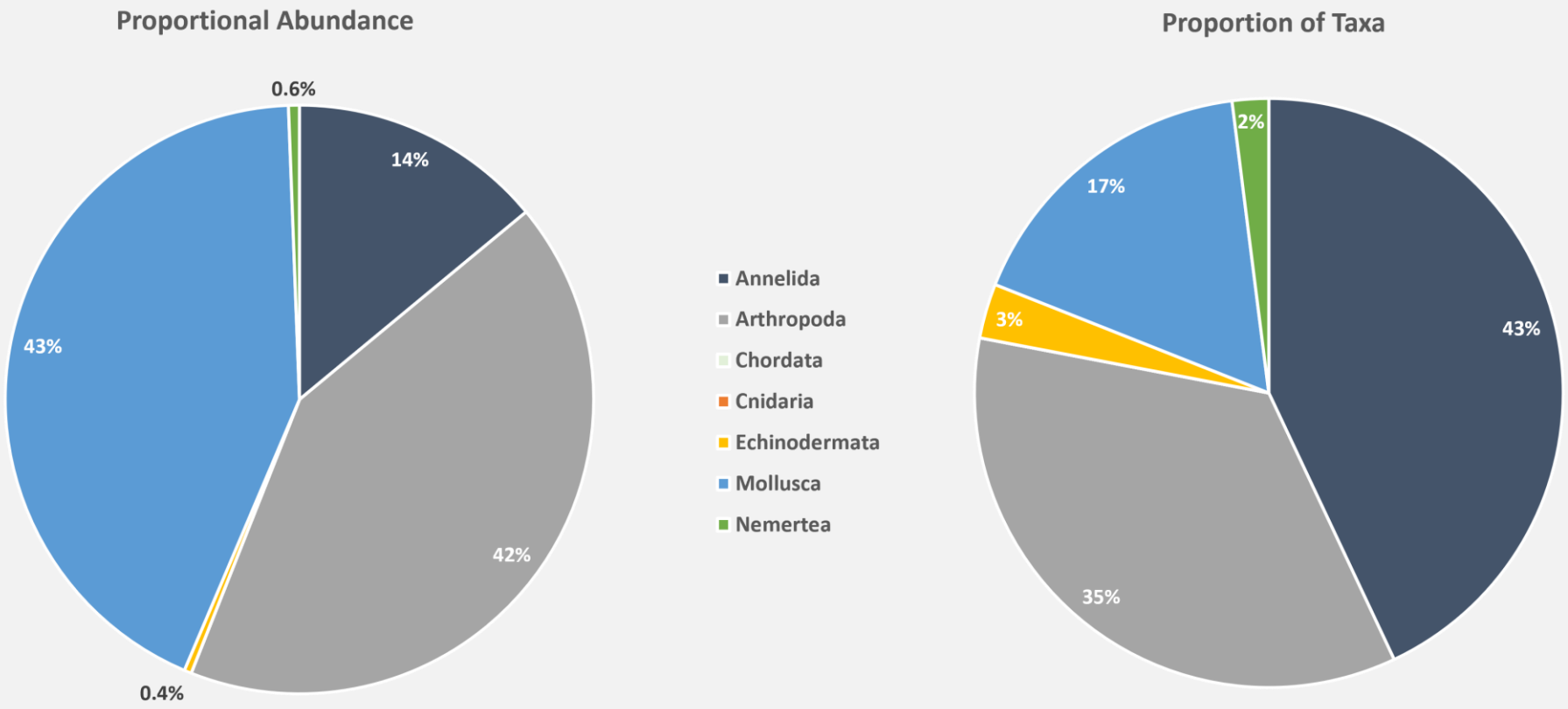


Figure 5.1-17a
Infauna Proportional Abundance by Phylum in Lease Area 2022

VINEYARD NORTHEAST
VINEYARD OFFSHORE

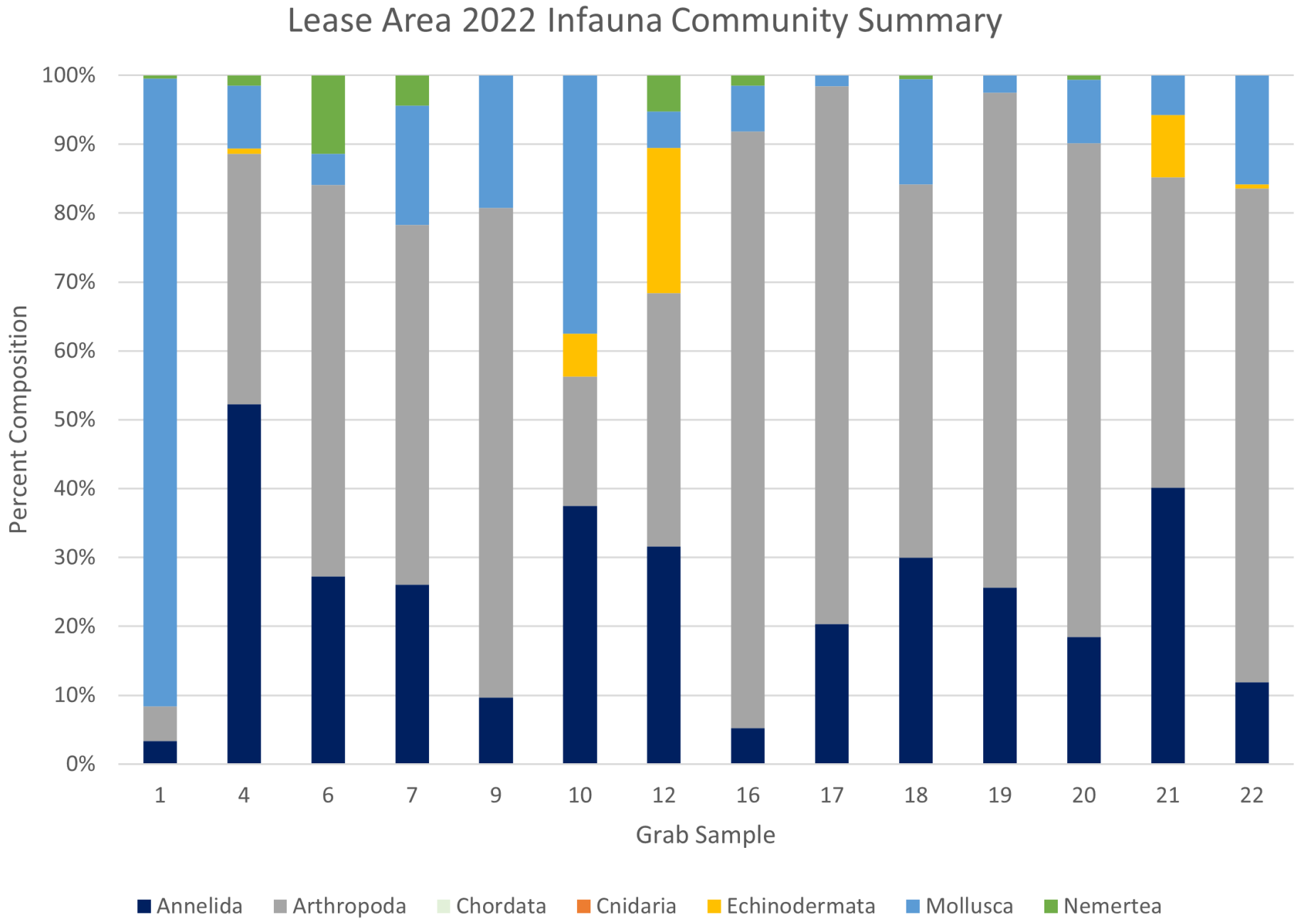
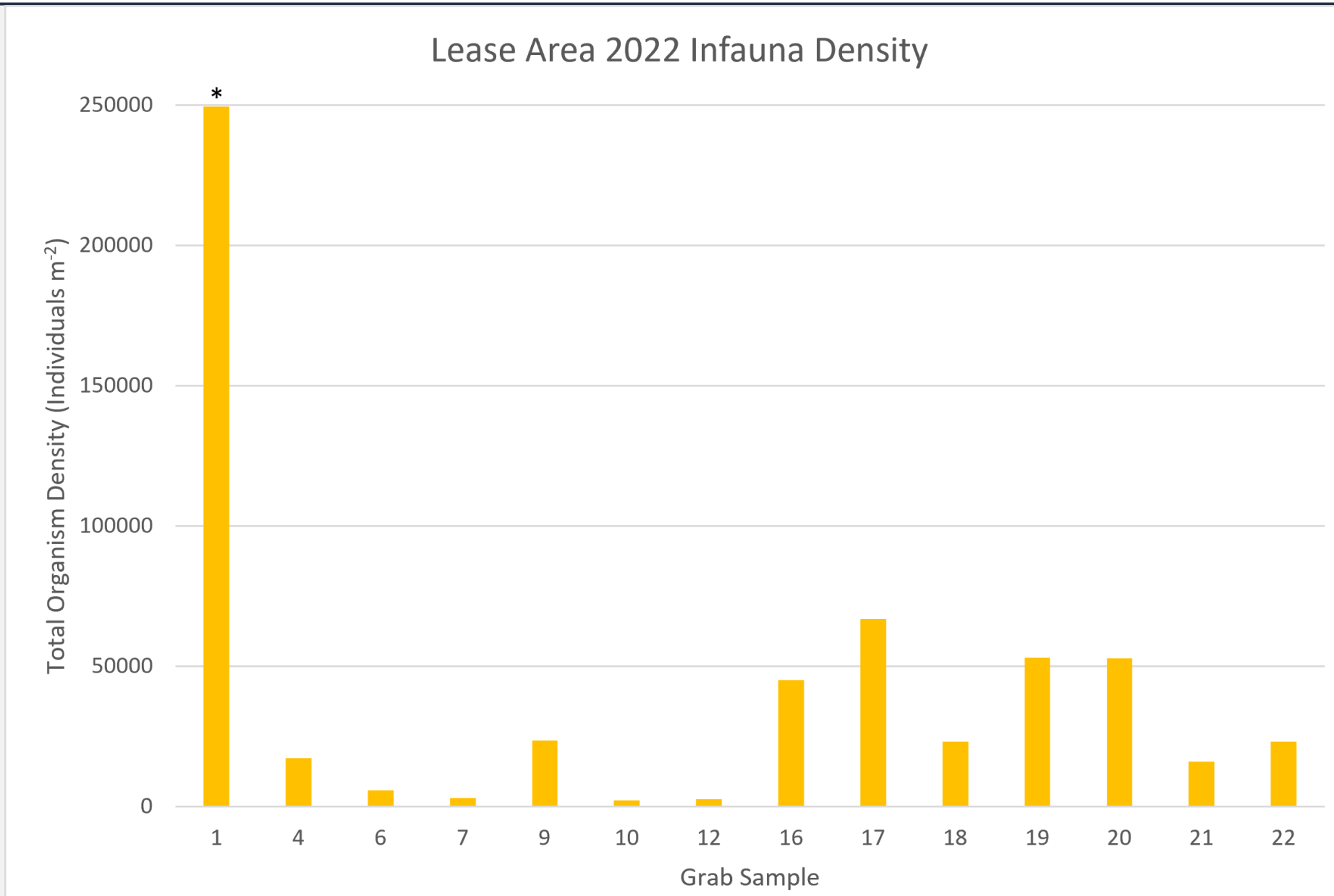


Figure 5.1-17b
Lease Area 2022 Infauna Community Summary

VINEYARD NORTHEAST
VINEYARD OFFSHORE



* Sample 522LA22-001 was a positive outlier due to a small field sample size of 9.58 cm^2, which likely overinflated the relative density when converted to individuals m^{-2}.

Figure 5.1-17c
Lease Area 2022 Infauna Density

VINEYARD NORTHEAST
VINEYARD OFFSHORE

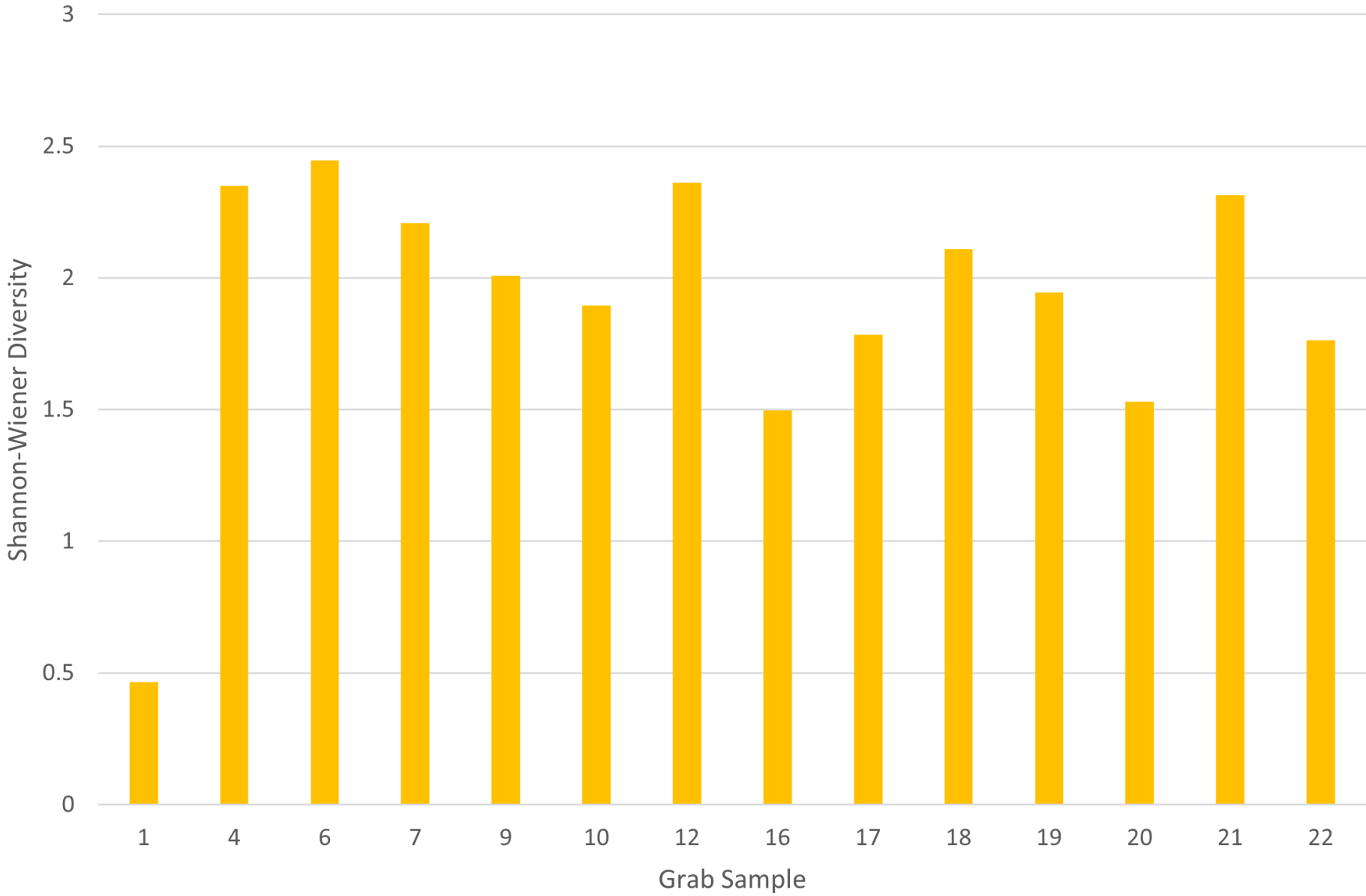


Figure 5.1-17d
Lease Area 2022 Infauna Diversity

VINEYARD NORTHEAST
VINEYARD OFFSHORE

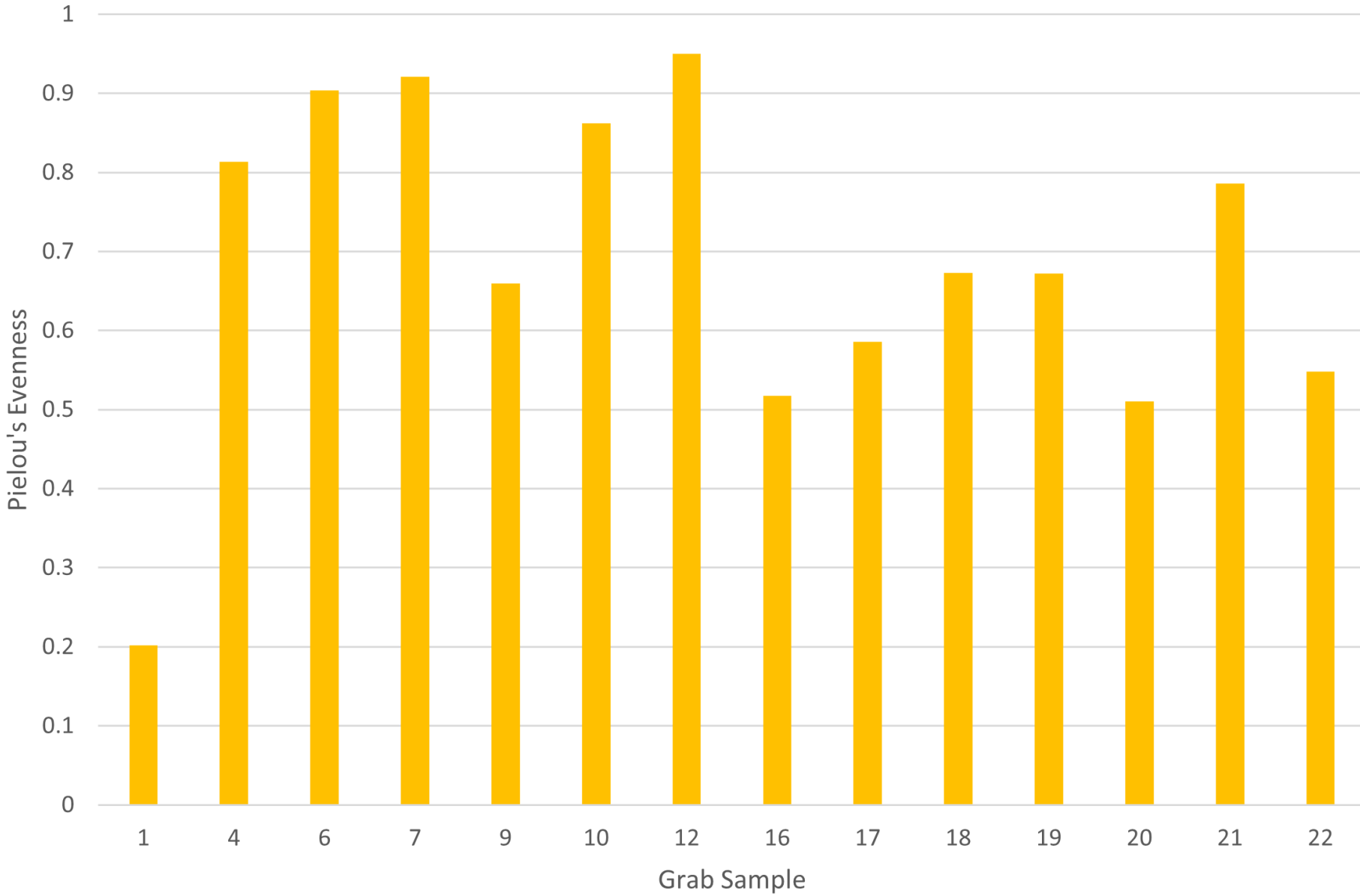


Figure 5.1-17e
Lease Area 2022 Infauna Evenness

VINEYARD NORTHEAST
VINEYARD OFFSHORE

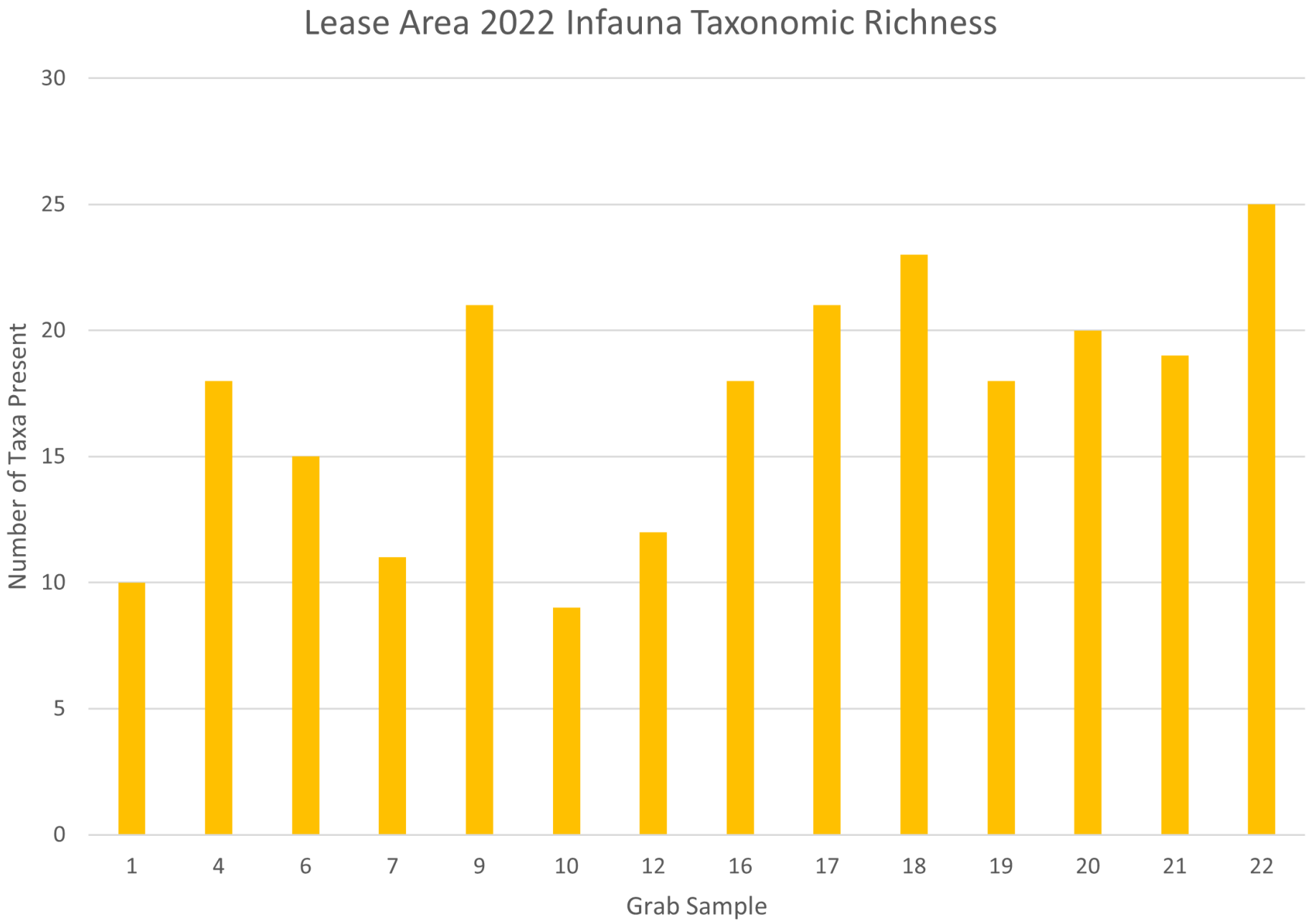


Figure 5.1-17f
Lease Area 2022 Infauna Taxonomic Richness

VINEYARD NORTHEAST
VINEYARD OFFSHORE

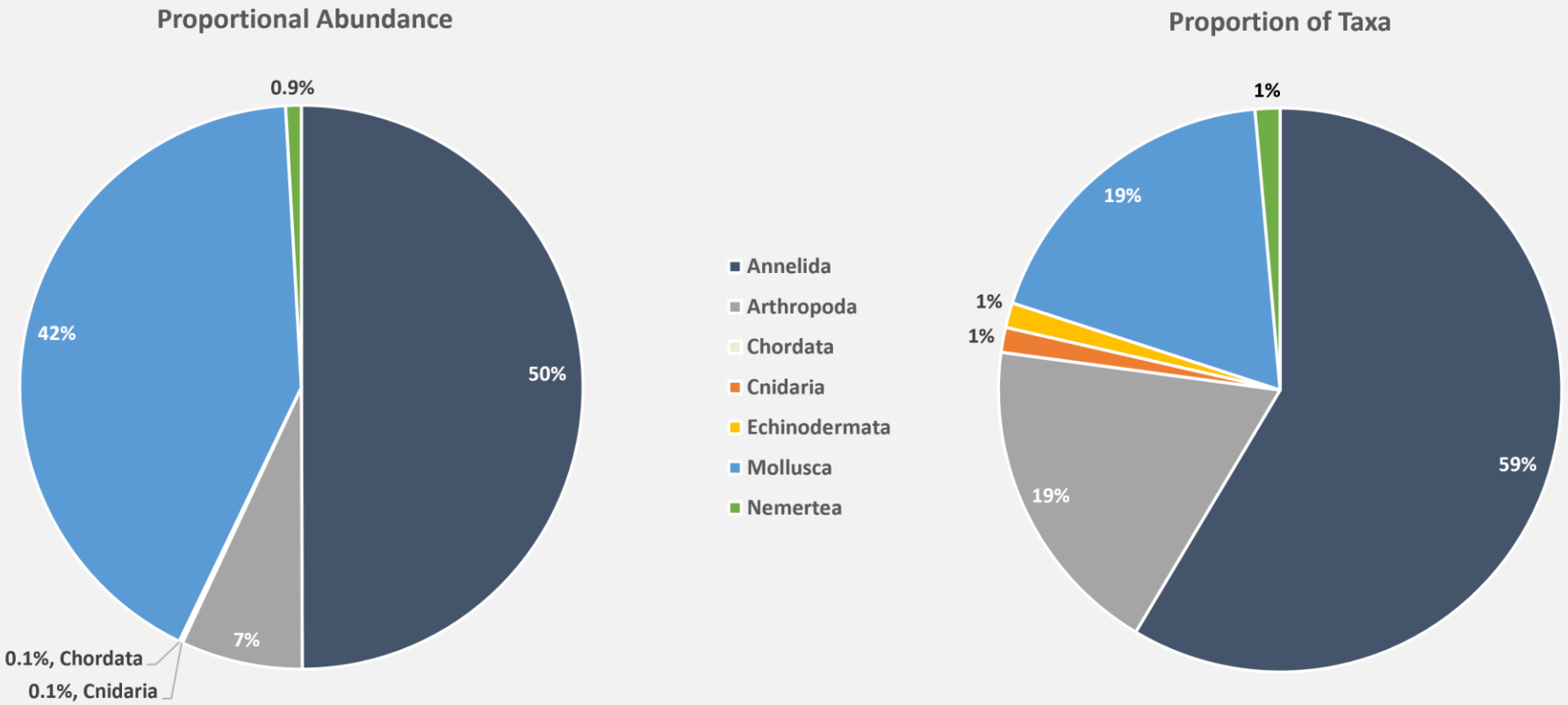


Figure 5.1-18a
Infauna Proportional Abundance by Phylum in Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE

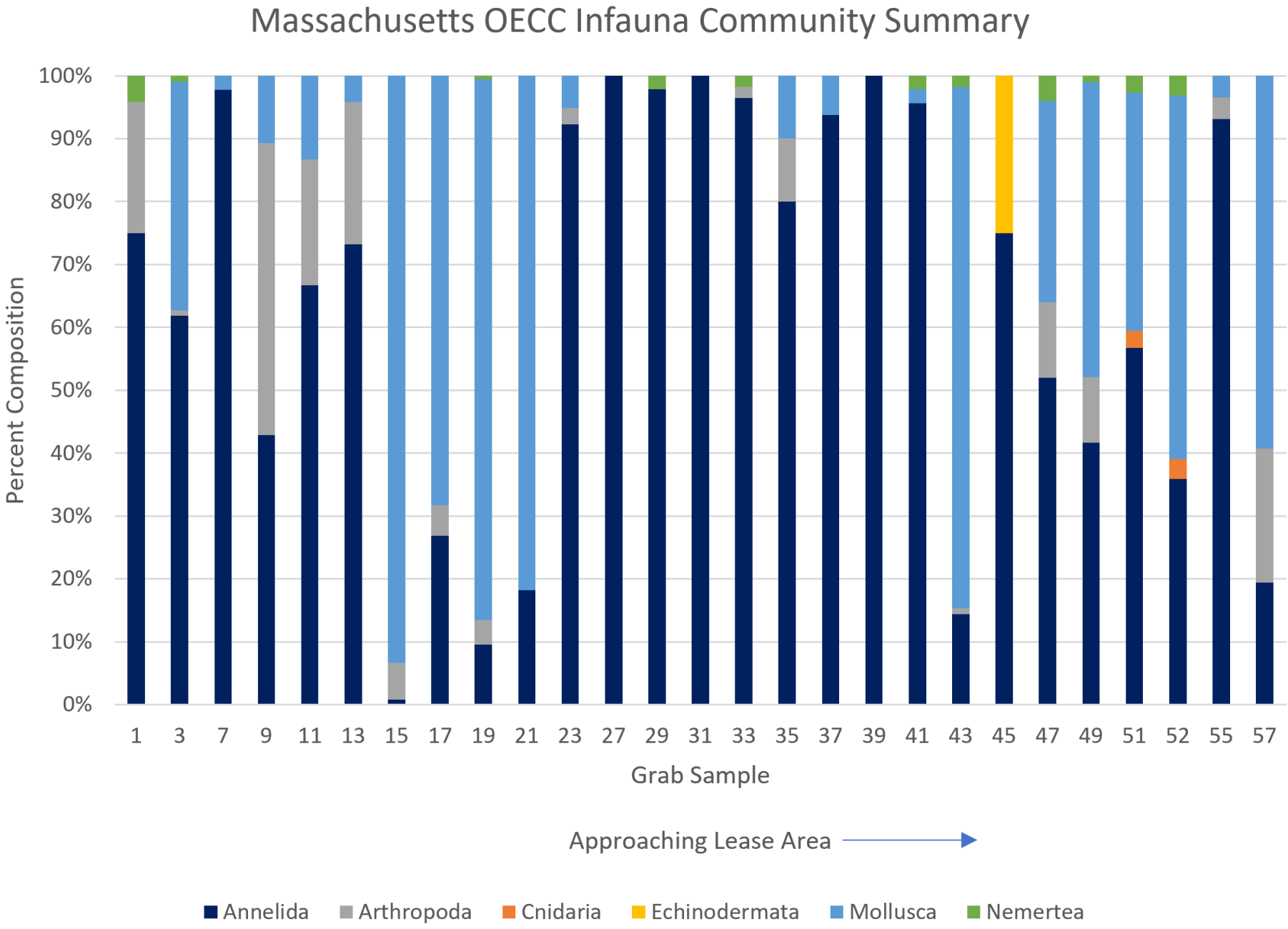


Figure 5.1-18b
Massachusetts OECC Infauna Community Summary

VINEYARD NORTHEAST
VINEYARD OFFSHORE

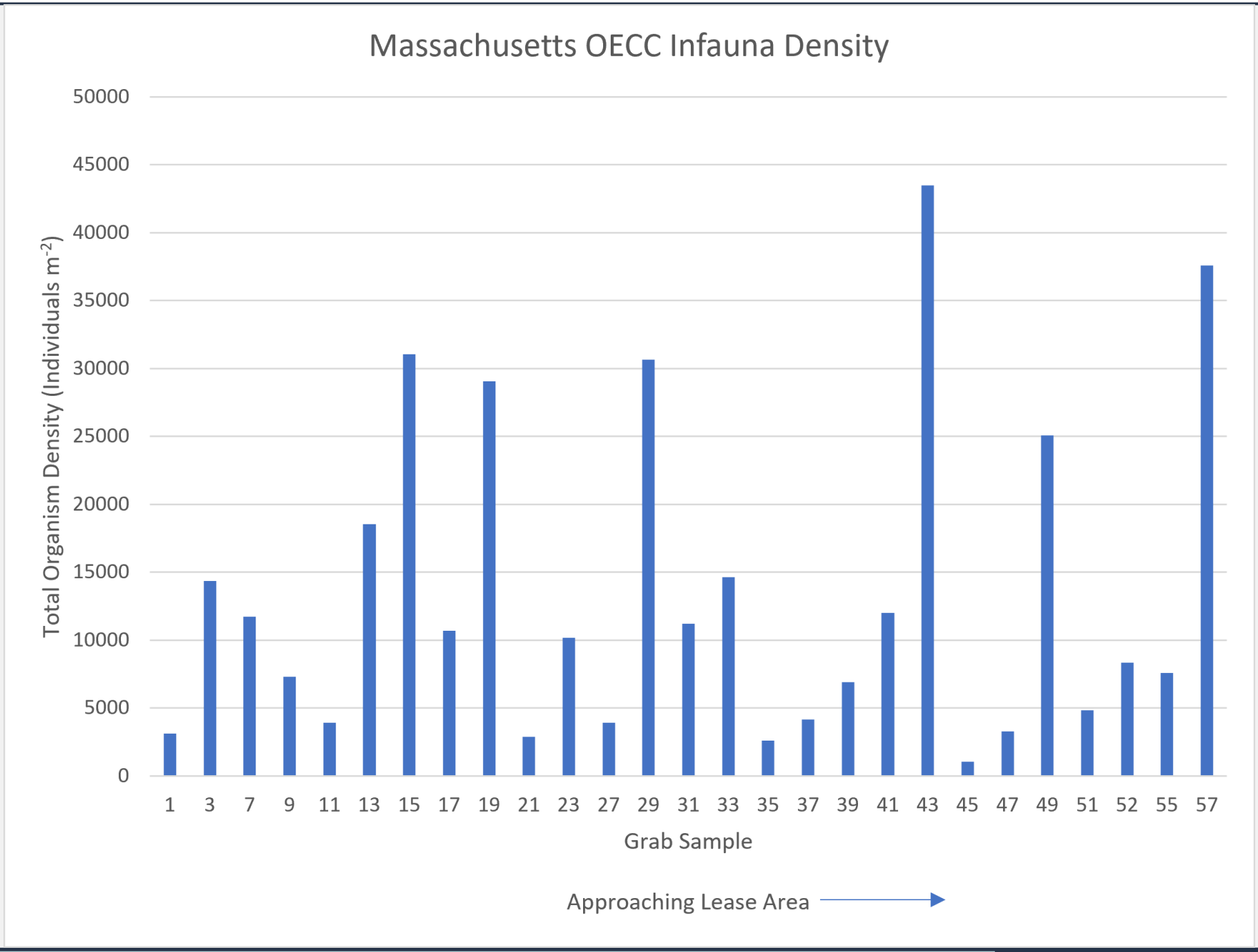


Figure 5.1-18c
Massachusetts OECC Infauna Density

VINEYARD NORTHEAST
VINEYARD OFFSHORE

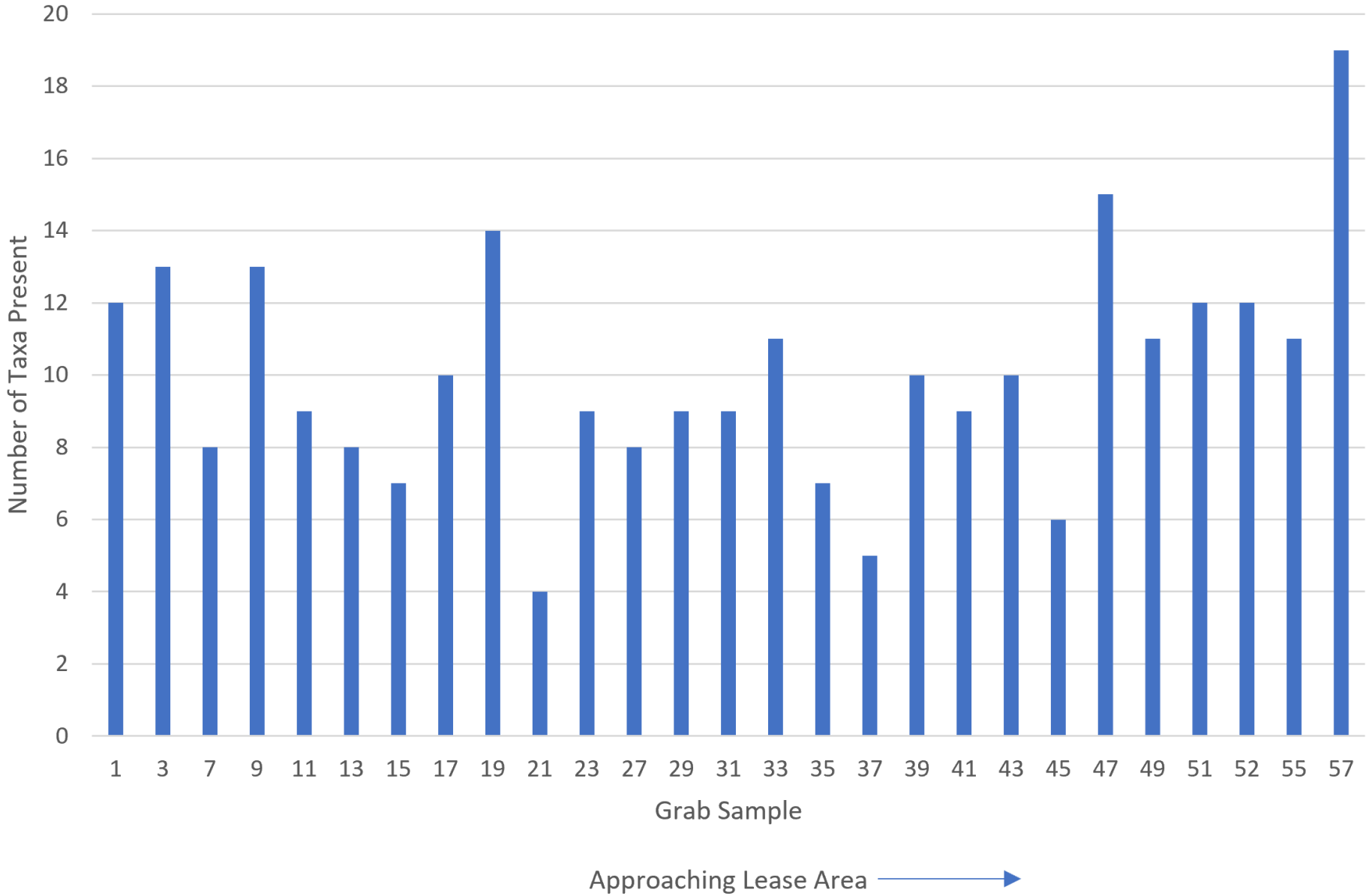


Figure 5.1-18d
Massachusetts OECC Infauna Taxonomic Richness

VINEYARD NORTHEAST
VINEYARD OFFSHORE

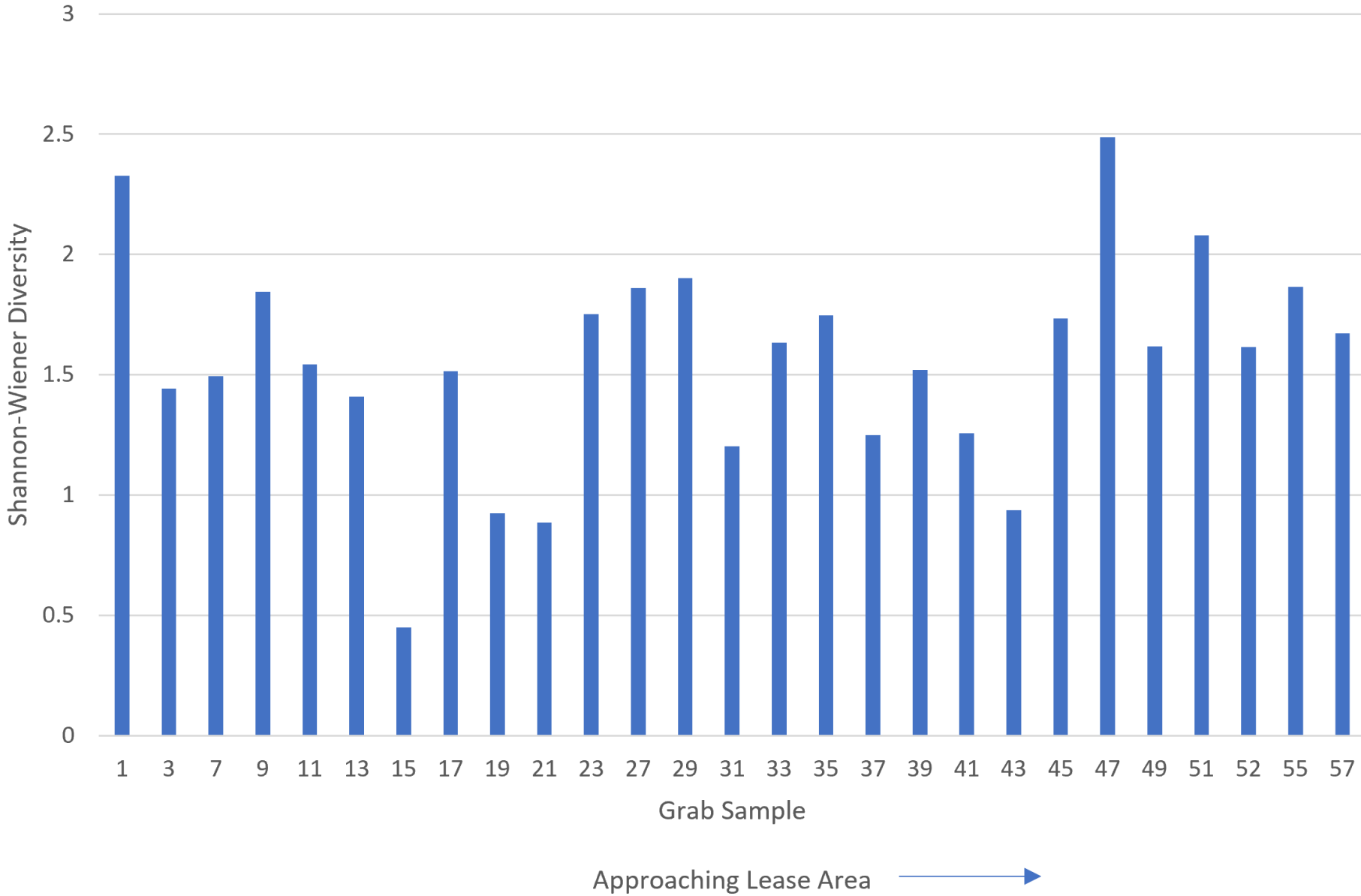


Figure 5.1-18e
Massachusetts OECC Infauna Diversity

VINEYARD NORTHEAST
VINEYARD OFFSHORE

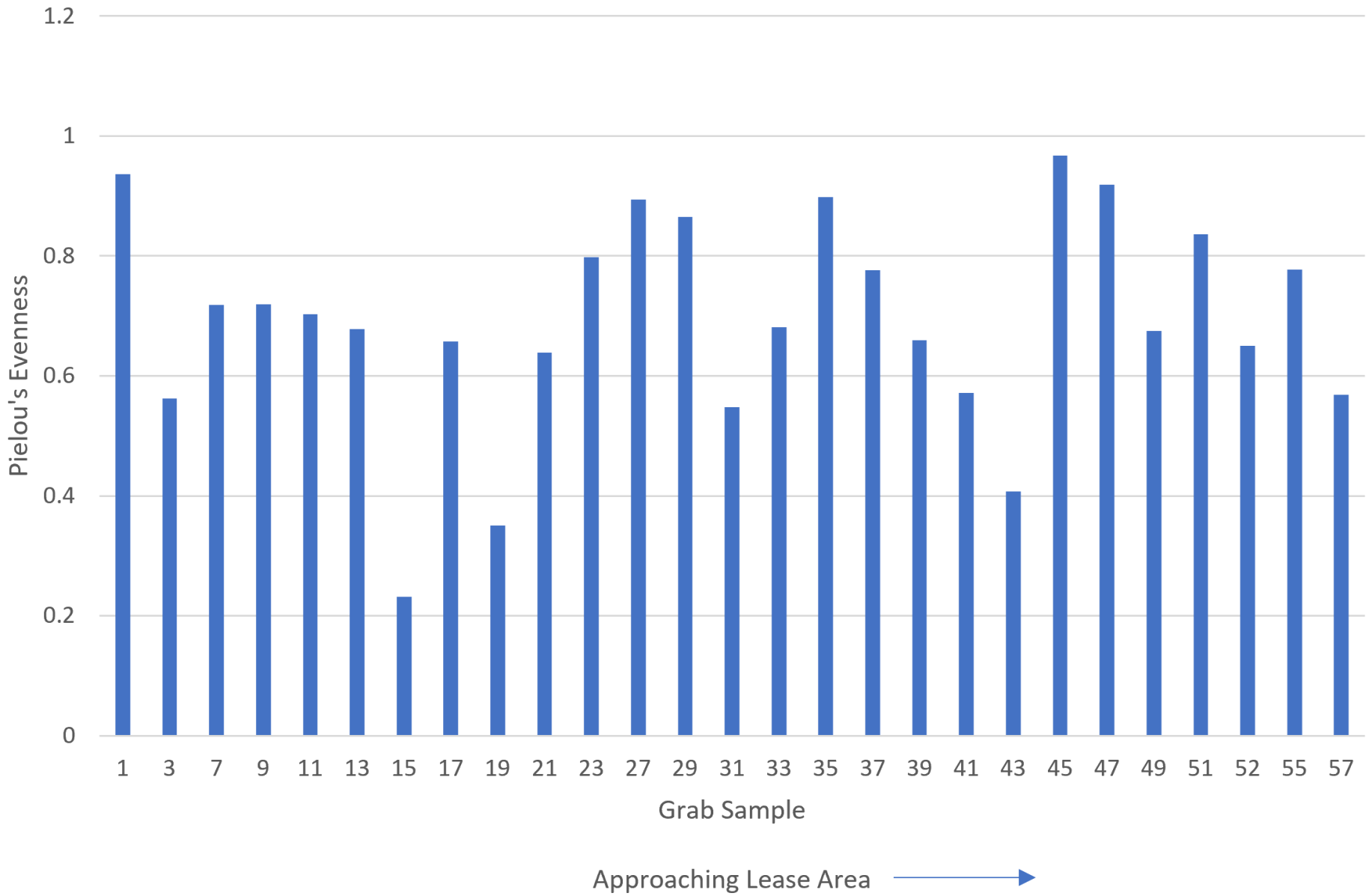


Figure 5.1-18f
Massachusetts OECC Infauna Evenness

VINEYARD NORTHEAST
VINEYARD OFFSHORE

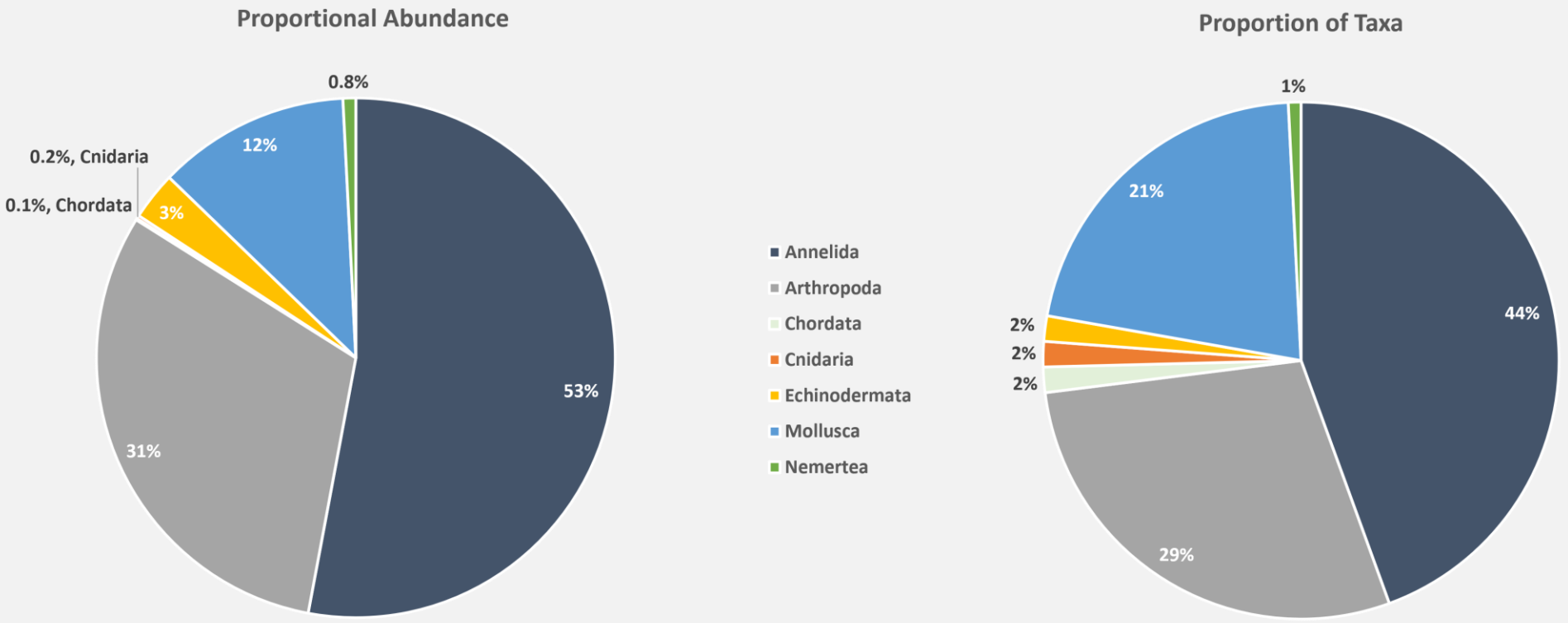


Figure 5.1-19a
Infauna Proportional Abundance by Phylum in Connecticut OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE

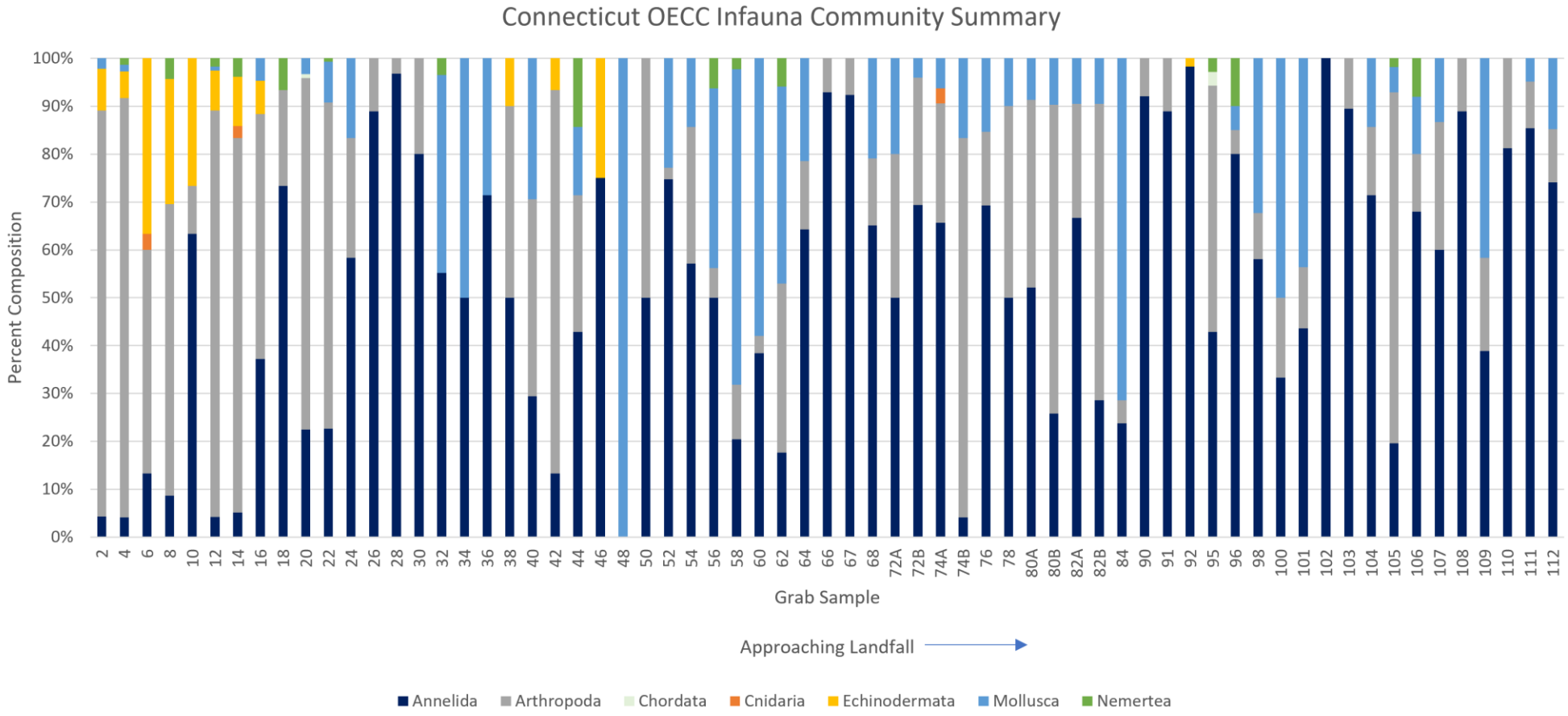
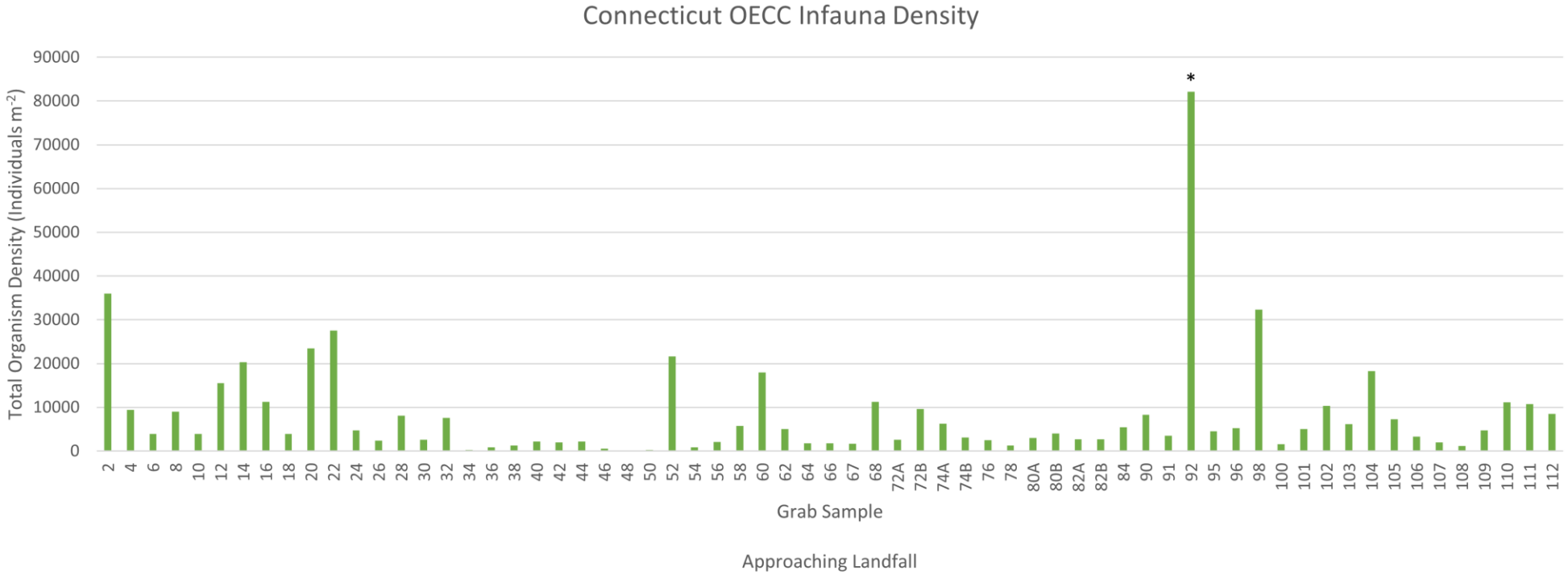


Figure 5.1-19b
Connecticut OECC Infauna Community Summary

VINEYARD NORTHEAST
VINEYARD OFFSHORE



* Sample 522CT22-092 was a positive outlier due to a small field sample size of 7.18 cm^2, which likely overinflated the relative density when converted to individuals m^{-2}.

Figure 5.1-19c
Connecticut OECC Infauna Density

VINEYARD NORTHEAST
VINEYARD OFFSHORE

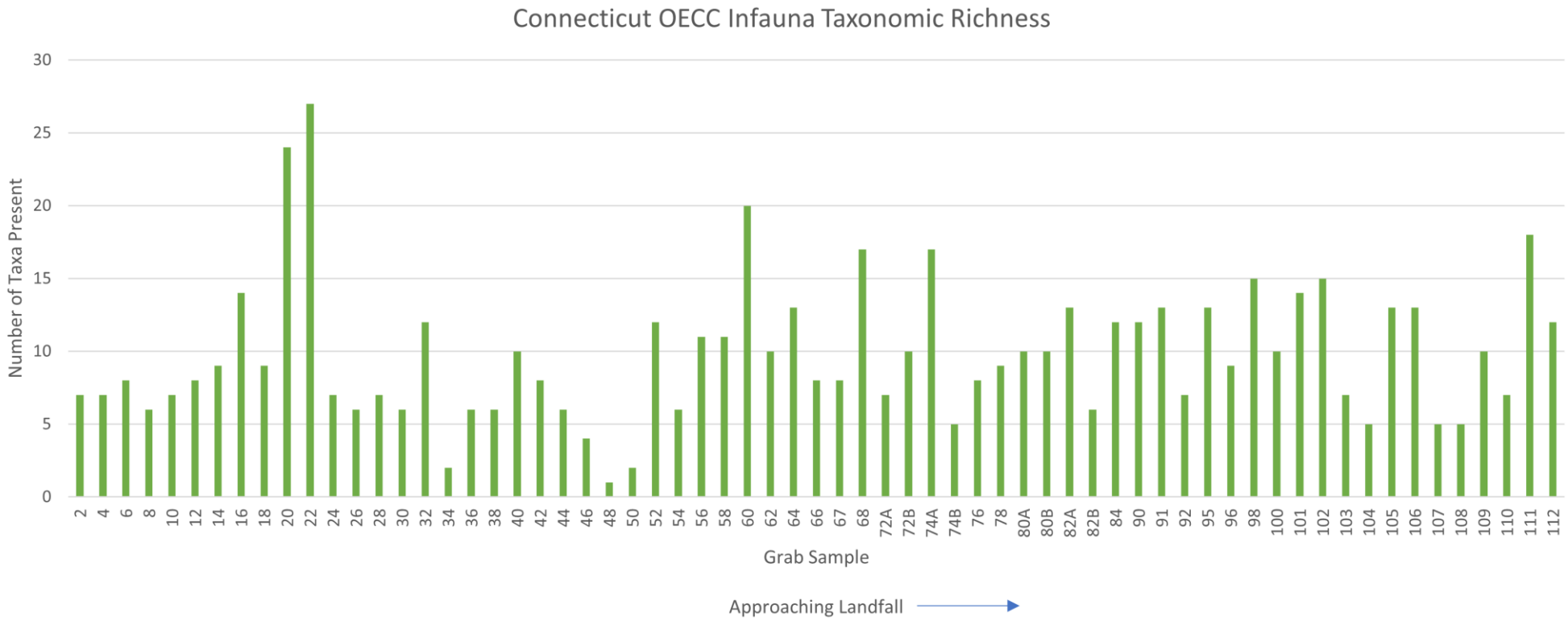


Figure 5.1-19d
Connecticut OECC Infauna Taxonomic Richness

VINEYARD NORTHEAST
VINEYARD OFFSHORE

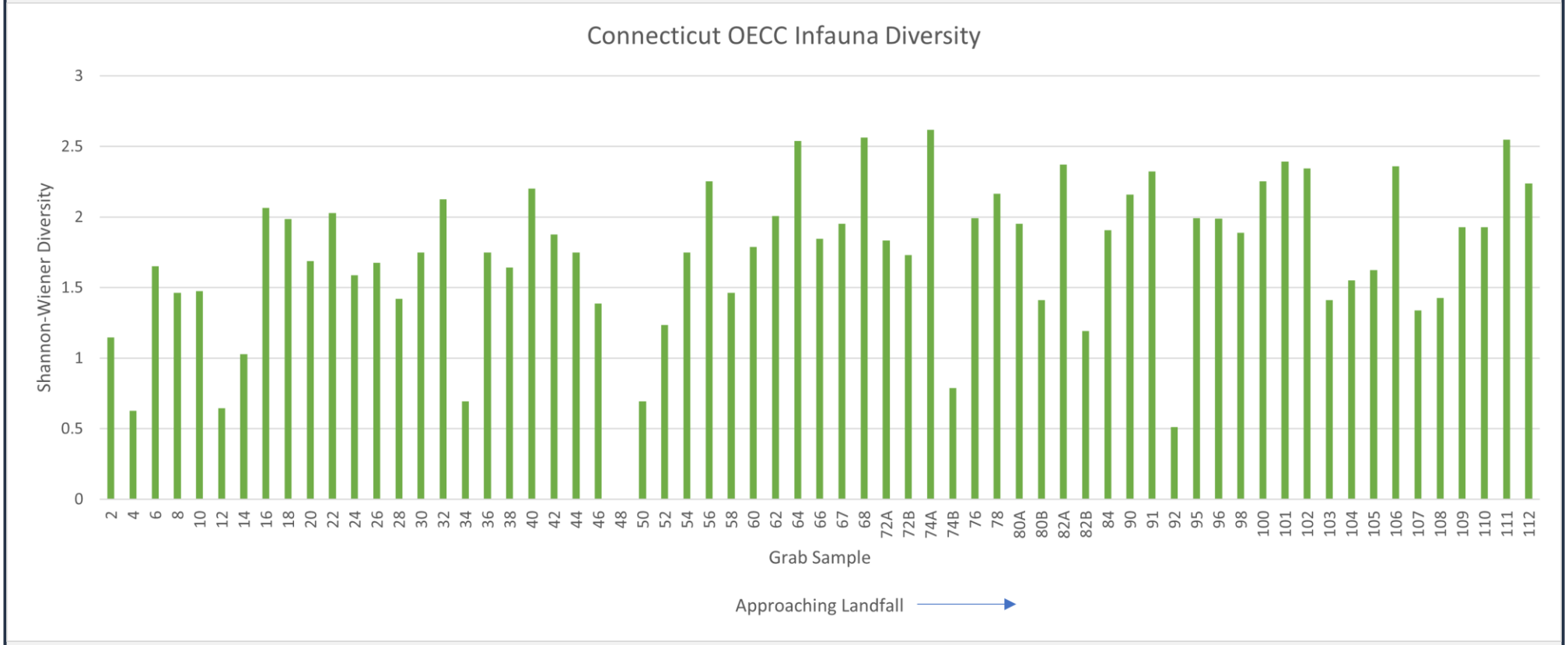


Figure 5.1-19e
Connecticut OECC Infauna Diversity

VINEYARD NORTHEAST
VINEYARD OFFSHORE

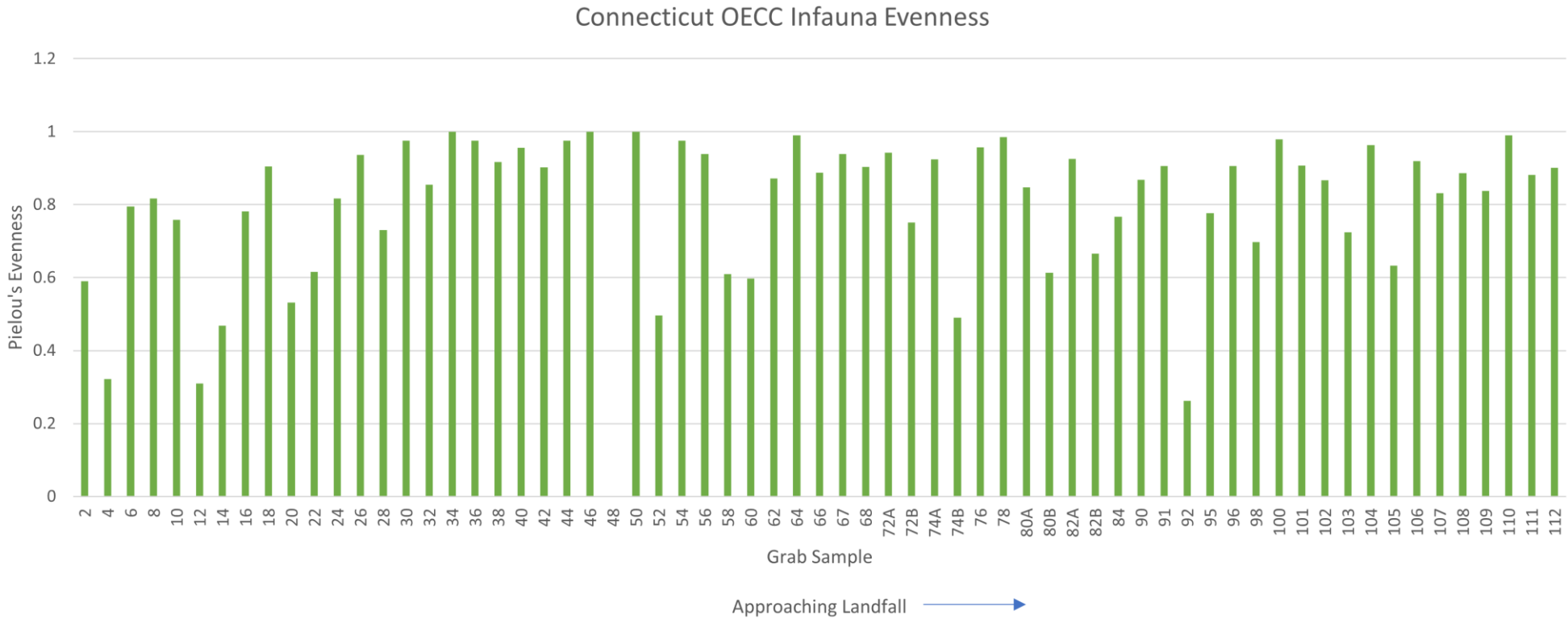


Figure 5.1-19f
Connecticut OECC Infauna Evenness

VINEYARD NORTHEAST
VINEYARD OFFSHORE

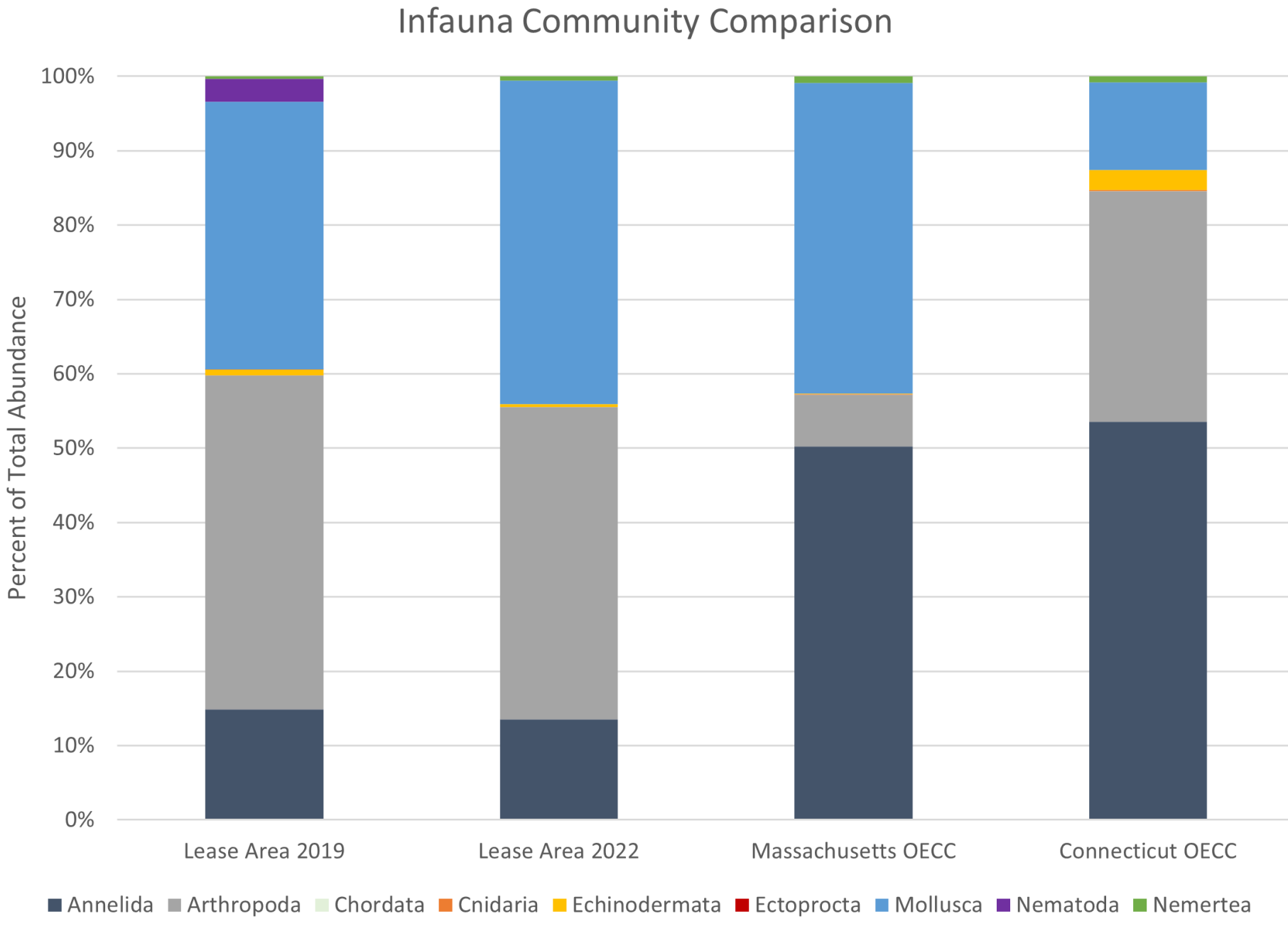


Figure 5.1-20
Vineyard Northeast Infauna Community Comparison

VINEYARD NORTHEAST
VINEYARD OFFSHORE

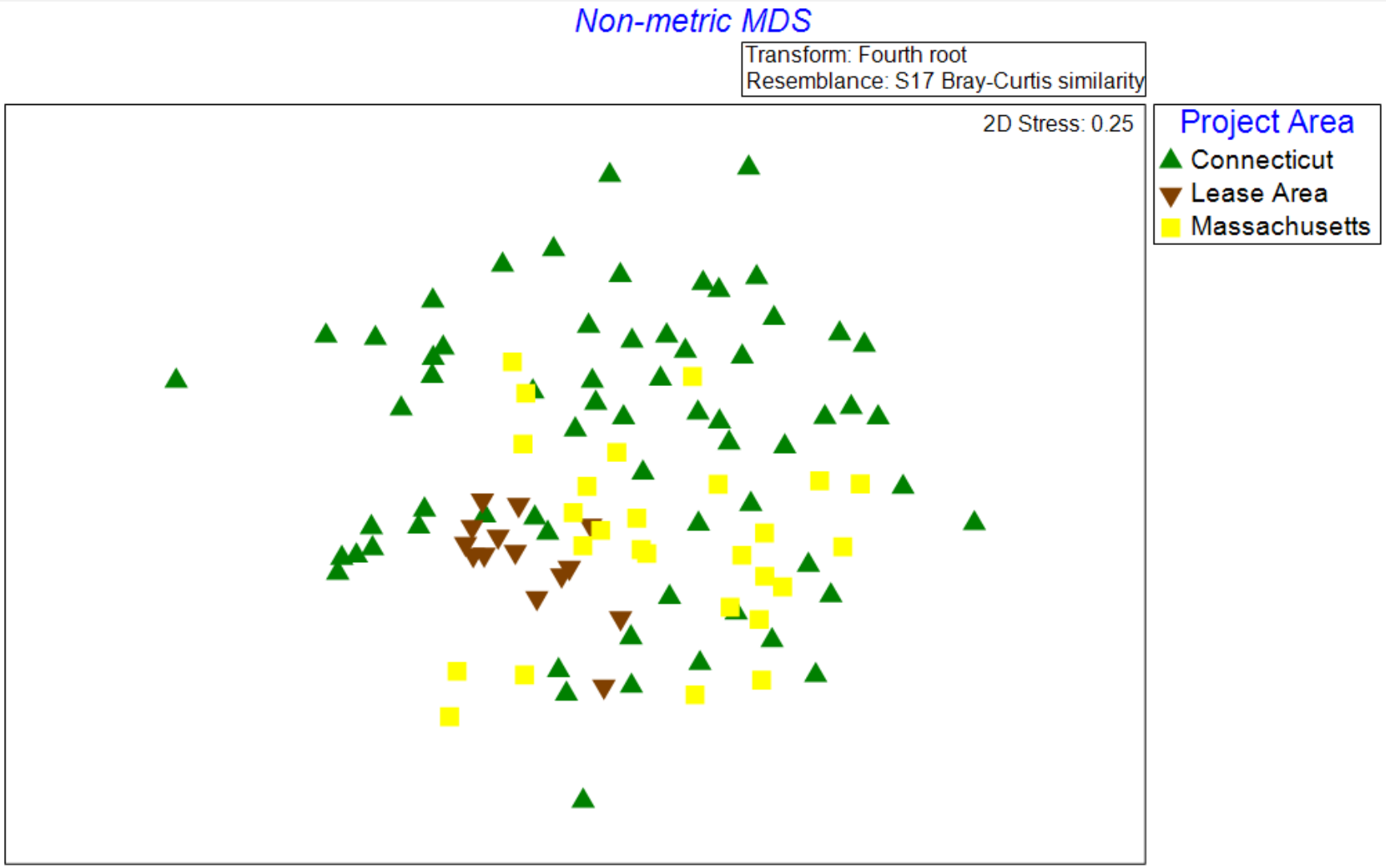


Figure 5.1-21
NMDS Ordination of Community Composition in Benthic Infauna Samples by Project Area

VINEYARD NORTHEAST
VINEYARD OFFSHORE

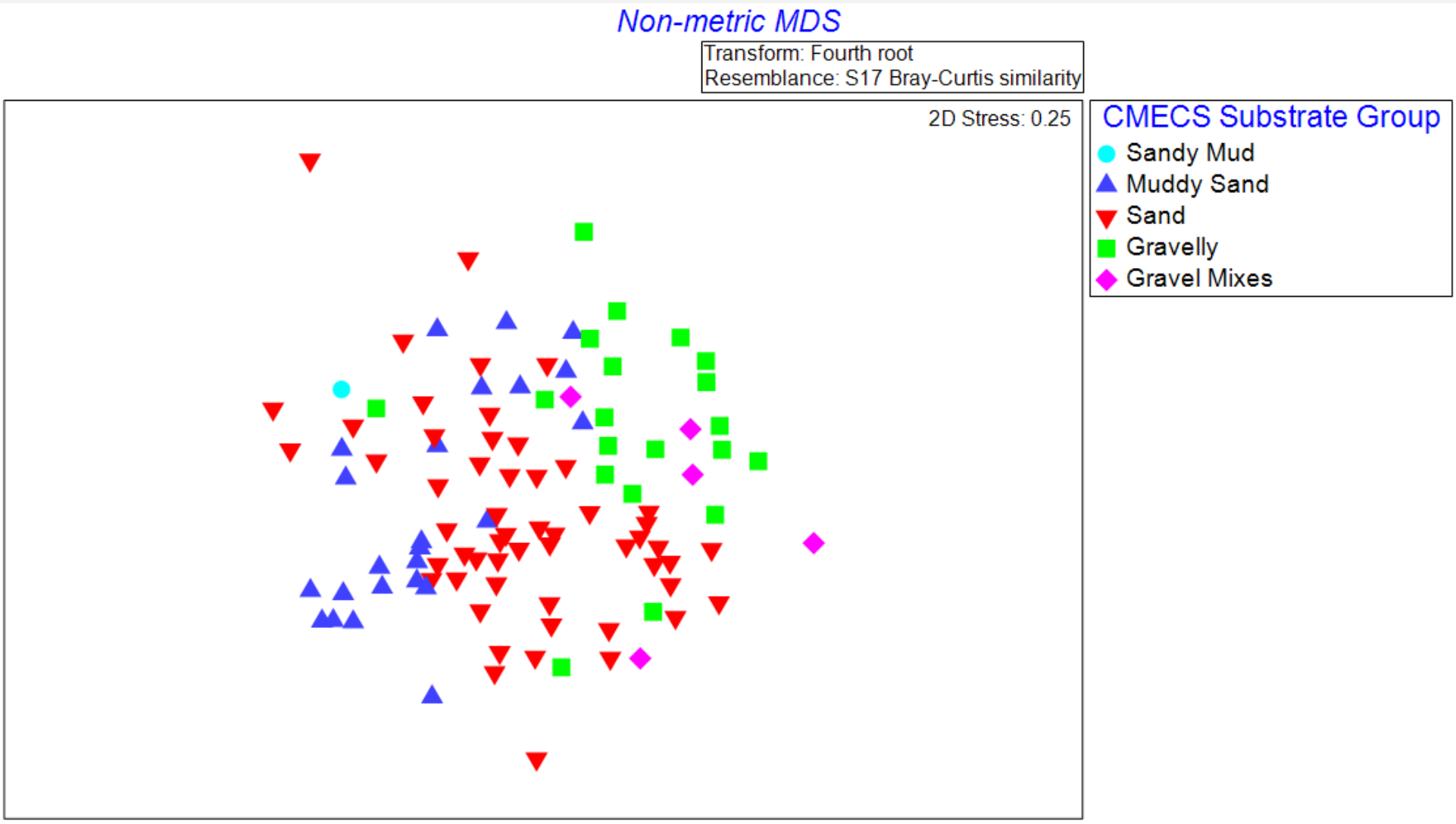


Figure 5.1-22
NMDS Ordination of Community Composition in Benthic Infauna Samples by CMECS Sediment Group

VINEYARD NORTHEAST
VINEYARD OFFSHORE

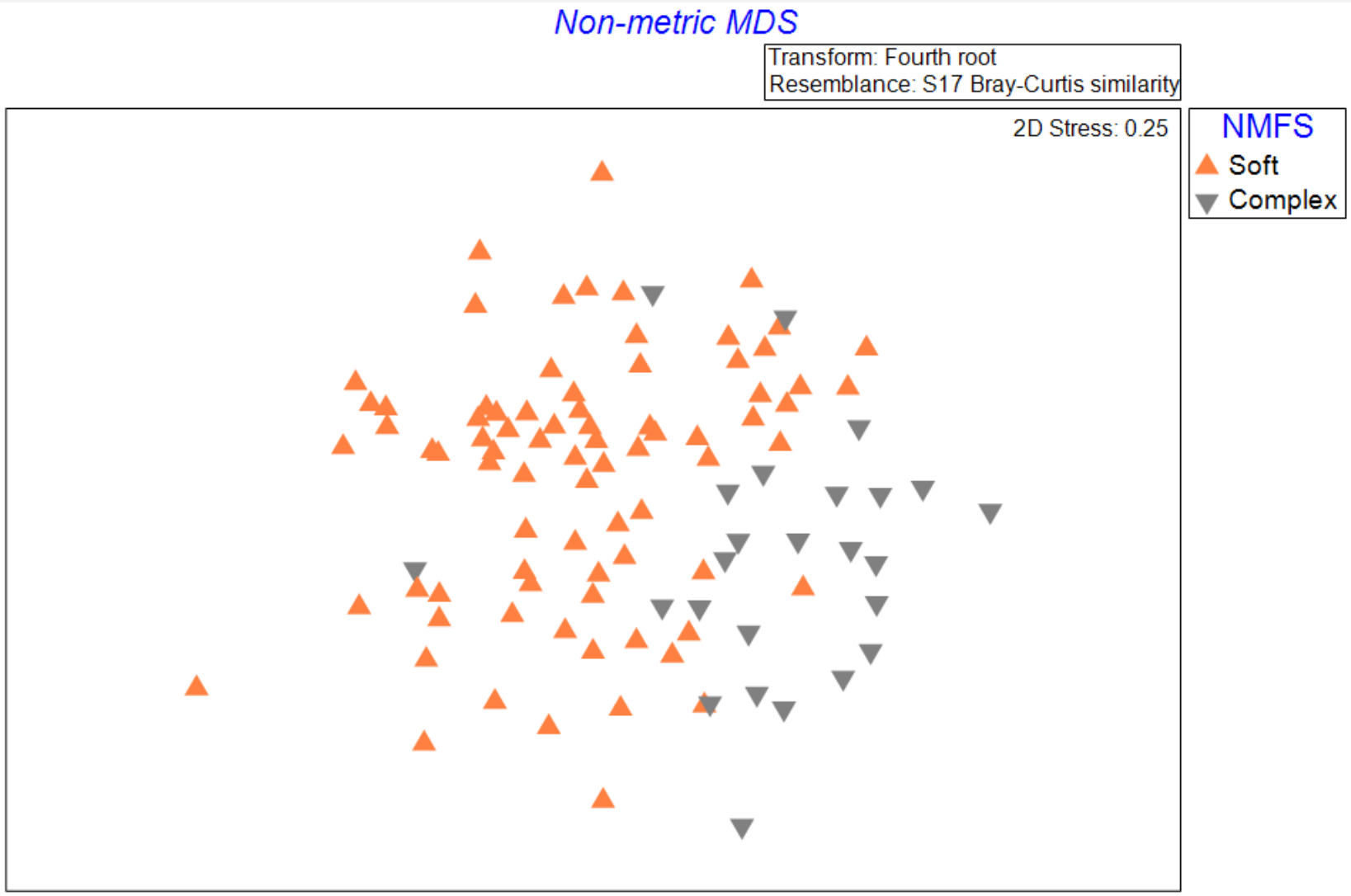


Figure 5.1-23
NMDS Ordination of Community Composition in Benthic Infauna Samples by NMFS Classification

VINEYARD NORTHEAST
VINEYARD OFFSHORE

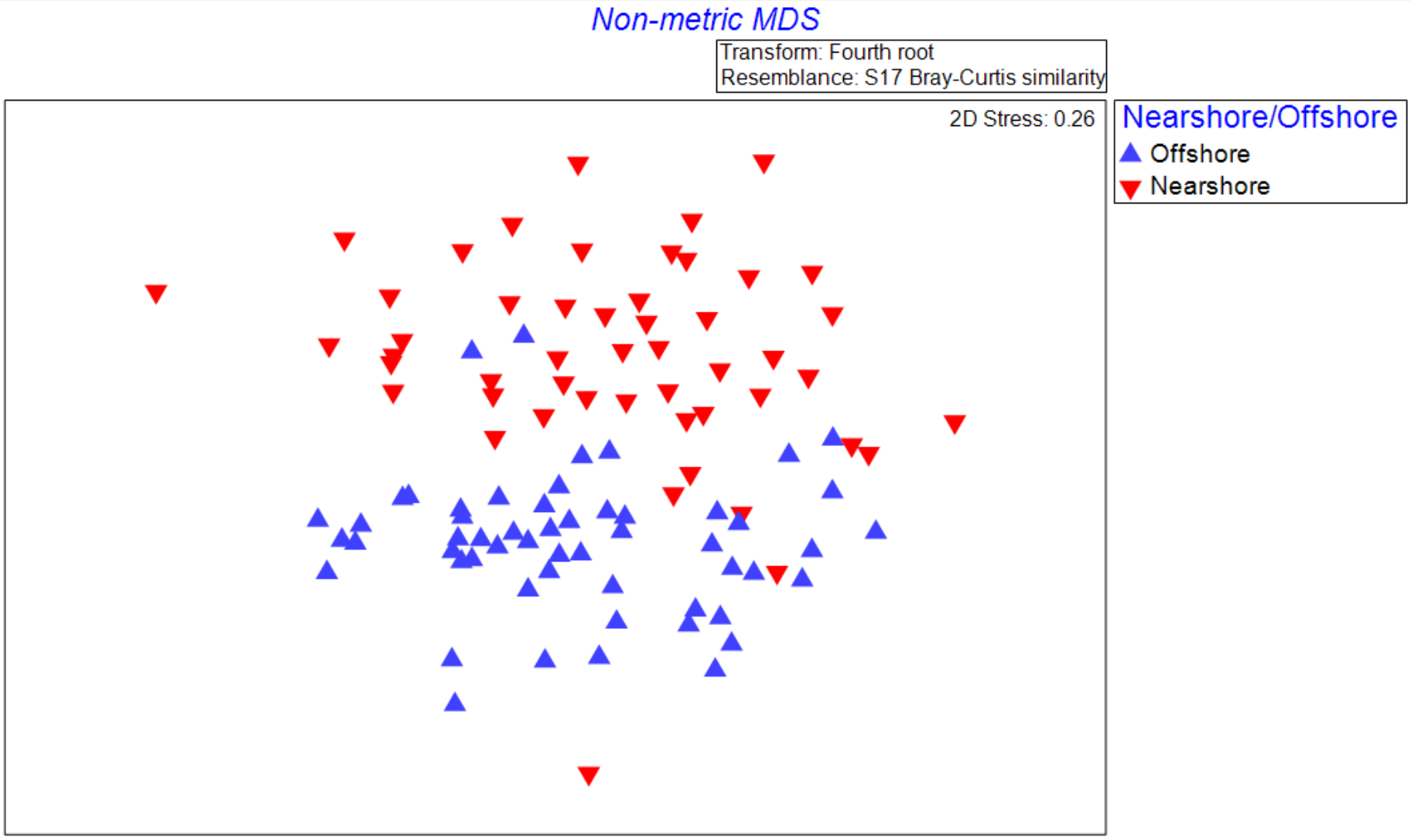


Figure 5.1-24
NMDS Ordination of Community Composition in Benthic Infauna Samples Comparing Nearshore and Offshore Waters

VINEYARD NORTHEAST
VINEYARD OFFSHORE

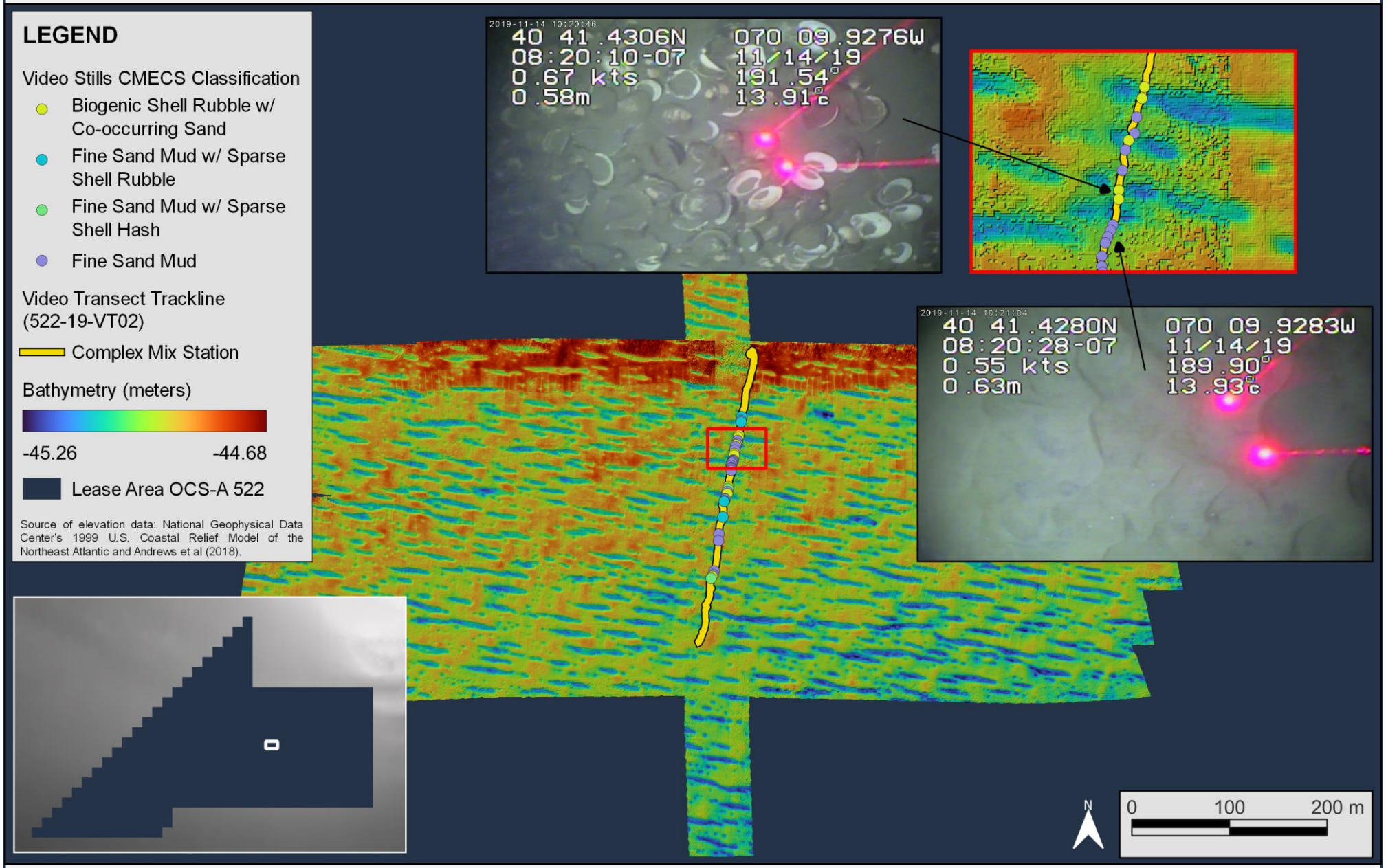


Figure 5.2-1
Shell Furrows Within Lease Area (MBES and Video Stills)

VINEYARD NORTHEAST
VINEYARD OFFSHORE

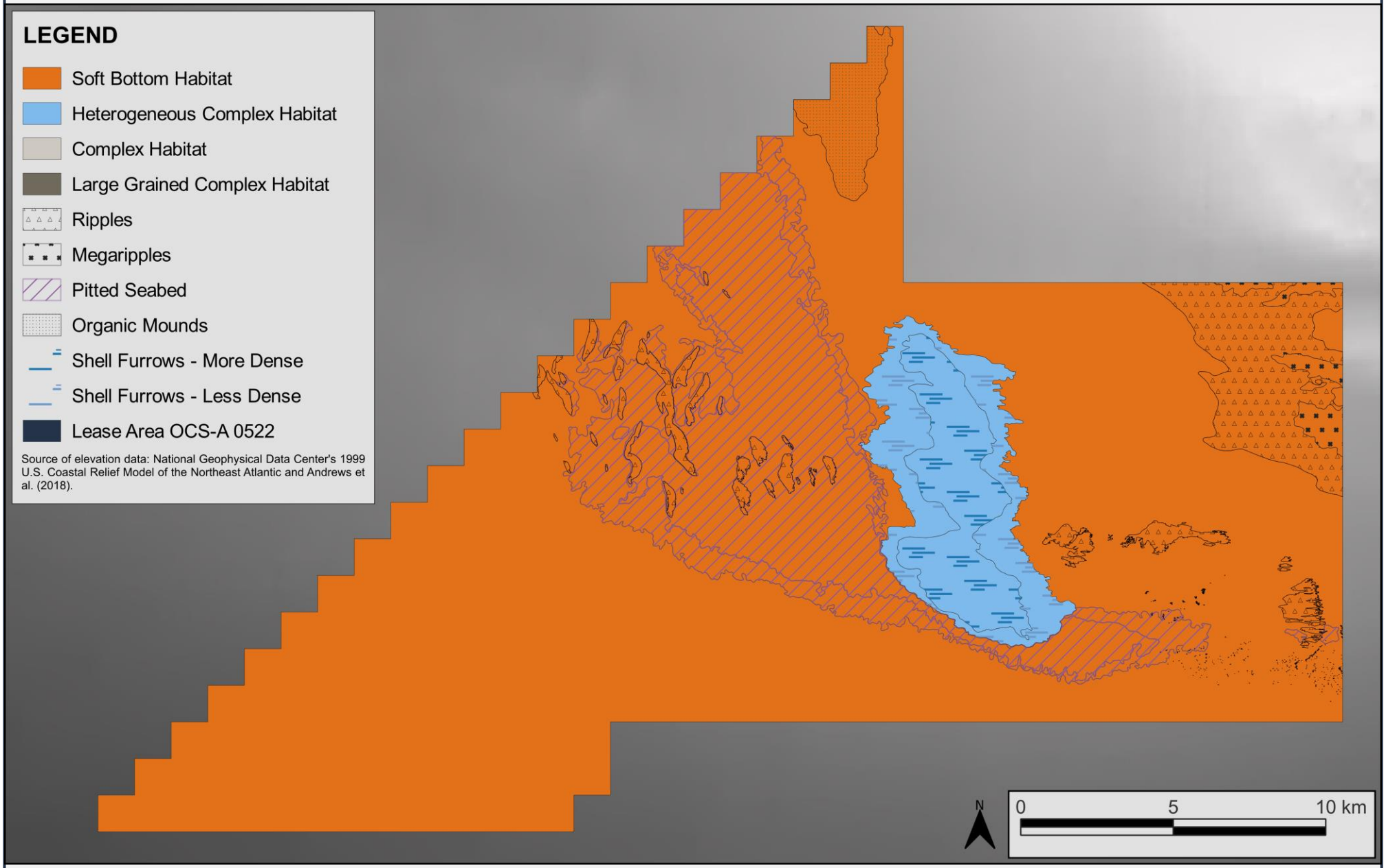


Figure 5.2-2
NMFS Habitat Mapping Lease Area

VINEYARD NORTHEAST
VINEYARD OFFSHORE

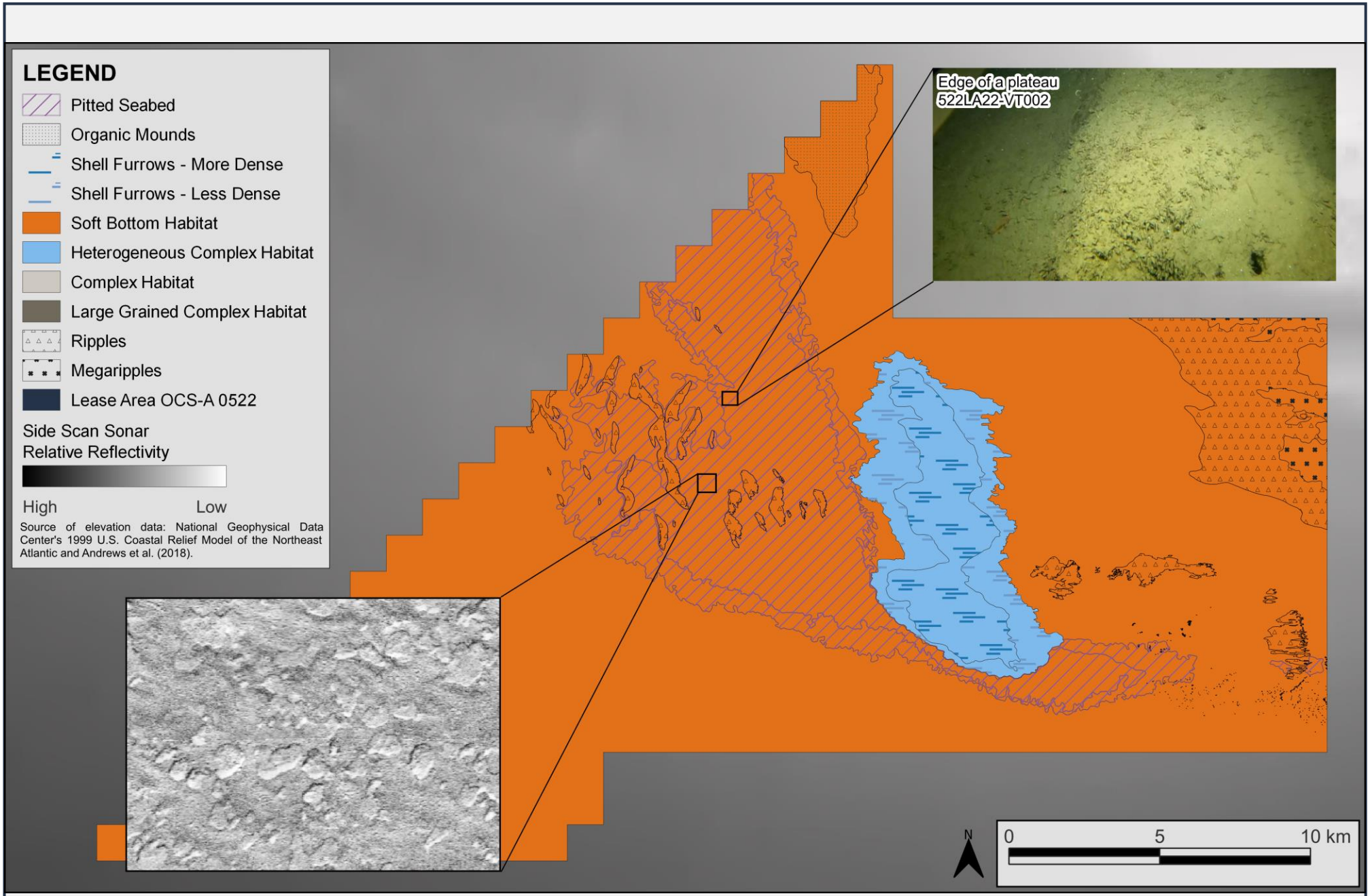


Figure 5.2-3
Pitted Seafloor Feature in the Lease Area

VINEYARD NORTHEAST
VINEYARD OFFSHORE

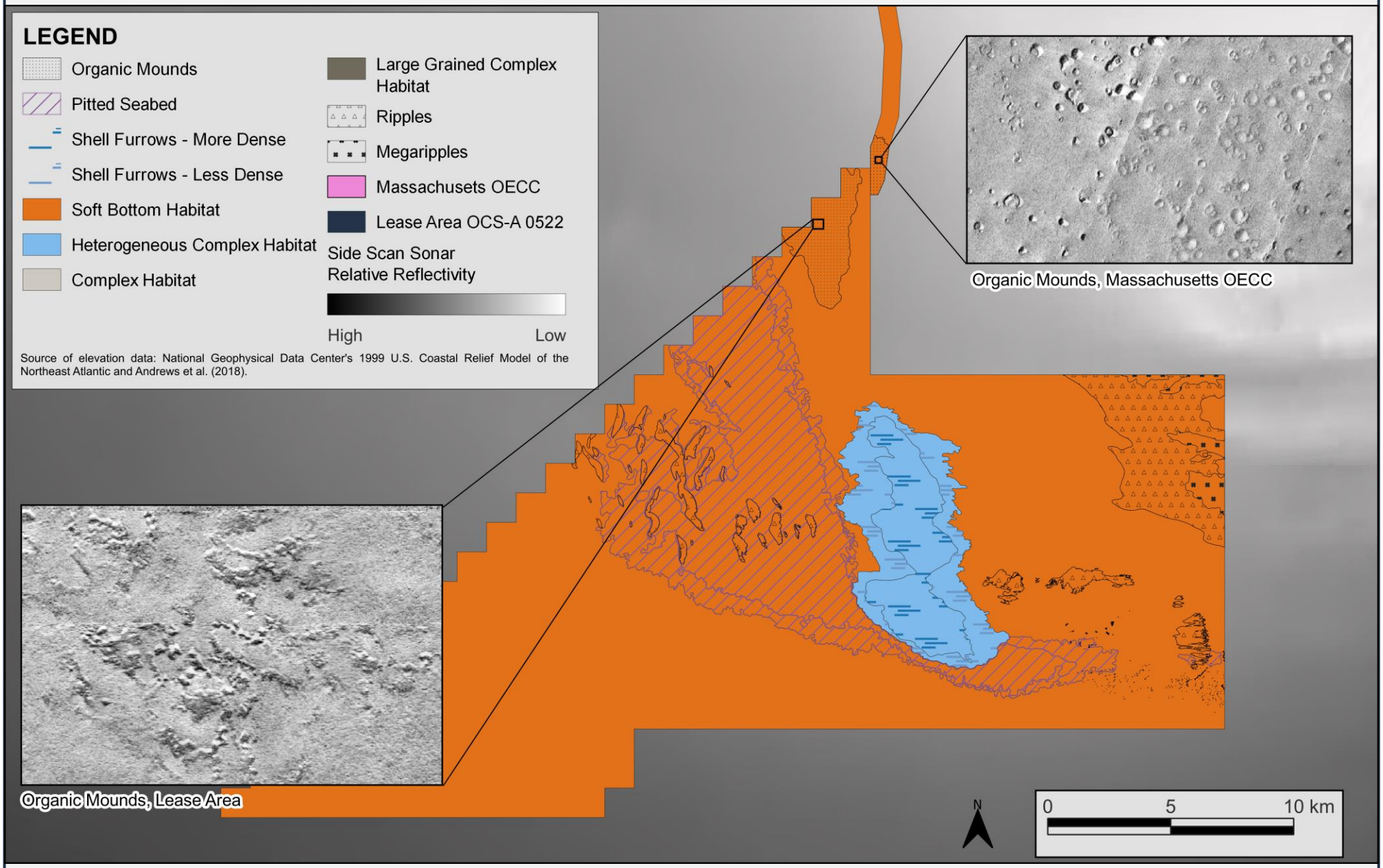


Figure 5.2-4
Organic Mounds in the Lease Area Compared to Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE

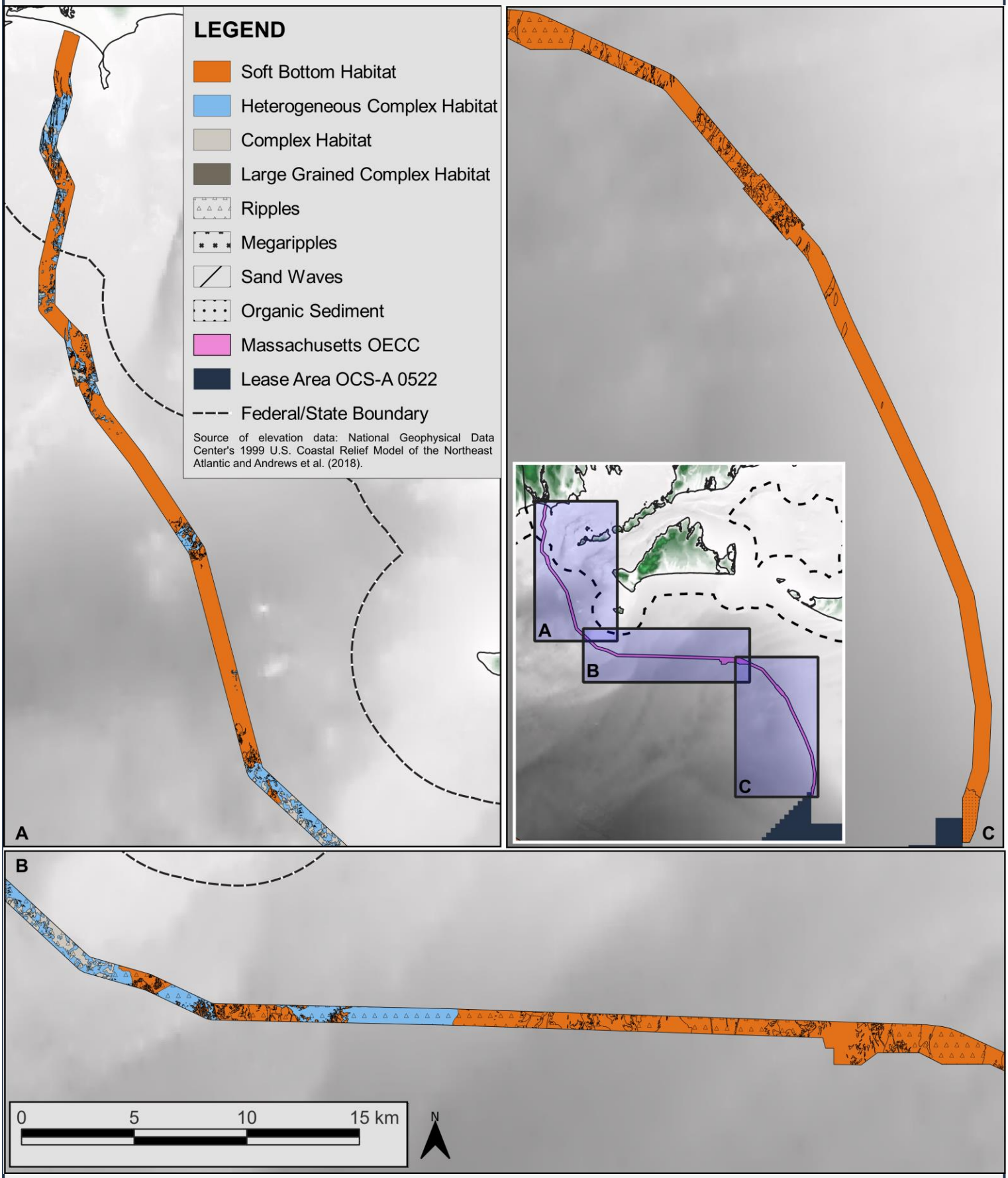


Figure 5.2-5
NMFS Habitat Mapping Massachusetts OECC

VINEYARD NORTHEAST
VINEYARD OFFSHORE

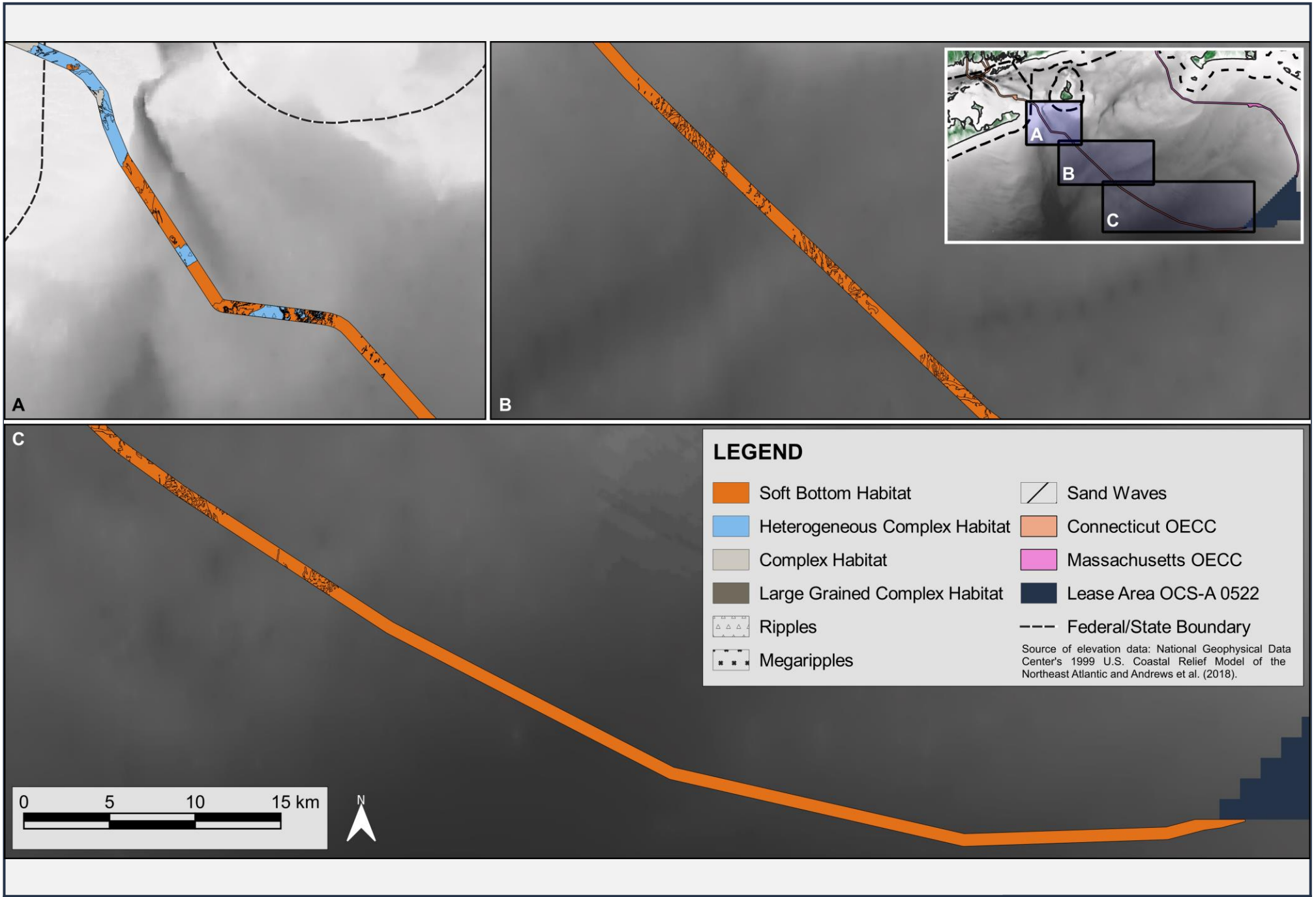


Figure 5.2-6a
NMFS Habitat Mapping Connecticut OECC Offshore

VINEYARD NORTHEAST
VINEYARD OFFSHORE

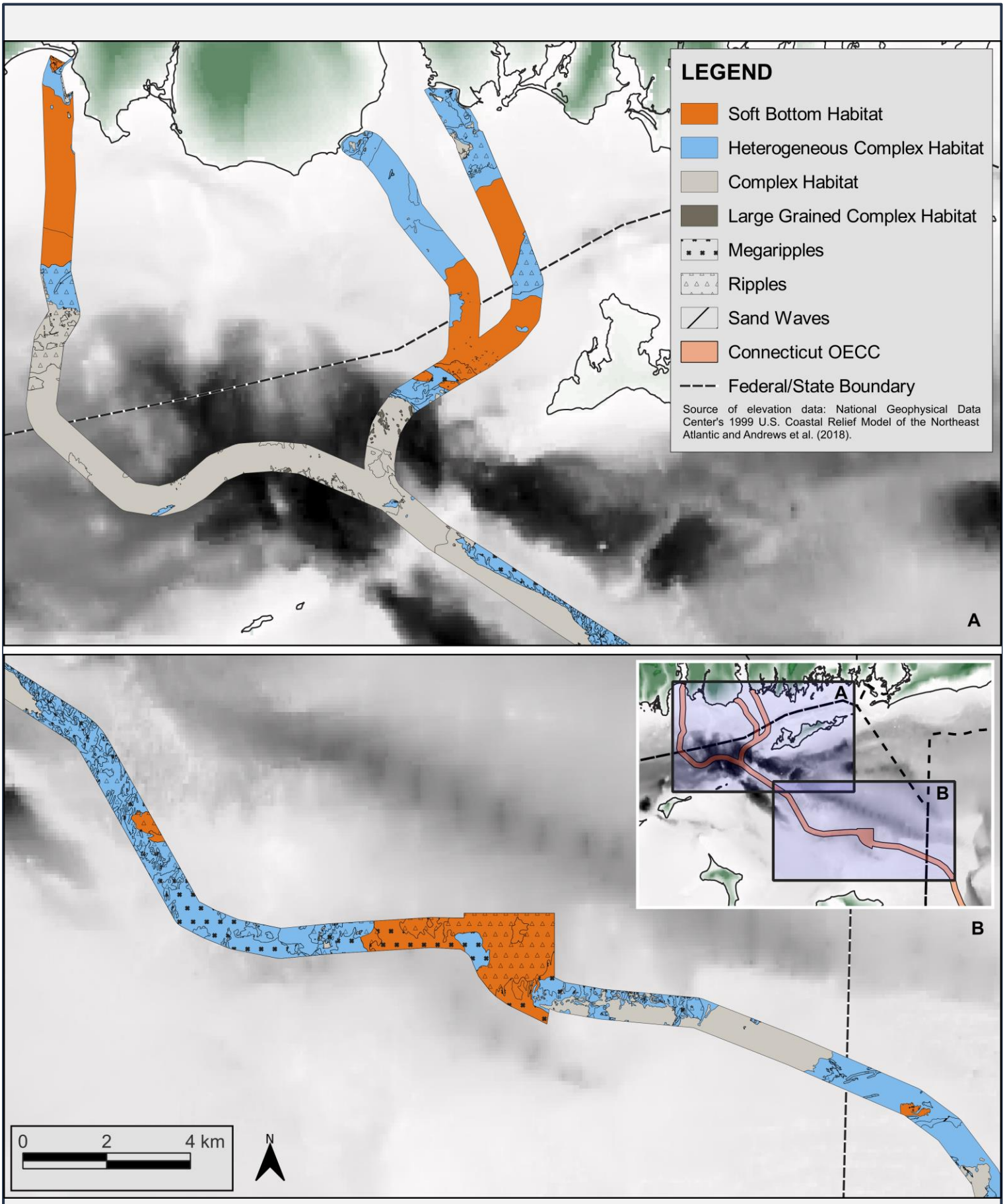


Figure 5.2-6b
NMFS Habitat Mapping Connecticut OECC Nearshore

VINEYARD NORTHEAST
VINEYARD OFFSHORE

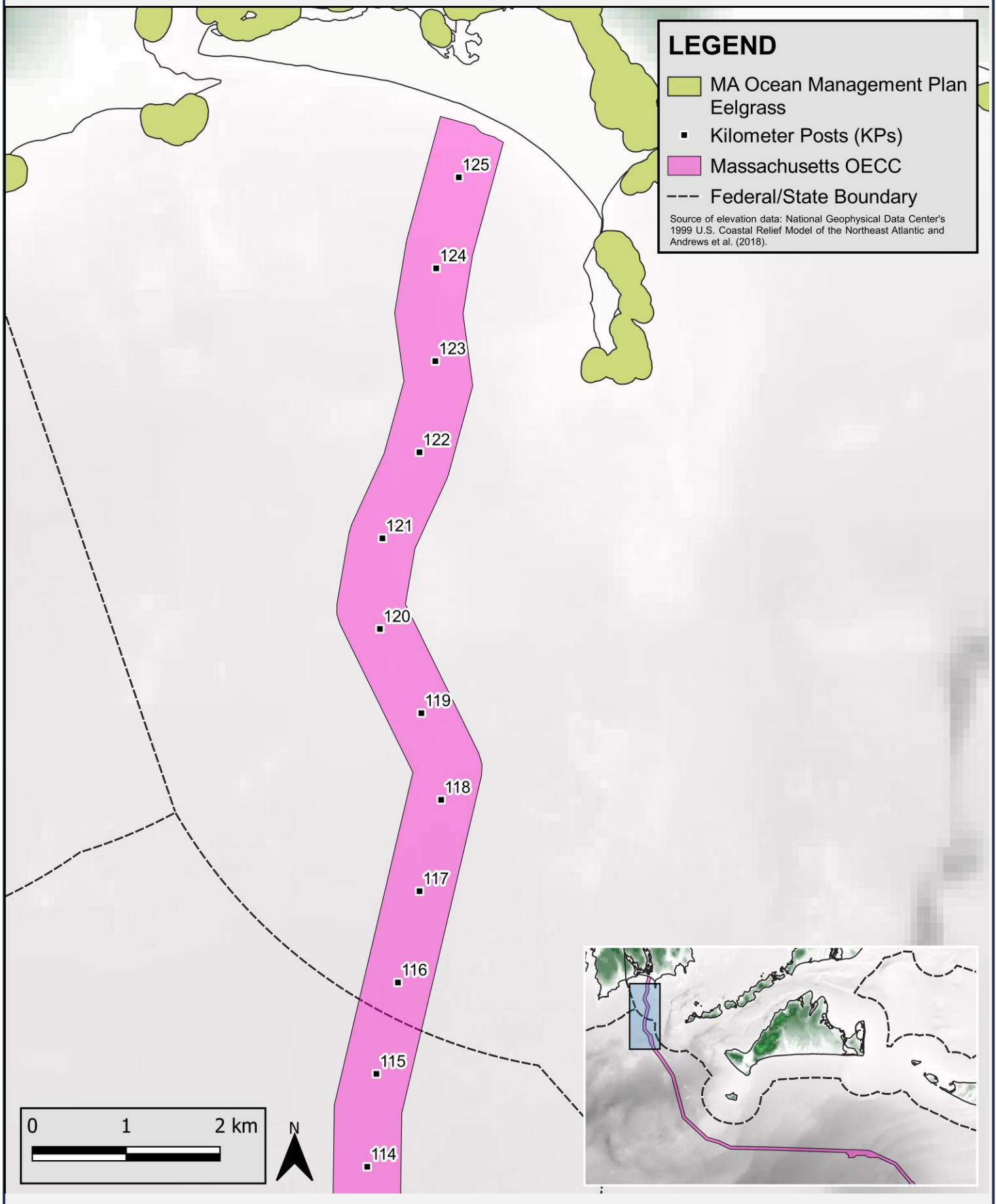


Figure 5.2-7
Massachusetts State Water SSUs Submerged Aquatic Vegetation

VINEYARD NORTHEAST
VINEYARD OFFSHORE

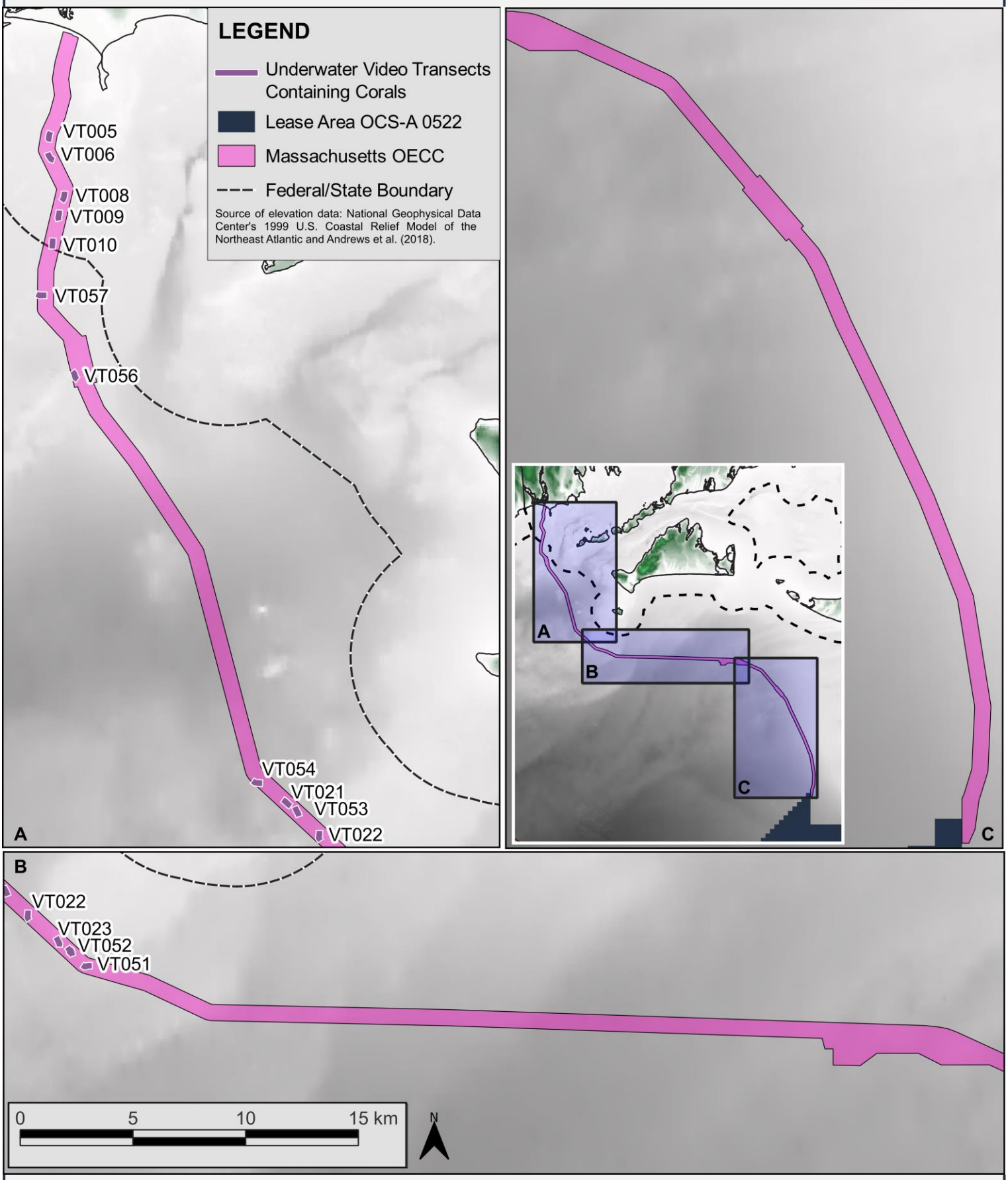


Figure 5.2-8
Massachusetts OECC Corals Detected in 2022 Field Survey

VINEYARD NORTHEAST
VINEYARD OFFSHORE

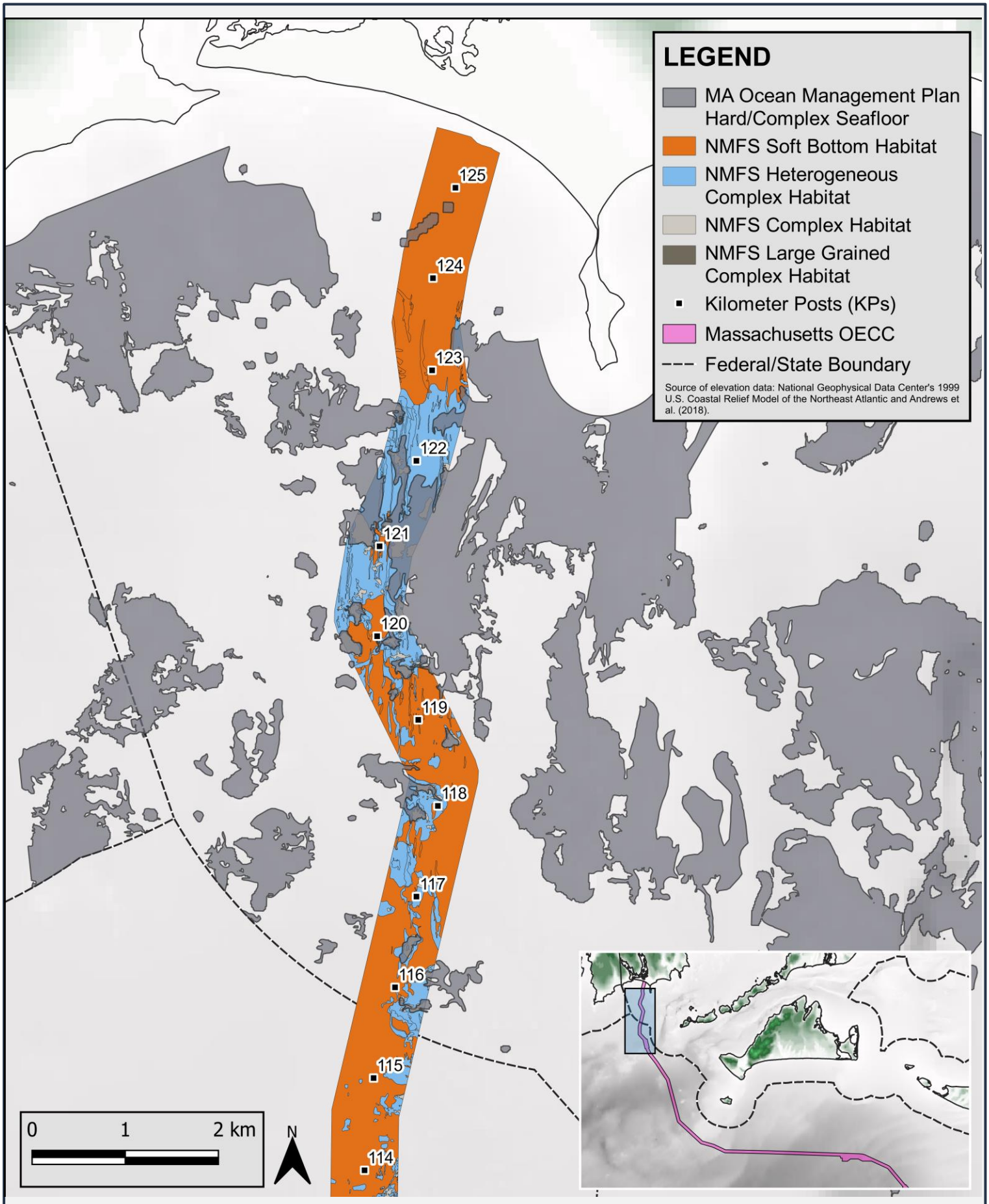


Figure 5.2-9

Massachusetts State Water SSUs Hard Bottom Compared to NMFS Habitat Classifications

VINEYARD NORTHEAST
VINEYARD OFFSHORE

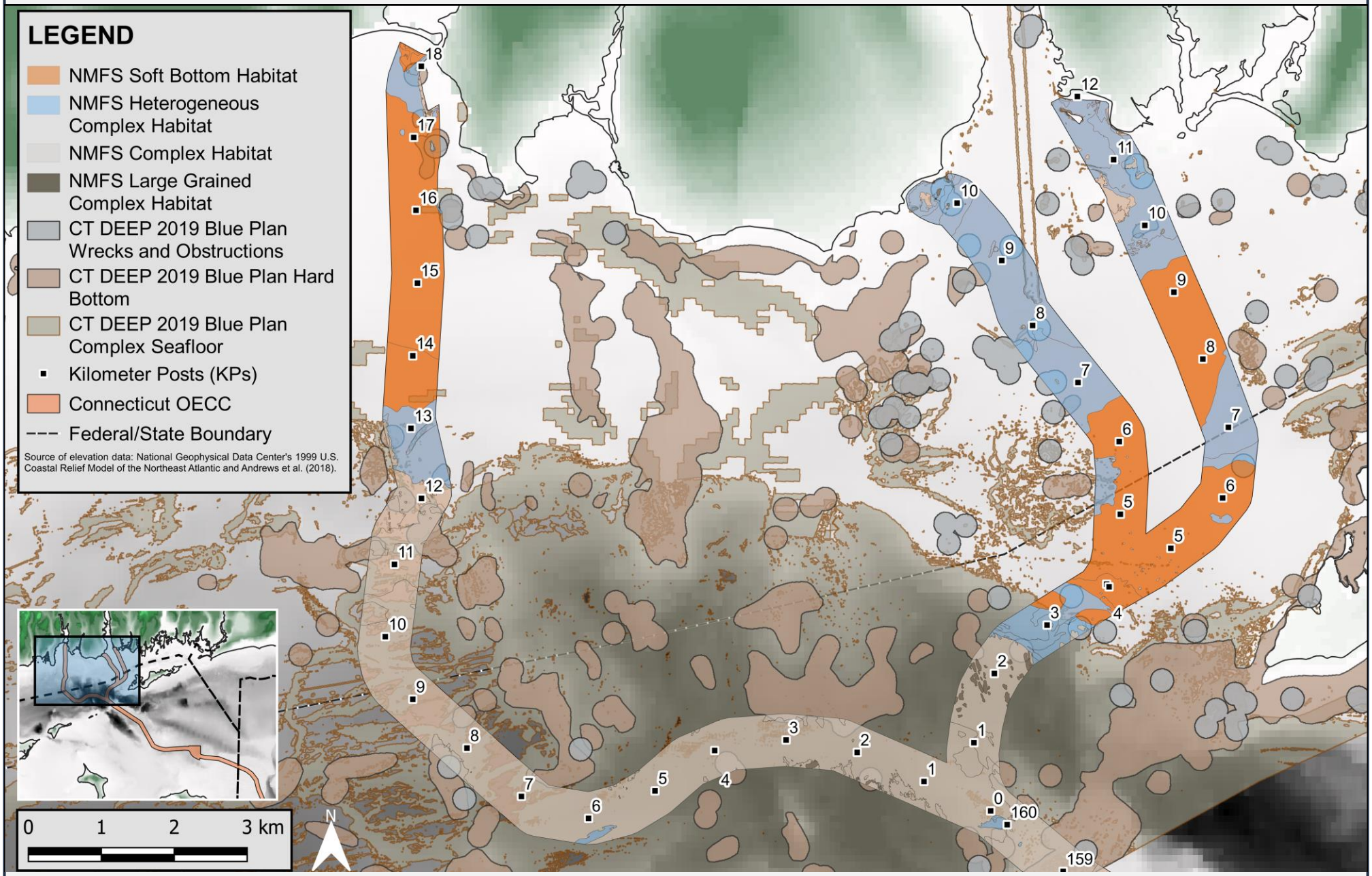


Figure 5.2-10

Connecticut State Water ESAs Hard Bottom, Complex Seafloor, and Wrecks Compared to NMFS Habitat Classification

VINEYARD NORTHEAST
VINEYARD OFFSHORE

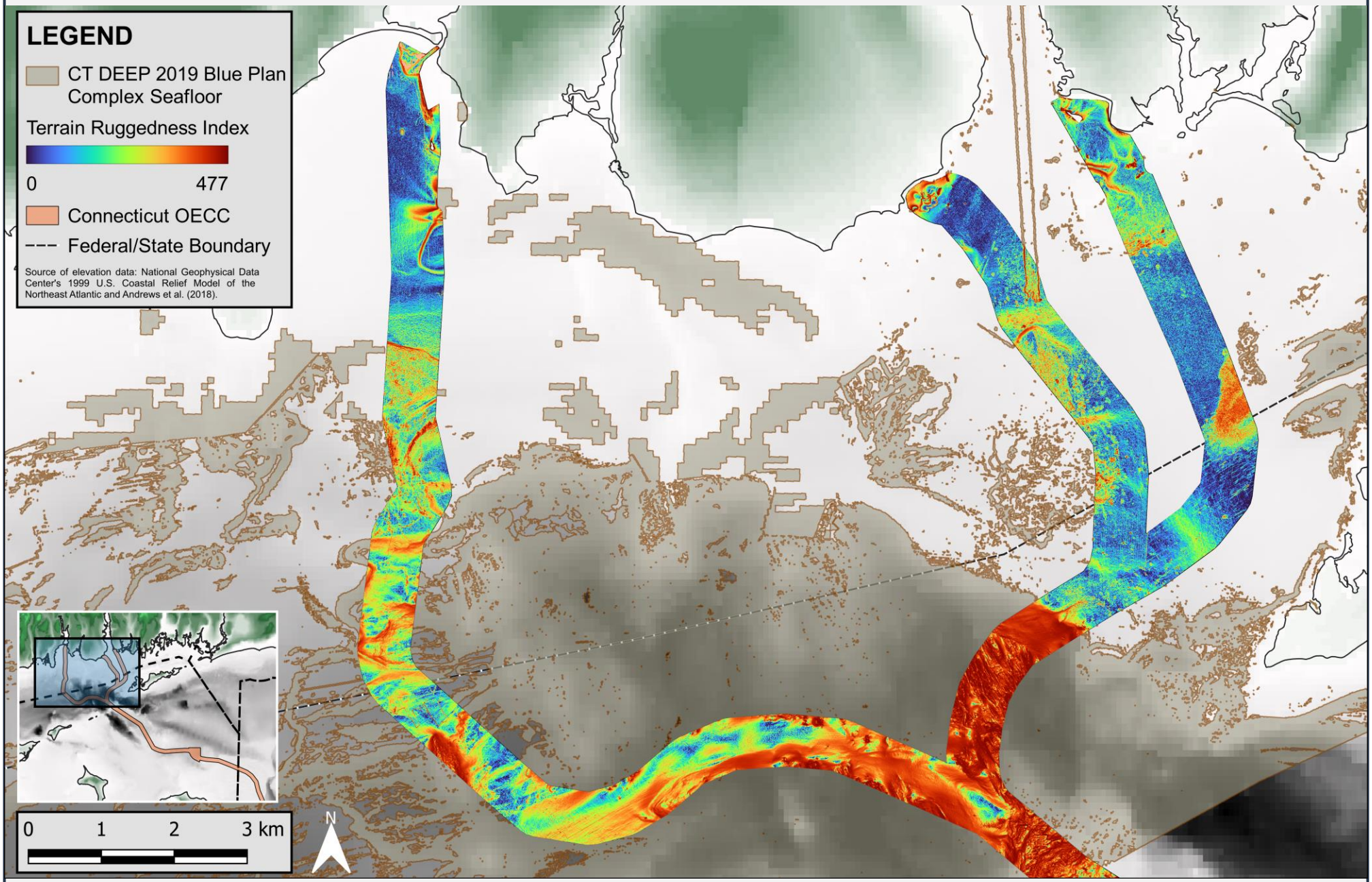


Figure 5.2-11
Connecticut State Water ESAs Complex Seafloor Compared to Terrain Ruggedness Index

VINEYARD NORTHEAST
VINEYARD OFFSHORE

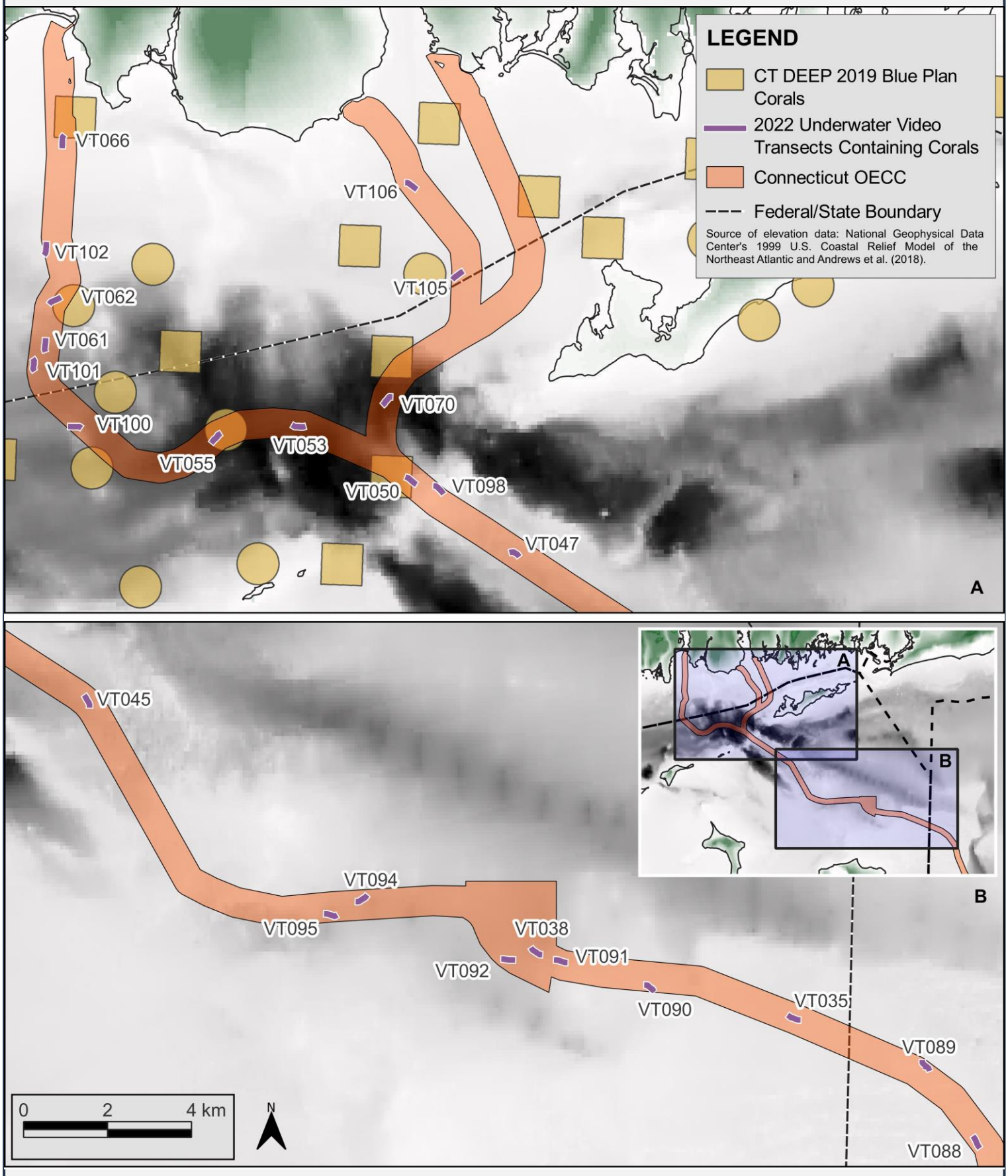


Figure 5.2-12

Connecticut State Water ESAs Corals Compared to Corals Detected in 2022 Field Survey

VINEYARD NORTHEAST
VINEYARD OFFSHORE

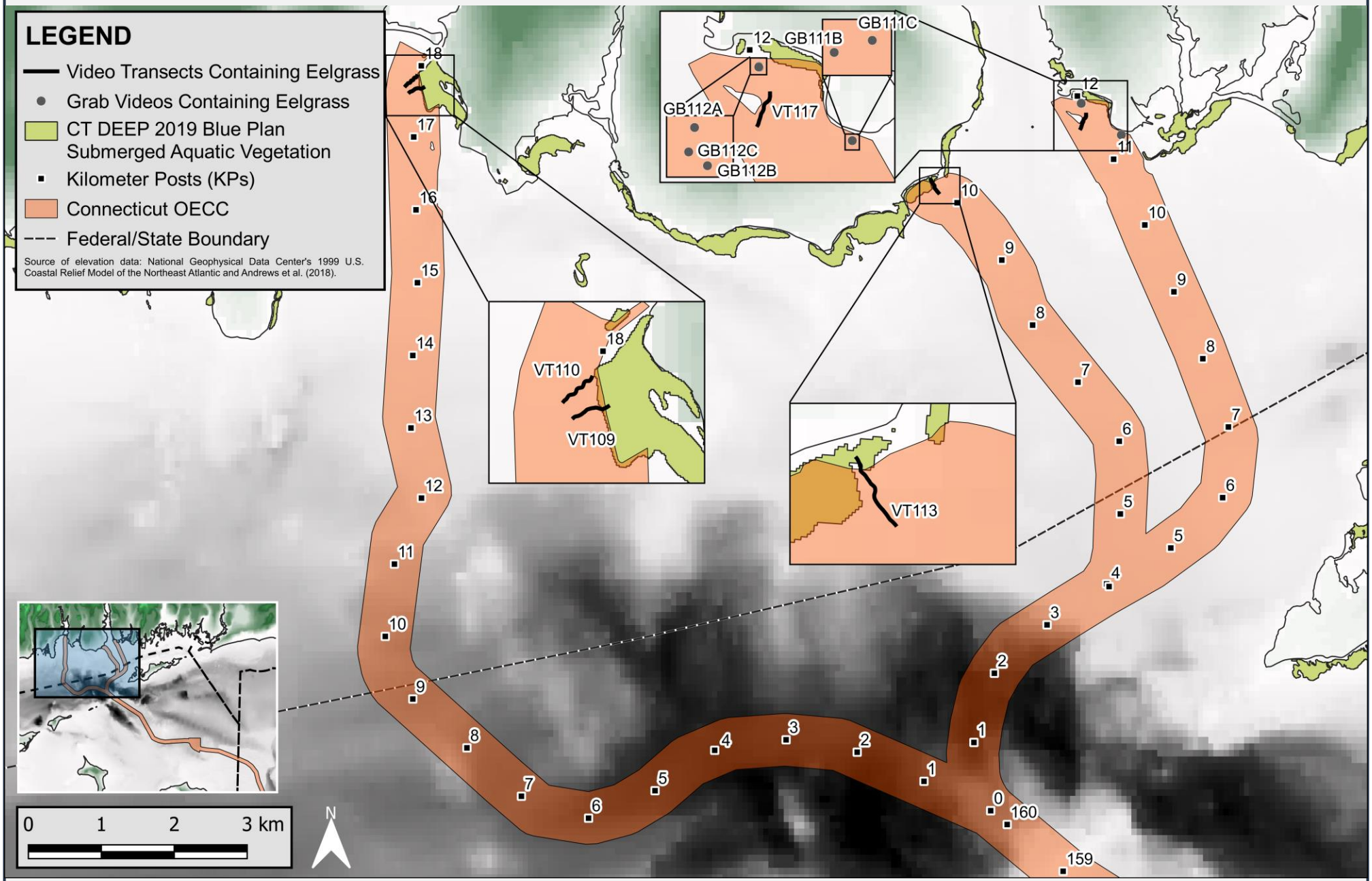


Figure 5.2-13
Connecticut State Water ESAs Submerged Aquatic Vegetation Compared to Eelgrass Detected in 2022 Field Survey

VINEYARD NORTHEAST
VINEYARD OFFSHORE

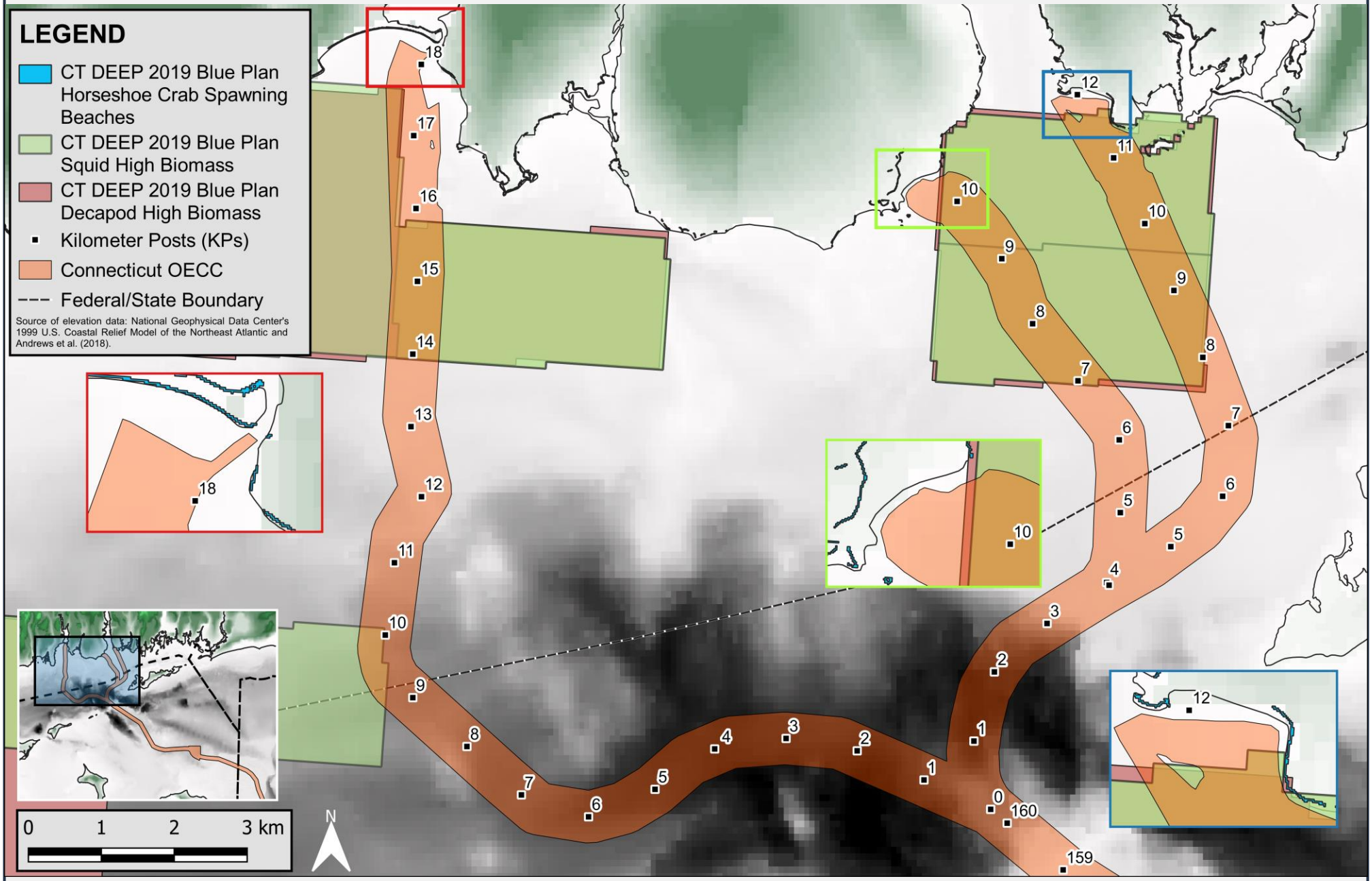


Figure 5.2-14
Connecticut State Water ESAs Mobile Invertebrates

VINEYARD NORTHEAST
VINEYARD OFFSHORE

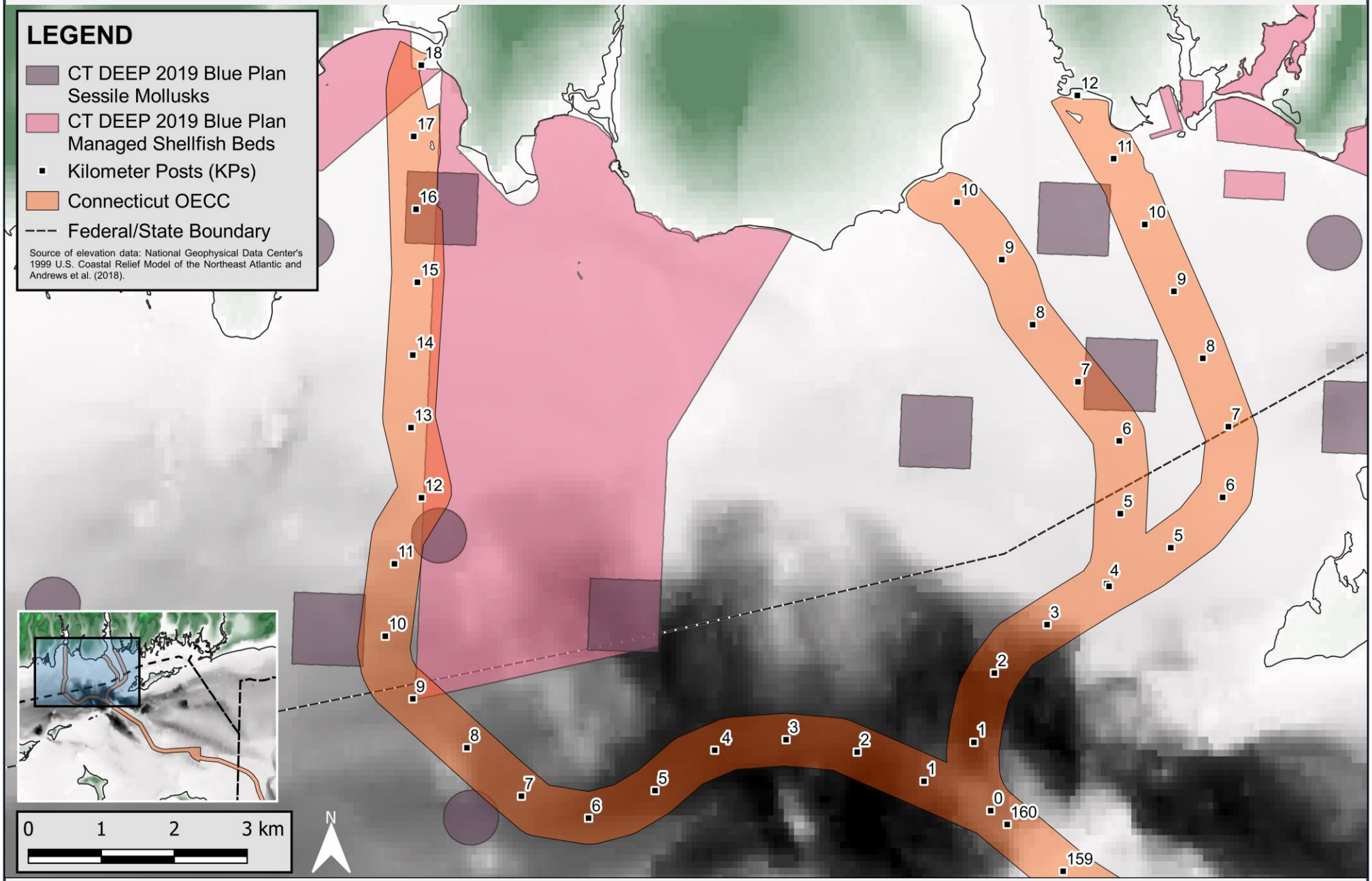


Figure 5.2-15
Connecticut State Water ESAs Mollusks Shellfish

VINEYARD NORTHEAST
VINEYARD OFFSHORE

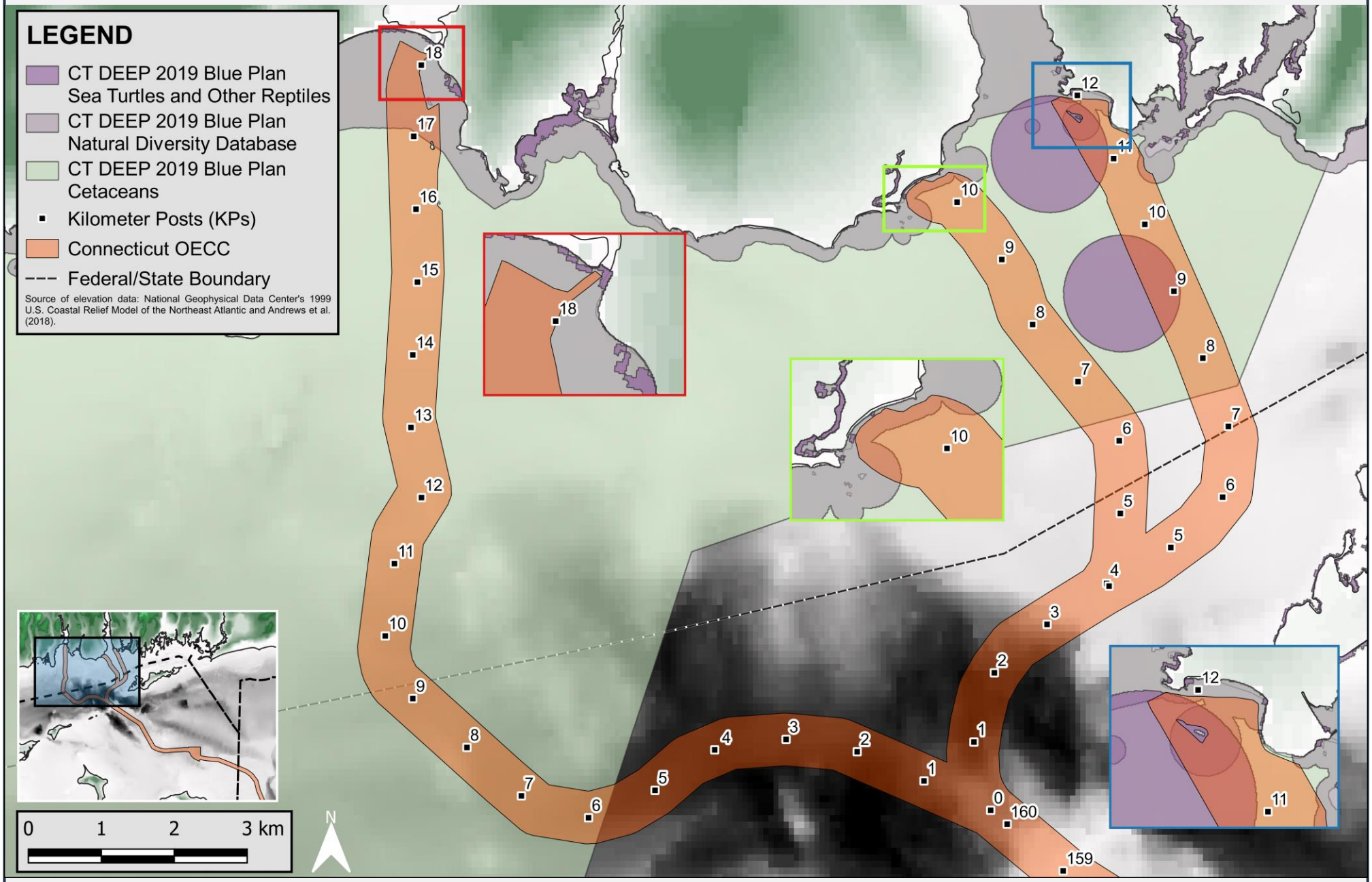


Figure 5.2-16
Connecticut State Water ESAs Cetaceans, Turtles, and Natural Diversity

VINEYARD NORTHEAST
VINEYARD OFFSHORE